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बालाजी श्रीवास्तव, भा.पु.से.
महानिदेशक

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FOREWORD

The Bureau of Police Research and Development was set up to identify the problems of Police forces operating in the country, conduct studies and research, and suggest effective solutions to overcome the issues. It has evolved as a multifaceted organization, taking a more direct and active interest in the matter, promoting speedy & systematic study of Police problems in a changed society and bringing about the rapid application of science & technology to the methods and techniques of Policing in the country.

2. Over the years, BPR&D has published numerous quality publications in various fields of police work and has emerged as a melting pot, as officers from across various Central Armed Police Forces & State police work together at the Bureau Headquarters to provide solutions to the problems faced by the law enforcement agencies and share the best practices being followed in police & prison work.

3. The Indian Police Journal is the flagship quarterly journal of BPR&D that publishes original articles, research studies, conceptual articles and theoretical overviews, to reflect the constantly changing landscape in which police personnel in the country operate.

4. This journal provides a platform for theory, research and practice to come together to advance all knowledge of different areas and diverse aspects of policing, by publishing contemporary articles written practitioners, academics and other contributors from different regional and national institutions and organisations providing a wide range of ideas, opinions and experience.

5. It has been the endeavour of the BPR&D to enrich its readers through well-researched articles on the umbrella theme of policing like administration, police and public relations, community policing, forensic and investigations, prison and correctional administration, etc. I hope that you will find these articles useful and would also continue contributing your valuable suggestions for further raising the standards of the IPJ.

(Balaji Srivastava)
Chief Patron

"Promoting Good Practices and Standards"

अनुपमा निलेकर चंद्रा, भा.पु.से.
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EDITORIAL

IPJ is a flagship publication of BPR&D dealing with subjects ranging from Policing, Police Administration and Management, Correctional Administration and Prison Management, forensics including digital evidence to sharing of good practices and standards among the police forces among others. In its own limited way, IPJ seeks to contemporize traditional policing wisdom with the tools of the day.

We have tried our level best to get the finest articles for an informational and educational standpoint from the serving officers, the retired officers, prison officers, judicial members, academicians, and other eminent personalities from law enforcement agencies.

The articles have covered a plethora of new and complex challenges for the forces to tackle along with the help of technology along with the traditional way of policing.

As always, it is a pleasure to introduce the latest edition of the IPJ. Our eminent contributors have authored several well researched articles on various subjects and I am happy to introduce them.

The article "Psychological Impact on Police during Covid-19 Lockdown in 2020 in Gujarat" talks about need to address the mental health of Police personnel, rationalize duty types and work towards overall improvement of health of Police personnel during COVID-19 and in general.

In the article "Practical Artificial Intelligence Applications for Indian Police", Shri Nisheeth Srivastava and Arvind Verma look into the potential for artificially intelligent systems in supporting the core policing functions of surveillance, patrolling, investigation and control.

The article "Demographic Profiling of Homicidal Death Cases in Raigarh Region", focuses particularly on the Raigarh region in Chattisgarh and presents findings of a detailed analysis of retrospective data base study of homicide cases.

"Promoting Good Practices and Standards"

In the article "Facial recognition in policing as a public policy: A study of various initiatives in India, the authors have tried to understand how Facial Recognition technology helps in policing and how it can be incorporated at various levels.

Ms. Nuti Namita's article, "Colonial Police in Madras Presidency: Shifting Priorities", is an informational piece about the policing strategy of the colonial government in the Madras Presidency.

The article "Combating Crimes by POC Model", talks about a model where occurrences of crimes could be effectively controlled by taking various precautionary measures.

In the article "Emerging Technology Threats and Preparedness for India", the author looks at the level of threat and preparedness of the Indian government, using the sources produced by the States and authorities.

Prof A.K. Saxena's article, "Continuous Professional Development Interventions- A Quest for Quality in Police", dwells upon need of looking beyond training interventions for the professional development of Police officers to make them more effective and efficient.
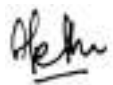
The article, "Suicide Pact and its Gender- Legal Perspectives", the authors have explained the prevalence and correlates of suicide pact and view it from a gender-legal perspective.

The article, "Challenges in Cyber Security: Some Solutions", aims to explain the concept of cybercrime and cyber security so that possible preventive techniques can be adopted to reduce cyber security threats.

In the article, "Emergence of Cyber Crime in India- Concepts and Anticipated Counter Response by Enforcement Agencies", the authors delve into reasons why cyber-crime is on the rise and recent steps taken by the Police to deal with cybercrimes.

The article "Leading the tough, gently: Helping the super heroes remain super through Mindful and Supportive Leadership", attempts to suggest some organisational level non-clinical psychological interventions, which may prove beneficial in ensuring psychological wellness resulting into effective policing and officer wellness.

I wish this publication will be useful to all stakeholders who aspire to bolster the functioning of the Police forces. I wish we will get your ongoing support in the future, Suggestions to improve are always desired.

Anupama Nilekar Chandra, ADG
Editor-in-chief

Contents

Psychological impact on Police during Covid-19 lockdown in 2020 in Gujarat

Dr. Lavina Sinha, IPS*
Chaitanya Mandlik, IPS**
Dr. Ankita Patel***

Abstract

COVID-19 has had a direct and indirect psychological effect on the Police personnel. This gets reflected in their health and ability to perform duty. There was a significant presence of stress and depression among Police performing COVID-19 duties. This was strongly related to the rank/ seniority, type of duty and working hours based on PHQ 9 (Patient Health Questionnaire 9) and Perceived Stress Scale scoring criteria. 14.4% participants had mild depression, 2.72% participants had moderate depression while 81.1% participants had low levels of stress and 18.9% participants had moderate levels of stress. Based on the fear of Covid-19 scale, it was discovered that 11.5 percent of participants were afraid of this disease. Based on these findings, there is a need to address the mental health of Police personnel, rationalize duty types and revisit duty roles and work towards overall improvement of health of Police personnel during COVID-19 and in general.

Keywords: *Psychological impact, Covid-19, lockdown, stress, depression, anxiety.*

Introduction

The world has been dealing with an epidemic of a unique infectious illness known as Coronavirus disease (COVID-19), which has spread swiftly over the world with the number of confirmed cases rising every day and has now been labeled a pandemic by the World Health Organization.[1] COVID-19 is caused by a novel, enveloped single-stranded RNA virus, Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2). Recent data shows that there are 6.27 mn cases of COVID 19 worldwide with 3,76,000 deaths. In India, 1,99,000 cases of COVID-19 with 5598 deaths due to COVID-19. In Gujarat, 16779 cases of COVID-19 have been reported till now with 1038 deaths. (COVID-19 tracker, on date 2nd June 2020) [2]

Author's Introduction:

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Fear is one of the characteristics of this infectious disease, which distinguishes it from other illnesses. Fear's transmission rate and medium (quickly and silently), as well as its morbidity and death, are all linked. This further leads to other psycho-social challenges, including stigmatization, discrimination, and loss. Dealing with this pandemic is not easy for anyone, but it's especially hard on first line warriors like Health care workers and Police forces. Some major concerns for first line warriors include: worry that they may carry the COVID-19 virus home and infect loved ones, the fear and uncertainty of a substantial risk of infection, unusually high and increasing demands to work longer hours, frequently changing guidelines from experts and leaders, widespread media coverage, lack of personal protective equipment, feelings of being inadequately supported and balancing their commitment to help others with an understandable dedication to safeguarding oneself and their loved ones. All these factors can affect their physical as well as mental health. Many studies have been done in the past about different psychological disturbances among the Police forces. Those studies especially focused on depression, suicides, coping mechanisms, occupation related stresses and burnouts related to it, etc. Studies on occupational stress have shown that Police officers are exposed to acute and chronic stressful events at work, which can result in impaired psycho-social well-being and physical health.

According to Gail Goolkasian and others, Stressors in Police work come into four types: "Internal tensions resulting from Police department procedures and policies, external stresses arising from the criminal, society at large and internal difficulties confronting individual officers."[3] Dr. Martin published the first study of Police officer stress, describing psychological effects of stress in Police officers, which divides the sources of Police stress into two broad categories: the nature of Police work and the nature of Police organizations. Constant exposure to risk, facing the unknown, addressing animosity, and making decisions in constantly changing, unexpected settings all fall under the first group of stresses. In the second category, stressors include the quasi-military structure of Police organizations, competition for promotional opportunities, disagreeable job assignments, and varying tours of duty.[4]

Policing is a mentally demanding job that involves risk, high expectations, uncertainty in work contacts, human suffering, and death. According to a decade of research on Police officers, the stresses they face put them at risk for high blood pressure, sleeplessness, higher levels of damaging stress hormones, cardiac issues, post-traumatic stress disorder, and suicide.[5] Research suggests that the suicide rates among Police are at a higher rate than other groups and also demonstrates high rates of divorce and reduced quality of family life among Police.[6] The amount of negative implications on an individual as well as the Police department, which is frequently disregarded, makes Police occupational stress a major concern. In the same study, one-fourth of the participants reported

as having high levels of psychological distress.[7] A study by Johnson et al. (2005) found that Police was one of the six professions where high stress leads to maximum impact in terms of poor health and low job satisfaction. Suicide has been on the rise in recent years as a result of the Police force's physical and psychological challenges. The rising percentage of suicides is simply due to higher levels of stress among Indian Police officers, which is also a severe problem. Stress is a multifaceted phenomenon with many elements.[8] According to a study by Mathur P, he found out that there were few job related factors among Indian Police personnel which act as specific stressors. Inadequate equipment, fear of serious harm, working conditions, anti-terrorist operations, lack of recognition, getting murdered while on duty, job overload, shooting someone in the line of duty, tackling the public, lack of job satisfaction and Police hierarchy are just a few examples.[9]

Working as the front line warriors in a particular situation like COVID-19 pandemic is a very different experience than their routine work. As a first responder, they already have enough for worrying on a regular basis, but knowing that you are daily entering in a potentially risky health environment is a new kind of stress. So to maintain an adequate workforce and to maximize the ability of Police forces to face this pandemic, they need to be assessed for the physical and psychological impact of this crisis and then help in those areas, which are disturbed.

Problem Statement

There has been a significant psychological impact on Police personnel during Covid-19 lockdown in 2020. This psychological impact is the effect caused by environmental factors (work and work environment), social factors as well as biological factors (COVID-19) on the Policemen and women, including some manifesting stress, anxiety and depression. During the first COVID wave, the Government of India had announced a nationwide lockdown from 25 March 2020 till May end, thereafter gradual unlocking after which easing of restrictions started.

The Police personnel faced a lot of mental difficulties, fear and psychological issues majorly due to COVID, and partly due to the nature of duty they were made to do. This adversely affected their health and also performance.

Objectives of The Study

-    To assess the psychological impact of COVID-19 pandemic on Police officers, as well as the duties during a lockdown.

-    To study the prevalence of stress, anxiety, depression and fear of Corona among the Police officers.

-    To study the relation of the nature of job, rank, duty hours, work areas and other work related factors with that of the stress and depression.

-    To study the correlation of depression and socio-demographic factors.

Methodology

Tools and technique for data collection

A proforma was used in the study, which was filled by each participant after being explained the form. The proforma contained socio-demographic details, personal bio data, past history, disease condition if any and if on treatment.

Three questionnaires were used in the study: The Patient health questionnaire (PHQ 9), Cohen's perceived stress scale (PSS) and fear of COVID-19 scales. Their translated Gujarati versions were used as the local language is Gujarati. PHQ 9 is readily available in different languages including Gujarati. PSS and Fear of Covid-19 scales were translated in Gujarati with the help of two senior psychiatrists, who have had their education in both languages and are also fluent in both English and Gujarati language.

PSS[10]: The Perceived Stress Scale (PSS) is the most widely used psychological instrument for measuring the perception of stress. PSS scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items. Individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress. Scores ranging from 0-13 would be considered low stress. Scores ranging from 14-26 would be considered moderate stress. Scores ranging from 27-40 would be considered high perceived stress.

Fear of Covid-19 scale[11]: The Fear of COVID-19 Scale is a seven-item unidimensional scale with robust psychometric properties. Initial psychometric results indicated that the FCV-19S had good properties from different types of testing (i.e., CTT and Rasch analysis). Furthermore, the total score of the summed-up elements might reflect the severity of COVID-19 phobia. Higher total FCV-19S scores suggest a greater fear of COVID-19.

PHQ 9[12,13]: The PHQ-9 is a nine-question instrument used to screen patients for the presence and severity of depression in primary care settings. It assigns a score of "0" (not at all) to "3" (extremely severe) to each of the nine DSM-IV criteria (nearly every day).A PHQ-9 score ≥10 has a sensitivity of 88% and a specificity of 88% for major depression. PHQ-9 scores of 0-4, 5-9, 10-14, 15-19, 20 indicate none or minimal, Mild, Moderate, Moderately severe and severe severity, respectively.

Different psychological parameters like stress, fear and depression were assessed in all participants. Comparison between different parameters like type of work allotted; socio-demographic data, personal history and severity of psychological disturbances were done.

Sample of study and data collection

All Police personnel - constables, head constables, assistant sub inspectors, Police sub inspectors, Police inspectors,

Lok Rakshak, ex-military, home guard etc. – a total of 600 people from Sabarkantha district of Gujarat state of India, were briefed about the study and invited to participate in the study.

Procedure of data collection

The research only included those who were willing to participate. 514 of them agreed to take part in the research and were therefore included in the study.

Their permission was obtained, and they were given a detailed explanation of the proforma that was handed to each of them to fill out on their own. For analysis, all of the data collected in respective forms was utilised.

Statistical Tool

SPSS 20.0 version was used for statistical calculations.

All the collected data was converted into categorical variables. Correlations between different parameters like socio-demographic variants, job related variants, personal history and psychological disturbances like perceived stress, depression and anxiety were analyzed using chi square test. P value was assumed to be significant at <0.05.

Analysis and Interpretation of Data

Out of 600 Police personnel, some were not willing to give consent while some had submitted incomplete proformas. Thus, 514 personnel were included in the study and their data from the filled proformas was used for analysis. Thus, the response rate for participation was 85.67%. Majority of participants (71.98%) were below the age of 40 years. 403 male Police personnel and 111 female personnel took part in the study.

On the PSS scale, 417 (81.1%) participants reported having low levels of stress and 97(18.9%) reported moderate levels of stress. Stress on PSS significantly correlated with rank of Police personnel and the working area. Lower the rank of Police personnel, significantly higher levels of stress were reported. Stress level was significantly higher in Police personnel who were working at the check post/naka points created and also in those whose area of work changed frequently.

On PHQ-9, 74 (14.40%) personnel were found to have mild depression and 14 (2.72%) participants had moderate depression. The association of work area of the personnel and depression was found to be statistically significant. Depression was significantly higher in Police personnel who were posted at check post and whose working area was changing frequently.

The correlation between Stress and Depression was also found to be statistically significant, with P value of P<0.0001. While stress and depression were not significantly correlated with any other variable.

On Fear of COVID-19 scale, 59 (11.5%) participants agreed with the statement that 'they are most afraid of Corona.

TABLES

Table 1 a: Stress and socio-demographic factors

Socio-demographic and personal factors		Total (n=514) Low	Stress on PSS		Chi square and p value
			Moderate		
Age	21-30 years	195	161	34	Chi – 3.06 P = 0.38
	31-40 years	175	146	29	
	41-50 years	99	75	24	
	51-60 years	45	35	10	
Gender	Male	403	323	80	Chi- 0.89 P=0.34
	Female	111	94	17	
Religion	Hindu	504	409	95	Chi = 4.65 P= 0.09
	Muslim	9	8	1	
	Christian	1	0	1	
	Others	0	0	0	
Marital status	Single	78	63	15	Chi = 0.70 P=0.87
	Married	433	351	82	
	Divorced/ Separated	1	1	0	
	Widow/widower	2	2	0	
Family types	Nuclear	64	55	9	Chi =0.77 P =0.37
	Joint	450	362	88	
H/O Physical illnesses	None	491	400	91	Chi =1.3 P=0.72
	Cardiac Illness	18	13	5	
	Respiratory illnesses	1	1	0	
	Diabetes	4	3	1	
P/H/O psychiatric illness	Yes	9	8	1	Chi= 0.029 P=0.86
	No	505	409	96	

Table 1 b: Stress and personal and work related factors

Work related details		Total (n=514) Low	Stress on PSS		Chi square and p value
			Moderate		
Designation (Rank)	Constable, Head constable, Lok Rakshak	303	260	43	Chi= 10.56 P=0.005
	PI,PSI,ASI	19	14	5	
	Ex-Army, TRB, Home Guard	192	143	49	
Work experience	<1 YEARS	56	43	13	Chi=3.88 P= 0.27
	1-5	144	120	24	
	6-10	118	101	17	
	>10	196	153	43	
Duty hours/ Day	8 HOURS	46	38	8	Chi= 1.1 P=0.58
	12	446	363	83	
	>12	22	16	6	
Working area	Headquarter	39	32	7	Chi= 15.85 P=0.0012
	Check post	351	276	75	
	Police station	120	108	12	
	Changing	4	1	3	
	Yes	512	416	96	
ADDICTION	No	477	388	89	Chi=0.051 P=0.82
	Yes	37	29	8	

Table 2 a: Depression and socio-demographic factors

Socio-demographic and personal factors		Total (n=514) None	Depression on PHQ 9			Chi square and p value
			mild	moderate		
Age	21-30 years	195	166	25	4	Chi= 6.7 P= 0.34
	31-40 years	175	148	21	6	
	41-50 years	99	76	19	4	
	51-60 years	45	36	9	0	
Gender	Male	403	330	61	12	Chi-1.3 P=0.50
	Female	111	96	13	2	
Religion	Hindu	504	417	73	14	Chi= 7.8 P=0.098
	Muslim	9	9	0	0	
	Christian	1	0	1	0	
	Others	0				
Marital status	Single	78	65	12	1	Chi =1.39 P=0.96
	Married	433	358	62	13	
	Divorced/Separated	1	1	0	0	
	Widow/widower	2	2	0	0	
Family types	Nuclear	64	55	8	1	Chi=0.62 P=0.73
	Joint	450	371	66	13	
H/O Physical illnesses	None	491	408	69	14	Chi=2.04 P=0.91
	Cardiac Illness	18	14	4	0	
	Respiratory illnesses	1	1	0	0	
	Diabetes	4	3	1	0	
P/H/O psychiatric illness	Yes	9	8	1	0	Chi=0.36 P=0.84
	No	505	418	73	14	

Table 2 b: Depression and personal and work related factors

Work related details		Total (n=514) None	Depression on PHQ 9			Chi square and p value
			Mild	moderate		
Designation (Rank)	Constable, Head constable, Lok Rakshak	303	260	38	5	Chi=8.35 P=0.08
	PI,PSI,ASI	19	14	5	0	
	Home guard, Ex-Army, TRB	192	152	31	9	
Work experience	<1 YEARS	56	47	7	2	Chi-1.83 P=0.93
	1-5	144	120	20	4	
	6-10	118	101	15	2	
	>10	196	158	32	6	
Duty hours/ Day	8 HOURS	46	40	6	0	Chi −=1.76 P=0.78
	12	446	368	65	13	
	>12	22	18	3	1	
Working area	Headquarter	39	34	5	0	Chi=20.18 P= 0.0026
	Check post	351	284	54	13	
	Police station	120	107	13	0	
	Changing	4	1	2	1	
ADDICTION	No	477	395	70	12	Chi =1.41 P=0.49
	Yes	37	31	4	2	

Table 3: Correlation between PSS and PHQ 9

Depression on PHQ 9	Stress on PSS		Chi Square and P value
	Low	Moderate	Chi =349.7
None	408	18	
Mild	9	65	P<0.0001
Moderate	0	14	

The correlation between Stress and Depression was also found to be statistically significant, with P value of P<0.0001

Table 4: Fear of Corona scale

No	Statement	Response				
		Strongly disagree	disagree	Can't say	agree	Strongly agree
1	I am most afraid of Corona	452 (87.9%)	3(0.6%)	0	55 (10.7%)	4 (0.8%)
2	It makes me uncomfortable to think about Corona	490 (95.3%)	5 (1%)	0	17 (3.3%)	20 (0.4%)
3	My hands become clammy when I think about Corona	507 (98.6%)	6(1.2%)	0	1 (0.2%)	0
4	I am afraid of losing my life because of Corona	502 (97.7%)	5(1%)	0	6 (1.2%)	1 (0.2%)
5	When I watch news and stories about Corona on social media, I become nervous or anxious.	505 (98.2%)	5 (1%)	0	4 (0.8%)	0
6	I cannot sleep because I'm worrying about getting Corona.	507 (98.4%)	2 (0.4%)	1 (0.2%)	3 (0.6%)	1 (0.2%)
7	My heart races or palpitates when I think about getting Corona.	509 (99%)	3(0.6%)		2 (0.4%)	0

Thus 59 (11.5%) participants agree with the statement that 'they are most afraid of Corona.

Recommendations

There is a definite increase in stress and depression which is directly proportionate to the seniority rank among the Police Personnel. Thus as one climbs up the hierarchal ladder in the Police force, there is

an increase in responsibility, accountability and risks of punitive action in terms of reprimands, suspension, departmental inquiries, salary cuts, demotion and departmental proceedings. With the new nature of work and responsibility in a never before encountered situation such as "NATIONWIDE LOCKDOWN", these responsibilities were even more and hence led to work load and work stress. This increased with seniority. Thus there is a need to evaluate the reasons other than COVID for stress and depression and address them on a regular basis so that such untoward emergencies do not increase these beyond a point.

1). Also, proper training in de-stressing techniques - meditation/yoga/music – needs to be given to all, as well as time, facility and opportunity needs to be provided for practicing these regularly.

2). As there is a significant co-relation between the area of work and stress and depression i.e. the more uncertain area of work with more outdoor shifts; there is more stress and depression. This suggests the need for better facilities for creation of check posts, with a basic SOP (Standard Operating Procedure) for creation of such check posts/ naka points. These are very routinely created in emergencies such as natural calamities, epidemics/ pandemics e.g. COVID 19, law and order matters, riots as well as bandobast duties. The health risks due to lack of basic facilities – water, food, pandals or roof shelters from heat/ rain/storms increased manifold during COVID, as there was also the risk of contracting the Coronavirus infection. Hence, formulation of an SOP for such duty roles and compliance of these guidelines will help in allying the fear of forces, who are otherwise left to arrange for themselves and thus improving their duty performance.

3). Nature of Duty: Rotation of duties, some fixed duty hours and assigned roles with weekly offs although found impossible in Police Department, being an emergency department, is the need of the hour.

4). Health and fitness: There is a tough fitness criterion for selection into Police forces and thereafter a rigorous training that ensures they are fit at the time of starting careers. With age, work stress, odd working hours, no fixed diet and eating schedules, unhealthy eating habits, addictions, and with increasing seniority, sedentary lifestyle the health and fitness deteriorates. Thus they become more susceptible to infections/ diseases during emergencies such as COVID.

Thus, there is a need to have a mechanism to ensure regular fitness e.g. Compulsory gym breaks/hours, monthly health check-ups, in-house trainers, gym facilities, dieticians. Health cafeterias, barracks for resting within the Police station with exercise and/or games area (e.g. volleyball) and daily attendance at these should be linked with attendance and leaves.

5). Mental health: is of essence and most neglected in the forces. Apart from physical health monitoring, there is a need for psychological evaluation at regular intervals. Facility tie-ups with de-addiction centers, psychiatrists, psychologists, counselling centers should be made available at a low cost or without cost. The need for such help should not be seen as a 'taboo' and should be encouraged.

6). Promotions and postings should be linked to health outcomes. Change in Police sub-culture especially at the Police station level where time-offs, breaks for exercise or rest, and weekly offs are taken positively as a necessity rather than as a sign of insincerity/lack of enthusiasm for work among Police personnel.

Conclusion

This study was aimed to look at the psychological impact of COVID-19 lockdown on the Police and it clearly brings out the fact that there were increased levels of stress and depression among Police personnels. The nature and role of Police changed manifolds due to the unprecedented nature and magnitude of the Pandemic. The Police personnel are trained for emergencies and working at odd hours, in difficult circumstances, however, the fear of contracting this virus which seemed omnipresent (spread through air as well as fomites) and lack of scientific knowledge about it, nor cure, added to the dilemma. The significant levels of stress, depression, their positive co-relation with the duty type,

rank, duty hours suggest an imperative need to bring about systemic changes in the way of the Police work. This will ensure a healthy Police force during regular times as well, which will be better equipped to take up challenges such as COVID lockdown and others.

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Practical Artificial Intelligence Applications for Indian Police

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Abstract

In this article, we briefly survey the potential for artificially intelligent systems in supporting the core policing functions of surveillance, patrolling, investigation and control. It also describes applications of such systems for improving organizational efficiency and accountability in the Indian Police system, using already available data within Police records. We present, in support of these prescriptions, case examples of ML-based systems that have been developed at IIT Kanpur over the past three years in support of these functions. Based on the gap identified between technology readiness levels and Police requirements, we further argue that Police agencies need academic partners in adopting such systems and describe the setting up of a research center at IIT-K to promote research on Criminal Justice issues and to work closely with Police agencies. We conclude with a pragmatic appraisal of the limitations of artificially intelligent systems in supporting Police functions and present a roadmap for evidence-based integration of such systems into Indian Police forces.

Keywords: *Academia-Police partnership, machine learning, Artificial Intelligence, predictive policing*

Introduction

Policing India by any measure is a difficult task. The scale of social, demographic, historical, political, economic, and technological problems confronting the Police is simply staggering. Emerging challenges of cyber-crimes, radicalization, and narco- threats, involving international organized crime mafias are straining the existing mechanisms for dealing with them. In the coming decade, state and central Police forces are going to face extraordinary problems in keeping India safe and in ensuring the democratic polity of the country. All Police units need to modernize and adopt new technologies to prepare and successfully confront these challenges.

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A particularly relevant technology for consideration in this light is the one that governs the working of data-driven artificially intelligent systems.

As vast generators and consumers of data, Police departments are actually very interesting targets for the deployment of AI systems. Millions of citizens interact daily with Police officers, seeking a variety of services including help in dealing with their criminal victimization. There are millions of calls being made every day asking for Police assistance. There are thousands of patrolling parties constantly moving in every part of the country, to respond to these calls and address citizen concerns. Every day, the Police is enforcing thousands of laws enacted by our elected representatives and acting against those who violate them. In the hundreds of courts, thousands of cases are being heard by the Judiciary, where Police investigators are presenting evidence to prosecute wrong doers. Indian Police register more than five million crimes and handle more than a hundred thousand public assemblies every year.

During all these activities, copious records are collected, or can be collected. The potential in the adoption of AI for policing relies on the premise that such data could be utilized in the service of more efficient policing. In this paper, we describe specific use cases in which this potential can be realized.

AI for Policing

Computer programs are instructions that programmers give to computers, such that the computer becomes capable of performing tasks that the programmer wants it to do. For example, a programmer may ask a program to look for occurrences of a whitespace character in text entered in a text box, and thus obtain a program that can count the number of words typed in it. In general, a computer program is only as smart as the logic that a programmer codes into it.

In the early years of the 21st century, a fresh approach to programming computers has emerged - the machine learning (ML) paradigm designs computer programs such that they end up writing important pieces of themselves, far more efficiently than humans could. While the historical roots of the latter term reach back longer, it is common these days to refer to such programs as artificially intelligent, or AI programs. Because of the greater effectiveness of such programs in solving complex pattern recognition tasks, the past decade has seen an upsurge of interest in the use of ML-based programs for solving a wide variety of real-world problems.

Technically speaking, artificially intelligent programs are ones that choose from among multiple options, without necessarily learning rules from data. Thus it is possible for AI programs to not be machine-learned (e.g. path-finding algorithms), and it is possible for ML programs to not be artificially intelligent, in the sense that they don't make any decisions (e.g. facial recognition systems). For this venue, in the interest of simplicity, we use the term AI programs to refer to both AI programs and ML programs.

Unsurprisingly, there are several problems in Criminal Justice that can benefit substantially

from the use of artificially intelligent systems. Multiple policing systems around the world are experimenting with the use of AI for license plate reading, facial recognition, video analysis, social media monitoring, crime forecasting (Perry, 2013), recidivism risk prediction (Oswald, Grace, Urwin and Barnes, 2018), and forensic analysis. Even within India, the Telangana Police's recent deployment of automatic number plate recognition systems, and the Delhi Police's proposed deployment of a hotspot tracking system (CMAPS) and the large number of Police departments that have acquired some form of facial recognition technology, e.g. PAIS in Punjab, FaceTagr in Tamil Nadu, AMBIS in Maharashtra and TSCOP in Telangana, point to an growing awareness of AI as a potential tool for helping Police discharge their functions effectively.

While this interest is commendable, the relatively opaque nature of AI systems' capabilities recommends caution in treating them as unquestionably valuable. After an upsurge of interest in predictive policing applications in the early 2010s, multiple Police departments around the world are in the process of withdrawing from such programs, given their inconsistent performance (Lum and Isaac, 2016; Saunders, Hunt and Hollywood, 2016). Mathematicians and statisticians have called for outright bans or radical reforms of predictive policing systems, given their potential to algorithmically amplify systemic biases (Shapiro, 2017).

Similar caution has been urged over the adoption of facial recognition technology, with San Francisco becoming the first city in the world to ban the use of facial recognition by Police (Conger, Fausset and Kovaleski, 2019), given its potential for abuse, and high error rates in practical deployments (Raji and Fried, 2021).

Given the extreme positions taken by very smart people on both sides of these debates, it is important to rationally assess the potential value of AI-based systems for assisting in policing. This is what we attempt to do in this paper, borrowing from our understanding of policing systems in India, developed over three years of sustained collaboration between IIT Kanpur and UP Police. Borrowing from the basic organizational schema of military theory, we address possible use cases for AI systems' deployment at the tactical, operational, and strategic level of policing.

Tactical applications

Under tactical applications, we consider applications that would basically be under the day-to-day command of an SHO or an officer equivalent.

Adaptive traffic control- Whereas the use of the term 'AI' conjures futuristic visions and expectations of human-like intelligence in robots, the reality of AI applications' value is far more sober. AI works best in predictable settings, where rules are laid out, and the state of the world can be unambiguously sensed. Traffic control is one such setting, and so it is remarkable, how little penetration, automated traffic control systems have made in India. Current commercially available products in India are a generation behind state-of-the-art systems in the West (Wang, Yang, Liang and Lu, 2016), but are

still perfectly appropriate to promote heavily in the ongoing Smart Cities development mission in our country (Smith, Pathak and Agrawal, 2019). Given the immense volume of traffic carried by our roads, the adoption of adaptive traffic control by our major cities' traffic Police will be immensely useful.

Specific to the Indian context, where labor is cheap and capital is scarce, it is worth exploring adaptive traffic control systems that, instead of requiring the installation or replacement of expensive traffic lights at every intersection (cost ~ USD 20000 per intersection, as noted in Selinger and Schmidt (2009)), can be implemented using cheap embedded systems that can assist a traffic Policeman in making appropriately timed signals (cost ~ USD 1000 per intersection). Such homegrown innovation is easily within the capabilities of our research institutions, and simply requires organizational willpower to materialize.

Facial recognition- Discussions about the deployment of large-scale facial recognition are frequently plagued by poor knowledge of the technical capabilities of such systems. While on the one hand, proponents wax eloquent about the benefits of such systems, if they work well, in solving crimes and preventing them (Kotsoglou and Oswald, 2020), critics argue for the dystopian consequences of unrestricted use of such systems, again provided they work as advertised (Gates, 2011).

The reality is that, there is a large gap between the performance of facial recognition systems in restricted view applications, such as in airport security or in attendance systems, and unrestricted view applications, such as in identifying people in street scenes or from random video sequences (Raji and Fried, 2021). While contemporary deep learning-based systems are close to perfect in recognizing people under restricted view settings wherein photos are taken in specific orientations and with the subject prominently fore grounded, they are close to hopeless in doing so under unrestricted view settings, wherein any of the camera's vantage point, distance to the subject, and ambient lighting conditions may be uncontrolled or unrepresented in the algorithm's training data (Komkov and Petiushko, 2019, Raji and Fried, 2021).

It is thus very important that, irresponsible statements about the use of automated facial recognition not be made by Indian Police forces currently operating facial recognition systems. Specifically, any claims that their systems can identify unknown culprits based on exhaustively searching a database of government photo IDs are quite frankly unbelievable based on the empirical results of such efforts when publicly documented, wherein error rates of between 75 and 100% are seen (Raji and Fried, 2021).

Such exaggeration is problematic, particularly because enlightened use of facial recognition technology can indeed be very beneficial for policing. While facial recognition technology is not yet advanced to a point where it can identify an unknown person from CCTV footage, it can identify with high confidence someone, already taken into custody. Similarly, access control at airports and other sensitive locations can benefit greatly from the use of facial recognition technology as a high accuracy,

low-friction biometric device (Spreeuwers, Hendrikse and Gerritsen, 2012).

Scene analysis- A rapidly developing functionality in computer vision, scene analysis measures properties of video sequences to infer what could be going on in them (Varadarajan and Odobez, 2009). This is intrinsically important for Police work, since such systems allow the detection of violent or abnormal crowd activity (Lloyd, Rosin, Marshall and Moore, 2017).

Given the large investment in CCTV surveillance being made by most Police departments in the country, investing further in customized scene analysis software, or in camera systems with native scene analysis capabilities, appears to be a reasonable direction. Notably, scene analysis methods collect no personally identifying information, thus obviating privacy and ethical concerns. Unlike facial recognition, scene analysis is also a self-limiting technology, in that it can only be used to detect large deviations from normal behavior, not to monitor behavior itself.

Operational applications

Under operational applications, we consider applications that would basically be under the day-to-day command of an SP or an officer equivalent.

Fraud detection- Detecting financial frauds, committed via accounting malpractices, the exchange of counterfeit notes, or via cybercrime, is an increasingly important Police function. ML-based computer vision systems have shown promising results in discriminating Indian counterfeit notes (Kamble, Bhansali, Satalgaonkar and Alagundgi, 2019). It is quite likely that the visible deployment of such systems at scale will considerably reduce the exchange of counterfeit notes.

Machine learning systems are also increasingly being used to conduct financial audits of corporate statements (Hajek and Henriques, 2017), with early pilots yielding encouraging results (Sifa et al., 2019). However, applications in this area are still at the proof-of-concept stage and require further maturation to warrant serious consideration by white collar crime investigators.

For all financial fraud activities detected within a jurisdiction, it is also important to maintain a repository of knowledge about the tactics used, for reference for future investigations. Indexing, tagging, and searching such database is a well-developed area in natural language processing, called semantic search (Mangold, 2007). Developing semantic search applications for monitoring financial fraud is a low-hanging fruit, which Indian Police departments would do well to pick quickly.

Patrolling- Police patrols are a key mechanism for collecting information, deterring crime, and maintaining a visible presence in the community for Police forces. Deciding where to patrol when, is an important problem that SHOs tend to solve ad hoc at the thana level, currently for local patrols, and State HQs tend to solve ad hoc at the State level for statewide first responder fleets (Koper, 1995; Eck and Clarke, 2019).

Algorithmic solutions to the problem of designing optimal patrolling routes, frequently assume a deterministic distribution of points of interest on a map, in the interest of problem tractability (Reis et al., 2006). More recently, the problem has begun to be modeled probabilistically, as it should be (Chen, Cheng and Wise, 2017).

Since the patrolling problem requires placing Police resources at locations where crime is expected to occur, it is reasonable to model it as a reinforcement learning problem (Santana et al., 2004). An additional factor, particularly important in the India context, is trying to reduce total miles driven by the patrol fleet, given high fuel costs.

Our team at IIT-K, in collaboration with UP Police's UP112 first responder service, has recently developed a decentralized reinforcement learning solution to the patrolling problem (Roy and Srivastava, 2021) that optimizes patrolling sites for patrol vehicles, for any configuration of fuel costs we wish to assign to the fleet. This system will be rolled out across the state later this year. Given the fleet's current fuel consumption of approximately USD 105 million per year, the project cost savings from adopting our system come to around USD 20 million per year. Similar solutions should be strongly considered in other Police departments in the country.

In addition to coordinating patrol routes for conventional PRVs, similar solutions should also be considered for fleets of drones currently being considered for highway monitoring, to materialize fast response times for accidents.

Strategic applications

Under strategic applications, we consider applications that would basically be under the day-to-day command of the DGP, or ADGs, of a Police force.

Crime prediction- As we discussed above, predictive policing has several important limitations, which makes direct application of crime trend predictions towards channeling resources at the operational level an inadvisable strategy (Shapiro, 2017). This does mean, however, that trying to predict crime trends in itself is inadvisable (Perry, 2013). We just have to be careful about what we do with these predictions. Crime forecasting has a long history within both the statistics (Gorr and Harries, 2003) and machine learning communities (Yu et al., 2011).

Since crime is not homogeneous by location and timescale, standard machine learning and statistical methods do not work very well in crime forecasting, necessitating the development of more sophisticated models (Rummens, Hardyn and Pauwels, 2017; Wang et al., 2020).

Within the Indian context, crime forecasting has primarily focused on statistical trend analysis across states (Das and Das, 2019) or on identifying broad criminogenic variables (Mittal et al., 2019). Very little crime forecasting has dealt with modeling variations at crime levels across districts, or split crime prediction by IPC sections to analyze differences across them.

Our team at IIT-K, in collaboration with UP Police's Technical Services, has developed a hierarchical Bayesian regression model

for crime prediction, trained on three years' of CCTNS crime records data alongside several socio-economic covariates. The model makes accurate predictions of the monthly count of crimes (RMSE = 0.15) across and within all districts of UP. The model also makes predictions for crimes of different varieties and uncovers interesting seasonal and spatio- temporal correlations between different crime categories. For instance, it points to a seasonal spike in narcotics-related cases in districts adjacent to the Nepal border during the months of July-September.

Such sophisticated machine learning approaches are necessary to engage with the complexity of genuinely predicting crime trends. While simpler autoregressive models can provide decent fits to data, they have very poor out-of-set generalization capabilities. We encourage states to support experimentation with methods such as ours to see whether a long-term generalizable predictive ability is seen.

Quantifying performance- The flip side of being able to predict crime trends well, is the ability to understand what one is doing, or not doing well, to reduce crime. One of the most trenchant criticisms of the predictive policing paradigm is that it is unfalsifiable. If crime reduces in an identified hotspot, we can say that it has reduced because of the efforts we made based on our predictive models. If it increases, we can say that the increase was predicted by the models, and so the models are correct (Lum and Isaac, 2016)

An accurate, or at least an unbiased, estimate of the prospective level of crime in a locality is crucial to identifying the degree to which various preventive measures taken by the Police are effective (Steiker, 1997). In the absence of such estimates, our judgments about the efficacy of such preventive measures are no more than testaments of blind faith.

With accurate estimates of crime trends for different varieties of crime in hand, senior officers can design preventative measures targeted specifically to tackle those crimes. For instance, our regression models also predict an increase in reported crimes in heavily urban districts during off-harvest months. Could seasonal rural-urban migration be responsible for this spike in crime? If so, what strategies could be used to handle it?

The measure of the efficacy of any given strategy could then be simply measured, as the difference between the predicted value of reported crime and the actually observed value. Multiple strategies could be tried in different districts to identify which works best. Once a quantitative basis for comparing preventive measures is established, an entirely new paradigm of evidence-based design of best practices can be operationalized.

In addition to enabling such group level measurements of performance, such quantification also permits unbiased measurements of individual units' performance. Once all covariates accounting for differences between two circles have been controlled for, whatever unbiased residual in performance remains unexplained afterwards, can be reasonably attributed to the difference in performance

of the corresponding CO's teams. The availability of quantified performance variables, too sophisticated to be gained directly by the evaluated candidates, may help in improving organizational efficiencies within the Police forces.

Our team at IIT-K has developed just such a method for quantifying performance within UP Police at the organizational and unit levels, building on top of the trend prediction model described above. Similar performance metrics, obtained from trustworthy prediction models, can be applied for quantifying performance in other states' Police forces.

Discussion

In this paper, we have reviewed the possibilities of applying state-of-the-art AI systems for supporting core Police functions, pointing out grounds for optimism, pessimism, and caution, as the case may be, for the adoption of different technologies.

Table 1: TRL for state-of-the-art AI systems for policing use cases

Function	TRL
Adaptive traffic control	9
Facial recognition (restricted view)	7
Facial recognition (unrestricted view)	3
Scene analysis	5
Fraud detection (counterfeiting)	4
Fraud detection (audit)	3
Semantic search	9
Adaptive patrol routing	7
Crime trend forecasting	6
Quantifying performance	3

Table 1 summarizes our assessment of the feasibility for adoption of various AI technologies for policing functions by Indian Police forces using the Technology Readiness Levels scale (Heder, 2017).

In general, Police functions against which high TRL levels are indicated (>7), are ones where currently commercially available AI systems are likely to prove entirely adequate. Functions against which low TRL levels (<4) are indicated, are probably not ready to be seriously considered for AI-integration in the immediate future.

Functions with intermediate TRL levels may, given sufficient interest on the part of the Police, be strong candidates for research support and collaboration with academia, as exemplified by the ongoing collaboration between IIT Kanpur and UP Police that we have had an occasion to mention in this paper.

This quantification of TRLs immediately suggests a straightforward roadmap for the adoption of AI systems in Indian Police forces over the coming decade. Adaptive traffic routing systems and semantically

searchable databases of crime records can be acquired from existing foreign commercial vendors, or re-engineered to specification by local vendors. Facial recognition systems for restricted view applications, e.g. identification, access control etc. and patrol routing systems can be acquired and customized at the same time.

Beyond these acquisitions, Police forces should invest in partnerships with local research organizations of repute to design problem statements that will eventually yield products capable of supporting the intermediate TRL use cases. The ongoing collaboration between IIT-K and UP Police is an excellent example in this regard. Notably, as the specific details corresponding to these use cases mentioned in this paper suggest, materializing workable systems for them will require sustained engagement between researchers and practitioners. Such sustained engagements necessarily require, formal mechanisms for sustenance; the IIT-Kanpur-UP Police model is an example of how this is possible.

Proposals for integration of AI systems purporting to solve low TRL use cases must be examined cautiously and skeptically, since the state-of-the-art globally in these areas do not yet support performance of the quality needed to meet the stated need. Again, Police forces would be well-served by soliciting inputs from academic experts before investing in such unproven use cases for AI systems.

Finally, Police officers seeking to become better informed about the underlying technologies driving AI systems are encouraged to take courses in this area. A deeper appreciation of the technical aspects of such systems will enable them to identify use cases and limitations of such systems beyond the ones outlined in this paper. One possible resource for such courses is the Center for Criminal Justice Research at IIT Kanpur[1], and especially its flagship certificate course on Criminal Justice Data Analytics[2].

In this course, IIT-K faculty teach participants how to understand and model the environment, in which crimes and policing take place and use these models to design better approaches for crime reduction and analyze data for criminal justice issues. Current capstone projects completed by students as part of this course include, an appraisal of the geography of property crimes in West Bengal, a study on the efficacy of CCTV in crime prevention in Himachal Pradesh, evaluation of training in Police academy in Maharashtra, prosecution of rape cases in Madhya Pradesh and etiology of cybercrimes, using telecom data to identify and trace the potential contacts of COVID-19 positive patients etc. Participation in courses of this nature will improve the ability of Indian Police officers, to optimally deploy and leverage the capabilities offered by artificially intelligent systems.

Naturally, such gains will not only be limited to working better with AI systems. An additional indivisible advantage of working with academic research institutions is the

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1   https://ccjr.cse.iitk.ac.in/index.php
2   https://outreach.iitk.ac.in/course/cjusda

training officers will receive in research, which is becoming the core of professional policing worldwide (Verma 2010). Research not only means a search for new way of doing things but also of challenging basic assumptions that guide current Police functions. For instance, it is believed that installation of CCTV cameras or constant patrolling helps control crime. However, these assumptions require empirical substantiation to judge their efficacy. For the Police to continue to serve its vital public function in the 21st century, it is vital that it evolves from its current norm-based model of evaluating praxis to a more empirically driven evidence-based strategy (Verma 2010).

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Demographic Profiling of Homicidal Death Cases in Raigarh Region

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"She is cold,
Her blood is settled, and her joints are stiff.
Life and these lips have long been separated,
Death lies on her like an untimely frost upon the sweetest flower of all the field."
-William Shakespeare

Abstract

Homicide is one of the most heinous crimes defined in the Indian Penal Code, 1860. The incidence of homicide is, perhaps, as old as the life of human civilization, finding mention in old religious texts, like Ramayana and Mahabharata and other documented pieces of history. This paper presents findings of a detailed analysis of retrospective data base study of homicide cases in Raigarh region of Chhattisgarh (CG) province of India in terms of time of incidence, age, sex, weapon, location of injury etc. Apart from scientific data, legal aspects of some critical points (includes the Hon'ble constitutional Court's guidelines and observations with respect to investigation of death due to medical negligence cases), hindrances to successful investigation and prosecution besides some viable solutions are discussed critically. Even in case of non-recovery of the body i.e. absence of corpus delicti, it has been analysed as to how conviction of murder charge against the accused can be sustained by pursuing the investigation in a way that connects the chain of evidence very cogently with a view to satisfying the expected standard of evidence sufficient to secure success in the trial proceedings. In the concluding part some suggestions are also appended to help the investigating officers/agencies to conduct successful prosecution.

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The article has been enriched in its contents with a view to enhancing its utility for the field level Police officers by giving position of extant laws and rules about infrequently taught aspects of investigation into the cases of homicidal and unnatural deaths, like procedure for Exhumation, Treatment of Unidentified bodies including their mandatory preservation for 72 hours awaiting determination of identity, second opinion on autopsy, guidelines issued by the constitutional Courts for handling of allegations of medical negligence, leading to the death of the patient/victim, position of legal issues by the Supreme Court, to name a few indicatively.

Keywords: *Homicide-culpable and non-culpable, Crime, Prosecution, Corpus delicti, autopsy, Conviction, Indian Penal Code (IPC), Criminal Procedure Code (CrPC), Medical negligence.*

Introduction

Black's Law Dictionary (2004)[1] had defined homicide as – "The killing of one person by another." **Merriam Webster**[2] had defined homicide as- "a killing of one human being by another". The word "Homicide", in fact, is derived from two specific words- (i) homo (derived from homo sapiens i.e. human) and (ii) cidium (i.e. killing) [3].

Some of the notable motives behind homicide have been found as (i) disputes, (ii) personal vendetta or enmity and (iii) gain etc. Disputes can be further classified into (a) property/ land dispute, (b) family dispute, (c) petty quarrel/dispute, (d) money dispute, (e) water dispute, (e) sexual rivalry/ infidelity, etc.

Some of the important homicide cases that hit the headlines of media in India are-

1. **Stone man of Kolkata**- An unidentified man was responsible for killing more than 26 pedestrians with the use of a heavy stone during 1985-89.

2. **Syed Modi** - Syed Modi, a renowned badminton player was gunned down on 28 July 1988 in Lucknow, as he came out of the K. D. Singh Babu Stadium, Lucknow (UP) after a practice session.

3. **Priyadarshini Mattoo** - *A* 25-year lady, Priyadarshini Mattoo, who was a student of Faculty of Law, Delhi University, was raped and murdered on 23rd January 1996 at Vasant Kunj, New Delhi.

4. **Jessica Lal** - Jessica Lal, a model in New Delhi, who was working as a celebrity bartender at a crowded socialite party, was shot dead on 30th April 1999.

5. **Nithari** - Moninder Singh Pandher and his servant Surinder Koli were charged for murder of 19+ victims (minors) in Nithari village of Noida (UP) during the time span of 8 February 2005–25 October 2006.

6. **Aarushi Talwar** - On 15-16 May 2008, bodies of Aarushi Talwar (F/13) and

Hemraj, domestic help (M/45) was recovered from the Aarushi's home stationed at Noida, UP.

7. **Nirbhaya -** Nirbhaya, a 23 year old Physiotherapy intern was brutally assaulted and raped on a moving bus during night hours in south Delhi on 16th December 2012, while she was returning home after watching a movie. She succumbed to her injuries on December 29, 2012.

When fragmented remains of two or more human bodies involving the crime of homicide dumped in many places, then the remains of the body are called **commingled remains**. In this situation combined effort of forensic medicine coupled with forensic anthropology, forensic biology, forensic serology and DNA finger printing experts besides the statements of credible witnesses, are considered as important scientific evidence to solve the identity of the victims and nature of injury likely to cause death.

Methodology

The cross-sectional retrospective record based study was conducted in the department of F.M.T., Late Shri Lakhiram Agrawal Memorial Govt. Medical College, Raigarh (CG) & Associated KGH, Hospital for the period of six years from March 2015- April 2021. Total 3411 cases were autopsied, of which 86 cases were found to be homicidal death. Detailed history of the case, age, sex, relationship between the victim and the offender etc. were obtained from inquest report, post-mortem report, hospital records, investigating Police

officers, relatives and friends who were present during autopsy. All the cases, where inquest report clearly pointed towards homicide, were brought for autopsy or where homicide was detected during autopsy, but inquest report had presented some other mode of death at mortuary of KGH Raigarh have been considered for the study. All cases other than homicide were excluded.

Objectives

1. Assessment of pattern of homicidal deaths.

2. Comparison of salient characteristics of homicidal death with the findings of studies in other regions of country.

3. Frequency and correlation of the incidence of homicide with templates like age, sex etc.

4. Identifying the modus operandi of the accused in homicide cases from type of weapon, injury pattern, crime scene etc.

Justification for the study

1. Academic- To gain further knowledge through study of pattern of injuries in homicide cases.

2. Helping investigating agencies/ officers in correct identification of cause of death, its criminal dimension as well as correlation with circumstantial findings.

3. Acquainting the Police officers with the medical procedure to deal with different aspects of homicidal investigation by the Forensic medical experts, as mandated by the state Medical Manual.

Permission from Scientific & Institutional Ethical Committee- Yes

Funding- No

Conflict of Interest- No

Review of literature

Among the renowned Indian authoritative figures/professionals in the field of forensics Kannan K. (2018)[4], Pillay (2017)[5], Dogra T.D. & Rudra A. (2010)[6], Reddy and Murthy (2014)[7] had discussed in detail about the problem of death due to Homicide. Apart from Indian forensic authorities Gordon, Shapiro and Berson (1991)[8], Pekka Sauko and Bernard Knight (2016)[9] had discussed about different aspects of homicide. Apart from textbooks, academic researchers had also critically analysed the larger subject of the homicidal crime. Some of them are Dutta, Arora and Sarmah (2011)[10], Dutta and Arora (2011)[12] in legal aspect. Apart from legal aspects, study of B.C. Sivakumar, D. Vishwanath, P.C. Srivastava (2011)[13] at a Tertiary Care Centre at Bengaluru, P.K. Mishra, J. Yadav, S. Singh, B.P. Dubey (2012)[14] at Bhopal, S. Mohanty, S.K. Mohanty, K.K. Patnaik (2013)[15] at Berhampur, Orissa, Memchoubi Ph., Th. Meera Devi, Nandeibam Pabitramala Devi and Nani Gopal Das (2014)[16] at Imphal on sexual homicides, D.J. Parmar, L.R. Bhagora, R.D. Parmar, K.M. Suvera (2015)[17] at Bhavnagar, Gujarat and Dhiraj D. Buchade, Rohit Bharti, Arthy Amarnath (2019)[18] at Delhi had addressed the problem of homicide in medico-legal angle.

Table-I : Some important weapons and injuries inflicted by the accused in Homicide cases-

Sl. No	Type of Weapon	Examples	Possible Type of Injury
01	Light & Blunt	Cane stick, Wooden stick etc.	Abrasion, bruise, laceration
02	Light , Blunt & Flexible	Rope, Hunter whip, Belt	Abrasion, Bruise
03	Moderate heavy blunt	Walking stick, Gupti, Belan, Bones etc.	Abrasion, bruise, laceration, Fracture of bones
04	Heavy, Hard & Blunt	Stone, Bricks, Iron rod, Cycle chain, Hammer, Spade/ Kodal/ Fawda, Gainti etc.	Abrasion, bruise, laceration, Fracture of bones
05	Light Sharp edged weapons	Safety razor blade, Spring Knife/ Rampuria Knife, Pen Knife, Sickle etc.	Abrasion, bruise, laceration, incised wound, stab wound, Fracture of bones

06	Heavy sharp edged weapons	Sword, Chopper, Axe, Kuthar/ Parasuram Kuthar etc.	Abrasion, bruise, laceration, stab, Chop wound, Incised wound, Fracture of bones
07	Weapons with pointed tip	Suja/ Needle, Screw Driver, Arrow, Dagger, Spear/ Bhala, Scissors, Trishul/ Trident, Broken glass bottles, Ice picks, Fork etc.	Abrasion, bruise, laceration, stab wound , Fracture of bones
08	Ligature material	Rope, Saree, Dupatta, Scarf, Dhotie, Leather Strap, Bed Sheet, Wire, Sacred thread, Nada, Turban, Metallic chain etc.	Pressure abrasion, Fracture of Hyoid bone or thyroid cartilage.
09	Firearms	Rifle, Revolver, Pistol, Shot gun, Machine gun, Katta etc.	Penetration injury, perforating injury
10	Explosives	Petrol bomb/ Molotov Cocktail, TNT, RDX, SEMTEX, PETN, Letter Bomb etc.	Abrasion, bruise, Punctate lacerations, Hollow Viscus Injury
11	Thermal	Dry Heat (Flame Burn, Heated Solid body), Wet Heat (Steam, Boiling liquid, Molten Metal), Chemical Burn, Electrical Burn, Microwave, Radiant Heat Burn, Frost Bite etc.	Burn injury, Scalds, Electrocution injury

Differentiating homicide from suicide or accident

When confusions are raised in cases like drowning, hanging, RTA, electrocution, fall from height etc., whether the case is suicidal or accidental or homicidal, in such situations crime scene reconstruction, autopsy report and FSL report play a pivotal role to fix the nature. However, some important points with reference to homicidal matter are appended below.

Table-II : Differentiating Homicide from suicide or accident in some critical situations

Sl No	Trait	Important points/hints indicating Homicide
01	Drowning	1. Absence of typical froth (White, Fine, Lathery and Copious) of drowning at Mouth and Nostrils. 2. Absence of floating aquatic plants, debris, sand, mud etc. in trachea, bronchioles, stomach etc. 3. Hands may be found tied behind the back 4. Heavy weight may be tied to the body 5. Presence of fatal injuries like head injury, ligature strangulation, throttling, stab wound etc. 6. Presence of intoxicating drugs or chemicals in viscera/ blood
02	Hanging	1. Absence of typical ligature mark of hanging and vital reaction in tissues underneath ligature mark. 2. Distribution of hypostasis not consistent with distribution of ante mortem self-suspension. 3. Findings of superficial bodily injuries not consistent with hanging. 4. Absence of dribbling of saliva from the mouth. 5. Presence of struggle marks, lethal injuries over vital parts, defence wounds etc. 6. Absence of suicide notes. 7. Presence of intoxicating drugs or chemicals in viscera/ blood. 8. Scene of Crime not consistent with self -suspension.
03	RTA	1. Lethal injuries on unusual site/locations of the body. 2. Injuries due to RTA are post-mortem in nature. 3. Presence of intoxicating drugs or chemicals in viscera/ blood. 4. Presence of ante-mortem lethal wounds (Firearm, stab, chop etc.) over vital parts of the body 5. Marks of dragging and repeat run over.

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09	Burn	1. Absence of characteristic line of redness of ante-mortem burn.
		2. Absence of vital reaction and no change in enzyme histo-chemistry
		3. Absence of soot particles in trachea and bronchioles.
		4. Absence of COHb (Carboxy haemoglobin) in blood.
		5. Absence of characteristics of ante-mortem blisters like redness, exudates etc.
		6. Presence of ante mortem fatal injuries over the body.
		7. Disturbance of scene of crime.
10	Poisoning	1. Presence of suspected injuries in and around mouth.
		2. Presence of marks of struggle and defence injuries
		3. Disturbance of scene of crime, absence of poison or article used for storing, mixing or administering the poison.

All India statistics of Homicide (2017- 2019)

Table-III : Year wise incidents and rate of (i) Culpable Homicide not amounting to Murder, (ii) Murder, (iii) Attempt to Commit Murder, (iv) Dowry Deaths, (v) Deaths due to Medical Negligence in India (2017-2019)[19]

Sl. No	Trait	2017		2018		2019	
		Incidence	Crime Rate	Incidence	Crime Rate	Incidence	Crime Rate
01	Culpable Homicide not amounting to Murder	3401	0.3	3635	0.3	3470	0.3
02	Murder	28653	2.2	29017	2.2	28918	2.2
03	Attempt to Commit Murder	51621	4.0	51489	3.9	51254	3.8
04	Attempt to commit Culpable Homicide	7191	0.6	7987	0.6	7766	0.6
05	Dowry Deaths	7466	1.2	7167	1.1	7115	1.1
06	Deaths due to Medical Negligence	198	0.0	218	0.0	210	0.0

Table-IV : Year wise statistics of murder in India (2017-2019) [19, 20. 21]

Year	Incidence	Total Cases for Investigation	Charge sheeting Rate	Total Cases for Trial	Total Cases Convicted	Conviction Rate
2017	28653	51,279	85.5	2,15,578	8,346	43.1
2018	29017	49,891	84.2	2,21,250	7,512	41.4
2019	28918	48,553	85.3	2,24,747	6,961	41.9

Table-V : Specific sections of the Indian Penal Code (I.P.C.) dealing with Homicide

Sl No	Section	Description
01	**Section 299**-Culpable homicide	Whoever causes death by doing an act with the intention of causing death, or with the intention of causing such bodily injury as is likely to cause death, or with the knowledge that he is likely by such act to cause death, commits the offence of culpable homicide.
02	**Section 300**-Murder	Murder is defined under Section 300 of the Indian Penal Code. According to Indian Penal Code , culpable homicide is considered as murder if: ➢ The act is committed with intent to cause death. ➢ The act is done with the intention of causing such bodily injury which the offender has knowledge that it would result in death. ➢ The person has the knowledge that his act is dangerous and would cause death or bodily injury but still commits the act, this would amount to murder. Ingredients of Murder- • **Causing death**: There should be the intention of causing death, • **Doing an act**: There should be the intention of causing such bodily injury that is likely to cause death, or • **The act must be done** with the knowledge that the act is likely to cause the death of another.

		In **Khokan** alias **Khokhan Vishwas** v. **State of Chhattisgarh**[22],- **Section 300 of the IPC** is in two parts. The first part is when **culpable homicide** can be said to be the murder and the second part is the exception when the culpable homicide is not murder. The relevant part of Section 300 IPC for our purpose would be **clause 4** to Section 300 and **Exception 4** to Section 300 IPC.
		As per clause 4 to Section 300 IPC, if the person committing the act knows that it is so **imminently dangerous** that it must, in all probability, cause death or such bodily injury as is **likely to cause death** and commits such act without any excuse for incurring the risk of causing death or such injury, such culpable homicide can be said to be the **murder.**
		However, as per **Exception 4** to Section 300, **culpable homicide is not murder if it is committed without premeditation** in a sudden fight in the heat of passion upon a sudden quarrel and without the offender having taken unfair advantage or acted in a cruel or unusual manner. As per explanation to **Exception 4 to Section 300 IPC**, it is immaterial in such cases which party offers the provocation or commits the first assault.
03	**Section 301** - Culpable homicide by causing death of person other than person whose death was intended	If a person, by doing anything which he intends or knows to be likely to cause death, commits culpable homicide by causing death of any person, whose death he neither intends nor knows himself to be likely to cause, the culpable homicide committed by the offender is of the description of which it would have been if he had caused death of the person whose death he intended or knew himself to be likely to cause.
04	**Section 302**- Punishment for murder	Whoever commits murder shall be punished with death, or imprisonment for life, and shall also be liable to fine
05	**Section 303**- Punishment for murder by life-convict.	Whoever, being under sentence of imprisonment for life, commits murder, shall be punished with death. Mandatory death sentence prescribed under Section 303 of the Indian Penal Code was struck down by the honourable Supreme Court as **unconstitutional** as far back as in 1983 in **Mithu** v. **State of Punjab**[23].

		Again, in **Sabiana** v. **State of Karnataka**[24], **Saibanna** was a life convict. While on **parole**, he killed his wife and daughter. Honourable Supreme Court sentenced him to death on reasoning which effectively made death punishment mandatory for the category of offenders serving life sentence.
06	**Sec. 304 of I.P.C.**-Punishment for culpable homicide not amounting to murder	Whoever commits culpable homicide not amounting to murder shall be punished with imprisonment for life, or imprisonment of either description for a term which may extend to ten years, and shall also be liable to fine, if the act by which the death is caused is done with the intention of causing death, or of causing such bodily injury as is likely to cause death, or with imprisonment of either description for a term which may extend to ten years, or with fine, or with both, if the act is done with the knowledge that it is likely to cause death, but without any intention to cause death, or to cause such bodily injury as is likely to cause death.
07	**Sec. 304A of I.P.C.** Causing death by negligence	Whoever causes the death of any person by doing any rash or negligent act not amounting to culpable homicide, shall be punished with imprisonment of either description for a term which may extend to two years, or with fine, or with both.

Legal aspect of some critical aspects of Homicide

A. **Duty of public to inform the Police with respect to unnatural death cases- U/s. 39 (1) (v) of the Code of Criminal Procedure 1973 (CrPC) -** every person is bound to inform Police with respect to offence u/s. 302, 303 and 304 of IPC. and in contradiction punishment can be awarded u/s. 176 of IPC. i.e. simple imprisonment for a term which may extend to six months, or with fine which may extend to one thousand rupees, or with both. **Rule 558 of The Central Provinces & Berar Medical Manual**[25], which was also known as **Medical manual for the State of M.P.**, had clearly mentioned the duty of Govt. Medical officer to inform the Police with respect to occurrence of unnatural death within Govt. hospital.

B. **Inquest-An official process to discover the cause of someone's death**, when death was sudden, suspicious and unnatural. Sec. 174 of Criminal Procedure Code, 1973, defines inquest by Police, and Sec. 176 of the same act has provision for magistrate inquest in certain cases.

C. **Panchnama**- When any person dies due to the result of crime or in suspicious circumstances then the I.O. must draw inquest Panchnama as per S. 174 of Cr P C, 1973. In this **Panchnama** the detail description of the body and its condition, how the dead body is lying and descriptions

such as of any mark of injuries found on the deceased, an apparent cause of death or by weapon or instrument such marks appear to have been inflicted are to be mentioned. This Panchnama helps to find out whether at the first sight of dead body it can be gathered, that cause of death is unnatural. **In Re: To Issue Certain Guidelines Regarding Inadequacies and Deficiencies in Criminal Trials, v. The State of Andhra Pradesh & Ors**.[26], where the Hon'ble Apex Court had given certain direction with respect to how Scene Mazahar/ Spot Panchnama can be prepared.

D. **When death caused is not a crime- (General exceptions to IPC) - Right to Private defence- Murder**- Section 96 to 106 had described about right to private defence. In case of claiming right to private defence, the burden of proof lies upon the claimant. In **Darshan Singh** v. **State of Punjab & Anr**[27], the Hon'ble Apex Court had described 10 guiding principles for Right to private defence. In **Sukumaran** v. **State Rep. by the Inspector of Police**[28], Hon'ble Apex Court had held that the right to self-defence extends to protection of another person's life and property. Court acquitted a Tamil Nadu Forest ranger, who was jailed for shooting an alleged sandalwood smuggler in 1988.

E. **Exhumation of dead body**- **Rule 586 of The Central Provinces & Berar Medical Manual**[25] which was also known as Medical Manual for the State

of M.P. clearly states the duty of Govt. doctors in exhumation cases.

F. **Entitlement for medico-legal autopsy**- Rule 226, 259, 554, 568 of The Central Provinces & Berar Medical Manual[25] which was also known as **Medical Manual** for the State of M.P. had clearly mentioned the entitlement of performance of medico-legal work by doctors.

G. **Defining an Expert**- Sec. 45 of Indian Evidence Act 1860 had defined expert and Sec 293 of Code of Criminal Procedure 1973 had provided the list of **certain Government scientific experts**.

H. **Status of medical science & medical jurisprudence in the eyes of law**- In **Pratap Mishra and Ors. v. State of Orissa**[29], where Hon'ble Apex Court of India had observed- ".....In the first place, it is well settled that the medical jurisprudence is not an exact science and it is indeed difficult for any doctor to say with precision and exactitude, as to when a particular injury was caused and in the instant case as to the exact time when the appellants may have had sexual intercourse with the prosecutrix. ..."
In **Pattipati Venkaiah v. State of Andhra Pradesh**[30] Hon'ble Apex Court had observed that medical science is not yet so perfect, as to determine the exact time of death nor can the same be determined in a computerised or mathematical fashion, so as to be accurate to the last second. Again, in **Kusum Sharma** v. **Batra Hospital &**

Medical Research Centre[31], where the respondent had submitted that the medical science is not an exact science.

I. **Dealing with unidentified dead bodies**- **Article 21 of the Indian Constitution which guarantees the Right to Life**, embraces many aspects of a person's life including Right to Dignity. In **Parmanand Katara** v. **Union of India**[32], the Hon'ble Apex Court had highlighted the importance of conferring dignity to dead persons. In **P. Rathinam v. Union of India**[33], the ambit of Article 21 was widened to include the dignity of a person. It emphasized that the right to life means a meaningful life and not merely animal existence. Further, this right to dignity was also expanded to a dead person. In **Ashray Adhikar Abhiyan v. Union of India**[34] it was held that the dignity of a deceased must be maintained and respected. Rule 592 of **The Central Provinces & Berar Medical Manual**[25], which was also known as Medical manual for the State of M.P. had clearly mentioned regarding how to handle unidentified dead bodies. Therefore, while dealing with the unidentified dead bodies-

1. The body must be photographed at the time of recovery from the scene and need to be transmitted to other Police districts for necessary identification.

2. Maximum use of static and mobile freezers for preservation of unclaimed bodies.

3. Fingerprint must be obtained and should be transmitted for matching with database.

4. At least 72 hours waiting period should be maintained with an objective to identify the deceased.

5. Preservation of skin from distal phalange of each finger and preserve each separately in a bottle containing spirit and duly in boiled and hand them over to the Police on demand.

6. During autopsy clothing of the deceased and body tissue for DNA profiling should be preserved.

J. **Medical negligence & Criminal investigation by Police**- In **Jacob Mathew v. State of Punjab**[35] Hon'ble Apex Court held that the doctor is not criminally liable unless negligence is reckless and gross and, in such cases, the doctor may be liable in tort. In this case Hon'ble Apex Court at Para 54 & 55 had laid down certain guidelines:

(1) Doctors can be prosecuted for an offence of which rashness or negligence is an essential ingredient, but they are to be protected from frivolous and unjust prosecutions.

(2) Many a times, complainant prefers recourse to criminal process as a tool for pressurising the medical professional for extracting uncalled for or unjust compensation. Such malicious proceedings have to be guarded

against.

(3) A private complaint may not be entertained unless the complainant has produced prima facie evidence before the Court in the form of a credible opinion given by another competent doctor to support the charge of rashness or negligence on the part of the accused doctor.

(4) The Investigating Officer, before proceeding against the doctor should obtain an independent and competent medical opinion preferably from a doctor in Govt. service.

(5) A doctor may not be arrested in routine, unless his arrest is necessary for furthering the investigation or for collecting evidence or the doctor would not make himself available to face prosecution unless arrested.

In **Lalita Kumari v. Govt. of U.P.**[36], the Hon'ble Apex Court had directed that no automatic FIR in medical negligence cases should be registered without preliminary investigation. In **Dr. Sudhir Kumar Thakur** v. **State of West Bengal & Ors**[37], Siddhartha Chattopadhyay J. of Hon'ble Calcutta High Court observed that the Courts should not encourage indiscriminate prosecution of medical professionals for medical negligence as it is counterproductive. In **Dr B. C. Jain v. Maulana Saleem[38], Atul Sreedharan J. of Hon'ble Madhya Pradesh High Court** had

issued seven-point **guidelines** for the Police and the subordinate Courts over handling of cases in which the government doctors are accused of patient's death due to negligence.

K. **Submission of chemical examiner report to autopsy surgeon**- In **Happu v. Emperor[39] where Callister, J. of Hon'ble Allahabad H.C.** had observed- "I also think that when a report is received from the Chemical Examiner containing a quantitative analysis, it should be shown to the medical officer who conducted the post-mortem examination so that he will be in a position to state before the Committing Magistrate what are the medico-legal inferences to be drawn from the report."

L. **Non recovery of weapon or non-matching of weapon with the alleged crime and it's consequence in conviction**- In **Mritunjoy Biswas v. Pranab alias Kutti Biswas and Another[40], the Hon'ble Supreme Court** held that "There is ample unimpeachable ocular evidence corroborated by medical evidence - Mere non-recovery of weapon from accused does not affect prosecution case". In **Himanshu Mohan Rai v. State of U.P.[41]**, is a case where the ballistic report is contrary to the evidence of the witnesses, but the statements of the witnesses have inspired the confidence of the Court and have been held to be credible and reliable, then such a contradiction between the ballistic report and

the credible evidence of a witness cannot be the basis of rejecting the evidence of a witness. Similarly in **Rakesh and another** v. **State of U.P. and Another**[42], where Hon'ble Apex Court had held that for convicting an accused recovery of the weapon used in commission of offence is not a sine qua non, the Hon'ble Supreme Court observed while upholding a conviction of a murder accused.

M. **When recovered weapon not submitted to FSL for scientific examination**- In **State of Rajasthan v. Wakteng**[43]**, it was held by the Hon'ble Supreme Court** that "Recovery on disclosure statement made by accused - Weapon of murder recovered - Weapon however not sent to Forensic Science Laboratory - Accused also not quizzed u/S. 313, Criminal P.C. on question of recovery - Evidence of recovery - Cannot be relied upon for conviction"

N. **Conflict between the medical/ scientific opinion and ocular evidence**- In **State of Haryana v. Bhagirath**[44]**, the Hon'ble Supreme Court** held that the opinion given by a medical witness need not be the last word on the subject. Such opinion shall be tested by the Court and if it lacks logic or objectivity, the Court is not obliged to go with the opinion. If there are two different opinions on the same facts, it is open to the judge to adopt the view which is more objective and probable one. If the opinion given by one doctor is not consistent with

probability, the Court has no liability to go with that opinion, merely because it is that of a doctor. It is well settled that an expert witness is not a witness of fact, and the opinion given by an expert is of advisory character given on the basis of symptoms found on examination.

O. **Preservation of viscera and collection of other evidence during autopsy and steady despatch of them to FSL**- In **Dev Kanya Tiwari v. The State of Uttar Pradesh**[45]**, where the Hon'ble Apex Court** division bench comprising N.V. Ramana and S. Abdul Nazeer JJ., while acquitting the appellant, who was convicted in a case of heinous crime held that- "17………. Medical evidence in the form of post-mortem report (Ext. P1) though supports the case of prosecution, non-preservation of viscera by the Doctor remains fatal to the prosecution case....." Even **in Md. Sayum v. The State of Bihar**[46]**, where Navin Sinha J. of Patna High Court** held that prosecution should send viscera to FSL as early as possible.

P. **Non recovery of dead body/ corpus delicti and conviction in murder case** – **Presumption of Death-** The presumption of death is explained under Section 107 and 108 of Indian Evidence Act, which refers to a situation when a person has disappeared for many years, and after such situations the law presumes him dead. Section 108 of this Act describes the amount or the tenure i.e. 7 years, where, there should be no proof of the existence of

the person in society. In **Balambal** v. **Kannammal**[47] Hon'ble Madras High Court held that the presumption of death could only be invoked if the death or inexistence of that person is proved when the presumption is raised in the Court and no person can utilise such presumption for generating any type of death record of the called person. In **T.K Rathnam** v. **K. Varadarajulu**[48], the dissenting opinion of the learned judge explains in his judgment that the presumption of the existence of the person or death of the person is always rebuttable. He also observed that the accurate timing of death is not a matter of presumption rather it is a matter of evidence. There are cases on record from the **Hon'ble** constitutional Courts where in absence of corpus delicti, conviction for the offence of murder was sustained subject to strong prosecution evidence. Some of the cases are (1) **Brijesh Kumar v. State**[49], (2) **Majee Taha v. The State**[50] [para12 (viii)]-"**,** (3) **Rama Nand v. State of H.P.**[51], (4) **Sevaka Perumal v. State of Tamil Nadu**[52], (5) **Sanjay Rajak v. The State of Bihar**[53]

Hindrance to successful prosecution and use of forensic medicine/science expertise as one of viable solutions thereto

Hostile witness: Hostile witness is said to be when a party calls the witness to depose in its own favour, instead, the witness goes against the party calling him. In examination of hostile witnesses (S.154 of Indian Evidence Act, 1972) the law states that, 'The Court may, in its discretion, permit the person who also witnesses to put any questions to him which might be put in cross-examination by the adverse party'. Section 154 of Indian Evidence Act, 1872 confers a discretion not limited by the criteria relevant to determining hostility, though in practice similar ideas appear to have been applied, at least in standard cases. Hostile witness is a major disturbing factor- In **State** v. **Sanjeev Nanda**[54]Apex Court had observed- "99. Witness turning hostile is a major disturbing factor faced by the criminal Courts in India. …….." **In Joshinder Yadav v. State of Bihar**[55], Division bench of Honorable Apex Court comprising Ranjana Prakash Desai and J. Chelameswar JJ. observed-"These scientific tests are of vital importance to a criminal case, particularly when the witnesses are increasingly showing a tendency to turn hostile…….."

Therefore, **scientific examination of physical evidence is of paramount importance in criminal cases to meet the end of justice.** Physical evidence is evidence that is found at a scene that can be physically held or touched.

Legal importance of scientific tests i.e., test of physical evidence in FSL

A. Fingerprints

a. In **Bhaluka Behera and Others v. State**[56]**,** their, Lordships said: - "If the fingerprints are clear enough, the Court must verify the evidence of the expert by examining them with a magnifying glass if necessary, and applying its own mind to the similarities

or dissimilarities afforded by the fingerprints, before coming to a conclusion one way or the other. The science has developed to a stage of exactitude. But the main thing to be scrutinised is whether the Expert's examination is THROUGH, COMPLETE and SCIENTIFIC."

b. In **Mohan Lal v. Ajit Singh[57]**, it was held as follows: - "Similarly it is for a competent technician to examine and give his opinion, whether the identity can be established and if so whether this can be done on eight or even less identical characteristics in an appropriate case."

B. **DNA Fingerprints**- It was observed in **Santosh Kumar Singh v. State through CBI[58]**, where the Hon'ble Apex Court had observed that that DNA is scientifically accurate and exact science and that the trial Court was not justified in rejecting DNA report.

C. **CCTV Footage from scene**-In **Tomaso Bruno & Anr v. State of U.P[59]** Hon'ble Apex Court had appreciated CCTV footage as reliable evidence. In **Kishan Tripathi v. The State[60]**, where it was held that Original Hard Disk containing CCTV Footage is a primary evidence u/s 62 Indian Evidence Act.

D. **Communication through e-mail**- In **Tomaso Bruno and Anr. v. State of U.P[59]** Hon'ble Apex Court held that the computer-generated electronic records in evidence are admissible at a trial if proved in the manner specified by section 65 B of the Evidence Act. Moreover, Hon'ble Calcutta High Court in **Abdul Rahman Kunji v. State of West Bengal[61]** while deciding the admissibility of email held that an email downloaded and printed from the email account of the person can be proved by virtue of Section 65B r/w Section 88A of Evidence Act. The testimony of the witness to carry out such procedure to download and print the same is sufficient to prove the electronic communication. In **Babu Ram Aggarwal & Anr.** v. **Krishan Kumar Bhatnagar & Ors**.[62] u/s. 65B Hon'ble Delhi High Court held that it has to be proved that the computer during the relevant period was in the lawful control of the person proving the email.

E. **Communication through mobile phone**- In **Syed Asifuddin v. State of Andhra Pradesh[63],** Hon'ble Andhra Pradesh High Court held that a cell phone is a computer according to IT Act, 2000. In *State* **(N.C. T of Delhi)** *v Navjot Sandhu* **@ Afsan Guru[64]** Hon'ble Apex Court had appreciated the use of CDR (Call Details Record) by prosecution and admitted such records. Even in **Mohammed Ajmal Mohammad Amir Kasab @ Abu Mujahid and Others** v. **State of Maharashtra and Others**[65] the relation between the operative elements of 26/11 and their handlers stationed in Pakistan was established with the help of the CDR. Hon'ble Apex Court in

Mohd. Arif @ Ashfaq v. State (N.C.T of Delhi)[66] had accepted Mobile Tower Location (MTL) as accepted evidence.

F. **Finding of Physical evidence at crime scene which exactly matches with the wearing of the accused**- In **Dhananjoy Chatterjee v State of W.B**[67], where the Hon'ble Apex Court had mentioned "……….The cream colour button recovered from the place of occurrence along with the shirt seized on the disclosure statement of the appellant and seized from his house on May 12, 1990 along with the other seized articles were sent by the investigating agency to the Forensic Science Laboratory. From the testimony of **Pratha Sinha PW 27, the Senior Scientific Officer**, attached to the Physics Division of the Forensic Science Laboratory, Government of West Bengal, it transpires that the cream colour button recovered from the place of occurrence was from the shirt which had been recovered at the instance of the appellant from his house after his arrest……."

G. **Relevancy of bite marks**- In *Mukesh* v. *State* (*NCT of Delhi)*[68], where the Hon'ble Apex Court at Para 242 had upholded the utility of Forensic Odontology in crime investigation and rejected the claim of defence with respect to managed bite marks.

H. **Relevancy of Forensic Entomology**- In **M. Sakthivel** v. **The State by Inspector of Police, Yercaud Police Station, Salem District**[69], where the division bench of Hon'ble Madras High Court comprising M. Jaichandren and S. Nagamuthu JJ had pointed out the importance of Forensic Entomology i.e., science of maggots as a tool to ascertain the post-mortem interval.

I. **Relevancy of Photographic Superimposition**- In **Ram Lochan Ahir v. State of West Bengal**[70]the Hon'ble Apex Court had laid down that the super-imposed photograph of the deceased over the skeleton of a human body was admissible to prove the identity of the skeleton under Section 9 of the Evidence Act.

Data presentation at Raigarh

According to clearance from scientific committee (26-07-2019) and subsequent approval of Institutional Ethical Committee (07-06-2021), a retrospective study was carried out at the institutional level in the Department of Forensic Medicine & Toxicology on the basis of inquest report, autopsy report as well as data gathered from the relatives of the victim. Out of 3411 cases of autopsy from 31-03-2015 to 31-04-2021 (i.e. six years study), only 86 cases were of homicide. All the relevant data were tabulated and analysed subsequently to arrive at a reasonable conclusion.

Table-VI : Year wise distribution of Homicide cases

Year	Total No. of Autopsy cases	Total No. of Homicide cases	% of cases
2015*	473	11	2.33
2016	561	13	2.32
2017	514	15	2.99
2018	551	10	1.95
2019	558	21	3.76
2020	601	12	2.00
2021**	153	04	2.61
Total	**3411**	**86**	**2.52**

*= From March 2015- Dec 2015, **= January 2021- April 2021

Out of total **3411 medico-legal autopsies,** homicidal cases comprised of 86 cases i.e., **2.52% of total autopsy**. From 2015- 2021, the trend of cases of homicide were showing a steady increase, except for the year 2018, where only 10 cases were found. In the year 2020 and 2021 (up to April 30) only 12 and 04 cases of homicide were recorded respectively due to covid-19 Pandemic and subsequent lockdown, which suggest decreasing trend of homicide in COVID-19 period.

Table-VII : Month & Season wise distribution of Homicide cases

Year	Winter				Summer				Rainy				Total
	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	
2015	01	03	--	--	01	--	01	02	01	01	--	01	11
2016	02	02	02	02	--	01	01	01	--	--	--	02	13
2017	--	--	02	--	02	--	03	--	04	--	01	03	15
2018	--	01	03	--	01	--	03	--	01	--	--	01	10
2019	01	03	04	--	05	01	--	--	05	--	01	01	21
2020	--	--	01	--	--	01	02	01	03	--	03	01	12
2021	--	--	--	--	01	03	--	--	--	--	--	--	04
Total	**04**	**09**	**12**	**02**	**10**	**06**	**10**	**04**	**14**	**01**	**05**	**09**	**86**
	27 (31.40%)				30 (34.88%)				29 (33.72%)				

During the period of study **maximum cases** were found in the month of **July** (2015-2021) (i.e., **14 cases**, **16.28%**), followed by **January** (i.e., **12 cases, 13.95%)**. Minimum number of cases were recorded in the month of **August (01 case, 1.16%)**. The table shows that in all three seasons nearly equal number of cases were documented and no uniformity in distribution of cases was observed throughout all months and all

years. On analysing total number of cases in three different seasons, it was noted that there was not any significant seasonal variation in frequency of homicide cases. Still in our study maximum autopsy of homicide cases were recorded in **summer season (34.88%)** followed by **rainy (33.72%)** and **winter (31.40%) season.**

Table-VIII : Age & Sex wise distribution of Homicide cases

Sl. No	Age Group (in years)	No. of cases	% of Cases
01	0-10	04 (M= 02 , F= 02)	4.65
02	11-20	07 (M= 05 , F= 02)	8.14
03	21-30	25 (M= 13 , F= 12)	29.07
04	31-40	18 (M=12 , F= 06)	20.93
05	41-50	17 (M=09 , F= 08)	19.77
06	51-60	07 (M= 06 , F= 01)	8.14
07	61-70	05 (M= 02 , F= 03)	5.81
08	71-80	03 (M= 00 , F= 03)	3.49
09	81-90	00	0.0
10	91- Above	00	0.0
Total		**86 (M= 49 , F= 37)**	**100**

In our study, age group belonging to **21-30** years was highest in number (**29.07%, n=25**) followed by **31-40** (**20.93%**) and **41-50 years** age group (**19.77%).** Therefore, majority of persons in adult age group were the most common victims of homicide. The table shows that 50% of the victims belonged to age group of **21-40 years**. In extremes of age i.e., less than 10 years and more than 80 years, victims of homicide were quite less in number and above 80 years, no case of homicide was reported. From **11–60 years,** male victims outnumbered female victims. Below **10 years** male and female victims were equal in number, while in the age group of **71-80 years,** only female victims were found. The table also shows that total numbers of homicide cases were steadily increasing in number up to age **30 years** and then declining further till **80 years**.

Table- IX : Distribution of Homicide cases according to time of incident

Sl. No	Time	No. of cases	% of cases
01	Morning (6 AM- 12 Noon)	08	9.30
02	Afternoon (12 Noon- 6 PM)	16	18.60
03	Evening (6 PM-12 Midnight)	30	34.88%
04	Late Night (12 Midnight- 6 AM)	08	9.30
05	Not Known	24	27.91
Total		**86**	**100**

The present study shows that highest number of homicide cases (**34.88%**) were committed during **evening hours (6.00 PM-12.00 Midnight**) followed by **18.60%** cases in the afternoon hours. In the morning and late at night, an equal number of cases were registered, while in **24 cases (27.91%)** the exact time of happening of the incident was not mentioned in the inquest report.

Table-X : Distribution of Homicide cases according to Sex, Identity & Place of Occurrence

Sex		Identity		Place of Occurrence	
M	F	Known	Unknown	Rural	Urban
49(56.98%)	37(43.02%)	78(90.70%)	8 (9.30%)	64 (74.42%)	22 (25.58%)

During the study period **56.98%** bodies of **male** and **43.02%** bodies of **female** were autopsied in homicide cases i.e. male outnumbered female victims and the **ratio of Male to Female was 1.32: 1**. Out of total 86 cases, 78 bodies (**90.70%**) were identified and 8 bodies (**9.30%**) remained unknown during autopsy. 64 bodies (**74.42%**) were recovered from **rural** area and **22** bodies (**25.58%**) were recovered from **urban** area, so it is evident that the incidence of homicide was approximately **three times higher in rural area as compared to urban areas**.

Table-XI : Distribution of Homicide cases according to place of recovery of body

Sl. No	Place of Recovery of Body	No. of Cases	% of Case
01	Victim's House	24	27.91
02	Open place (Ground/ Land, Road, Street etc)	25	29.1
03	Farm	02	2.33
04	Forest	04	4.65
05	Pond	03	3.49
06	River	03	3.49
07	Buried in Ground or Sand	02	2.33
08	Ditch	01	1.16
09	Drain	01	1.16
10	Canal	01	1.16
11	Hospital Admission	20	23.26
Total		86	100

In maximum cases **(29.1%)** the dead bodies were recovered from **open places**. In **27.91%** of cases, the body was recovered from victim's house. In 20 cases (**23.26%**) victims were hospitalized prior to death. In **10.47%** (n=9) cases, bodies were

recovered from the places having water source. In **2 cases,** victims' body was found buried either in the **ground** or in the **sand**, which suggests the tendency of the offender to hide the commission of crime.

Table- XII : Distribution of Homicide cases according to relation between the accused and the victim

Sl. No	Relation between the accused and the victim		No of cases	% of cases
01	Relatives/ Family members		22	25.58
02	Known	Neighbour	05	5.81
		Co-workers	02	2.33
		House owner	01	1.16
		Others	22	25.58
03	Not Known		34	39.53%
	Total		**86**	**100.00**

In most of the cases (**34 cases, 39.53%**) relation between the victim and the assailant was not mentioned in inquest report. In **25.58% cases (n=22), relatives or family members were the offenders**. Other than close relatives or family members, the offenders were also known to the victims in **34.88% (n=30)** cases. So it is clear from the table that in **60.47% (n=52)** cases the assailants were apparently known to the victims.

Table- XIII : Distribution of Homicide cases based on Motive

Sl No	Motive	Number of Cases	% of cases
01	Argument/ Sudden Provocation	25	29.07
02	Revenge	13	15.12
03	Marital dispute	03	3.49
04	Infidelity	01	1.16
05	Property dispute	01	1.16
06	Extortion	01	1.16
07	Sexual assault	01	1.16
08	Love affairs	00	00.00
09	Unknown	41	47.67
Total		**86**	**100.00**

In most of the cases (**41 cases, 47.67%**) motive behind the act was not disclosed in inquest report. Among the known motives, **argument between the victim and the assailant,** followed by **sudden provocation** was the principal factor behind commission

of offence. Among others, **revenge** was also notable in **15.12%** cases. In a very smaller number of cases alleged history of infidelity, extortion, property dispute and sexual assault was also reported.

Table- XIV : Distribution of Homicide cases according to Type of Weapon used by the accused

Sl. No	Type of Weapon used	No. of Cases	% of cases
01	Hard & Blunt (Light, Moderate & heavy)	30	34.88
02	Sharp cutting (Light, Moderate & heavy)	28	32.56
03	Hard, Sharp, Pointed	02	2.37
04	Ligature Material	04	4.65
05	Manual Force	20	23.26
06	Thermal Burn	01	1.16
07	Firearm	01	1.16
Total		**86**	**100**

The table shows that the commonest preferred weapons for commission of homicide were **hard & blunt weapons** in **34.88% (n= 30)** cases. In **32.56%** of cases **sharp cutting weapons** were used, while in **23.26%** of cases (n= 20) **manual force** (includes use of fists, hands, legs etc.) was used by the offender. **Ligature material** was applied for murder in 4 cases (**4.65%**), while the use of firearm and thermal burn was also recorded in one case each. It was observed that other than use of manual force, **different types of weapons** were used in **76.74%** of total cases, depending on availability and for ease of access.

Table-XV : Distribution of Homicide cases according to location of injury

Sl. No	Location of injury	No of cases	% of cases
01	Head and Face	37	43.02%
02	Neck	30	34.88%
03	Chest (Front + Back)	12	13.95%
04	Abdomen (Front + Back)	06	4.65%
05	Whole Body	01	1.16%
Total		**86**	**100**

In maximum number of cases **head (43.02%)** was the **most common** region of body sustaining fatal injuries, followed by **neck** in **34.88%** of the total cases. Maximum number of injuries over head and neck region suggests the intention of the offender to inflict fatal injuries on vital parts of body.

Table-XVI : Distribution of cases according to pattern of Homicide

Sl. No	Pattern of Homicide	No of Cases	% of Cases
01	Head Injury	39	42.62
02	Stab injury	06	8.20
03	Cut Throat	09	13.11
04	Multiple Injuries	09	13.11
05	Decapitation	02	3.28
06	Mechanical Asphyxia (smothering, strangulation etc)	17	19.77
07	Firearm Injury	01	1.16
08	Chop wound Neck	03	3.49
09	ITVO (Injury to Vital Organs i.e., heart, lung, major blood vessels etc.)	09	10.47
Total		**86**	**100**

The **commonest pattern of injury** in our study was **head injury in 42.62%** cases followed by **mechanical asphyxia** in **19.77% cases**. Decapitation was found in 02 cases, while firearm injury was reported in 1 case only.

Table-XVII : Analysis of Asphyxia death

Sl. No	Type	No. of cases	% of cases
01	Smothering	04	23.53
02	Manual Strangulation	07	41.18
03	Ligature Strangulation	04	23.53
04	Smothering + Manual Strangulation	02	11.76
Total		**17**	**100**

Amongst the asphyxia death, maximum cases (**7 cases i.e. 41.18%**) were of **manual strangulation** followed by **smothering** (**4 cases**) and ligature strangulation (**4 cases**).

Both **smothering and strangulation** was applied collectively to the purpose of commission of homicide in **2 cases** only.

Table- XVIII : Distribution of Homicide cases based on survival period of victim

Sl No	Survival Period	No of cases	% of cases
01	Spot death	60	69.77
02	< 12 hrs	15	17.44
03	> 12 hrs to < 24 hrs	03	3.49
04	>1 to <3days	05	5.81

05	>3 to <7days	03	3.49
06	>7 days	00	00
Total		**86**	**100**

In **69.77%** (**n=60**) of homicide cases, the victim had died in the place of occurrence. In **17.44 %** cases the victims survived for less than **12 hrs,** while in remaining **12.79%** of cases victims survived up to **7 days** after sustaining injuries. The table shows that no victim had survived beyond 7 days.

Table- XIX : Distribution of Homicide cases based on allegation

Sl. No	Allegation	No of cases	% of cases
01	Homicide	81	94.19
02	Accident	03	3.49
03	Suicide	02	2.33
04	Natural	00	0.00
05	Not Known	00	0.00
Total		**86**	**100**

Most of the cases **(81 cases, 94.19%)** were presented with alleged history of homicide**.** Out of total 86 cases, **5 cases (5.81%)** were brought for autopsy with alleged history of either accident or suicide, which may either be due to misleading history furnished by the relatives or non-specific findings at the time of inquest.

Discussion of local data

In the study at Raigarh, CG, out of total **3411 cases of autopsy, 86 cases were homicide i.e., 2.52%,** which nearly match up with the study **of Parmar DJ *et al* (2015)**[17], where 2.40% of total autopsy cases were homicide and **Gambhir and Gupta (2007)**[71], where they found incidents of homicide in 2.89% of total medico-legal autopsy cases. It is also evident that higher percentage of homicide was recorded in other studies. [13, 72].The present study depicted maximum cases **in summer season (34.88%)** followed by rainy season (33.72%), which matches up with the study of **Mishra PK *et al* (**2012)[14], where the authors had found 33.94% and 33.03% of cases in summer and rainy season respectively. The present study showed that **maximum cases (29.07%)** were in the age group of **21-30 years**, which is consistent with the study of **Parmar DJ *et al*** (2015)[17],where they found the majority of the victims (28.81%) in the age group of 21-30 years, again in **31-40 years** age group, **20.93%** of victims were found, which also matches up with the study of **Sivakumar *et al* (2011)**[13], where they found that **20%** victims belonged to age group of **31-40 years.** Maximum cases (50%, n= 43) were recorded within the age group of 21-40 years. This finding can be ascribed to the fact that such age group is involved in outdoor activities, public dealings, conflicts, addiction etc. in a higher quantum. In the present study 30 cases out of total 86

homicide cases i.e. **34.88%** were committed between **6 P.M. and 12 midnight**, which closely match up with the study of **Patel DJ** (2012)[74] at Bastar Region of CG, where the author had found 30.37% of homicide cases during the same time. During this time period people used to come from work and involved in the superlative degree of enjoyment. Even during this time slot, the possibility of consumption of alcohol is more and hence incidences of family disputes or other disputes trigger off in a violent manner. The study conducted at Raigarh, CG showed that the **majority of victims were male**, which also matches up with the study of **Buchade Dhiraj D. et al** (2019)[18].Dominance of male sex group in homicide cases could be due to more involvement of males in violent & aggressive activities. The study further revealed that the maximum number of homicidal death cases occurred in **rural areas** (**74.42%**) which closely matches with the study of **Mohanty S. et al** (2013)[15], where the researchers had found **79.66%** of cases of homicide in rural areas. Occurrence of homicide cases in higher magnitude could be due to low literacy rate in rural areas. Out of total 86 analysed homicide cases at Raigarh, **48.84%**(n=42) were committed in **open places**, which closely match up with the study of **Shivakumar et al** (2011)[13].The study at Raigarh had revealed that in **39.53% (n=34)** of the total homicide cases, the relation between the accused and the victim was not mentioned in the inquest report, in this regard **Gupta et al** (2009)[78] noted that the majority of the offenders (**40.41%, n=78**) were not known, which may be due to lack of proper history from the concerned

persons. In a significant number of cases (**41 out of 86 i.e.47.68%**) at Raigarh, the motive behind homicide was not known, this observation is in accordance with the study of **Gupta et al** (2018)[79] at Delhi, where the authors had found that, in significant number of cases motive was not known. The present study exhibited that in **34.88%** cases (n=30) **blunt weapons** were used, which is consistent with the finding of **Patel DJ** (2012)[74], where the author had found use of blunt force in 37.97% of cases. The use of blunt weapons in higher number of cases can be attributed to easy accessibility of nearby blunt weapons during intensity of emotion. In largest number of cases **head was the most commonly affected body part** found in the study at Raigarh, which is similar to the study at Bhopal[14] and Guwahati, Assam[77]. Again, H**ead injury** was the predominant type of injury in homicide cases found in the study at Raigarh, such finding correlates with the study of **Malik Y, Chaliha RR et al** (2012)[77] at Guwahati, Assam. This type of finding can be assigned to the intention of the accused as well as selection of vital part of the body. In **19.77%** of cases **violent asphyxia death** were recorded, which closely matches with the study of **Zanzrukiya KM et al** (2014)[80], where they observed asphyxia death cases in **17.81%** cases. Even **Mishra PK et al** *(*2012)[14]at Bhopal also recorded violent asphyxia death in a significant number (15.59%) of cases. The finding of asphyxia deaths in a significant number of cases could be due to knowledge of many offenders about lethal consequences of asphyxiation and various easily available means or methods. In the present study, it was observed that **69.76%**

victims **died on the spot**, which nearly matches with the study of **Jainik P.S. *et al*** (2013)[73] at Rajkot of Gujarat, where they found spot death in **65 %** cases. The higher incidences of spot death in the study can be attributed to lethality of the weapons and severity of inflicted injuries over vital parts as well as lack of basic lifesaving knowledge in people. In the current study 05 **cases were also presented as either suicide or accident during inquest**, but the scientific investigation during autopsy pointed towards homicide. In this regard a case study of **Rastogi AK *et al*** (2018)[75] had proved one RTA case as homicide in Indore of M.P. Even in western world, the study of **Wahlsten P *et al*** (2007)[76] had mentioned that Police did not suspect homicide prior to autopsy in **4%** of cases.

Conclusion

The study discloses that during the period from March 2015 to April 2021, covered by this study, 86 autopsies of homicide cases (out of total 3411 autopsies) were performed at Late Shri Lakhiram Agrawal Memorial Govt. Medical College, Raigarh (CG) & associated KGH Hospital, The analysis of findings of the autopsy data has revealed that-

➢ Homicidal deaths comprised of **2.52%** of total autopsy cases.

➢ The maximum number of cases were found in **summer season** (34.88%) followed by **rainy season** (33.72%).

➢ The age group belonged to **21-30 years (29.07%) was predominantly** affected age group, followed by **31-40**

years (20.93%).

➢ **Highest number (34.88%)** of homicidal cases were committed during **evening hours** (6 PM- 12.00 Midnight).

➢ **Male victims (56.98%)** outnumbered **female victims (43.02%)** and **M: F** ratio was **1.32:1.**

➢ In **90.70%** of total homicide cases, the **identity of the deceased was established** prior to autopsy, while in **9.30%** of cases the deceased remained unidentified at the time of autopsy.

➢ The total incidence of homicide was **74.42% in rural area** and **25.58% in an urban area**.

➢ In a majority of the cases **(29.1%) victim's** body was recovered from **open places**.

➢ In most of the cases **(39.5%)** the **relation between the victim and the assailant was not known**.

➢ In 47.67**%** of cases the **motive behind homicidal act remained unknown**.

➢ The commonest preferred weapon was **hard and blunt weapon** in **34.88% cases** followed by a **sharp cutting weapon** in **32.56%** cases.

➢ **Head (43.02%)** was the most commonly targeted the region of the body followed by the **neck (34.88%).**

➢ The commonest pattern of injury was **head injury (42.62%)** followed by **mechanical asphyxia (19.77%)**. Among the asphyxia deaths, **manual strangulation (41.18%)** was most commonly applied method.

➢ In **69.77%** of cases **victims died on the spot**.

➢ The majority of the cases (**94.19%**) were brought with the **alleged history of homicide**.

Suggestions

On a careful examination of national data i.e. **Crimes in India** it is evident that Chargesheet rate is higher than conviction rate in homicide cases. There are several cases, where the different Hon'ble constitutional Courts had cast aspirations on (i) Perfunctory investigation [81, 82, 83], (ii) Imperfect autopsy report [83, 84] and (iii) Improper reports submitted by scientific community [39, 85, 86]. Moreover, in **State of Gujarat v. Kishanbhai Etc.**[11] the Hon'ble Apex Court division bench comprising C.K. Prasad and Jagdish Singh Khehar, JJ. had directed all the Secretaries of Home Department of States and UT to conduct the auditing of actual cases belongs to heinous nature of crimes against human body to fix the responsibility behind such acquittal.

Therefore, in the light of foregoing background to this important subject of scientific aid to the criminal justice system and for the interest of criminal justice delivery system suggested that the followings steps/initiatives are being suggested for implementation, to the extent feasible, for very significant improvement in the quality of investigation by the enforcement agencies, and to secure enhanced conviction rate in the trial Court with a view to ensuring securing justice to the victims of crime and the arraigned accused:

1. **Providing static and movable freezers to the autopsy centres, where such instruments are not available.** Such step will enhance the protection of dead body from decomposition because for unidentified dead bodies 72 hours is a mandatory waiting period prior to autopsy.

2. **Body sketch to accompany medico-legal certificate, post-mortem report and inquest report**- Every Inquest Report, Medico Legal Certificate, Post-Mortem Report shall contain a printed format of the human body (both frontal & rare view) on its reverse and injuries, if any, shall be indicated on such sketch.

3. **Photographic presentation of crime scene & autopsy work**- The photographs (Still & video) should be done by skill hand coupled with a reference scale and close and distant range, so that interpretation of various objects and body parts sustaining injuries can be established with precision.

4. **Scene Mahazar/ Spot Panchnama**- In this regard the I.O. should follow the guide lines framed by the Hon'ble Apex Court division bench comprising A.S. Bopanna, V. Ramasubramanian JJ. in **Re: To Issue Certain Guidelines Regarding Inadequacies And Deficiencies In Criminal Trials, v. The State of Andhra Pradesh & Ors**.[26]

5. Maintaining a chain of custody should be the responsibility of every column of prosecution (Police, Forensic Medicine & Forensic Science).

6. To enhance the conviction rate proper training of investigating Police officers in medico-legal and forensic field regarding relevance of physical evidence, their identification, collection, storage, transportation and submission to appropriate agency for examination and analysis, which will be in the greater interest of justice.

7. Reliability and reproducibility of the tests should be the liability of the forensic science institution concerned.

Further suggestions

The contents of this article have been enriched by describing various situations where the investigating Police officer needs guidance as to the specific provisions of law/rule that enables him to steer his course of investigation further most logically to conclusion while remaining very well-aligned to the extant legal/rule position. Keeping in view their utility to ensure flawless investigation and its sustainability in a Court of law, it is imperative that these provisions are included in all training programmes related to criminal investigation in general and investigation into deaths by unnatural causes in particular.

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Facial recognition in policing as a public policy: A study of various initiatives in India

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Ankita Singh**

Abstract

In India, aided by increasing smartphone penetration and advances in artificial intelligence Facial Recognition Technology (FRT) is continuously making inroads in various areas of policing. As a result, a lot of FRT based initiatives in policing have come up at the state and national level. This study discusses these initiatives with policy choices and recommendations to regulate FRT in policing.

Introduction

Face recognition is the science of understanding of how faces are recognized by biological systems and how this can be emulated by computer systems.[1]

FRT has matured with the advances in Artificial Intelligence. There have been exciting uses of FRT in developed countries. It has found its use in social media, security systems, access control, biometrics, commercial identification and marketing tool.

Coupled with ubiquitous mobile, social media and 4G revolution this technology can solve some of the age-old problems of policing like lost and found, human trafficking, criminal tracking, access control, crime detection and investigations and verification in Indian context.[2]

Indian Police have also started using FRTs to deal with increasing public expectations. Lately, there have been various facial recognition projects in policing by central governments and state governments. Use of FRT in policing has its positives and negatives. The positives include increased efficiency, economy and effectiveness whereas on the negative side, there are concerns related to the reliability, maturity, transparency, accountability, privacy, bias, discrimination and preparedness with respect to use of such a powerful technology in policing.[3]

Over human history, we have seen technologies ranging from nuclear power to missile technology. Technology is not a boon or bane but it's how we use it. For e.g. Nuclear power is used both for peaceful purposes like energy generation and for

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destructive purposes like nuclear weapons as well. There are a variety of views about how we should use this technology. They range from complete ban to self-regulation or no regulation. It will be prudent to take a middle path with appropriate regulations and safeguards along with well-designed checks and balances.

Facial Recognition Initiatives in Indian context

United Nations recommend 222 police personnel per 0.1 million population. In India, State police forces had 24% vacancies in January 2016. Hence, while the sanctioned police strength was 181 police per 0.1 million population in 2016, the actual strength was only 137 police.

During 2005-2015, the crime has grown by 28% per 0.1 million population. In 2015, only 47% of registered cases convictions were secured. According to law commission, poor quality of investigations is main reason for low percentage of convictions.[4]
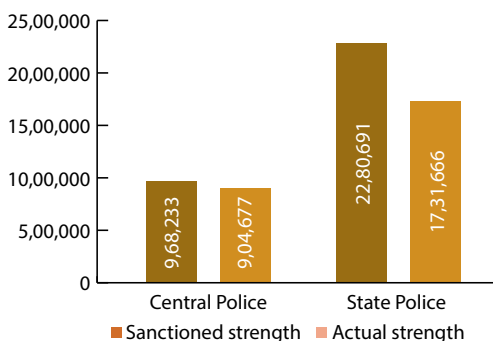
Sources: Bureau of Police Research and Development; PRS.

As the police find it hard to deal with the increasing crime with fewer resources, technology as a force multiplier is an obvious solution. Here are some of the FRT based national and state level solutions.

National Crime Record Bureau (NCRB) is working on Nationwide Automated Facial Recognition System (NAFRS) which will be used for tracking criminals, missing children and persons and identifying unidentified dead bodies. It will collect the information from a variety of sources including CCTVs.[5]

The main advantages cited for NAFRS are timely and relevant information gathering, criminal identification, verification and its dissemination for investigation and detection among various police organizations and units across the country.[6]The critics point out mainly the concern of mass surveillance, absence of stakeholder consultation, loss of privacy amongst other concerns.

Punjab state police have been using PAIS (Punjab Artificial Intelligence System) as a mobile app which uses facial recognition and natural language processing to identify criminals. It also uses gang analysis, phonetic search technologies.[7]

The Uttar Pradesh police use Trinetra (The third eye) which was developed to centralize and digitize criminal records. It uses the jail and police databases to create a holistic database of criminals. It also uses facial recognition and sketch-based search technologies to identify criminals.[8]

The main advantages with these initiatives are mobility, ease of use and centralized information. But, the quality of photographs and data quality authenticity are major criticisms, it might lead to a false positive and cause harassment of law-abiding citizens.

Reunion solves the problem of missing children or persons. Though there are different mobile applications available

for finding missing persons but Reunion is unique in the way it uses the FRT in matching the geo-tagged images in lost and found database.

On one hand, the police version of App is used for reporting lost persons when lodging a complaint. On the other hand, a citizen version of App is used to report found persons. Police and child line numbers are readily accessible from the app. One dashboard having a global view of lost and found databases along with match alerts is for coordination between multiple agencies.

Child line can act as a centralized agency which can monitor all alerts across the nation on dashboard and can act as a coordination agency between different police stations.[2]

About Us

What is 'Reunion'?

'Reunion' is a technology platform for law-enforcement and volunteer such as citizens, NGO or Shelter homes. The citizen application allows volunteers to report any child or person found when spotted. The police application helps law-enforcement agencies to report missing child or person.

The platform uses advanced face detection and comparison technology to match found persons with missing reported. The platform matches the child or person's face and sends notification to relevant law-enforcement agencies to take necessary actions to reunite families. It also has web based dashboard for NGO and Shelter homes to help reunite found child or persons with their families.

SMF
SUDHANSHU MEHTA FOUNDATION

Conceptualized By
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Sources: Ashish Tiwari, Chirag Shah, Indian Police Journal (2018). Reunion: Novel application of facial recognition in policing

DARPAN (Mirror) project from Telangana police also tries to solve the problem of missing children. It collects the data of missing children from police records along with national lost and found portal.[9] The found children database is made by children found by police, NGO or at shelter homes. It does a centralized one-time match of these databases to find the missing children.[10] Delhi police have also used Automated Facial Recognition System (AFRS) for

matching up with missing children and also identifying protestors.[11]

Pehchan[7] (Identity) solves twin problems of verification and intelligence using facial recognition. It interestingly uses crowd sourcing for gathering intelligence and shifts power of verification from police to the citizens using technology. The Police App feeds criminals' photos in a criminal database. The citizen can verify any person's criminal antecedents against this database by just clicking a photo before entering into any contract with him/her. The hospitality industry in a city can also cross check the new guests by taking a photo with the mobile application and help in collecting real-time intelligence for police control rooms.

Central Industrial Security Force (CISF) which is in charge of airport security in India has proposed 'digiYatra' (digital travel) project for access control using facial recognition.[12]

Similarly, SmartEPolice[13] project of UP Police uses facial recognition for access control of the policemen deployed for a dignitary's visit.[14]

The main advantages of these Apps are that they solve the problem of information asymmetry between different organizations and also force the police into action using technology leading efficiency and economy.

But in all these mobile applications, data quality leading to false predictions, transparency of database and processes, security and safety of data in the absence of third-party audit of database are pertinent issues.

Problems with FRT in Indian context

The FRT is not fully accurate and reliable, as it depends on the algorithms, quality of training data, and quality of input image as well.[15] It is shown it can be confused with 3-D printed heads to give false positives.[16] Though recently technology has improved a lot.

Since, it is an artificial intelligence-based system. So, the process and logic of matching is also not clear to the developers either, who have made the system.[17] The system intelligence depends totally on the quality and quantity of training data. This can lead to bias and discrimination[18] and lack of transparency in the system.

In a vast country like India where, in remote areas, the basic infrastructure like electricity and mobile network is an issue, policing based on facial recognition will not be always possible.

India has Information Technology (IT) Rules, 2011, under the IT Act, 2000[19]. It categorizes the biometric data as 'sensitive data' but 'body corporate' does not include the government. The definition of sensitive personal data under the rules is narrow. Though Indian constitution guarantees 'right to privacy' but in the absence of data protection and privacy act, it leads to imbalance between citizen privacy and government's power to use facial recognition.

Policy Alternatives

It is clear from preceding discussion that FRT usage in law enforcement is at a nascent stage, so it is the right time to

regulate it. We have four policy choices across the spectrum to regulate FRT –ban[20], self-regulation[21], regulation by government and no regulation.

Some of the actors in policy formulation are advocating a total ban on the use of facial recognition especially by the government. Since, some countries don't have strong institutions to guarantee the right of privacy to citizens, so it makes it a tempting policy choice for those countries. But technology is ubiquitous in a globalized world so it will be very difficult to implement.

Self-regulation by private and public sector organizations is another policy proposal. In India, media is mostly self-regulated[22], so a similar model can be followed in regulation of facial regulation. But the FRT is far more intrusive and can have a wide effect on the public order and national security in case of inappropriate unregulated use.

The literature review points us to the fact that there is a greater agreement that some form of regulation is necessary. So, given the capabilities and effect of the FRT, no regulation as policy choice might not be prudent.

Finally, if we have to regulate FRT, then what should be the principles of such regulation? The Justice B.N. Srikrishna Committee on data protection recommended the need of checks and balances to avoid becoming a surveillance society.[23]Based on the recommendations of committee, Personal Data Protection Bill, 2019[24]was proposed that regulates personal data related to individuals, and the processing, collection and storage of such data. Recently, with 89

amendments the bill is about to be tabled in parliament. In a setback to FTR, it makes it a criminal act to knowingly match anonymous data with publicly available information to find out the identity of an individual.[25]However, it provides exemptions as well in processing of personal data in some cases for e.g. cases related to national interest, public order, prevention, investigation, or prosecution of any offence, legal proceedings, or research and journalistic purposes, providing benefits for a citizen and medical emergency.

In the famous Puttaswamy judgement[26], the Supreme Court of India held that right to privacy is not an absolute right, but the basis of state interference can be in a "fair, just and reasonable" manner only. Any restriction of privacy should pass tests of legality of means, legitimate goal and proportionality between means and goal.

This test of proportionality was further clarified by the Supreme Court of India in the landmark 'Aadhar'[27] case by the concepts of effectiveness and necessity. Necessity was defined to have no disproportionate impact on the right holder. But, in case of mass surveillance by CCTVs, a law-abiding citizen can be falsely implicated due to a false positive by FRT. Effectiveness of means is a precondition for necessity. As FRT is not fool proof, so its effectiveness and hence necessity is questionable.

So, the regulation has to take a middle path, it has to encourage innovation as well as it has to stay true to the above-mentioned tests.

Policy Recommendations and Conclusion

On the basis of the preceding discussion, following policy safeguards about usage of FTR in policing are proposed:

1. There cannot be a legal vacuum. So, based on the principles laid by Puttaswamy and Aadhaar judgements, the data protection law should be a precondition for usage and regulation of the FRT.

2. In consultation with all stakeholders, internal and external checks and balances should be ingrained in the FRT system.

3. In India, in case of call interception permission from the highest-ranking administrator i.e. home secretary is required. In case of usage of FTR for lawful purposes, similar permission should be sought.

4. The design of the FRT systems with logs should increase transparency and accountability of the system with a transparent system design, terms and conditions and regular performance audits that are to be put in the public domain.

5. The FRT databases should not do mass surveillance but databases should have specific category persons only.

6. Third party audit of the data by a committee having all three wings of government should be made mandatory.

7. To prevent data breaches, appropriate levels of cyber security standards should be prescribed.

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Colonial Police in Madras Presidency: Shifting Priorities

Nuti Namita*

Abstract

This paper gives a comprehensive account of the Police system in the Madras Presidency during the colonial period. The Police as an institution play a vital role in maintaining peace and order in society. However, colonialism creates its own unique imperatives. The Indian subcontinent has been under British colonial rule for over two centuries until 1947. To administer a vast country like India with a hugely diverse population, the British colonial rulers had to devise a Police structure which would not only help in upholding law and order but also ensuring the advancement of its commercial interests. The colonial instruments of criminal justice and Police systems played a crucial role in maintaining their dominance and supremacy in India. This paper will analyse the particular shifts in the policing strategy of the colonial government in the Madras Presidency. In 1858, East India Company was dissolved and the British Crown took over the direct control of the government in India. How was Police organisation in India impacted? What were the changing priorities of the colonial government after 1858? How was Madras Police affected? This paper will examine how the Police organisation, largely composed of Indian people was significantly responsible for the continuance of colonial rule in India in general, and Madras Presidency in particular.

Keywords: *Police, Madras, Presidency, law and order, colonial, East India Company.*

Introduction

Madras, Chennai in the present day, was not just a capital city, as it is now, but encompassed a huge and varied geographical area on which diverse people lived, who spoke different languages, ate distinct food and followed various religions. Madras Presidency was the most significant province of British Raj in South India, extending from present day South-coastal

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Orissa, coastal Andhra, covering a major part of Karnataka, down to Tamil Nadu and some parts of Malabar Coast in Kerala as well.

The history of South India dates to several centuries and since it is a peninsula surrounded on three sides by sea, it has always been, open to influence from outside lands. It had interdependent relations with North India, however, it succeeded in creating a rich historical tradition rooted in its literature, religion and environment. The first Europeans to arrive in India were the Portuguese who followed the steps of their legendary explorer and trader, Vasco da Gama, whose appearance in Calicut (Kozhikode) in 1498 on the Malabar Coast of India was the beginning of the long era of European presence in India.

For almost a century the Portuguese maintained their supremacy in trade on the west coast of India. Pulicat, 38 miles north of San Thome, was secured by the Dutch for trading activities in 1602.[1] Dutch had the upper hand in eastern trade, becoming major rivals not only to the Portuguese but also to the British and the French. France, also a sea-faring country and buoyed by mercantilist ambitions was not far behind to secure bases in India. A French East India Company was established in 1644, which subsequently possessed fortified settlements at Pondicherry and Chandannagar.

The British were on the lookout for new pastures to trade as well. English East India Company received the royal charter to trade in India in 1600. East India Company, very soon, was to swamp all of India and establish its suzerainty, by defeating not only the native kingdoms but also by overpowering the rival European powers.

Founding of Madras: Madras presidency

English East India Company formally started trading in India from 1613, the first factory being set up in Surat.[2] In South India, they acquired two ports on the eastern coast: Machilipatnam and Armagaum (1626), where they established their factory and conducted trade for some time. When these ports were unable to earn handsome profits, they started scouting for suitable trading base on the Coromandel Coast.[3] Francis Day, the chief of Armagaum factory began this search, and after consultations with the Portuguese who were already entrenched in San Thome, and after negotiating with the local naik, he finally was able to zero in on a strip of narrow land, five miles in length which was originally the village of Madraspatam on the Coromandel Coast. On 22nd August, 1639, a descendent of the erstwhile illustrious Vijayanagar Empire, Venkata 111, granted the English, through a farman, a specific, not very large territory, contained within the limits of Madraspatam.[4] It came to be known as Fort St. George. In 1661, the English King, Charles XI, through a Charter, granted the governors and councils

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2   Bandyopadhyay, Sekhar. *From Plassey to Partition; A History of Modern India,* Orient Blackswan,2004, p 7
3   ibid
4   Verma, Amit. *History of Madras Police, Chennai, p2*

of the factories, power to exercise civil and criminal jurisdiction over both Indians and other inhabitants of the settlements, according to the laws of England. Madras started as a small establishment, but within a period of less than half a century, it had developed into a proper city.

Madras Presidency expanded over a period of time. By 1800, it had incorporated many districts ceded by the Nizams and some territories acquired from Mysore on the death of Tipu Sultan. In 1839, internal mismanagement on the part of the Nawab of Kurnool led to the annexation of his state. Tranquebar was purchased from the Danes in 1845. In 1862, the District of North Kanara was transferred to Bombay.[5] By the middle of the nineteenth century, Madras Presidency consisted of twenty-two districts and five dependent native states. The Laccadive Islands from administrative point of view were part of Malabar and South Kanara. The districts were as follows: Ganjam, Vizagapatam and Godavari, Anantapur, Bellary, Kurnool, Cuddapah, Kistna Nellore, Chingleput, North Arcot, South Arcot, Tanjore, Madura, Tinnevelli, Salem, Coimbatore, Nilgiris, Malabar and South Kanara.[6]

History of Police

The Police, as being part of administrative machinery of the state to protect life and property came into existence with the inception of civilized society. The Police, in one form or the other has existed since society came into existence. The Police were considered as the primary tool of the state/ruling class. "A society dominated by a ruling class needs a coercive instrument to maintain this class control over basic resources and over a labour force necessary to produce surplus goods to support the ruling class."[7](Hass, 1982: 173-174). "Indian Police history can be seen as the expansion and contraction of an imperial power always set upon an impermeable stratum of village institutions. Structures came and went, but there was no qualitative evolution from one imperial high-point to another."[8] 'The government formed certain rules and regulations for promoting the welfare of the people and restraining the activities of the lawless elements. [9]

Police as an institution, as it exists today, has evolved over several centuries, tracing its roots to the long gone period. Police as an independent administrative institution in India, however, developed only during the British colonial period, which to a great extent was an amalgam of various features prevalent during the Medieval ages and some borrowed from the British structure of law and order. The present Police system structurally and functionally owes its existing structure to the various Acts and Enactments promulgated by the colonial rulers.

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5   Imperial Gazetteer, Madras province. P24
6   W.W Hunter. *Imperial Gazetteer of India; From Madras to Multai*. Vol. 1X. 1886. P16
7   Hass, 1982: pp173-174
8   Bayley, David. *Police and Political Development in India.* Princeton University Press, 1969.p39
9   G.O.Ms.No. 1208, Home Department, dated, 25-05-1976.

History of Police in Madras Presidency

South India, as we can discern from historical evidence from the Vijayanagar Empire, had an evolved policing system. The duties of Police have been defined by Abdul Razzak as "to acquaint themselves with all the events and accidents that happen within the seven walls and recover everything that is listed, or that may be obstructed by theft, otherwise they are fined."[10] "The traditional Police of South India were of two kinds-the Taliyaris and the Kavalkars."[11] In pre-colonial South, feudal system provided the framework for Police systems. The feudal landlord through his retainers in the village, and by utilising the service of the taliyaris (village watchmen), would ensure that law and order was maintained at the village level. The office of the taliyari was hereditary and he was remunerated with a share in the harvest or with a small rent-free land. The British muddled into the age-old system and created disaffection. Taliyaris were divested of their land and were in turn given a small stipend by the British. Then in 1802, Regulation XXXV introduced the Darogha system in Madras Presidency. Each district was divided into small Police jurisdictions with an area of about twenty sq. miles. In each division, a Darogha and a thanedar were employed who were under the supervision of the collector.[12] This was a measure to supplement the existing rural system. However, it also failed in its objective of containing crime; *Daroghas* were corrupt and despotic. In 1816, after a thorough assessment, the *Darogha* system was abolished and the *taliyaris* were restored as the traditional watchmen under the supervision of the village headmen. However, the gradual decline of the *taliyari* system could not be stemmed. In a district Police report compiled by William Robinson in the 1850s, there were frequent references to the decay of the taliyari as being part of the Police institution.[13]

Kavalkars were originally state appointees who also acted as local auxiliaries. They were, unlike the *taliyaris,* responsible for several villages and had the right to collect protection fees (*kaval*) for the task they performed as protectors. Very soon they became predatory and corrupt, assuming the role of 'robber Police'.[14] J.H Nelson described the *kavalkars* as potential *poligars* who "gained an influence and authority over the *ryots* which was highly undesirable and indeed productive of the worst consequences."[15]

The all-powerful '*poligar-warrior elite*'[16] (landlords) were at the helm of the hierarchy to maintain peace in their area, ensure trouble-free rent collection and prevent robbery and violence.

East India Company came to South India for the highly beneficial trade in pepper and cotton textiles. Although, when the

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10   Sharma, Anupam. *Police in Ancient India.* The Indian Journal of Political Science , Jan.-March, 2004, Vol. 65, No. 1 (Jan.- March, 2004), p108

11   Op.cit. Arnold p17

12   The History of Madras Police: Centenary Volume. 1859-1959. P96

13   Robinson to CS, 24th Feb 1861, Jdcl. Proceedings,9-10, 4th April 1861, IOR

14   *op.cit.* Arnold p19

15   J.H Nelson, The Madura Country Manual (Madras, 1868), Part 4, p21

16   *op.cit.* Arnold, p11

East India Company established its dominance in the South in the latter half of the eighteenth century, many were still convinced of the feasibility of retaining the indigenous Police system. Munro believed in the credibility of the 'ancient system of Police in India'.[17] Restoring the indigenous system was according to Munro highly beneficial to the colonial interests. However, very soon it became clear that the pre-colonial system was ineffective and did not serve the purpose of the colonial rulers. By the beginning of the nineteenth century, the East India Company had formed its ascendancy in South India. The province of Madras embraced a large area, including Tamil Nadu, parts of Andhra territory, and a small Kannada speaking area and some parts of Malabar Coast. The essentially military nature of their acquisitions ensured that the East India Company relied heavily on the military troops. But in the 1850s, this overdependence on the army for maintaining their control over the populace was becoming unsatisfactory. "To maintain and consolidate its hold over the province, the Madras government needed to refine and to strengthen its civilian administration."[18] Apart from the usual misgivings about the continuation of the military Police, there were specific reasons to create civil Police in Madras. Madras was a huge province and there was inadequate supervision of European officers over the area. There were frequent complaints of torture committed by the local indigenous Police functionary. A torture Commission was instituted by the Madras Government in 1854 to investigate

the complaints. This Commission submitted its report in April 1855. In this report, it admitted that torture had been practiced in the country for long by Police and revenue functionaries.The remoteness of several interior districts of the Madras Presidency created additional problems. There was a spate of violent crimes which the Police were not able to control. The vulnerability of the European officers was revealed when there were a series of attacks on them. The case in point was the assassination of H.V Conolly, the District Magistrate of Malabar in September 1855. Conolly had ineffectively tried to subdue the Muslim *Mappila* community from targeting the rich Hindu landlords. In 1854, the Malabar Warknives Act was passed which authorized the confiscation of their weapons. The assassination was a backlash against these measures of Conolly. The assassination was a big blow to the prestige and credibility of the colonial rule. There was an implicit realization of the failure of the existing Police administration in the province; to assure security and uninterrupted flow of revenue, to create secure environment for trade and property. Thus, British policing models were deemed necessary in the Indian setting.

Madras Police Act of 1859

Functionally, Indian colonial Police was based on the Royal Irish Constabulary, which was more centralized, authoritarian, and militarized. It was felt that it fitted with the Indian colonial conditions better. "No system of Police has ever worked for the suppression of political agitation, or agrarian

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17   Selection of papers from… East India House,11, p107
18   *Op.cit.* Arnold p 15

disorder, than the Irish Constabulary"[19], argued Sir Hugh Rose, Commander-in-chief of the Indian army in October 1861. It was Sir Charles Napier who had introduced the Irish model of Police in Sindh for the first time in India in 1843. Subsequently, bits and pieces of the Sindh model were introduced in Punjab after its annexation in 1849. The military element in the Sindh Police was strong, even though Police were separated from the army. There were some discussions about introducing this model in Madras too. But ultimately, it was found unsuitable. The Irish model seemed too military dominated for Madras. The more militarized Irish model was better fitted for the newly conquered provinces i.e., Sind and Punjab. Madras had long been subdued and a more balanced Police force was the need of the day.

The Madras Police Act of 1859 distinctly separated the unarmed Police from the armed sections of the Police. They hardened into two separate, distinct branches of the force "with no interchange of personnel below the inspectorate."[20] Another major feature of the Act was the total integration of the Police force with the provincial state structure. Police were organised on a provincial, rather than an all- India basis.[21] It was felt that the Madras Presidency was vast with huge regional variations which made it impossible to supervise Police work from a single centre. "In Madras, Act XX1V of September 1859, authorized the formation of provincial constabulary. The first district force was established in North

Arcot in 1859 and by the end of 1860, fifteen of the twenty districts of the Presidency had been brought under the new Police."[22] Through this Act, "three levels of supervision and control was enacted. First, was the supervision of the civil administration over the Police department; Second, the supervision of European officers over Indian subordinates and third, a rigid hierarchical division between the superintendency at the top, inspectorate in the middle and constabulary at the bottom."[23] Europeans were posted in key superior posts whereas the Indians, though more in number were placed at subordinate positions. Another way of keeping check on Police, was to make it answerable to the provincial government and civil service. There was integration between the Police and civil administration by bringing the Police under their supervision and control, both at the provincial and district levels. The Chief Secretariat acted as the nodal agency for Police in Madras province. A slight change occurred after the introduction of provincial autonomy by the Government of India Act of 1935. After the elections of 1937, an Indian minister took over the Police portfolio that coordinated with the bureaucracy through the Home department rather than the Chief Secretariat.

At the district level, the Police were subordinated to the District Magistrate/ Collector, although, in 1856, a post for Superintendent of Police was created. However, the Superintendent was outranked

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19   Minute,12 October.1861, India Jdcl Process,32,8 March.1862, IOR
20   *Op.cit.* Arnold p28
21   MPAR,1874, pxxxix
22   *Op.cit.* Arnold p28
23   Ibid p29

by the Magistrate in the District. The magistrate "would direct the distribution of the Police and call for their services when required, but he would have nothing to do with the interior economy of the force. That would be regulated by the [chief] Commissioner under the orders of the government."[24]

Establishment of Special Police force

20th century ushered in a period of renewed and more persistent nationalist agitations and disturbances throughout the country. Madras Presidency was no exception. Many areas of the province were rocked by rebellions and unrest. The existing district Police, though, expanded over a period, was not enough to bring control. Therefore, it was decided to constitute armed 'striking forces. Two major striking forces were formed in the Madras Presidency.

The Malabar Special Force

The Malabar region in Madras province had always been more volatile but in the second decade of the 20th century, the level of unrest and violence reached an unprecedented level which the local Police were unable to suppress. The physical features of the Malabar were unique. It had dense forests, interspersed with hills, backwaters and narrow passages. The network of communication and transportation was scanty. And, more significantly, *Mappilas* were becoming a huge problem. Mophlas were mostly, converted Muslim agricultural

tenants who held antagonistic sentiments against their rich Hindu landlords. They also harboured fanatic zeal and regularly perpetrated acts of violence. In 1919, when the Khilafat movement was at its peak, the *Mappilas* used this as an opportunity for religious propaganda. And in August 1921, Mappilas started a rebellion in the southern taluks which alarmed the British government. It was a logical outcome of the "insidious propaganda of the non-co-operation and *Khilafat movements*."[25] Lord Willingdon, the Governor of Madras, interpreted the rising as "an organized effort to upset the British Raj and sought powers to deal energetically with the rebels to steady things elsewhere in the presidency."[26]

They had limited options as calling the Army was to be avoided, Jallianwala Bagh had recently happened. The best solution was the formation of a special paramilitary force to fight against the rebels. On 30th September 1921, the Government of Madras constituted a body of armed Police, which was to be called the Malabar Special Force. They were equipped with the latest weapons and were successful in crushing the rebellion. As a future measure, it was decided that the MSP would not be restricted to the Malabar region but would be used in the whole province,ll as and when required. "In 1928, they were used alongside railway Police during the South Indian Railway strike and in 1928-29, were sent to Madras city to prevent disturbances during the visits of the Indian Statutory Commission." [27]

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24   MacLean, Statement of the Police committee, p 191

25   Madras Public Dept. circular 3 I O-S, 3 September I 92 I, T.N.A., S.F. 328, l5 November I 92 I, p. 7 I.

26   Willingdon to E. Montagu, Secretary of State, 27 August I92I, India Office Library, London, Willingdon Papers, F. 93/.

27   Arnold, David. The Armed Police and Colonial Rule in South India, 1914-1947 Modern Asian Studies , 1977, Vol. 11, No. 1 (1977), p112

The East Coast Special Police

Another region of concern for the Government of Madras in the early 1920s was the East Coast, particularly, the Telugu districts of Guntur, Kistna, and Godavari. Motivated by Gandhi's programme of nationalist movement, the people in this area were prone to agitations. Non-Cooperation Movement, especially, had drawn in several people in its fold. Madras government did not want to leave anything to chance. The East Coast districts were only "partly integrated into the economic and political system of the rest of the presidency."[28] "It was cut off from the coastal plain by the mountains of the Eastern Ghats and it was mainly populated by tribal peoples."[29] In 1922-24, there occurred a *fituri* rebellion in the Godavari area against the tyranny of the local officials. The existing Police structure was not equipped to quell the uprising. East Coast Special Police was formed which was modelled on the Malabar Special Police. However, by 1927-28, it was deemed as a failure. "The force was disbanded, and the district armed reserves strengthened in its place."[30]

British rule in India faced graver challenges in the 1930s and 1940s. Gandhi's strategy of non-violent Satyagraha was bearing fruit. Millions of Indians took to the streets demanding self-governance. The Salt Satyagraha engulfed the whole of India in its frenzy. Madras was no exception. Madras Government was getting convinced about the necessity of permanent paramilitary force to deal with mass movements. "The new force called the Presidency General Reserve, was quickly recruited, trained, and equipped with muskets made available by the rearming of the district reserves with new smooth-bores"[31] Government of India Act of 1935 introduced Provincial Autonomy in British India. Under that provision, Provincial elections were held in 1937 and Congress came to power in Madras province. C. Rajagopalachari, as the Premier and the Home Minister was inclined against socialists and labour unions. Thus, during the two years of his government, repressive powers of Police were freely used. Rajagopalachari told the Madras legislature in I939 that since violence still existed in the presidency "there is therefore a need for counter violence on the part of the Government".[32] With the spread and aggressiveness of the Quit India agitation in 1942, and the onset of the Second World War in 1939, the government perforce had to increase the strength of the Police reserves as well as paramilitary forces.

To sum it up, we can say that the Police systems in both the Madras Presidencies were initially based on the existing village Police structure. It was only after the 1857 Revolt, that the British Government brought about reforms to establish a uniform Police system in Madras. The Police Act of 1859 was implemented in all the districts of the

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28 *ibid* p113
29 Frederick G. Bailey, Tribe, Caste and Nation A Study of Political Activity and Political Change in Highland Orissa (Manchester 1960). Pp175-83
30 Inspector-General to Chief Secretary, 25 October I927, T.N.A., G.O. 259 Judicial (Conf.), 14 May 1928. pp. 21-22
31 *Op.cit.* Arnold. P 115
32 Madras Legislative Assembly Debates: X1,21 March, 1939, p491

Madras Presidency. The structure thus established remained in practice without any major changes, till 1947.

History of Police in India is characterized by trials, errors, vicissitudes, and imperatives of an imperial government, changing priorities and changing context. India, after Independence, retained the basic structure of Police organization, though the nature of policing did change.

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Combating Crimes by POC Model

Dr. L. Kailasam*
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Introduction

Sustaining peace in any society comes with a cost. Brand and Price (2000)[3], attempt to estimate the various components of crime costs, such as tangible/intangible costs. Tangible costs are for security. Official surveys are used to estimate the hidden crime rate (using the inverse of the propensity to report crime) and the costs occurred (e.g., asking the value of stolen or damaged properties). Intangible costs normally refer to fear, suffering, pain, and diminished quality of life. One of the most important intangible costs in sustaining peace by preventing crimes is that more than thirty-four thousand police personnel had sacrificed their lives and about seven hundred police personnel are attaining martyrdom[4] each year in protecting Indian fellow citizens. Though the police personnel perform their dedicated duties and researchers continuously try and find the ways to reduce the gravity of risk of police personnel as well as combating the crimes by innovative ideas like Community Policing, Problem Oriented Policing, Continuous Capacity Building etc. Despite these activities, the occurrences of the crime incidences and consequently crime rates have not reduced. Crimes, instead, grow every year. The exponential increase of the crime incidences and crime rate may be due to economic and technical and social factors and consequent development of society.

Is it possible to eradicate all the types of crimes and form a new society without crimes? It is not possible to locate a single nation without any crimes. It is impossible to remove the crimes totally in any society, unless all the members in society decide not to commit crimes. As it is extremely difficult or impractical to accomplish such angelic ideal situation, the occurrence of crimes is inevitable in any society. Though crimeless society is unrealistic and unattainable, the occurrences could be effectively controlled by taking various precautionary measures.

In this pioneering endeavour, a preliminary attempt is made to estimate the saturation point (defined elsewhere in this article, on the lines of Enrico Ferri) of crime incidences of various types of crimes by adopting

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Mathematical Modelling to estimate the permeation level of various crimes. The identification of the saturation level of various types of crimes will facilitate to identify the crimes, for taking immediate precautionary experimental measures to combat them. If the incidences of such crimes are reduced by experimental measures, it could be continued further to combat such type of crime. If the precautionary experimental techniques failed, alternative strategies could be developed to combat them.

Earlier Research

The founder of the Criminal Sociology Enrico Ferri, who challenged Lombrosian views on criminality, stated that mere biological reasons were not enough to account criminality. He believed other factors such as emotional reaction, social infirmity or geographical condition also play a vital role in determining the criminal tendencies in men. Enrico Ferri was the first criminologist to state the law of criminal saturation, according to which,

> *"…the level of a country's criminality is determined by factors in the social environment and changes when they change. Ferri completed his analysis of the French data and prepared a manuscript for publication…."*

His famous theory on 'Law of Criminal Saturation' (1905) supports that crime is synthetic product of physical or geographical, anthropological, and psychological or social.

In his own words Ferri[5] (1905) explains

> *" Criminal statistics show that crime increases in the aggregate, with more or less notable oscillations from year to year, rising or falling in successive waves. Thus, it is evident that the level of criminality in any one year is determined by the different conditions of the physical and social environment, combined with the hereditary tendencies and occasional impulses of the individual, in obedience to the law which I have called, in analogy with chemical phenomena, the law of criminal saturation.*
>
> *Just as in a given volume of water, at a given temperature, we find a solution to a fixed quantity of any chemical substance, not an atom more or less, so in a given social environment, in certain defined physical conditions of the individual, we find the commission of a fixed number of crimes".*

Further Ferri (1905) argues that

> *"...Inter alia....Not only so, but it may be added that as, in chemistry, over and above the normal saturation we find that an increased temperature of the liquid envelopes an exceptional super-saturation, so in criminal sociology, in addition to the ordinary saturation we are sometimes aware of an excess of criminal saturation, due to the exceptional conditions of the social environment".*

From the above points, two fundamental conclusions of criminal sociology may be

drawn from this law of criminal saturation. The first is that it is incorrect to assert a mechanical regularity of crime. This has consequences on the budget for crime. One cannot claim that the budget for crime is an annual taxation paid with more preciseness than any other and that it is possible to calculate beforehand how many homicides, poisoners, and forgers will be there. In fact, if the level of criminality is of necessity determined by the physical and social environment, how could it remain constant in spite of the continual variations, sometimes very considerable, of this same environment? That which does remain fixed is the proportion between a given environment and the number of crimes and this is precisely the law of criminal saturation. But the statistics of criminality will never be constant to one rule from year to year. There will be a dynamic and not a static regularity.

The second consequence of the law of criminal saturation, one of great theoretical importance, is that the penalties hitherto regarded, save for a few platonic declarations, as the best remedies for crime, are less effectual than they are supposed to be. For crimes and offences increase and diminish by a combination of other causes, which are far from being identical with the punishments lightly written out by legislators and awarded by judges.

This was a radical concept during Ferri's time, in the earlier 1900s where later sociologists, interested in crime, acknowledged the concept of social change, which is inevitable in a dynamic society, results in disharmony, conflict, and cultural variations. As a result

of this, social disorganization takes place and a traditional pattern of social control mechanism totally breaks down. In the wake of such rapid social changes, the incidence of crime is bound to increase tremendously. The heterogeneity of social conditions destroys the congenial social relationship, creating a social vacuum which proves to be a fertile ground for criminality.

Regrettably, criminological researchers in the past century have not given due importance to this knowledge arising out of Law of Saturation. Estimating the point of Saturation, as envisaged by Ferri has an immense impact on costs involved in crime and its prevention. The aim of present study is to identify the saturation point of various types of crimes to control them by taking adequate preventive measures.

The crime-rate-series analysis was subsequently taken up by scientists of various disciplines ranging from economics, law politics and sociology. Nobel Laureate Gary Becker (1968) stated that the economic theory of criminal behaviour is an application of the neo-classical theory of demand and potential criminals are economically rational and respond significantly to the deterring incentives by the criminal justice system.

Ian O'Donnell[6] (2003) also revealed that Crime is a normal feature of social life and it can never be eradicated or eliminated. The level of crime reflects the way the society is organised. Economic and cultural shifts in society are more likely to have an impact on the level of crime than the criminal justice system. However, it is possible to reduce the criminal opportunities and a

proportionate response to lawbreakers may lead to reduction of crime incidences and crime rate.

There may be many reasons such as poverty, pressure, drugs, politics, religion, family environment, and unemployment for the occurrence of crimes in society. Econometric modelling and regression are generally used to predict the crime incidences by linking the economic factors. The major deficiency of these types of modelling is that they can enumerate linear relationship and econometric modelling as convoluted. Time series data are less suitable because of the limited historical data. Therefore, Razana Alweeaetal (2015) developed a hybrid model which combines grey relational analysis and support vector regression and he used particle swarm optimization to increase the accuracy of the model.

Steve Cook[7] et al (2012) examined the potential convergence in activity across the states of United States of America. They identified β and σ convergence for all the various criminal activities and found that β convergence where the lower crime regions at the start of the sample were found to exhibit faster growth in crime over the sample period than regions with higher initial rates and σ convergence shows the tendency towards convergence were noticed for all classification of crime aside from motor vehicle theft.

The primary intention of the present study is to estimate the convergence level of crime incidences by articulating theatrical mathematical and statistical analysis to get an insight and guidance for taking precautionary measures to prevent the occurrence of crimes.

We are unable to identify any literate to estimate the convergence point of various types of crimes. We made preliminary attempt to identify convergence level of the various types of IPC crimes by developing the Model, named as **Point of Cap Model** as explained below.

Point of Cap (POC) Model

The preliminary analysis of the crime data shows that crime incidences are increasing every year though a marginal decrease found in some years. We made a preliminary attempt to develop a new model to identify the various crimes which exceed the benchmark estimated in the Model. The following steps are involved in the proposed POC Model.

Steps Involved

Step 1 : Collecting the time series data of the various crime incidences or crime rate and sub divide the data into period vice such as decade etc.

Step 2 : Confirm whether the time series data of each type of crime is convergent or divergent as whole time series of the crime incidences or crime rate as well as subdivision wise to conclude the time series of each type of crimes.

Step 3 : If the time series is convergent, go to the step. If it is not convergent the following steps could be taken.

Step 4 : By using the mathematical formulation, it is possible to get the point of cap or convergence point for each sub-

period data of the various crime incidences.

Step 5 : By using Regressor it is possible to get the estimated crime incidences or crime rate for each type of crime.
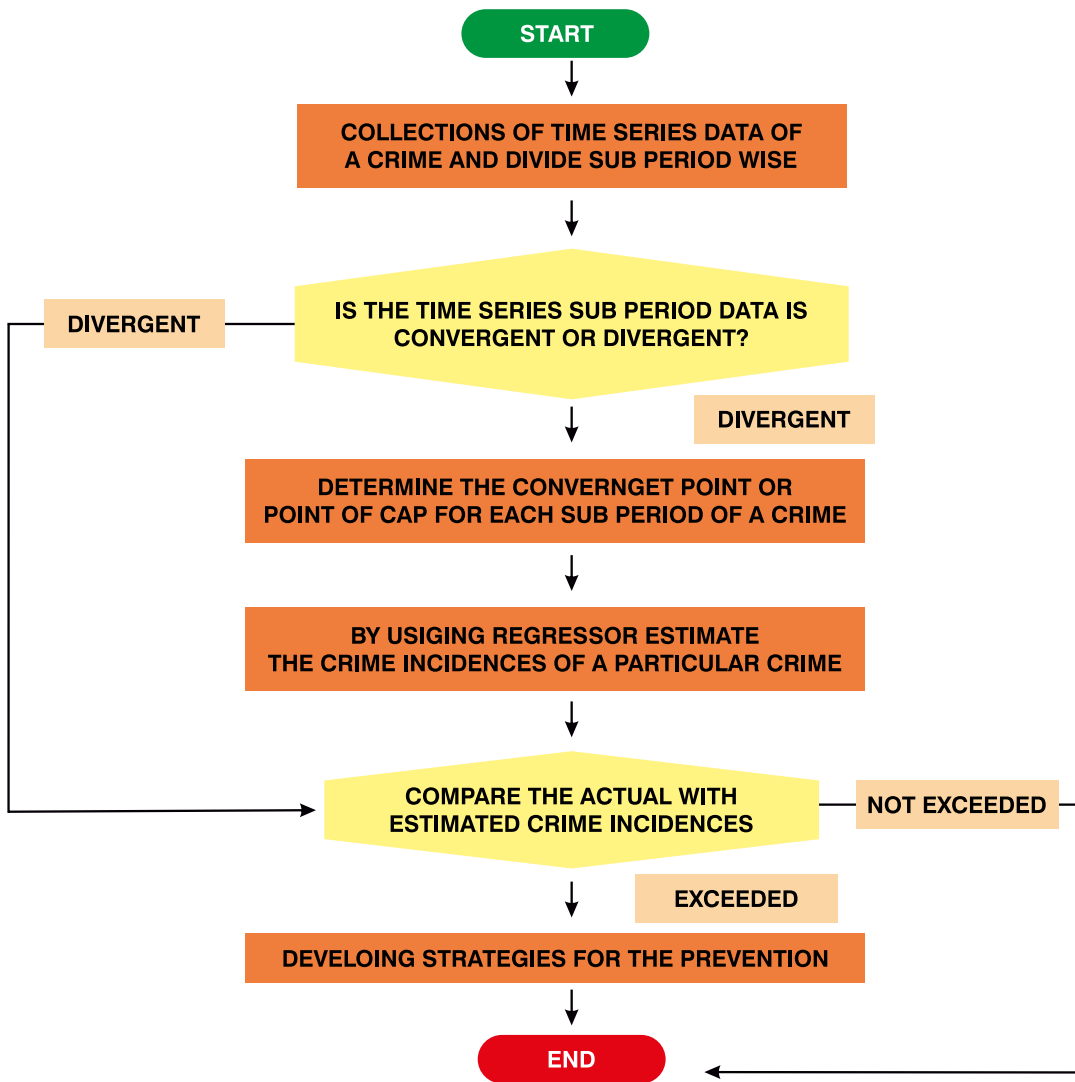
Step 6 : The estimate crime incidences derived from Step 5 could be compared

with the action to identify the crimes which exceed the Point of Cap or Benchmark.

Step 7 :Developing adequate strategies and precautionary measures to combat such crimes.

Flow Chart

The flow chart of the above steps is given below.

Convergence and Estimation of Point of Cap of time series data of crimes

The POC Model requires two evaluations: One being to confirm whether the time series of crime data is convergent or divergent. The second being the estimation of Point of Cap. The following steps are required to confirm the time series of crime data is convergent or non-convergent.

1. Convergency

We can identify two types of convergency in the literature i.e., β Convergence σ Convergence. Beta-convergence (β-convergence) is defined as a negative relationship between the initial crime incidence-level and subsequent growth of crime incidences. Sigma-convergence (σ − convergence) pertains to the decline in the cross-sectional dispersion of crime incidences over time. It is also established that the necessary condition for the existence of σ-convergence is the existence of β-convergence.

Mathematically it could be written as

$$Y = \mu + \beta X + \varepsilon \quad (3.1)$$

Where,

Y = Change in the Incidences of Crime

X = Initial value of Crime Incidences

μ = Constant (to be evaluated)

β = Constant (to be evaluated)

ε = Un explained factors

The above exercise was done not only for the entire data and for the sub-data of each crime incidences.

If the time series is convergent, the sub-data could be regressed to estimate of crime incidences for the current year. The second evaluation required in this model is estimation of benchmark or Point of Cap, which is explained below. This step is required if the time series of data is non-convergent.

2. Point of Cap (Convergence Point or Benchmark)

At present, Linear Models (LM) and Auto Regressive Integrated Moving Average (ARIMA). were extensively used for predicting the crime rate trends. The results derived from such models are primarily based on the historical and economical information. In certain circumstances, such as heavy fluctuation and oscillation of the input data, the prediction derived from Linear Model may be unworkable and the analysis based on such results would lead to erroneous decisions. Hence, a preliminary attempt was made to remove the above deficiencies by proposing a new model termed as 'POC' Model.

The proposed Point of Cap (POC) uses Mathematical as well as Statistical techniques to estimate the convergence point of various types of Crimes. The POC model assumes dependency of the movement in time with the incidences of crime and not primarily depends upon the distribution of the input crime data.

In the proposed 'POC Model', 'time' is treated as an independent variable and 'crime rate' is considered as the dependent variable. The crime rate was predicted by assuming the existence of reciprocal relationship between time and crime rate.

This facilitates to determine the saturation point when time tends to infinity.

Mathematically, if "n" i.e., time is independent variable time and "y" i.e., crime rate is the dependent variable, then relationship between time and crime rate is

$$y_n = a + b/n \qquad (3.2)$$

where a and b are constants.

By using the historical financial information, the constants, a and b could be estimated.

The major benefit of the model as the time goes by the crime rate, which is under consideration, will neither go up nor go down drastically as normally happens in the Linear Model. Instead, in this model it will shrink or converge or saturated to a fixed point if the time tends to infinity.

Mathematically, when time i.e., $n \to \infty$

$$\lim_{n \to \infty} y_n = \lim_{n \to \infty} (a + b/n) \qquad (3.3)$$

Which leads to y = a when n or time tends to infinity

This facilitates the analyser to conclude where the crime rate finally converges to a constant, as time tends to infinity. It is amazingly simple model to derive the yield or saturated point convergence of the crime rate, as constant "a" being the remaining factor i.e., "b/n" leads to zero when "n" i.e., time tends to infinity.

The data available for all sample period could be used for determining the Point of Gap. The entire data could be divided into decade wise or otherwise and the least point of crime incidences in each sub-divisional period for each type of crime was found.

The linear regressor is used to estimate the crime incidences of the current year for each type of crime.

By using this model for the non-convergent series or as derived earlier in the case of convergent series, the Point of Cap or Saturation point or Benchmark for all crimes could be estimated by using linear regressor.

The estimated crime incidences with actual for the current year incidence could be compared to identify the crime which has major deviations.

There may be possibility of positive as well as negative difference of the actual crime incidences with the estimated saturated crime incidences. The preventive measures including improving the capacity building etc. in respect of the crimes with positive variation are necessarily to be taken. Similarly, the data recorded in the negative variations are necessarily to be rechecked to confirm the recording of crime incidences are done as the laid down Criminal Procedure Code 1973.

Data

In the present paper, data analytics was extensively made by the incessantly available secondary data. The entire set of data available in Crime in India, published by the National Crime Records Bureau for the year 1954- 2019 were used. As the data in respect of crimes-Murder, Kidnapping and Abduction, Dacoity, Robbery, Burglary, Theft, Riots, Criminal Breach of Trust, Forgery, Cheating and Fraud and Counterfeiting are available, and they were

used in the present analysis.

The entire sample of 65 years leaving one year for comparison of the estimated figure and actual for taking timely action were subdivided into decade wise (1954-63, 1964-73, 1974-83, 1984-93, 1994-2003, 2004- 13, 2014- 19) and the last spell of five years only for the reason the data leaving one year for comparison and for the remaining period of the last decade are yet to occur.

Results and Conclusions

Conforming Convergency

The regression is performed over the incidences and change in the incidences of ten classifications of crimes for the sixty-six years and regressor for each type of crime was found and presented in Table No 5.1.

Table No 5.1 : Beta Convergency and its significance

SI No	Crime type	β Value	P Value (Significance)
1.	Murder	0.976	0.000
2.	Kidnapping and Abduction	1.087	0.000
3.	Dacoity	0.971	0.000
4.	Robbery	0.970	0.000
5.	Burglary	0.955	0.000
6.	Theft	1.068	0.000
7.	Riots	0.957	0.000
8.	Criminal Breach of Trust	0.942	0.000
9.	Forgery, Cheating & Fraud	1.063	0.000
10.	Counterfeiting	0.884	0.000

The focus of the attention on the estimated value and significance of beta. The negative value of beta indicates the time series converge. On the other hand, if the estimated value of beta is non-negative, the series could not be convergent and ultimately divergent.

The inspection of the results in Table No 5.1, reveals that for all crime series beta convergence with negative coefficient is not detected with zero significant value. The greatest positive beta was found in respect of Kidnapping and Abduction and lowest level positive beta was found in respect

Counterfeiting.

Though the above analysis leads to non-convergence of crime incidences, convergence over sub-periods was also considered. The entire sample of 65 years leaving one year for comparison of the estimated figure and actual for taking timely action were subdivided decade wise (1954-63, 1964-73, 1974-83, 1984-93, 1994-2003, 2004- 13, 2014- 19) and the last spell of five years only for the reason the data leaving one year for comparison and for the remaining period five years (2014-23) of the last decade are yet to occur.

The convergence was considered for each using the Equation No.3.1. The results obtained were given in Table No 5.2

Table No 5.2 : Beta Convergency and its significance for the sub-periods

SI No	Crime Type	Sub Period 54-63	Sub Period 64-73	Sub Period 74-83	Sub Period 84-93	Sub Period 94-03	Sub Period 04-13	Sub Period 14-19
1.	Murder	0.766	1.061	1.081	0.928	0.884	0.551	0.602
	Sig (P Value)	0.017	0.000	0.000	0.000	0.004	0.117	0.029
2.	Kidnapping & Abduction	1.075	0.842	0.852	0.974	0.974	1.300	0.846
	Sig (P Value)	0.005	0.009	0.001	0.000	0.372	0.000	0.02
3.	Dacoity	0.537	1.028	0.539	0.415	0.885	0.649	0.789
	Sig (P Value)	0.102	0.001	0.113	0.157	0.000	0.001	0.019
4.	Robbery	0.546	1.006	0.078	0.684	0.828	1.408	0.117
	Sig (P Value)	0.183	0.001	0.835	0.028	0.002	0.000	0.551
5.	Burglary	0.392	0.328	0.783	0.407	1.008	0.893	0.803
	Sig (P Value)	0.342	0.483	0.02	0.208	0.001	0.519	0.161
6.	Theft	0.669	1.120	0.707	0.729	0.659	1.351	1.042
	Sig (P Value)	0.199	0.004	0.078	0.050	0.008	0.000	0.014
7.	Riots	1.052	1.004	0.836	0.545	1.024	0.735	1.701
	Sig (P Value)	0.005	0.000	0.002	0.109	0.000	0.011	0.057
8.	Criminal breach of trust	1.435	0.134	0.977	0.577	0.594	1.029	0.429
	Sig (P Value)	0.001	0.707	0.001	0.109	0.032	0.000	0.552
9.	Forgery, Cheating & Fraud	-2.021	1.058	0.297	0.994	1.057	1.185	0.908
	Sig (P Value)	0.006	0.018	0.226	0.000	0.000	0.000	0.266
10.	Counterfeiting	0.628	0.466	0.365	0.733	0.234	0.249	0.694
	Sig (P Value)	0.0130	0.132	0.378	0.007	0.460	0.373	0.053

On analysing the results of subdivided period all crimes except Forgery, Cheating and Fraud were found to be non-convergent, which has been a single incident for a decade in respect of a particular crime. Hence it is possible to conclude that all crime incidences during the period of review could be considered as non-convergent,

Therefore, an alternative method is required to identify convergent point, benchmark or Point of Cap (POC) to take a precautionary measure.

Estimating the Point of Cap (Convergence Point/Benchmark)

By using the Point of Cap Model, the convergence or benchmark of the various types of crime by applying the Equation for the seven period and they are given Table 5.3.

Table No 5.3 : POC (Convergence) of various crime for the sub periods

Crime Type	Sub Period 54-63	Sub Period 64-73	Sub Period 74-83	Sub Period 84-93	Sub Period 94-03	Sub Period 04-13	Sub Period 14-19
Murder	11065.733	15804.951	22067.025	36083.972	35905.811	33190.617	27883.141
Kidnapping &Abduction	6627.671	9469.449	13790.099	18823.690	22311.641	44527.835	103263.931
Dacoity	4460.575	9260.811	13290.841	9920.064	6275.402	4307.588	3350.054
Robbery	6901.052	15667.775	22229.492	24460.755	19893.447	25315.913	29147.199
Burglary	29147.199	166206.638	155621.621	126012.585	102306.606	94211.430	104891.961
Theft	239760.443	346449.150	399692.682	338682.088	255188.301	338944.856	614028.780
Riots	27525.966	63837.694	103028.331	98314.869	74786.650	68445.143	57594.993
Criminal breach of trust	16818.824	21946.164	20624.824	17314.643	14412.973	17555.587	19831.667
Forgery, Cheating & Fraud	9307.658	12689.297	19245.364	27104.715	44091.414	87354.520	132408.974
Counterfeiting	414.828	915.593	824.519	3434.303	1655.506	2692.601	1084.620

By using the above estimated value for each decade and by using the regressor, the estimation of various types of crimes is evaluated. The regressor and estimated value are given in Table No. 5.4

Table No. 5.4 : Regressor and estimated value

SI No	Crime type	Regressor	Estimated Value
1.	Murder	Y = 3537.94X+11848.42	40152
2.	Kidnapping & Abduction	Y =13162.40 X -21390.40	83909
3.	Dacoity	Y =-220.30 X+4506.70	2744
4.	Robbery	Y =2989.24 X+8559.57	32473
5.	Burglary	Y =-9248.40 X+161949.71	87963
6.	Theft	Y =34403.29 X+224207.75	499434
7.	Riots	Y =2542.15 X+57794.04	78131
8.	Criminal breach of trust	Y =-212.66 X+19208.45	17507

SI No	Crime type	Regressor	Estimated Value
9.	Forgery, Cheating & Fraud	Y =19410.02 X-30182.64	125097
10.	Counterfeiting	Y =228.37+661.08	2488

The estimated number of crime incidences of various types and actual for the year 2019 difference are given in the Table No 5.5.

TABLE No 5.5 : Percentage of variation of actual and estimated incidences of crimes

Sl. No	Type of Crime	Estimated Value	Actual 2019	Difference	Percentage of variation
1	Theft	675916	499434	176482	**35.34**
2	Kidnapping & Abduction	105037	83909	21128	**25.18**
3	Criminal Breach of Trust	20833	17507	3326	**19.00**
4	Dacoity	3176	2744	432	15.73
5	Forgery, Cheating & Fraud	143909	125097	18812	15.04
6	Burglary	100897	87963	12934	14.70
7	Robbery	31965	32473	-508	-1.57
8	Murder	28918	40152	-11234	-27.98
9	Riots	46209	78131	-31922	**-40.86**
10	Counterfeiting	1040	2488	-1448	**-58.20**

From the above it is found that the crimes **Theft, Kidnapping & Abduction, Criminal Breach of Trust** exceed more than sixty three per cent among A category Positive Crimes and immediate precautionary measures to be taken to combat such crimes. The incidences of Riots and Counterfeiting exceeding seventy three percent of A category negative crimes and the recording of the crimes under this head are necessarily to be analysed in order to confirm whether all the crimes which satisfy the dacoity definition are properly recorded under the heading.

Conclusion

The primary intention is to reduce and deter crime and criminals and enforcing criminal Justice.

It is not possible to confirm precisely whether any mechanical regularity of crime such as uniform raise or fall of the crime incidences. The incidences of crimes go down sometimes, and many times show an upward trend and hence we estimate the saturation limit of various types of crime for every decade and by using the saturation limits we predict the crime incidences using Regressors.

Though the punishment for IPC crimes for the several decades did not much vary, but the incidences of crimes go up and come down in some cases. A detailed research must be made to confirm whether increase or decrease of crime incidences has relevance with the punishment written out by legislators and awarded by judges. The famous Tamil saint Thiruvalluvar[8] says that after a proper enquiry and it was found punishment appropriate to the crimes should be given to the criminals and the punishment should aim to rehabilitate the criminals so that they will not commit the crimes again have to be taken care of and the entire punishment theory has to be revisited again.

By taking adequate preventing and precautionary measures the crimes like Theft, Criminal Breach of Trust and Kidnapping and Abduction could be prevented. The crime prone areas could be identified and effective police strategies concerning, where, and when the police should exercise patrol to deter such crimes. Police forces are already using hotspot techniques situational crime prevention techniques. The new concept of automated predictive policing in addition to hotspot policing could be adopted to prevent such crimes.

The theft could be broadly classified into two categories auto thefts and other thefts. In respect of vehicle or auto theft it should be made mandatory that each and every movable vehicle including scooter should be fixed with an electronic identifier and their movements could be watched in the police control room. This will facilitate not only preventing auto thefts but also other crimes using automobiles. The entire analysis pertaining to IPC crimes only and SLL Crimes are not considered for the present review. The same analogy could be easily extended to SLL Crimes too. As the results are derived from the time series data, the exercise done could not be final and to be continued each year for identifying the saturation level of various crimes.

The entire data analytics were done based on the secondary data and the factor that all crimes are not reported to the police authorities were not taken into the consideration. Further based on the National Level data the entire analysis was made. However, it could be extended to the State Level data to identify and prevent the crimes varying from the saturation level. The logarithmic effect was not considered for the evaluation of β Convergency as the negative fluctuations were noticed in certain cases.

The model developed will facilitate the enforcement authorities to frame extraordinarily strong predictive strategies to prevent crimes in National as well as State level.

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Emerging Technology : Threats and Preparedness for India

T.K. Singh*

Abstract

The use of explosive-laden drones in a terrorist attack at the airport, near an Indian Airforce base in Jammu, in June 2021 indicates the weaponisation of emerging technologies[1], and highlights the capabilities of terrorist using air as a domain of warfare after they had successfully exploited water[2] and land in the past. While India is in the process of digitisation, it also perceives multiple threats from new emerging technologies associated with cyberspace. Hence over the past few years, to enhance its development and protect digital services, India introduces various initiatives of future technologies such as 5G, Internet of Things, Artificial Intelligence, Big Data, Quantum computing, Cloud computing, and Blockchain etc. In this backdrop, this paper would like to study threats(misuse of future technologies)and preparedness(the initiatives)taken up by the Indian government, using chiefly the primary sources produced by the states authorities.

Keywords: 5G, AI, IoT, Emerging Technology, Big Data, Block chain, Cloud Computing

Introduction

Any development of advanced technologies is essentially meant for growth and prosperity as well as to maintain peace for mankind. However, mishandling and misuse of such machinery lead to threats against the states. The recent explosive-laden drone (quadcopters) attack at the airport in Jammu on 28 June 2021, clearly reveals the misuse of such technology by non-state actors for terror purposes. On the next day of the incident, India raised its concerns to the United Nation General Assembly for the use

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1   Emerging Technology has been defined as "a radically novel and relatively fast growing technology characterised by a certain degree of coherence persisting over time and with the potential to exert a considerable impact on the socio-economic domain(s) which is observed in terms of the composition of actors, institutions and patterns of interactions among those, along with the associated knowledge production processes. Its most prominent impact, however, lies in the future and so in the emergence phase is still somewhat uncertain and ambiguous" (Daniele Rotolo, 2015).

2   The use of water as an infiltrating route for Mumbai terrorist attack of 26/11 is the best example of terrorist using sea as a domain of terror campaign.

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of weaponised drones in terrorism activities against national critical infrastructure(PTI, Possible use of weaponised drones for terrorism calls for serious attention: India at UN, 2021). Similar incidents have also been observed in some other states. In 2018, Syrian rebels used drones to attack Russian military bases in Syria. In the same year, Venezuelan President Nicolas Maduro merely escaped from a drone flying towards him which exploded closeby. In 2019, Houthi rebels claimed to have exploded the Saudi oil installations by using drones (Flying terror: On drone attacks, 2021). Otherwise, drones or Unmanned Aerial Vehicles (UAV) in Indian security parlance are generally used by security forces to control law and order situations or other military activities such as surveillance and reconnaissance of extremist movements. Besides, it can also be used for several other civil purposes such as emergency response, humanitarian aid, disaster relief, wildlife conservation, agriculture, mainlining, infrastructure development, journalism, foodservice, entertainment, etc.

India has also worried about criminal misuse of other emerging technologies such as Artificial Intelligence (AI), Internet of Things (IoT), 5G, Cloud computing, Quantum Computing, and Blockchain. Subsequently, to protect and promote the role of emerging technology, the Ministry of Electronics and Information Technology (MeitY) developed a dedicated unit, "Emerging Technology Division". These technologies support government planning, decision-making, development acceleration, analysing deployment, problem-solving,

discovering new trends, and drawing out correlations(MeitY, Emerging Technology Division, 2020). The division identified emerging technologies are 5G, AI, IoT, Big Data, Blockchain, Cloud computing, Quantum Computing, Advanced Data Analytics, Augmented and Virtual Reality, 3D printing, robotics, etc.(MeitY, 2021: 16).Meanwhile, the Data Security Council of India (DSCI) produced *National Cybersecurity Strategy-2020* envisioned for the technology transformation and its security transformation for the five few years. As technology is not static and it continues to evolve, future challenges would be based on areas such as personal transaction processing, social exchanges, business and financial transactions, cross border exchange of data and trade, and national economic transformation. Future efforts on emerging technology will also associate with research on assessment of threats, speech-to-text (or act) mechanism, determining of future technology roadmap, etc. Its future would also draw more interest in the strategic interest and mapping for potential technologies that would be vital for the nation (DSCI, 2020).

Emerging technologies are associated with cyber networks and protection of them inevitably becomes a component of cybersecurity. The increasing role of new technologies and the possibility of criminalising (weaponizing) them also posed a serious challenge to law enforcement agencies in India. To deal with such prohibited activities, the Ministry of Home Affairs (MHA) established a dedicated cybersecurity body known as the Cyber

and Information Security (C&IS) Division. It will also address matters relating to cybersecurity, cybercrime (using emerging technology), implementation of "National Information Security Policy & Guidelines" or NISPG (MHA,2014). and National Intelligence Grid or NATGRID(PTI, 2019). Meanwhile, to encounter cyber offensive activities, the Ministry of Defence (MoD) has developed Defence Cyber Agency (DCA) under the Integrated Defence Staff in 2019. The DCA acts as a central agency to command and control the system of cyber capabilities for Indian military services(IISS, 2021: 138). According to the Joint Doctrine Indian Armed Forces released by the IDS in 2017, the agency will operate with a cooperative approach to cyber threats along with the army, navy and air force(IDS, 2017:49).

5G Technology

The 5G technology has been introduced to maximize the potentials of the networked society. The technology would allow to connect "smart things" on a massive scale. It will have economic benefits for India by creating employment and digitising the economy which would help in increasing the GDP. It will easily reach out to global markets, and consumers would gain with the economies of scale. While India opens for collaboration, it will also join the race of 5G technologies in the global trade system (DoT, 2021). As much as 5G technology is important, so much so it is controversial. Some of the countries including India and the United States reject Chinese 5G companies Huawei and ZTE from their service in the fear of compromising national

security as they will snoop on the host nations. On 04 May 2021, the Department of Telecommunication (DoT), Ministry of Communication has permitted telecom companies such as Reliance Jio, Bharti Airtel, Vodafone Idea and Mahanagar Telephone Nigam Ltd. (MTNL) to conduct 5G trials with the condition that none of them will use Chinese technologies (India's decision on 5G trials a sovereign one: U.S., 2021). Against the development, the Chinese Embassy in New Delhi expressed its concerns/regret about excluding the companies from the trial programme (Krishnan, 2021).

India's security policy of 5G has been discussed at the High Level Forum which was earlier established on 22 September 2017. The forum is chaired by the secretary of DoT, co-chaired by secretaries of MeitY and the Department of Science and Technology. Members of the forum are nominated from academic and telecom service providers such as the Indian Institute of Bangalore, Indian Institute of Technology, Stanford University, BSNL, Reliance Jio, and Airtel etc. (Committee, 2018: 52). A report on Making India 5G Ready was also published on 23 August 2018 to address the regulatory policy of using the new technology. The document has nine chapters including references in 61 pages. It expressed India's 5G policy to deploy mobile networks for close linkages with the physical, financial and security infrastructure of the country. The development of 5G will take place in three phases. Phase-I begins in 2019 with fixed wireless fix services; Phase-II starting in 2021 will start connecting the technology

with IoT, and the final Phase-III will initiate from 2022 based on low latency and highly reliable wireless services (Committee, 2018: 17).

Artificial Intelligence

AI has become a significant technological evolution as electricity and the internet in the history of human civilization. India believes that AI possesses the power to considerably transform the economic and social condition of the world system. AI has the value to add $957 billion or 15% of the present GDP to the Indian economy by 2035 (Indian AI, 2021). The nation concerns about AI not being misused in future and is responsible for using it for the good purpose of humanity and socio-economic development inclusively (India AI, 2021). Against this backdrop, the *Centre of Excellence[3] (CoE) in Artificial Intelligence* was established with the vision of 'Inclusive AI' for responsive governance, and to improve government service delivery to citizens. It also acts as a platform to innovate new solutions in the AI space, a gateway to test and develop solutions for projects undertaken by National Informatics Centre (NIC) at the central and state level (NIC, 2021). This centre has state of the art AI lab with supercomputing facilities and has been providing an AI Development Platform as a service to its state units. It has taken up several projects including Computer Vision

project for COVID-19 Detection, Computer Vision for Swachh Bharat Urban and Rural initiatives, Natural Language Processing domain (NLP), project for Name Similarity Matching for Farmers Database across Soil Health Card, PM FasalBima Yojana, PM Kisan and Land Records etc (MeitY, 2021: 291).

Meanwhile, in one of the interesting initiatives taken up by the MeitY, National Association of Software and Service Companies[4] (NASSCOM) and National e-Governance Division[5] (NeGD), the *National AI Portal* has been implemented as a single portal for AI-related developments in India. It shares resources details of start-ups, investment funds in AI, companies and educational institutions related to AI in India. The portal (*https://indiaai.gov.in)* currently has the major sections for publication of news, articles, case studies, research reports, start-up lists, fund investment lists, colleges, companies, countries, people, videos, datasets, courses, initiatives of state and central ministries. Presently, it has 107 central initiatives, 28 state initiatives, 33 research reports, 219 news and 178 articles(MeitY, 2021: 161)*.* On 5 October 2020, the *Responsible AI for Social Empowerment (RAISE 2020)*was organised (online) in partnership with industries and academics. The programme was conducted to share knowledge on machine learning

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3   A Centre of Excellence (CoE) is a domain-specific specialized incubation facility for start-ups in the area of emerging technologies where the highest-standards and best-practices in terms of infrastructure, technology, leadership, mentoring, training, research & development, funding, networking for the given focus area is made available (https://apiary.stpi.in/about-us.html#APIARY).

4   NASSCOM is the premier trade body and chamber of commerce of the Tech industry in India and comprises over 3000 member companies including both Indian and multinational organisations that have a presence in India (https://nasscom.in).

5   In 2009, National e-Governance Division was created by the Ministry of Electronics & Information Technology as an Independent Business Division under the Digital India Corporation {erstwhile Media Lab Asia}. Since 2009, NeGD has been playing a pivotal role in supporting the Ministry of Electronics & Information Technology in Programme Management and implementation of e-Governance Projects and initiatives undertaken by Ministries/ Departments, both at the Central and State levels (https://negd.gov.in).

(AI) for social empowerment, inclusion, and transformation in key areas such as healthcare, agriculture, education and smart mobility amongst various sectors.

Separately, on the military aspect, under the Defence Research and Development Organisation or DRDO (MoD), the Centre for Artificial Intelligence and Robotics (CAIR) was established in October 1986 to research in areas of AI, robotics, cognition and control systems. It was developed to add value to information and enable battle space dominance. It focuses on domains and technologies that ensure reliability, security, safety, resiliency, survivability and trustworthiness, enabling the use of these systems in critical applications and missions. Since 2000, the centre is merged with "R&D groups of Electronics and Radar Development Establishment, and working on areas of Command Control Communication and Intelligence (C3I) systems, Communication and Networking, and Communication Secrecy". The centre also develops a range of intelligent systems, information processing devices, advanced technologies relevant to these classes of systems. Thrust areas of the centre include netcentric systems for tactical C3I systems, unmanned systems, information security, artificial intelligence and robotics (CAIR, 2021).

Internet of Things

IoT is one of the significant emerging technologies that emerging India is drawing sheer attention to. About 20 billion devices (things) were connected with the Internet and are likely to be increased by 75 billion in 2025 (Gupta, 2018: 312). As the "Digital India" programme is in process, MeitY along with NASSCOM and state governments (Andhra Pradesh, Haryana, Gujarat and Karnataka), has set up Centres of Excellence on Internet of Things at Bengaluru, Gurugram, Gandhi Nagar and Visakhapatnam. In July 2015 the Prime Minister of India announced to begin the IoT ecosystem for creating innovative applications and domain capability by harnessing the innovative nature of the startup community and leveraging the experience of corporate players (ERNET, 2021). Subsequently, the first centre of IoT was established in Bengaluru in 2016 along with the Government of Karnataka and NASSCOM. The centre works with seven main objectives. They are "to create innovative applications for the country's needs such as smart city, smart health, smart manufacturing, smart agriculture, and others; build industry capable talent, start-up community, and entrepreneurial ecosystem for IoT; provide an ecosystem for innovation to prosper and embrace entrepreneurship; energise research mind-set and reduce cost in research and development by providing neutral and interoperable, multi-technology stack laboratory facilities; reduce import dependency on IoT components and promote indigenization; position India as a provider of end-to-end solution in engineering space; and provide the environment for product creation, testing and validation" (NASSCOM, 2021). The centre connects various entities such as start-ups, enterprises, venture capitalists, government and academia. It also enables start-ups in areas of IoT, Big Data, AI, Augmented Reality/Virtual Reality, robotics

to reach their maximum potential. While CoE-IoT, Gurugram was operationalized in 2018, the CoE-Gandhinagar begin to functions in 2019. The centres focused on healthcare, Industry 4.0, agriculture, automobiles etc. Currently, more than 468 start-ups have been incubated in these centres, 41 societal projects have been undertaken, 56 solutions related to Industry 4.0 & Healthcare developed and 34 IPs filed (MeitY, 2021: 161).

Big Data

Big Data plays an important role in India's growth and development, proven with great success in sectors such as health, education and finance (Sanyal, 2021). Consequently, as an initiative taken by the National Informatics Centre Services Inc. (NICSI), NIC in MeitY, the Centre of Excellence for Data Analytics (CEDA) was established in 2018. The centre provides quality data analytic services to different government departments in India. It helps government departments to define their analytical needs; identify the data sets that are required to meet the analytical needs; determine access to the relevant data sources (both within as well as outside the government); build the required data analytic solutions; share the data in a secured manner; and integrate departmental data silos and deliver integrated whole-of-government analytics for an integrated policy formulation (NIC, 2021). It adopts advanced analytic and machine learning capabilities within the government systems. It operates on major analytics projects including Trade Analytics for the Department of Commerce, eWay Bill Analytics for Good and Services Tax

Networks (GSTN), Scholarship for Ministry of Tribal Affairs, Immigration Visa Foreigners Registration & Tracking (IVFRT) for MHA, Ministry of Steel etc. It also handles other analytics allied activities like exploration/ evaluation of tools, consultancy services for analytics, capacity building, big data, advanced analytics (machine learning) applications etc. (MeitY, 2021: 291).

Quantum Computing

India is also increasingly focussing on other emerging technology such as Quantum Computing. To begin a breakthrough on the aspect, the Centre for Excellence in Quantum Technology (CEQT) was developed at the Indian Institute of Science (IISc), Raman Research Institute (RRI) and Centre for Development of Advanced Computing (C-DAC), Bengaluru. The initiative laid a preliminary foundation in the field of quantum technology in India. The centre focuses on developing necessary elementary hardware components, an 8-qubit quantum processor, quantum teleportation over long fibber link of over 100 Kilometre for secured communication, and demonstration of quantum sensing technology. The centre will also develop technical and manpower skills in quantum technologies. Important project such as "Quantum Computing Toolkit and Capacity Building" initiative is currently undergoing and focusing on the development of quantum simulator, workbench and generating skilled manpower by offering short-term courses. A research project on "Post- Quantum Digital Signature for Document Signing" is also initiated at Society for Electronic Transactions and

Security (SETS), Chennai. This project will analyse, implement, benchmark digital signature schemes which are resilient to attacks by quantum computers (MeitY, 2021: 133). The centre has intended to have international collaborations and take advisory to guide the research effort on quantum computing. It would train and hire skilled researchers in this cutting-edge research field, from the student, the post-doctoral and the teaching communities. It conducts periodic workshops and meetings to keep abreast of the latest developments and motivate young researchers. The centre also keeps updating its objectives and priorities along with the latest developments by having regular reviews (CEQT, 2021).

Cloud Computing

Advanced Cloud Computing has become an important resource of the computer system, especially for data storage and computing power, without direct or active management by the user. As part of the "Digital India" vision, and to exploit the benefits of the cloud system, India introduced an ambitious initiative, "GI Cloud" also known as MeghRaj (MeitY, GI Cloud (MeghRaj), 2021). The programme was designed to provide ICT services over the cloud to all the departments and ministries associated with states, centres and union territories. It aims to accelerate the provision of e-services in the country while reducing the ICT spending of the government. All the applications, services and projects shall be evaluated to assess, whether they should be migrated to the GI Cloud. Under the GI Cloud initiative, few achievements have been made including "driving cost efficiencies with increased utilization of IT infrastructure resources through the cloud; enable conversion of capital expenditure (CAPEX) to operate expense (OPEX) to pave the way for consumption-based billing and faster procurement of IT infrastructure services; rapid development, deployment and re-use of ICT applications" (MeitY, 2021: 27). One of the major components of GI Cloud is the setting up of state and national clouds. Consequently, the first "National Cloud" was implemented by NIC and has already being used by more than 1,260 applications of government departments. Under the Digital India Programme, NIC Cloud hosted for Digital India Portal; Digital Locker; Make-in-India; Skill Development; Smart Cities; Online Registration System (e-Hospital); Aadhaar based Biometric Attendance of Government employees; Jeevan Pramaan (service for pensioners), and MyGov, largest citizen engagement platform of Indian government (NIC, Services of National Cloud, 2021).

Blockchain

Blockchain is a type of distributed ledger technology that stores data (commonly immutable and sequenced transaction records) in a decentralized manner via encryption and consensus algorithms(Amritha Jayanti, 2020: 1).It constantly grows as miners and adds new blocks to it (every 10 minutes) to record the most recent transactions. The blocks are added to the blockchain in a linear and chronological order(Swan, 2015).Some application of the blockchain includes, financial (crypto-currencies, security, trading and settlement, insurance

etc) and non-financial (decentralised IoT, notary public, decentralised storage, etc) applications(Michael Nofer, 2017). Considering the importance of this novel technology, NITI Aayog (Planning Commission) has released "Blockchain: The India Strategy" in 2020 explaining the framework, necessity, challenge and cases of blockchains It also recognised Blockchain technology as the potential to revolutionize interactions between governments, businesses and citizens(Aayog, 2020).

In March 2020, the Software Technology Park of India[6] (STPI) has set up the *Centre of Excellence in Blockchain (Apiary)* also known as STPI Apiary in collaboration with MeitY, STPI, Government of Haryana, Pad up Venture Private Limited, IBM, Intel, Government Blockchain Association, and Foundation for Innovation and Technology Transfer. STPI Apiary will identify and evaluate promising start-ups in the field of blockchain technology that will be hosted in the STPI Gurugram Incubation Facility. In the initial phase, the Apiary accommodate 80 seats of co-working space and a dedicated Blockchain Platform. Besides the physical infrastructure, the centre will have the access to technocrats mentorship, mentorship programmes and VC funding(STPI, 2021).

Conclusion

Threats associated with novel technologies is emanant in future, and preparedness for India has a long way to go. As these new technologies are in the evolving phase,

their menace shall also be augmented eventually. India's preparedness in the field of AI should be encouraged as it has the value to add billions in the Indian economy. The increasing connection of things with the Internet (IoT) will be a new challenge for India in future. Meanwhile, big data management and concerns for its protections from criminals should not be ruled out. Meanwhile, other new areas of quantum computing, advanced cloud and blockchain require a time to time updating to challenge the threat from emerging technologies and make India's preparedness complete.

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Continuous Professional Development Interventions- A Quest for Quality in Police

Prof. A.K. Saxena*

Introduction

Due to the consistent efforts of Police Leadership, the training system for the IPS Officers and the Subordinate ranks at the induction level has evolved as one of the best systems in the world. Introduction of `Mid-Career Training Programmes (MCTPs)' and the thematic courses on contemporary issues in NPA is an exemplary attempt. Induction training programmes for the Police have well-structured indoor and outdoor training interventions. Training methodology wise, the National Police Academy is not behind any training institution in the world.

A very large number of people in Police force cannot be trained continuously in the existing Police Training Institutions. In their entire career, the Police officers do not get more than 4-5 chances to attend training programmes. If they are to be developed to perform meticulously, the Police Leaders right from SHO Level to the middle level and top leadership levels will have to embrace facts - `Leaders are the great trainers at the workplace' and `Learning takes mostly at the workplace'. Meaningful interaction of a leader at the workplace catalyzes the process of learning

and development of their subordinates. In a nutshell, we can say that the leaders shape the destiny of an organization by shaping their subordinates at workplace, ensuring superior performance by them.

My experience at NPA for more than three decades had forced me to think:

- Whether the training interventions, although beautifully created, are sufficient enough to ensure the continuous superior professional development of Police officers or not?

- Whether the `Training Interventions' are sufficient enough to reach out to a large number of Police officers who are geographically spread out?

- Whether we should go for other Human Resources Development Interventions for the development of Police Officers or not?

Taking into consideration the above-cited questions, the author has embarked on the points in this paper :

- Concept of HRD (Besides the Training concept).

- Focal areas for the Development of

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Human Resources.

- Human Resources Development Interventions.

Concept of Human Resources Development (Besides Training)

Rao (2001, 2004, 2016) has come up with the following definition of HRD- "Human Resource Development in the organisational context is a process by which, the employees of an organisation are helped, in a continuous and planned way, to:

- Acquire or sharpen capabilities required to perform various functions associated with their present or expected future roles.

- Develop their general capabilities as individuals and discover and exploit their own inner potentials for their own and/or organisational development purposes.

- Develop an organisational culture in which supervisor- subordinate relationships, teamwork, and collaboration among sub-units are strong and contribute to the professional well-being, motivation and pride of employees.'

Through analysis of definition leads to the following points:

- Human Resource Development is a continuous systematic and planned way for competency development of Police officers.

- HRD helps Police officers sharpen competencies for the present and future roles.

- HRD focuses on helping Police officer discover their potential and actualize it.

- HRD focuses on the development of culture besides every intervention to provide soil and climate for development.

In a nutshell, we are to look beyond training and embrace the concept of Human Resource Development in Police for continuous development of the Police officers for individual and organization excellence.

Focal areas of the Development of Police Personnel

There are six areas for the development of Police officers. Narrowing the concept of development to only knowledge skills and attitudes (KSA) will not serve the purpose. (Pareek and Rao, 2010)

Focal Area 1: The Individual Police Officers

The individual employee is the key unit in an organization. HRD is primarily concerned with the development of persons working in the organization, so that they may be able to have their own fulfilment and contribute to the goals of the organization.

Development of persons /individuals has three different aspects as suggested below:

(i) **Self-Management Competence:** The person working in his organization should develop competencies to manage his/ competency to improve performance in future.

It is felt that following competencies are important:-

- `Learning how to learn' Skills.

- 'Planning and organizing' competence.

- Time Management competence.

- Stress Management competence.

- Emotional Intelligence competence.

- Emotional resilience competence.

- Oral and written communication competence.

- Perceptional and Observational Competence.

- Managing health competence (physical, social, emotional and spiritual – W.H.O. framework)

- Professional skills set as per the requirements of the job.

- Right attitudes for right behavior skills.

First Set of Attitudes

- Attitude to the Police Organization

- Attitude to the 'Law of Land'.

- Attitude to the 'Scientific Aids to Investigation'.

- Attitude to ensure 'Social Justice' by having very positive inclination to serve the following:

  o Poor

  o Underprivileged

  o Minorities

- Attitude towards the observance of Human Rights.

- Attitude of non-discrimination on the basis of

  o Religion

  o Caste Region

  o Heterogeneity of Socio-Economic Statues

Second Set of Attitudes

- Attitudes to 'Self'.

- Attitude to learning and change.

- Attitude to significant others.

- Superiors, Colleagues and Subordinates.

- Officers of other branches of Criminal Justice System

- Outside experts.

- Internal customers (Officers of other departments in Police)

- External Customers (People to be served)

- Media and Press

- Elected Representatives of people

Third Set of Attitudes

- Attitude to quality of service

- Attitude to innovativeness and creativity

The list includes a comprehensive set of Soft Skills required by a Police Officer.

(ii) Competence Building

The main contributions of HRD to the individual's development are in terms of building competencies required for a better performance.

(iii) Advancement

Every employee wants to advance her/ his career in the organization. HRD should

help in the process of such advancement. Advancement of employees involves identifying their potential for use in higher responsibilities in the organization, and helping them develop further potential to take up new challenges.

Focal Area 2: The Role

The individual employees perform various roles in the organization

It is necessary to pay attention to roles independently. Role is not synonymous with Job. The role is not synonymous with status or position in the organization. Role is the position a person occupies, as defined by expectations of different significant persons (who have fact-to fact relationship with role occupant) have from him.

There are three main aspects of the development of role with which HRD must be concerned:

- Optimum Stress: Each role must have enough challenges, which may help the role occupant to stretch himself to meet the challenge. Building optimum stress in the role is like setting the strings of musical instruments at a level where the strings are stretched enough to produce music but not to the extent that those strings snap.

- Linkages: While roles in organization are occupied by individual employees, it is necessary to build linkages amongst the roles as well as linkages of different organizational roles with challenging goals. If the roles get isolated and produce a feeling in the role occupants that their work is very narrow (and not much use for wider groups) it will have damaging effects on the individuals.

- Autonomy: If individuals who occupy the various roles feel that they have enough scope for taking the initiative or solving problems or doing creative work by the role occupants as well as the organization benefits a great deal, HRD must attempt to develop the autonomy of this kind in every role, even at the lowest level in the of the organization.

Focal Area 3: The Dyad

The dyadic group, a Police officer and his ex-senior are the basic building blocks in an organizational structure. The stronger the dyads are, the stronger the organization will be. The focus of development of dyads in an organization would involve developing the following three aspects:

- Trust: Effective work cannot be done in an organization, unless trusting relationship is established. Trust does not develop easily; efforts should be made to develop such relationship.

- Mutuality: Effective dyads will require free exchange of help between the employee and the supervisor. Helping relationship is not a one-way relationship

- Communication: Developing effective dyads will also involve improving communication between the members (the employee and the supervisor).

Typical Dyadic structures will be:

- Police officer – his superior

- Police officer – other Police officer
- Police officer- his colleague
- Police officer – a member of public
- Police Officer- A Judicial Officer
- Police Officer an Officer of correctional administration etc.

Focal Area 4: The Team

Every Police officer had to be developed, both as a leader or a follower in teams. Therefore, he will focus on:

- Ensuring cohesiveness.
- Using resources optimally

Focal Area 5: Inter team

The main emphasis of inter-teams is to develop cooperation amongst various groups in the organisation, (e.g. departments, divisions, functions) so that they are able to work effectively towards the common organizational objectives. Networking competence with the following organizations becomes necessary:

- Judiciary
- Magistracy
- Correctional administration
- Science and technology organization of eminence
- Media
- Academia etc.

Focal Area 6: The Organisation

As far as the Police organization is concerned the following three aspects should deserve the attention of the HRD effort:

- Growth: Obviously, the development of the organization would involve increase in its size, activities and operations. Even if growth is not in terms of its size, the organization may be concerned with providing qualitative services or maintaining leadership position in its field of operations.

- Impact: Each organization would like to have some impact on the outside organizations or customers etc. Impact may be in terms of developing new services or products, introducing new technology which others can follow etc.

- Self-renewal: The organization must examine its working from time to time and take steps to update its technology. It should also analyze the present and potential problems imminent on its growth, and take steps to prepare itself to meet these challenges.

Human Resources Development Interventions

Keeping in view the number of Police officers, immediacy of the requirement of having updated fully professional Police force and the limitations of training intervention below-cited, HRD intervention needs attention of the Police leaders.

Developing e-learning platforms

These will be required for the Police officer deployed in the field. Enhancing professional knowledge and some skills through simulations are possible. During Covid-19 pandemic, many organizations in our country have come up with the models of e-learning technique. E-learning platforms

may be developed by BPR&D through utilizing the consultants and the Police Professionals. State Police Headquarters may focus on developing platforms at the District level with excellent connectivity. Similarly, CPOs may also take lead in this direction.

Knowledge Management Architecture

This type of architecture will be highly useful for transmitting professional knowledge through various portals. It may focus on-

- Legal knowledge

- Important Court decisions

- Research in Police

- Best practices in Police Sciences in India and abroad

- Media reports in Indian Police in

    o Science and technology

    o Weaponry

    o Management concepts and practices

    o Current affairs etc.

Performance Management Systems

Performance Management System has main elements as depicted in Figure 1. These are, performance planning, implementation and evaluation phases.

Performance Planning → Implementation of Plan → Performance Evaluation
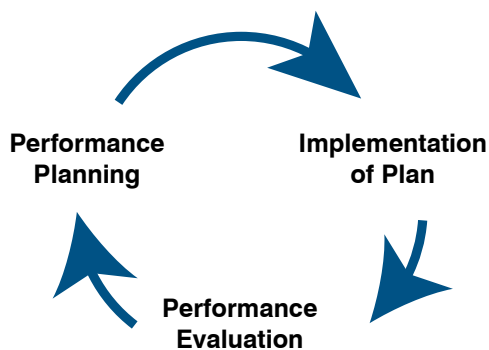
Performance Management System

Performance Management seems to be very weak in Police. Performance indicators have not been defined for each position in Police hierarchy. The indicators have not been further subdivided into competencies. It leads to ineffective performance planning, implementation of performance plans and evolving effective performance appraisal system in Police.

If performance appraisals are to be used for the development of Police officers, Performance Appraisal System (PAS) should be developed well. For developmental purpose, PAS should be interactive and should be followed by Performance Counselling, Coaching, Guidance and Effective supervision.

Therefore, defining performance in terms of indicators (i.e. competencies) and evolving PAS on the basis of identified `Performance Indicators' becomes a preliminary exercise.

Performance Counselling and feedback

Leadership in Police is required. To be trained in skill conducting, Performance Counselling session is to be reinforced through coaching and guidance.

Mentoring

For developing the perspective leaders in Police, mentoring seems to be a good intervention. In earlier days, an ASP was required to stay with SP so that he may be mentored well for developing proper attitudes, values and professionalism. (Further details on `Mentoring' are beyond the scope of this paper)

Talent Management

Talent Management encompasses:

• Identification of talents.

• Development of talents.

• Motivation of talents.

In previous literature, identification of talents was referred as `Potential Appraisal'. Again, Police Organization has no formal system for the development of talents. Advanced education, diversified training (as per the talents), counselling, coaching, mentoring, supervision and adequate motivation to them is important .As per the talents, the Police officers are to be exposed to the organizations where expertise is available. Attachments, field visits, deputation and advanced training in those organizations become important.

OD Interventions

OD interventions are research based techniques to manage change in the Police. OD interventions develop Police officers in:

• Managing creativity and innovation at work

• Goal setting

• Management by Objectives (MBO)

• Team Building

• Interpersonal Competence

• Collaboration and Negotiation

• Performance Management

• Action research Methodology

• Distance Education (Media, Channel may be hired)

Other important HRD interventions include:

• On-the-job training

• Effective conduct of meetings, e.g. `Crime Meeting

• Participative Management

• Role- Negotiation exercises

• Stress Audits

Very Important Step

If the continuous development of human resources development in Police is to be ascertained, first of all the Police leaders are to be trained and shaped further in the following.

• Human Resource Development – Concept and Practices.

• Knowledge Management

• Learning Management

• (Organizational learning)

• Performance Management System (with the focus more on `performance'.

• Performance counselling and feedback.

• Effective superior's practices

• OD interventions

• Art of conducting research

- Talent Management

- Negotiation skills

These inputs may be interwoven in the design of 'Mid-Career Training' Programmes.

Summing-up

In this paper, an attempt has been made to stress the need of looking beyond training interventions for the professional development of Police officers. A broader term `Human Resource Development' has been defined. Individual, Role, Dyads, Teams, Inter team, Collaboration and Organization have been described as focal areas of continuous development of Police officers. These focal areas are beyond the KSA (Knowledge, Skills and Attitude) traditional concept of development. Many HRD interventions have been covered viz. e-learning, knowledge management, Performance Management System (PMS), Performance Counselling, Mentoring, Talent Management, OD interventions etc. Need for training the Police leadership in the process and practices of HRD has been emphasized. Mid-career and other in-service courses for the IPS Officer may cover the various concepts processes of HRD.

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Suicide Pact and its Gender- Legal Perspectives

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S.Suba**

Abstract

Suicide pact is an agreement for suicide. It is often carried out after several days of meticulous planning and preparation. Surprisingly, those who are involved can even be strangers having suicidal tendency as their common denominator. The persons involved could agree to either kill themselves or be killed by a person of choice. However, everyone agreeing to the suicide pact must have the intention of dying at the end of its execution. This paper aims to find out the prevalence and correlates of suicide pact and view it from the gender-legal perspectives.

Keywords: *Suicide pact, abetment, criminal liability, culpable homicide, gender, mental health, survivors.*

Introduction

Osborn's Concise Law Dictionary defines suicide pact as "a common agreement made by two or more persons to bring about the death of all, whether or not each is to take his own

life." Quite often, suicide is a self-made decision. But a few of such incidents occur because of a pact between people (Vijayakumar and Thilothamal, 1993). A suicide pact is said to occur when two or more people plan to end their lives at the same time, by using the same lethal methods, in the same place and based on a premeditated plan (Behera et al.,

2017; Brown, King and Barraclough, 1995; Rastogi and Nagesh, 2008; Sathyavathi, 1975). It is also referred to as 'double suicide', dual suicide, family suicide, etc., (Gregory, 2013; Hocaoglu, 2009; Santy, 1982). Suicide pacts account for <1% of all suicides (Radhakrishnan and Andrade, 2012). It is an unusual form of suicidal behaviour that involves two or more people acting together and end their lives (Brown and Barraclough, 1997). Despite it being a rare phenomenon, studies report suicidal pacts among family members, lovers and friends (Brown and Barraclough, 1999; Fishbain et al., 1984; Griffiths and Mamun, 2020; Prat, Rerolle and Saint-Martin, 2013).

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Suicidal pacts are more successful than individual attempts (Avis and Hutton, 1994). Unlike an act of suicide, which is the result of either emotional or impulsive outburst, suicide pact is a well thought plan coupled with meticulous preparation. In most of the cases, the parties to suicidal pact complete the execution among themselves. However, the survivors of suicide pact are charged for various offences ranging from abetment of suicide, attempt to commit suicide or even for murder.

This paper reviews the extant literature on suicide pact, examining some of the seminal work published in peer-reviewed journals, with special focus on journals pertaining to law, applied social and behavioural science including health, etc. The paper also considered critical reports on suicide pact published in mainstream magazines, newspaper reports and importantly, codifications and judicial pronouncements of both National and International Courts. In this paper, the author presents critical information about the prevalence and correlates of suicide pacts and attempted to examine suicide pact from the gender, legal and gender-legal perspectives.

Suicide Pacts: Prevalence and Correlates

Suicide pact refers to a scenario where two or more members who are related by family or kinship, commit suicide jointly (Behera et al., 2014; Prat, Rerolle and Saint-Martin, 2013; Shikary et al., 2016). Tamil Nadu accounted for 22 cases and Andhra Pradesh had 19, Madhya Pradesh had 18, Rajasthan had 15 and Assam had 10. Regarding deaths by suicide pacts, Andhra Pradesh reported 46 deaths and Tamil Nadu reported 45, Madhya Pradesh had 39, Rajasthan had 36 and Assam had reported 10 (National Crime Records Bureau, 2020). Some of the reasons for suicidal behaviour, attempts and pacts are related to bereavement, separation, stress, material loss or serious illness (Brown and Barraclough, 1997). Studies have found significant difference among suicide pacts among societies (Milinand Turgay, 1990). While pacts among lovers were common in Japan, spouse-related pacts were reported in England. In India, pact frequency was highest among friends (Fishbain and Aldrich, 1985). Studies in India would show that persons related to pact suicides are childless couples, failed lovers, spinster siblings, or women dying on their own along with children due to domestic or financial problems (Altindag and Yanik, 2005; Rastogi and Nagesh,2008; Sarkar, Srinivas and Grover, 2014).

Financial debt is a major reason for suicide in developing countries (Vijayakumar et al., 2005). In Bhopal, five persons of one family committed suicide on November 29, 2021, because of continuous harassment and threat from the loan sharks. The perpetrators threatened that the two daughters of the debtor's family would be abducted if he failed to repay the debt. The family decided to commit group self-murder in order to get rid of the imminent insult (Times of India, 2021). In a similar study, a woman and daughter died by taking poison in Hogenakkal on July 19. (The Hindu, 2015).

Religious Mysticism/Shamanism has been reported as the reason for the suicidal

death of 11 members of a family in Burari area, Delhi during July 2018. Since an occult practice gone wrong, they had chosen the untowardness (The Print, 2021). Believers of Jainism argue that 'Santhara', or 'Sallekhana', is not a suicide because it is not cutting short the natural span of life, or an act of self-violence undertaken in anguish that punishes those around one, but it is an act of peace and of giving up the body and worldly passions, with the participation of family and community. Unlike Abrahamic religions, dharmic traditions like Hinduism, Jainism and Buddhism do not believe that God has a claim on life, and they accommodate a willing renunciation.

Inter Caste Marriage has been reported as a cause in suicidal pacts (Atreya, Shrestha and Acharya, 2017; News18, 2020). A scrap dealer drove his car into a canal along with his wife and son as his daughter married against their wishes at Sirsa on November 05, 2019. A family of three committed suicide on February 11, 2020, at Gadchiroli, Maharashtra as they were shocked by the act of their daughter who went away with a person of lower caste and married him secretly. Later the newly wedded couple also attempted to commit suicide but were fortunately rescued by the Police. In another case in Bareilly division, nearly 58 people lost their lives due to inter caste affairs which includes suicide pact cases. (Singh, 2020).

Dowry has been reported as a cause of suicide among women who choose to end their lives along with their children. In 2015, a 23-year-old women fell into a water tank along with her one-year-old son in Tamil Nadu

Sexual Harassment is yet another reason for suicide pacts. Four teenaged water sports girls trained at the Sports Authority of India, Kerala tried to commit suicide by eating a poisonous fruit. One among them died in hospital and others suffered with severe morbidity and ill-health. Athletes and sports women face both sexual and mental harassment at training centres, which is a matter of concern. "In any case, girls training in camps or academies rarely speak out because of the threat of being kicked out" (Aarefa, 2015).

Internet influence is also a reason for suicidal pact. Referred as the 'deadly net effect', internet continues to impact the lives of people worldwide (Naito, 2007). With the constant use of internet and cyber technology, the suicide pact gets the convenience of culminating through internet. Due to the influence of suicide websites, suicide pacts with strangers become easier than the traditional methods, where mostly such agreements would be between close relations. This novel form of suicidal pact is called as cyber suicide (Mok, Jorm and Pirkis, 2015). With the recent trend of suicide pact through internet, it has become very important to identify the risk factors for suicide. Some people use information gathered from internet to commit or bet suicide (Durkee et al., 2011; Sedgwick et al., 2019). The vulnerability of some isolated individuals to communicate with anonymous persons through internet subjects them to the risk of aiding or abetting suicide (Hemphill and Thornley, 1969; Jiang et al., 2017). It may also lead to committing suicide. The blue whale challenge and

the profound influence of internet and social media like Instagram impacts the psychological health and abetment of suicide among young population in India (Joyshree, 2017; Luxton, June and Fairall, 2012). It has been observed that suicide attempters get influenced by others and develop suicidal behaviour under suicide pacts. This kind of imitation is referred as suicide contagion (White, 2021). To mitigate some effects from influencing, the role of media reporting is significant. People, who report, deal with or manage suicide attempts, pacts and related morbidity must be more sensitive while reporting incidents of suicide as it tends to encourage other similarly placed individuals to end their lives (Latha, 1996; Sripad et al., 2021).

Gender Asymmetry of Suicide Pact

Suicide remains a major social problem among various countries (Cohen, 1961), and 8, 00,000 lives are lost every year (Bilsen, 2018). Studies attest the effect of age on suicidal behaviour and pacts and report it as higher among adolescent or young adults. Gender plays an important role in suicidal thoughts, behaviours, and pact. While suicidal deaths are higher among males in High Income Countries (HICs), in lower-and-middle-income economies (LMICs), the rate is significantly higher among females (Lester, 1990). Many reports suggest that women usually attempt suicide during their menstrual phases (Owens and Eisenlohr-Moul, 2018). During that time the female sex hormones like estrogen and progesterone are fluctuating and imbalanced in their bodies. Several autopsy reports suggest that completed suicides among women often

occur during the menstrual phase (Osborn et al., 2021). Sarayu Mohanachandran IAS, while sharing her experience has registered that five of the married women who died unnaturally were mothers who were nursing their toddlers. It remained a mystery why these poor women took such an extreme decision. The doctor who conducted the autopsy of those deceased women said that they took the drastic step during the days of their monthly periods. Some women during and pre-menstrual period undergo emotional instability, anger, irritation, sadness, depression and anxiety. Post-partum depression is also an important area which needs serious attention. Even a minor discord is sufficient to trigger an extreme decision to commit suicide. Suicide pacts among females are also associated with a psychiatric disorder called folie `a deux (Salih, 1981). It creates delusional beliefs and thoughts within themselves. So, they often tend to isolate themselves and remain withdrawn or make their relationship messy.

As seen in other pacts, the dominant person imposes the delusional belief on to the other. This disorder occurs among sisters, usually spinsters (Rajagopal, 2004). Normally, women are made to play gendered stereotypic roles and are mostly dependant on husband, children, or parents. In such asymmetric relationships, dominant partners take advantage of the vulnerability and subjugation of other partners and force them to dance to their tunes and infect the suicidal behaviour on them. Such suicide contagion is seen to be significantly higher among women (White, 2021). The reasons for suicide ideation among men who are

brothers, include family problem, financial issues, genetic conditions like depression, other unattended mental illness, substance abuse, estranged relationship, traumatic impacts due to suicides of some closer persons (Hocaoglu, 2009**).** Though it might appear that both the partners are acting together due to a common understanding, in reality, one partner assumes more power than the other and intensifies the desire to pursue the unhealthy act of killing themselves together. However, the mortality in males due to suicide attempts are more in figures than females. While females opt for deliberate self-harm as a cry for help or attention, males choose violent means or very serious attempts resulting in inevitable deaths. (Rich et.al., 1988). Further, males don't seek professional help or confide in family or friends (Griffiths, 1992: Addis & Mahalik, 2003: Biddle et.al., 2004). This aggravates their deleterious mental health condition and eventually their vulnerability for pacts.

Gender Orientation and Suicide Pact

Suicide pact among adolescents is yet another matter of concern. Deeksha (2017) reported that two girl students jumped off a five-storey building in Salem consequent to a suicide pact between the duo. They shared an '*intimate relationship'* between themselves because of which they were treated badly by their peers, teachers and parents. They were criticized that they had *'inappropriate behaviour'* and they were questioned for that. They were even asked to go for counselling. Unable to face the challenges and hardship, they went and took the extreme decision of killing themselves on a pact between themselves. In the age of adolescence, children need help from elders and well-wishers to understand themselves. It is a stage where they deeply register the negative thoughts and feelings, they get out of the experiences undergone. Such undue exposures to negativity would have a lasting impact on their very nature, character, life and emotions. The adolescents in the reported case had become more vulnerable to negative thoughts and made negative decision. Though gender and sexuality are fluid, the significant persons in the life of those adolescents failed to understand them and were intolerant to their behavioural changes and acted short-sightedly. Without respecting their choices, knowingly or unknowingly a pre-closure to their lives was given by exhibiting intolerance. The adolescents were found to be at fault for their orientation which is not understandable even to themselves.

The data of National Longitudinal Study of Adolescents (King et.al., 2020) showed that the lesbian, gay and bi-sexual respondents reported higher rate of suicidal ideation than their straight counter parts. If a person's sexuality is different or deviated from the so called *'normal'*, it is difficult to get acceptance. They are forced to face humiliation. The kith and kin or other significant persons associated with them simply stigmatise and segregate them from the common stream. The gender stereo-typical pattern of life plays a role in determining the positive or negative support system available to a person. Hence, the possibility of entering into suicide pact can also be more among

the non-hetro individuals than the hetro-sexual individuals.

Survivors and Criminal Liability: Legal Aspects

According to Jowitt's Dictionary of English Law, suicide pact is killing another person in pursuance of an agreement to commit suicide, or becoming a party to another for being killed by a third person. The British law considers suicide as 'self-murder' and the survivors of members of pact as 'attempted murderers'. In *Dunbar v Plant*, the Court of Appeal of England stated that the public interest does not generally call for the survivor of a suicide pact to be prosecuted. The court gave the advantage of applicability of forfeiture rule for assisted suicide, since suicide is a crime under Sec. 2 of the Suicide Act 1961. As per Sec. 4 of Homicide Act of England, if a person kills the other or becomes a party to the other for being killed by a third party on a pact, he is liable to be charged for manslaughter and not for murder. So, in the trial for murder, suicide pact can be a defence.

In the United States suicide has long been believed as a symptom of chronic mental illness and therefore the survivors of suicide are not punished. In *State v. Sage, 31 Ohio St. 3d 174 (1987),* the court held that if a survivor could prove mutual pact, that is good enough to defend the criminal liability. Neither suicide nor abetment of suicide is a crime in Ohio, if the members voluntarily enter into a pact. However, the courts would investigate the facts and circumstances of each case before arriving at a decision and hence no straitjacket formula is applicable to

all such cases. Most States in the developed countries have abolished punishment for suicide (Keating, 1988).

The legal implications and Criminal liability of Indian law needs more elaboration. Abetment to suicide still acts in its full vigour (Latha, 1996), and the survivor if happens to be acting under purposeful aiding or soliciting suicide, can be charged under Sections 306 or 302 or 304(1) of IPC depending on his/her degree of participation in suicide pacts. Criminalisation of suicide attempt under Section 309 IPC has been later mitigated by virtue of Section 115 of Mental Health Care Act 2017. As per Section 115 of Mental Health Act, it is presumed that suicide attempters have 'severe stress', until the contrary is proved. Sec. 115(2) makes it obligatory on the State to treat them with care and consideration in order to avoid the risk of recurrence. Despite these developments, Section 309 IPC has not yet been repealed.

In Indian law, if the self-attempted suicide is completed in pursuance of a suicide pact between the members of a group, the survivors will be prosecuted for abetting or aiding suicide. If someone in the group causes the death of the other, with the consent of the other, that will fall under the 5th exception to Section 300 IPC and hence the offence committed would be culpable homicide not amounting to murder. And the same is punishable under Section 304 Part I of IPC. Since the offender knows that he is causing the death of someone and with an intention of causing his/her death, it comes under the purview of Part I of Sec.304 IPC.

If the death is not caused, but only attempt is made, the offender would be dealt under Section 308 IPC for attempting to commit culpable homicide not amounting to murder. However, if the person who gave the consent is a minor or insane person, the offender is punishable for the offence of attempt to commit murder under Sec.307 IPC. If the death of a minor or an insane person is caused on a pact, the offender will be prosecuted under Sec.302 IPC for the offence of murder. It is because of the fact that a minor or an insane person is incapable of giving consent. (Sec.11, 13 and 14 of the Indian Contract Act) and hence their consent is immaterial. If the minor or an insane person commits suicide by being a member of the suicide pact, the survivors of the group would be penalized for abetting his suicide under Sec. 305 IPC. However, there are cases when the infants in the family are given poison or drowned in the well to make sure that they are not left behind when the entire family is involved in a suicide pact. In such cases, if any adult member of the family or the parent survives, they will be charged for murder.

Gender-Legal Perspective

In view of the asymmetric relationship between the couples and due to gender stereo-typed behaviours, predominantly women in India play secondary role in decision making. In the suicide pact between the couples or among the family members, the dominant partners are capable of forcing their will on the submissive partners. As per Sec.498-A of the Indian Penal Code, if a woman's husband or his relatives, due to any willful conduct which would drive the woman to commit suicide or cause grave injury or danger to life, limb or health (whether mental or physical), it is called cruelty. If a member of such pact is a married woman and if her suicide had taken place within 7 years of her marriage and it is shown that her husband and his relatives had caused cruelty onto her, the court may presume, that she was abetted to commit suicide by her husband or his relatives. (Indian Evidence Act S. 113-A). Explanation to Sec. 113-A of the Indian Evidence Act clarifies that for the purpose of that provision, cruelty shall have the same meaning as in Sec.498-A of the Indian Penal Code. So, any suicide pact made with a married woman, within 7 years from the date of her marriage, by her husband or his relatives and if the woman commits suicide consequently within the said period, on her own or assisted by someone, the law will presume abetment. Because, suicide pact would also amount to cruelty, as per the explanation given in Sec. 498-A. So, the proof of suicide pact would only aggravate the criminal liability of the husband or his relatives, if she commits suicide within 7 years from the date of her marriage.

Conclusion

Suicide reflects the failure of the system to provide appropriate support to people who suffer serious mental health issues. Suicide pact is a crucial societal issue which ought to be addressed carefully. The State should prevent such untoward incidents by forming suicide help-cells and treat the victims empathetically. The survivors of suicide attempts should be given cost free counselling. Steps should

also be taken to facilitate them to effect life style changes for balancing their mental health. While reporting such incidents, the act of suicide should not be glorified by showing repeated visuals. Mental health issues of women, while they undergo hormonal imbalance should be addressed appropriately. Women –friendly and gender sensitive attitude should be inculcated in all the stakeholders. Parental control is essential while the wards surf the internet. Schools and colleges should conduct depression screening programs to assess students who show deviant or different behavioural pattern. Every care should be taken that the students who receive help are not exposed or stigmatised by others. Priority should be given to both physical and mental health and media should help to spread awareness in this context. On November 13, 2021, a 17-year-old girl from Coimbatore committed suicide by hanging. She wrote in her suicide note that she committed suicide because she could not tolerate any more of sexual abuse from her teacher and two other abusers were also named. This was popularised by the media as sensational news. There were blogs, tweets with hashtags, besides photos and videos. Thereafter, on November 19, 2021, another girl from Karur committed suicide due to sexual harassment suffered by her at school. Subsequently, on December 21, 2021, one another school girl of same age committed suicide due to sexual harassment by leaving a suicide note. Since suicides are sometimes contagious, media should act responsibly with utmost care and caution. The academia, social workers, and other key stakeholders should help to give

sexual education and gender sensitisation at various levels. There are certain websites and blogs dedicated to educate and prevent suicidal tendencies among individuals who acquaint themselves with strangers through internet and social media platforms. The availability of information about support groups and their contact details to prevent suicide in these web-sites to mitigate the menace is appreciable.

"Suicide is no one's fault and yet is everyone's fault, and suicide prevention is everyone's responsibility. "Scott Poland

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Challenges in Cyber Security: Some Solutions

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Abstract

In the modern era, along with the development of new technologies, the ways of working and interacting are evolving, as the internet has emerged as a basic need. One such empire where plenty of work is done through the internet is known as cyber space. Cyber space is a dynamic platform where advancement occurs over time. New network technologies are provided in cyberspace that benefits the people and promises to be completely safe and reliable. People must have confidence that their data is safe and secure while working online. The flow of information on a large scale, the safety and confidentiality of data, and the connectivity in many networks are important for the modernization, economic prosperity, and security of the nation. Internet is considered the best medium of communication and it is definitely connected to almost all the practical fields of mankind. New wireless technologies are developing day by day and digitalization is being encouraged. It is a dark side of the coin, that enormous flexibility in cyberspace is providing more opportunities for criminals also and they are getting motivated towards cybercrimes. Victims are easily available for these cyber criminals as online responses grow. Increasing cases of cybercrimes have emerged as a matter of global security. Considering the serious nature and ill effects of cybercrimes, there is a need for effective adoption of cyber security norms, along with their understanding at the global level. At present, cyber security is the topmost threat to mankind and organizations. In the present paper, the authors have made an attempt to explain the concept of cybercrime and cyber security so that possible preventive techniques can be adopted to reduce cyber security threats.

Keywords: *Cybercrime, Cyber Security, Cyber Space, Challenges.*

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Introduction

The dependence of people, government, and private sectors on the Internet and the availability of different networking sites promote digitalization. In today's world, digitization and wireless media have become the basic need of every individual (Saxena & Singh, 2020). Internet users stay connected in cyberspace through various networking sites and gadgets, globally. The positive aspect of the internet is that it is beneficial for society but the other side of the coin is that, it has also a grey aspect to provide opportunities for cyber criminals. People use social media to facilitate life but at the same time, cyber security is also necessary. The advent of the computer has been a boon to students, lawyers, businessmen, teachers, doctors, researchers, and also not to forget the criminals (Dhupdale, 2011). During the COVID-19 pandemic, many organizations preferred the online mode of working and by taking advantage of the vulnerability of software, cyber criminals made many people their victims. The people working from home required awareness and knowledge of phishing scams, the fastest-growing type of cybercrime, many of which are now playing on fears of the Coronavirus (Ahmad, 2020). There is an unexpected upsurge in cyber-attacks during the Corona pandemic as the working approach suddenly drifted from offline platform to digital platform. Cyber criminals are interested in stealing the personal data of students and employees, as well as taking control of devices and resources; access is possible through the use of various technologies of remote access and online learning platforms (Alexei & Alexei, 2021). A virtual world has been created through cyberspace where our privacy and security are threatened. Users share their personal information online during online shopping, banking, using social media sites, etc. and cyber criminals take advantage of this aspect of technology. Cyber criminals can harm anyone by misusing the online information or data shared by them. Technology cannot differentiate between use and misuse and cyber criminals take advantage of this. Cybercrime is a criminal activity that involves the illegal use of one's personal information, accessing the computer without permission, hacking, financial loss, etc. Cybercrime does not exist in the physical world, it is the crime of the digital world, cyber world, virtual world or device-based world which is run through our activities and responses. The constantly changing technologies in the area of Computer Science, makes it most difficult to access a specific collection of moral codes (Khan & Haque 2017). Everything, which one can see and hear in the virtual world, is not the truth, many people make mistakes to understand the truth and this serves as the basis for cybercrime. It is necessary to adopt cyber security methods to avoid cybercrimes. Cyber security depends upon how effectively the technology is being used. Till people are not aware, there is no technology that can protect them from cybercrimes. Day by day technology is becoming advanced, in the same way, criminals are also detecting new ways to harm people by cracking technology. The Coronavirus pandemic was a testing time for the whole world, during which,

the increasing trend of online working strategy opted to maintain social distancing, which gave many new opportunities for cybercriminals. However, while the world focussed on the health and economic threats that COVID-19 posed, cyber threats increased during these times, as the environment is well suited for cybercriminals to strike (Rabie et al., 2021). The changing nature of cybercrimes is a danger to public security. The risk of cybercrimes can be reduced by using Artificial Intelligence which plays an equal role in preventive techniques. Securing the digital world and controlling cybercrimes are challenging tasks, as new threats are emerging day by day. Enhancing awareness and upgrading the skills, capabilities, and infrastructure to protect the country's cyberspace, to provide rapid response to cyber-attacks, to minimize damage and recovery time, and to reduce national vulnerability to cyber-attacks, (Badruddin & Ahmad, 2019) the law enforcement alone will not be able to work against cybercrimes. The main weapons to fight against cybercrimes are education and awareness. As technology is dynamic in the virtual world, in the same way cyber security technologies are also required to be modified over time.

Cyber crime

The concept of cybercrime is not much different from conventional crime as both break the law. Such actions which are against the reliability, privacy, and security of computer data or various types of software, fall under the category of cybercrimes. In general, cybercrimes are those criminal activities under which ICT devices (computer and digital equipment) are used to commit a crime to harm the person, trade, government data, ICT infrastructure, etc. The Oxford Reference Online defines 'cybercrime' as a crime committed over the Internet. Cybercrimes are also known as high-tech crime, computer crime, or e-crime.

Cyber Security

Cyber security is made up of a combination of two words cyber and security which means safety techniques provided through the cyber world to secure data, online information, and devices. Cyber security is a broader term that includes preventive techniques, policies, training, security approaches, and guidance against cybercrime in cyber space. Moreover, cyber security is a set of rules and laws that are used as a preventive action against cyber threats.

Rule and Laws in India to Prevent Against Cyber Threats

In today's era, cyber security has become the primary need of everyone, whether it is an individual or private or government organization because cyber criminals can target anyone, anywhere and anytime. According to the demand of the times, various schemes and laws are being introduced to avoid cyber breaches. Many important laws and acts were made in India to protect rights and fight against cybercrimes. Some of the Cyber laws implemented in India to provide digital security are as under:

- IT Act, the first domestic law against cybercrimes in India, was introduced

in October 2000. Under this Act, legal recognition was provided to e-commerce activities. This Act considers computers, networking systems, Internet-based data, e-mails, etc. in electronic format. The Act provides provisions for punishment for cybercrimes, along with descriptions of crimes in various sections. Sections 43, 43A, 66, 66B, 66C, 66D, 66E, 66F, 67, 67A, 67B, 70, 72, 72A and 74 of the Information Technology Act 2000 deal with hacking and cybercrimes. This Act considers cyber security as an emerging issue, and also legally recognizes digital signatures, so that a person can secure his or her identity in cyber space.

- In order to protect against cyber breaches and to strengthen digitization, the Government of India introduced the National Cyber Security Policy in July 2013. The security policy was framed to fulfil the objective of a secure digital platform for the government, other organizations, and the citizens of India. The National Critical Information Infrastructure Protection Centre (NCIIPC) was established under the policy to combat cyber violations. The policy focuses on the collaboration of the public and private sectors to suggest innovative ways of cyber security. Moreover, the policy calls for providing research and training programmes in the field of cyber security and the appointment of a Chief Information Cyber Officer at each workplace.

- To give a new dimension to cyber security, the Government of India established a National Cyber Security Coordination Centre (NCCC) in the year 2017. Its main objective is to provide a real-time assessment of cyber violence and scan internet traffic.

- Cyber Swachhata Kendras were inaugurated in 2017 under the Digital India campaign. It is a website of the Ministry of Electronics and Information Technology, which is responsible for providing cyber security tools for the devices and creating a secure cyber ecosystem in India.

- The Cyber Surakshit Bharat Initiative was brought into existence in the year 2018 with the goal of strengthening cyber security. It focuses on three key principles viz. cyber security awareness, education, and enablement. Along with this, it recommends the appointment of IT staff in all government offices.

- The Indian Computer Emergency Response Team (CERT-IN) was made the nodal agency to analyze, anticipate and warn about cyber security threats.

Challenges in Cyber Security

Cybercrimes and cyber security both originate from the cyber world. Various types of cybercrimes have come into existence in current scenarios such as cyber bullying, child pornography, identity theft, cyber terrorism, virus attack, drug trafficking, etc. Increasing usage of the internet in every sector is giving exposure to cyber criminals to find their victims easily.

As the technology is getting advanced, the hacker is also getting smarter. In the present era, the computer has become the most important tool almost in all fields of work, and the education system must meet the demands of technology to compete with global level education (Saxena et al., 2019). Cyber criminals can easily access the contact details, personal information, bank details of a person available on different networking sites. A digital platform is a place where criminals can easily commit crimes and escape. Rapidly growing cybercrimes are deadly for government, defence organizations, the corporate sector, society, and individuals. Working safely and securely online is a major challenge and issue. Various security challenges are emerging in the digital world. On one hand, the internet is a means to make people's lives easy and on the other hand it is used to commit crimes. Data security, global corporation, enforcement of the law, software weaknesses, lack of awareness, etc. are the challenges faced by the cyber world. Continuous development of modern technologies brings advancement in cybercrimes as well, due to which a new generation of challenges are evolving. Incessant expansion of modern technologies upgraded the level of cybercrimes as well, due to which a new cohort of cyber challenges are sprouting.

Lack of Consistency in Gadgets used for Internet Access

For the use of the internet, various types of devices are being used such as mobiles, computers, tabs, laptops, etc. These devices are manufactured by different companies and their operating systems are different from each other. The security level of these devices also differs from each other. The safety standards of these devices are set according to their cost in the market. On the basis of wide differences between these security norms, it becomes impossible for policymakers to set laws and techniques uniformly, which is a big challenge to cybercrimes and security.

Lack of International Level Architecture in Cyber Space

The area of cyberspace is so wast that the physical world appears to be very small. People of any country can harm people and institutions of different countries through online crimes. The digital world lacks international-level architecture to fight against cybercrimes. Generating global cooperation to formulate security-related policies to combat cybercrimes is a challenging task. It is difficult to develop the security architecture in cyberspace according to the different economic, political, social, and cultural conditions of different countries.

Lack of Harmony in Legal Approaches at National and International Level

Cybercrime is not an incident that happens at a fixed time or place; it can happen anytime, anywhere because the digital world has no boundaries like states and countries. Every country has its own laws to deal with crimes, but cybercrimes are spread worldwide. With the dynamic changes in cyberspace, it is a challenge to bring flexibility in security laws and regulations. There is a need to

harmonize such legal approaches at the global level, which can benefit each nation (Rajasekharaiah, 2020). The inclusion of domestic and international cyber law is a challenging task to eliminate cybercrimes. Due to a lack of cooperation between countries, these cases reach to a dead end and are closed without any conviction (Iqbal & Maqbool, 2017). It is mandatory to work internationally on preventive measures related to cybercrimes which are implemented by law.

Software Vulnerability

New technology has discovered millions of software that have made our everyday life easier. Different types of software are being used for the purpose of conversation, shopping, study, information, banking, etc. The vulnerability contained in the software poses a threat to cyber security. It is not necessary that all software companies create secure and reliable software that the information technology sector requires. Software vulnerability provides opportunities for cyber criminals and makes them easier to find their victims.

Non-compatibility of Out-dated Hardware Updated Software

Not only does software pose cyber threats, but out-of-date hardware systems also pose a risk of cyber-attacks. If the software developer realizes the shortcomings of the software, then they keep updating the software, but it is not necessary that the updated software be compatible with the old version of the hardware. Many times it is difficult to operate a new version of the software in out-dated hardware, due to which cyber threat arises.

Lack of Awareness

Awareness is the only key to protecting us from cybercrime. It is mandatory for every person, government, and private sector to be aware of cybercrimes and security. Knowing and being aware of cybercrimes and security policies are two different things. Cyberspace is governed by the responses given by its users. Many people are unaware that they are falling prey to cybercrime due to lack of awareness about cyber threats and security. Awareness of cybercrimes and security can be spread through education. Content related to cyber security should be produced in the curriculum at different stages of the education system to make the public aware. Understanding and being aware of the nature of various types of cybercrimes is mandatory in the Internet-based era.

Lack of IT Talent

Lack of IT talent is a big challenge for cyber security, as it plays an important role in the field of information technology. There are many people who do not know about cyber security skills when they are working in the IT sector. There is a lack of cyber security experts and criminal investigators who know how to protect data and information from cyber threats. As long as there is an unavailability of IT experts in police and law departments, it will be difficult to reduce cybercrimes. Cybercrimes are different from traditional criminal offences, so it requires a technologically savvy investigation team.

Suggestions to Overcome the Challenges in Cyber Security

The involvement of the people in the cyber world is being seen everywhere. Hence, cyber security became a big challenge before mankind. Therefore, it is imperative to discuss some suggestions to overcome these challenges of cyber security. The authors have tried to share some of the suggestions to overcome the challenges of cyber security.

Regulation of Devices

All IT devices manufactured by different companies should be regulated through some specific security norms. These norms for the regulation of gadgets may be as follows:

- Regulations regarding ICT gadgets must be clear and strict for manufacturers, sellers, service professionals, and customers.

- The manufacturers should give the instructions related to the terms, conditions, and privacy policy of the device in the video form and ensure that the device starts functioning only after watching the video completely.

- The safety standards must be ensured before realizing the IT device to the end-users irrespective of its cost.

- Every company that manufactures ICT devices must ensure the presence of anti-virus software in the device. Installation of anti-virus software in the device should be made mandatory.

- Device manufacturing company should allow software/applications installation only from authentic and approved platforms. The devices should be made in the manner that the pirated version will not be installed. Unknown sources of applications must be restricted.

- Software related awareness test facility should be made available in the device and it is mandatory to pass the minimum criteria to use the software.

- Strong password management can protect the login and authentication process from unauthorized access, therefore password reminders must be set by the manufacturer for IT gadgets.

- It has to be ensured that customers are not allowed to have the Internet of Things without an authentic electronic identity card.

- If the customer has access to any kind of offensive and defamatory material intentionally or unintentionally, then the alert should also be given by the device.

- The activities performed in the personal device must be end-to-end encrypted, but there should be a monitoring system under the regulatory bodies so that the originator can be traced if any kind of verification is required.

- The device must have a setting to alert the users about the latest cyber security threats.

- All types of ICT devices must have a security application that can categorize

and protect software that poses a threat to personal data.

- The device must be equipped with proper tools to control malware attacks, spam calls, messages, and mail, etc.

- Layer firewalls, proxy servers, web content filters, etc. should be effectively implemented to prevent the capabilities of devices that may process or store sensitive data on web browsing. These secure resources can protect users from cyber hackers and attackers.

- Personal or sensitive data should be stored in an encrypted file with the help of a specific key so that only the key holder can access the data, ensure such facility in the Internet of Things (IoT) also.

- Use of Virtual Private Network (VPN) at unknown internet facilities and public Wi-Fi networks can protect the users from cyber threats.

If these security norms will be followed strictly, one can get rid of cyber threats to a great extent.

International level Architecture in Cyber Space

Different countries need to build security architecture globally to identify the nature of cybercrimes and to tackle them effectively. Cyber security architecture is a set of security principles, defensive techniques, strategies, and models that can be implemented or executed to protect countries from cyber threats. For example, just as a house is built according to an architect's guidelines,

cyber security architecture will also provide an infrastructure to fight against cyber breaches on a global scale. It is necessary to have international-level cyber security architecture to reduce the risk of cyber threats worldwide so that a secure cyber province can be generated. It will come into effect by including all security aspects, international customs, policies, and networks. To implement the cyber security architecture on a global scale, an international level organization is needed to which all nations can contribute. As World Health Organization has instructed the whole world to stay safe from the corona pandemic, similarly there is a need for such organization that can drive the defensive strategies that come under the cyber security architecture. Cyber security organizations will be helpful in examining the factors responsible for cyber security threats such as economic, political, sexual, psychological, etc. to create a protective model that can be applied at the local and global levels. It will create an integrated framework for the cyber defence of each nation, surveillance of the overall elements of national interest like civilians, defence forces, government and private organizations, corporate sector, etc. Cyber security architecture will require professional and certified workers in cyberspace who are skilled in windows, network security, virtual private networks, control objective for information and related technology, distributed network attacks, etc. Different nations need to formulate ethical hackers, cyber security architects, ICT professionals, global information assurance managers, and cyber security experts so that all of them

together can represent the international level security architecture. It must be mandatory to present a model on the techniques adopted to avoid cybercrimes in different countries in international conferences so that these technologies can be incorporated into the security architecture. The IT sector, corporate world, governmental and defence coalitions, and international organizations must play an important role in protecting the international cyber network. Creating such security architecture on a global scale will be helpful in increasing the scope for secure practices in cyberspace and reducing cyber breaches.

Harmonizing National and International Cyber Legal Approaches

International legal cooperation is necessary to fight against cybercrimes. Since cybercrime is not confined to a particular place, a law should be made with International corporations. The law should be supported worldwide and should not have borders. All laws and regulations related to cyber security should be applicable to the national and international levels. Law enforcement agencies of each nation must be responsible for representing and coordinating internationally. There is a need to establish international harmony to fight against cybercrimes. To make Cyber security more effective, it is mandatory that factors like skills, cyber laws, international cooperation, and technical implementation need to be given tremendous importance (Alansari et al., 2019). There is no doubt that lawmakers, the IT sector, and various nations have been campaigning against cyber breaches for the past several years.

Common Wealth of Nations, Interpol, Budapest Convention, European Union, Group of Eight, etc. are working to make laws and regulations regarding cyber security at the international level. There should be an investigative committee with mutual participation, which will have to complete its process according to national and international legal approaches. The cyber legal approaches at the national and international levels should be harmonized in such a way that the sovereignty of each nation is maintained.

Strengthen the Software

Any software whether it is designed for the purpose of banking, education, entertainment, or sharing information should also be strong for the purpose of security. Software manufacturer companies should create reliable software that takes responsibility for the safety of online activities as people have increased confidence in online activities. Online networking sites should create security concealment to protect the customers who are in compliance with the cyber security norms. All user software should be regulated by policymakers for minimum mandatory security before releasing to the end-users.

Hardware Authentication

Security experts should focus on ways to make hardware legitimate so that people can be protected from cyber threats. It is not necessary that the passwords used by people are strong, so a hardware authentication method should be adopted which can prevent cybercrime. Every

internet user should keep their devices up to date and maintain to avoid cyber threats. It must be mandatory to form an inspection committee of cyber experts for checking whether the updated system is being used in all government and private offices. It is mandatory to have security standards in both software and hardware so that one can avoid the possibility of cybercrimes.

Awareness

It is important to be aware of cyber security to remain active in cyberspace so that people can adopt security methods to avoid cyber-attacks. It is the responsibility of every person to be aware of the measures of safeguarding online data. The availability, confidentiality, and integrity of information in any association is essential, for which endeavours must be set up to guarantee that they are exceptionally secure because it is the significant cyber resource that makes each association stand. (Kalakuntla et al., 2019). A secure online experience can only be achieved if people have the right attitude and high awareness towards cyber security. If a person is properly aware of cyber security and cybercrimes, then he or she can work in the digital world in a positive manner. Being aware of cyber security, internet users will not respond to false messages, emails, calls, etc., and will be able to protect themselves from being victims of cybercrimes. Awareness campaigns related to cybercrime and cyber security should be conducted so that everyone can protect themselves from cyber threats. Cyber security organizations generated by the government will be responsible for running awareness campaigns in the villages and

cities of the country. People should be made aware of cyber breaches and ways to avoid them. In order to take concrete measures against digital warfare and hackers targeting business organizations and government processes, India will have to take joint measures with other countries and increase awareness. Technically advanced nations around the world need to propel agendas, set role models, and train others with safeguarding principles of cyber space.

Education

Education and awareness are interlinked because the right education can make a person aware in the right direction. Education plays an important role in making people aware of cyberspace, cyber security, and cybercrimes. It is mandatory to educate people about the safe use of the internet. Cyber ethics should also be a part of primary education, just as life ethics are taught at the primary level because the Internet is linked to every aspect of life. Central Universities, Private Universities, Industry Associations, Industrial Training Institutes, and other educational institutions should include cyber security courses in their curriculum. The educational institutions should start some orientation programmes for the students and the teachers related to cyber security. The training of cyber security should not only be limited to the students but it is necessary to train the teaching staff as well. Workshop and seminars on cyber security should be held after a certain time interval. Research programmes on cyber security should be given importance in academic research institutions. There should be a provision of

specialization for the courses introduced under cyber security so that the country can get the best cyber experts. As the internet is used for various educational purposes and using the internet in a safe manner should also be a part of the education system. Cyber security campaigns should be conducted by education institutions to make the public aware in general and the students in particular.

Role of Social Media

The trend of social media has increased over the years. The need of the hour is how to secure personal data in a virtual environment, in which social media can play an important role. People can be given the right information to avoid cyber threats through social media sites. No doubt that many people are falling victim to cybercrime through social media sites, but if using these sites wisely and smartly one can find ways to avoid cybercrimes. The public should be made aware of cybercrimes and cyber security through blogs, tweets, videos, massages, etc. as social media is the biggest tool of communication today. Various types of cybercrimes and security measures should be disseminated through social media, which should be recognized by the regulatory authorities.

Strengthen the Cyber Cell

Keeping in mind the increasing operation of cyberspace, the government should strengthen the cyber cells across the country. The working strategy of the cyber cells should be strong enough to monitor all kinds of cybercrimes happening

around. The Delhi Police is planning to appoint forensic experts to investigate cyber financial crimes and collect evidence from the crime scene (Tripathi, 2021) on the other hand, the Cyber Crime Wing of Tamil Nadu Police has tied up with Digital Forensics and Cyber Investigators to assist the force in the detection of cybercriminals (Chandrashekhar & Mohanty, 2019). If a person becomes a victim of cybercrime then how he should register the report in the cyber cell, such information should be provided for the public. These cyber cells should make people aware of cyber threats and cyber security. The regulatory authorities of cyber law in India should deal with cybercrimes with the help of experts, for example, the help of ethical hackers can be taken to investigate the cases related to cybercrime. The cyber cell should be strengthened under the cyber security policies being run by the government. The government must ensure that the number of trained officers in the cyber cell is appropriate and they must be provided with the facilities required to face the menace of cybercrime. For an appointment in the cyber cell, the qualification criteria should be fixed, which can serve the purpose. The best example of this is the state of Telangana, where cyber security experts are being recruited in the police force (Chandrashekhar & Mohanty, 2019). The government should increase cyber warfare capabilities by forming a more alert, efficient and strong cyber security force so that cybercrimes can be checked by efficient techniques. Cyber cells across India need to reach new technological dimensions to strengthen their strategy for cyber security.

Professional IT Training

Training on cyber security-related issues should be made mandatory in all government and private organizations because the internet is required in every sector. There is a need for skilled employees in the field of IT in every organization. It is essential for police, judges, and lawyers to understand various types of cybercrimes, so that they can identify the tools of investigation and protect victims from criminals. There is a need for trained IT staff in every organization due to the increase in online services. The position and educational qualification for Computer Specialist, Cyber Officers, Information Technology Specialist, Chief Cyber Security Officer or Cyber Security Expert in various government and private organizations should be prescribed. More IT training centres should be established, under which training should be provided to every staff member. Such training should be provided by cyber security experts everywhere, which can make sure availability of professional IT workers. Every employee should be proficient in the practical experience of the software being used for the defence mechanisms of cyber security. IT security system needs to be critically strengthened to reduce cyber breaches in India.

Conclusion

It is true that cyber space provides exposure, information, resources but it is also a fact the cyber space is full of danger and challenges. Cybercrime is an illegal act; it needs to be handled through cyber technology in an effective manner. Online facilities can be taken advantage of through conscious behaviour and if there is a lack of awareness then the person can harm himself. These pose a serious threat to public security which may be local in nature but have a global impact. Due to the increasing complexities of cybercrime, it is difficult to control cyber threats. In view of the changing nature of cybercrimes, many challenges have arisen in front of the world, which needs to adopt safeguards to overcome them. There should be a global culture for cyber security under which policies should be formulated, developed, and implemented to prevent cybercrimes. There should be harmony in cyber laws being implemented at national and international levels. The education system should be so competent and well informed that every individual is aware of cybercrimes and security. Awareness, positive attitude, wise behaviour, and following the security rules are the best ways to avoid cybercrimes. This digital world will become even more reliable and secure when everyone has a safe experience in cyber space.

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Effect of Repeatability of Probes on Experiential Knowledge in BEOS

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Abstract

Brain Electrical Oscillation Signature Profiling (BEOS) is a neuro-cognitive indicator which establishes whether a memory or remembrance of an experience is present when cued using probes. BEOS measures the autobiographical memory of a certain incident that can be provoked through the use of probes presented about that incident. The process of remembering an incident is different from the process of knowing the same event. Therefore, BEOS uses this principle to gain experiential knowledge, which is achieved through the first-hand experience of that event rather than the memory of that event. In India BEOS is used as an instrument that assists in forensic psychological investigation. The expert testimony through the result generated by BEOS is used as corroborative evidence. Even after validation studies, BEOS has come under intense scrutiny. This study has attempted to examine the effect of repetition of same probes on the Experiential Knowledge (EK).There were three trials for the same probe on each participant with an array of unending EEG(Electroencephalogram) recordings in each session. This recorded information later was used to generate a report using Neuro Signature System (NSS) for each session. The presence of EK signifies that an individual had previously experienced the incident indicating their participation. The objective of this study was to examine the effect of repetition of same probes on the EK of that incident throughout the three trials. On analysing and comparing the reports generated for each participant, EK in all the three trials existed for similar probe numbers. Further analysis indicated that there is no significant difference in the EK generated during the three trials. That is the experiential knowledge does not improve or decrease with repetition of the probes.

Keywords: *Brain Electrical Oscillation Signature, EEG, Experiential Knowledge, Remembrance, Neuro Signature System.*

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Introduction

Brain Electrical Oscillations Signature (BEOS) profiling is a neuro-cognitive indicator that identifies experiential knowledge. Experiential knowledge is based on remembrance. Knowing and remembering are considered as a separate neuro-psychological process. Remembrance is gained from personal experience unlike knowing which is not necessarily gained from personal experience. Experiential knowledge is therefore unique to an individual, because the same event is experienced differently by both individuals (Mukundan, Sumit, & Chetan, 2017).

Experiential knowledge is evoked due to the personal experience of participation in an activity which involves emotional arousal and responses. The emotional arousal can be only present when the individual experiences the event. Knowing is different from experiencing an event. Knowing can include a mere understanding of an event, how it unfolds. However, it will fail to indicate the presence of experiential knowledge based on just information of that event. Experiencing an event involves participation in that activity, the memory for experiencing an event varies from knowledge of the event (Mickley & Kensinger, 2008, Mukundan, Sumit, & Chetan, 2017).

The present study focused on the report generated using the BEOS system on repeated probes after an interval of time. BEOS emphasizes the role of experiential knowledge and therefore if repeated probes are presented to an individual in different trials, the report should evoke experiential knowledge for the similar probes as presented in previous trial. There are only few research data available on BEOS and therefore it is often questioned on the efficacy of the system and its use as investigative technique. The report generated by the system on presentation of the same probe is expected to produce the similar report in each trial. It was further explored whether there is any change in the number of EK generated in each trial that is to understand whether there was any enhancement or reduction in the number of EK throughout this trial.

The main objective of this study was to explore whether there will be any significant difference in the EK of all the three trials. If such difference exists then, further the question arises as to whether the reports generated by the Neuro Signature System (NSS) for the same probes, presented at 3 different trials, with a gap of around 7 days between each recording provide a similar result? And whether the reports will indicate enhanced or better presence of Experiential Knowledge (EK) due to repetition of the BEOS examination? In other words, the effect of EK on all three trials is to be observed. Another objective is to identify that through this study whether it can be established that the results are consistent or similar when the BEOS examination is repeated for the same set of probes.

Data sources/tools

Brain Electrical Signature Profiling (BEOS) was created by C. R. Mukundan. BEOS operated by processing information of an unending continuous recording of EEG

from the subject. The EEG is then used in extraction of signature that is collected through the electrical oscillations recorded through EEG in the subject's brain. This signature is evoked due to the presentation of probes and is known as Experiential Knowledge. As the probes are presented during the process, the subject becomes aware of the experience of the event through the aid of these probes. The experiential knowledge is marked depending on the frequency of the electrical signals in the brain during or after the time of probe presentation. Visual Auditory Stimulus Programming (VASP) is used for the recording of probes and Neuro signature Profiling is used for these recording the information during the process of probe presentation and later generating report for the same.

Procedure

The aim of the study is to understand whether Experiential Knowledge (EK) will be similar for the same probes presented at different interval of time for each trial. The data was collected of total 13 samples, who were willing to share their experience on either transgression or their guilty experience and consented for 3 recordings at the stipulated time period. The samples age ranged between 18 to 25. Consent of each participant was taken and they were given a questionnaire where they have to answer the question and elaborate on their experience. Later on, the designing and recording of probes was undertaken. For each individual participant different sets of probes were formulated based on the information given by the participants which was either a guilty experience or an experience where they had transgressed the law. For every participant the first scenario had the same probes i.e. the neutral probes which included probes that would not provoke experiential knowledge (e.g. sun is shining). The second scenario of probe was control probe which stated facts about personal details of the participant. The probes were the same but it the facts changed based on the individual (e.g. my name is……, I am….years old). The first and second scenario had 10 and 8 probes respectively. The following scenarios depended on the information collected about the event shared by the participant. The minimum number of 120 probes including the neutral and control scenario was established. The probes for each participant were carefully designed and recorded by male or female on the basis of gender of the participant using the Visual Auditory Stimulus Programming (VASP). The Final step was the continuous Electroencephalography (EEG) recording. Thirty-two channels of Neuro Signature System (NSS) were used to acquire the EEG using a custom-made Electro cap with linked earlobe electrodes as reference. There was one reference electrode placed on the left earlobe of the participant. The online recording of brain activity through the EEG is examined for energy spectrum and the values are recorded. These values are represented with the aid of brain maps. Baseline was taken before each EEG recording of 120 seconds. The NSS uses a programme by which a probe is presented only if the power values in different frequency ranges are within fixed ranges as derived from the EEG of the eyes

closed condition of the subject. When there is a fluctuation or change from the fixed frequency ranges, the probe is temporarily halted until the value returns to the fixed frequency range. Continuous video of the subject was recorded during the recording. There were in total three EEG recording for each participant. The probes used for all three recording were the same. The second EEG recording took place on the 8th day from the first EEG recording and similarly third EEG recording took place on the 8th day from the second EEG recording. The trial gap of 7 days was strictly maintained across the entire participant.

In this study, there were three trials conducted on BEOS for each participant to understand the effect of repeatability of probes on Experiential Knowledge in BEOS. Therefore, a paired sample t-test was used to statistically analyse the data. The objective of the study was to understand whether there will be any significant difference between all the three trials which may indicate an enhancement in EK after each trial. Does repeating probes indicate an improvement in EK is the primary question. When suspects go through only one trial on BEOS system, does taking further BEOS examination will help in better results.

Results and discussion

Figure1.

Number of Experiential Knowledge detected in three trials for each participant
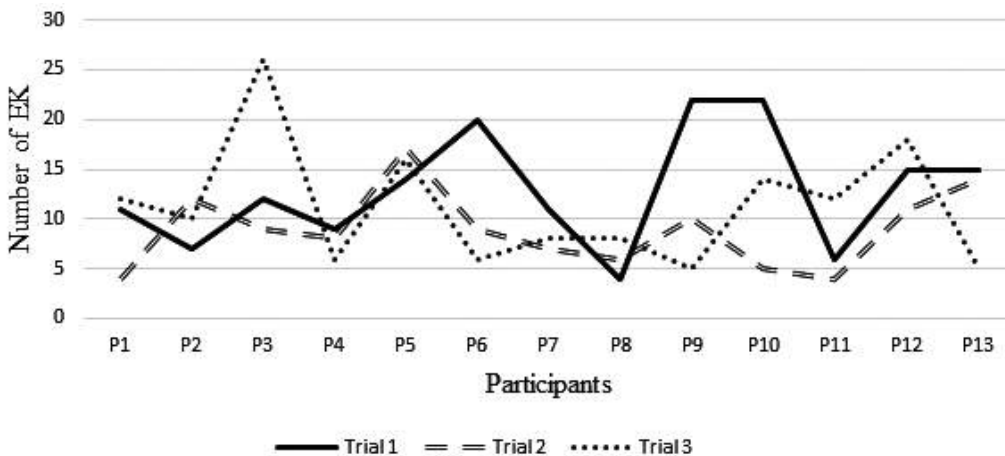
In Figure 1, the number of Experiential Knowledge detected of each participant across three trials is indicated. Upon observation, the number of EK is higher for the Participant 1, 3,8,11 and 12 for third trial when compared to trial one and two. In participants 1,3,4,6,7,9,10,13 there is a decline in number of EK from first trial to the second trial. The trend of an increase from first to second trial can be observed in participants 2, 5, 8 and 12. There is a major downward slope indicating decline in number of EK in participants 2, 4,5,6,9 and 13 from second trial to the third

trial. However, it cannot be deduced that overall number of EK in all three trials were significantly declining or increasing based on individual data and therefore, a paired t test is carried out for further analysis.

Figure 1 indicates the mean EK of 13 participants in each trial that is trials 1, 2 and 3. The mean EK of the first trial is greater than that of second and third trials. Whereas, the mean EK of second trial is lesser than mean EK of third trial. The mean EK of third trial is greater than trial two but is lesser than that of the first trial. This indicates that the EK in the first trial is the highest.

Table 1. Participant data for presence of EK for probes in each trial

Participants	Scenarios	Probe Number		
		Trial 1	Trial 2	Trial 3
1	2	-	-	-
	3	18	-	-
	4	1,15,18,21,22	29	1,15,23,31
	5	2,13,17,18,45	2,16,26	11, 16, 17, 18, 19, 23, 37, 38
2	2	7	-	1
	3	4,6,	-	-
	4	22,29	8,21,24	5,7
	5	21	4,5,7,8,14,16,23,37	1,5,8,14
	6	16	1	13,14,18
3	2	2,7,8	-	1,2,6
	3	3,5,20,23,26	6,14,20,22	6,14,15,17,18
	4	9,30,50	13,46	2,15,19,24,30,32,34, 35,38,39,40,41,42,49 ,50,54
	5	12	9,20,21	11,15
4	2	1,6	7	6
	3	-	19	9
	4	10,29,33,38	12,35	2
	5	3,4,24	3,11,25,31	26,29,30
	6	-	-	-
5	2	-	2	3,6,7
	3	-	3,6,8	4
	4	8,10,12	6,8,10	7
	5	14,28	4,14,30	10,29
	6	10,14,16,27,36,38, 40,42,45	20, 23, 24, 27, 31, 44, 50	20, 23, 24, 27, 31, 44, 50

6	2	2,8	-	7
	3	3,5,6,9,17,22,27	-	3,10
	4	1,4,11,13,34	7,23,30	-
	5	7,23,26,29,32,40	5,14,16,23,27,35	33,42,43
7	2	-	1	1,6
	3	14	1,10,14	6,16
	4	13,22,30,31,32	-	2
	5	1,4,7,23	2,21	28,34
	6	22	17	8
8	2	2	8	1
	3	4	-	9,13,18
	4	-	-	12,15,16
	5	2,10	-	16
	6	-	-	-
	7	-	5,10,11,20,22	-
9	2	6	6	1
	3	7, 9, 14, 20, 27, 33, 34, 36	13,18,20,27,36	35
	4	2,10,13,16,25	5,24	-
	5	3,9,14,26,27,28,29	3,24	29,46,47
10	2	1	-	-
	3	1,2,7,17,19,23,24	-	14,22
	4	1,14,16,20,23,27	20	6,20,21
	5	9,10,18	8,9	5,21
	6	11	3,10	8,10
	7	2,4,8,12	-	7,12,16
11	2	-	-	-
	3	6,23,24	35	4,29,35
	4	23	-	3,5,9,18,20,21
	5	16,22	7,14,36	6,9,22
12	2	1,7	1,7	6,7,8
	3	6,12	7,15,21	14,17
	4	2,3,17,19,22,25	2,9	6,8,9,12,19
	5	2,18,21	8,12,22	2,17
	6	13,23	3	7,8,10,15,17,26

13	2	-	1,2	7
	3	5,8	13,17	-
	4	7,9,11,12,14,21	12,13,18	10,21
	5	12,16,17,22,23,30	2,9,10,14,20,32,41	3,33

From table 1, it can be observed that in each participant EK was evoked for the probes that were closer. Especially in participant number 3, 4,9,10 and 12 there is presence of EK for the some of the same probe numbers. However, it is not consistent throughout. The main trend that is observed is that presence of EK is repeatedly seen in the closer probe numbers in all three trials.

Table. 2.1 Mean, Standard Deviation and paired sample t-test of Trial 1 and Trial 2

	Paired Differences				
	Mean	Standard Deviation	t	df	Sig (two Tailed)
Trial1-Trial2	4.0	6.32	2.280	12	.042

Using statistical analysis of paired sample t test the null hypothesis is examined in order to understand whether the results when compared with each trial have a notably different outcome.

The first null hypothesis is that there is no significant difference in EK of the first and second trial. Table 2.1 indicates results of the paired sample t-test conducted to compare the number of EK in trial 1 and trial 2. As seen in the table, the t (12) = 2.280, p=0.042. There was a significant difference in trial 1 and trial 2 in the number of EK. So, the null hypothesis is rejected. Therefore, there is no significant difference in EK of first trial (M=12.92; SD=5.85) and EK of second trial (M=8.92; SD=3.9).

Table. 2.2. Mean, Standard Deviation and paired sample t-test of Trial 2 and Trial 3

	Paired Differences				
	Mean	Standard Deviation	t	df	Sig (two Tailed)
Trial 2-Trial 3	-2.30	7.11	-1.170	12	.265

The second null hypothesis is that there is no significant difference in EK of the second and third trial. Table 2.2 indicates results of the paired sample t-test conducted to compare the number of EK in trial two and trial three. As seen in the table, the t (12) = -1.170, p=0.265 There was no significant difference in trial two and trial three in the number of EK detected. So, the null hypothesis is accepted. Therefore, there is

no a significant difference in EK of second trial (M= 8.92, SD=3.90) and EK of third trial (M= 11.23, SD=6.12).

Table. 2.3. Mean, Standard Deviation and paired sample t-test of Trial 3 and Trial 1

	Paired Differences				
	Mean	Standard Deviation	t	df	Sig (two Tailed)
Trial 3-Trial 1	1.69	8.66	0.704	12	.495

The third null hypothesis is that there is no significant difference in EK of the third and first trial. Table 2.3, indicates results of the paired sample t-test conducted to compare the number of EK in third trial and first trial. As seen in the table, the t (12) = 0.704, p=0.495. There is a significant difference in trial three and trial one in the number of EK. So, the null hypothesis is accepted. Therefore, There is no significant difference in EK of first trial (M= 12.92, SD=5.85) and EK of third trial (M=11.23, SD=6.12).

It can be deduced from the individual participant data from table 1 that EK is present for similar probes. There is a significant difference in the trial one and trial two. This indicates that in trial 2 there is decline in the number of EK. In trial 2 and trial 3 there is no significant difference and trial 3 and trial 1 there is no significant difference. So this indicates that there is not much decline or increase in number of EK even if the probes in each trial are repeated.

Conclusion

There is a consistency for each individual in terms of EK provoked for the probes in all three trials. The probes which are similar or are nearby have indicated presence of EK, this reflects that the report generated is almost similar when probes are repeated. However, further statistical analysis is important and therefore, the significance of each trial was also conducted using a paired t-test. This analysis indicated that the number of EK in first trial and second trial had a significant difference. However, the number of EK of second trial and third trial did not have a significant difference. Similarly, the number of EK of first and third trial did not show any significant difference. So it can be concluded that an individual data analysis indicates consistency in generation of the reports in BEOS. However, overall, the difference in number of EK reported after a week is negligent. There is neither enhancement nor reduction in number of EK evoked during the BEOS recording after the interval of some time.

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Emergence of Cyber Crime in India : Concepts & Anticipated Counter Response by Enforcement Agencies

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Abstract

This article is designed as an aide-memoire to the practical and non-existing or wanting response of law enforcement agencies. The jargon of taxonomy and actors of cyber crime is kept to the minimum. The present article will also delve into reasons why cyber-crime is on the rise and different mechanism used by these neo- criminals. The article also deals with how the whole operation is run, as smooth as a corporate entity. This article highlights the policing challenges in hotspots like Mewat & Jamtara regions. The local criminals have evolved their modus operandi towards cybercrimes involving selling non-existent artifact on intermediary marketplace e.g. - Facebook, OLX etc. Alarmed on the rise of such crimes, Police have been acting and tackling these crimes with new vigour & abundant clarity to annihilate this nuisance. The article shows recent steps taken by the Police to deal with cybercrimes and creation of special mechanism lie I4C. In the end, multiple suggestions and recommendations are proposed to make the current counter- strategy more effective and prudent to tackle these crimes many of these propagated by I4C and other stakeholders.
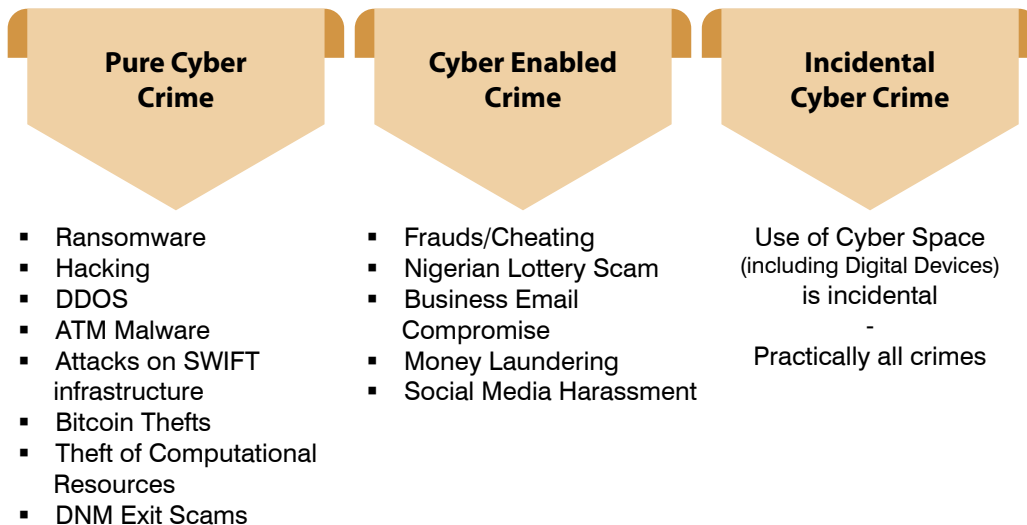
Keywords: *Cyber Frauds, Modus operandi, operational process, counter-strategy, integrated effort, Best practices.*

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Broad Taxonomy for Cyber Crimes[1]

Pure Cyber Crime	Cyber Enabled Crime	Incidental Cyber Crime
- Ransomware - Hacking - DDOS - ATM Malware - Attacks on SWIFT infrastructure - Bitcoin Thefts - Theft of Computational Resources - DNM Exit Scams	- Frauds/Cheating - Nigerian Lottery Scam - Business Email Compromise - Money Laundering - Social Media Harassment	Use of Cyber Space (including Digital Devices) is incidental - Practically all crimes

Reasons of emergence of cybercrime Hotspots

Due to reasons which include historical, geographical and sociological, like prevalence of 'Thug' culture & porous borders along areas of Rajasthan, Haryana and Uttar Pradesh, Mewat region provides good shelter for different kinds of crimes. Highway robberies and gruesome dacoities gave way to extraordinary novel crime like '*Tatloobaazi'* which again gave way to newer cyber crimes which were safer and difficult to trace too due to jurisdictional entanglements and scarce domain experts in investigations. Similarly materialistic ambitious and qualified[1] youth of erstwhile wealthy coal belt of Jharkhand shifted to cyber crime hub in areas like Jamtara.

A simple 'Cost Benefit Analysis' by smart consultants of these conventional criminals, who have been having insider information or seen loopholes in close proximity have cast a spell on novel crime around their habitat to get quick bucks sans the usual risks. These are usually youth of the same cohort, like common community/village or kinships and beneficiary of their cosmopolitan experience:

- Worked in E-commerce platforms, or
- Ola-Uber drivers or
- ATM operators/ security guards at ATMs
- Back-end support in mobile companies
- SIM vendors/retailers
- E-Mitra/E-Kiosk franchisers

These catalysts along with others push factors enumerated below have given a boost like a projectile growth trajectory:

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1   Image taken for representational purpose from- *"Training for Investigation & prosecution of new & emerging crime -Compendium of National Security Strategy -2018,"* Published by BPRD, By- Sh. M.M. Oberoi, Sh. Sai Manohar, Sh. Dhitiman Shukla.

1. Some communities have historically been involved in crimes

2. Lack of local employment opportunities and industries

3. Nexus between Telecom Distributors and retailers, latter given license without adequate background verification given target based expansion strategy.

4. SIM purchase very easy without proper verification, incomplete CAFs (customer application form).

5. High density of E-Kiosks centres, usually unchecked or monitored – acting in connivance, as centres to forge documents and transfer money across different stakeholders involved in process.

6. Peer to peer learning plus social acceptance to earn money through frauds.

7. No mission mode project to tackle such problems by Police until recently.

8. Perception that the local Police are not cooperative with outside Police personnel.

9. Lesser understanding of Police personnel to understand and investigate cyber cases.

10. Easy availability of untraceable bank accounts which are used to withdraw money and create complex chains of money transfer. All of it combines with lack of awareness of common people about e-commerce transactions'.

Given ease of operation, lesser risk and increasing use of B2B & B2C E-Commerce ecosystem & its spread symptomized by internet shopping and mobile usage – more and more people have shifted to cybercrimes. *In sum*, *they have introduced Disruptive technology in the field of conventional crime*.

Why response from LEAs is wanting

The problems faced by Law enforcement agencies are as follows:

1. **Proportionality paradox**- these crimes are cumulatively less in amount but at the same time disproportionate individually. This leaves inherent skewed Police prioritization when dividing overall resources.

2. **Lack of verifiable Biometric identification** of users of mobile telephony and banking facilities after Supreme Court verdict on Aadhaar Act & lack of Data Protection Act in India, which can pull up the intermediaries.

3. **Problem of Jurisdiction:** These crimes are borderless due to safe havens provided by inherent advantage of distance from scene of crime, due to mobile technology involved. Criminals reside in places where Police are least bothered about them due to lack of Police FIRs originating in those areas, whereas the originating areas of crime does not get cooperation of Police agencies in areas of domicile of fraudsters, thus making a win-win

situation for these criminals.

4. **Inertia effect -** For cyber criminals it is de-facto *Inertia of Motion* with 'Low effort & High return' but at the same time for LEAs it is *Inertia of Rest* in operation because of 'High effort – Low return' due to frequent dead ends encountered.

5. **Disconnection advantage to criminals** provided by privacy of Mobile tech - Regulatory and enforcement gaps as they exist today leads Police authorities to the device and not the criminal. Linking devices and SIMs to criminals is a critical gap. Use of VPN's makes things further very difficult.

6. The verification of most identities in banking and ISP requirement is not API based but **paper based verification** across many domains, thus creating inherent gaps for spurious/forged identities to have a healthy existence across the board. Use of forged documents to create fake accounts and issue SIMs is a routine.

Modus Operandi of these cyber criminals

These syndicates operate in an organized manner and work in group of 2-3 or more. Each group has a separate role to perform. For example, one group arranges the bank accounts opened on fake IDs or fraudulently obtained, one group arranges the tele-subscribers on fake IDs or someone else's ID, one group arranges the database related to financial details and one group engages in tele- calling to gullible citizens. Gang also consists of Social Engineering Team (who researches victims profile & matches the modus operandi), Computer operators and ATM withdrawal parties. All concurrently work till the withdrawal is completed.

Different means used by these cyber criminals to commit these frauds are:

1. Phishing banking websites & sending messages in the name of the banks stating that your card is blocked or the ATM PIN has expired

2. Phishing websites offering cheap electronic and home goods e.g. - OLX etc.

3. By sending a QR code.

4. By luring with pretending to call from KBC

5. Facebook ads posted with PhonePe rewards and other coupons for cash back.

6. Fraud Customer Care number related services available on Google. (Google Ad services)

7. Enticing victims to download certain apps through which their banking credentials can be stolen.

8. By downloading the Team Viewer application in the accused phone.
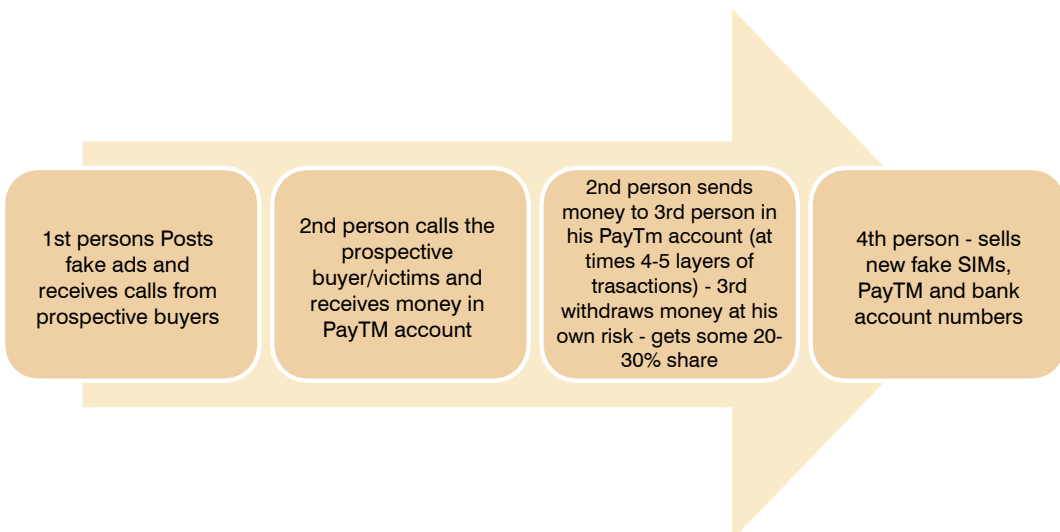
9. E-sim Swapping.

Salient Characteristics in these modus operandi

SIM cards & bank accounts for a commission are sourced on fake IDs from Jharkhand and neighbouring States of West Bengal, Odisha and Bihar. For Mewat region it is area of western UP Western MP. **Search Engine Optimization** is used to ensure that the fake websites/web-pages show up as top results of a Google search.
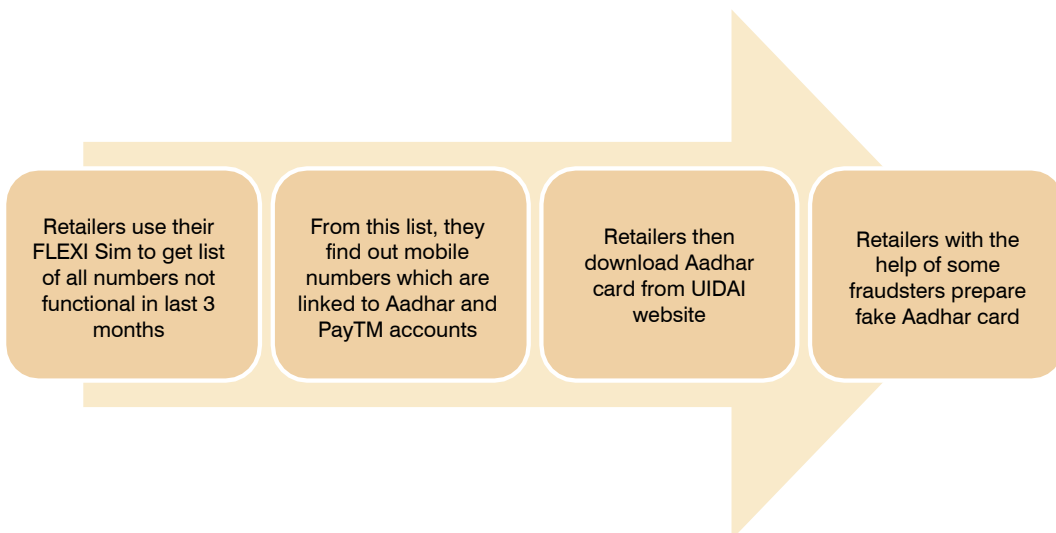
Fake e-wallets (PayTM) are used by activating those SIM cards in which the previous user had gotten KYC done. Advertisements of fake websites/webpages are also placed on social media (mostly Facebook). Use of Remote-Access Mobile Apps to gain full access to the victim's phone and subsequently, transfers entire amount from UPI-linked accounts of the victim.

Moreover, these practices are updated as per scope of committing this cyber crime through other means, e.g. using Facebook Market Place, Sextortion using dating apps, PayTM payment App. Recently there are complaints of skimming FAST- TAG amount from someone's account. **However most recent & disturbing trend of fraud** is through posting advertisements on Olx and Facebook Market place as **Army personnel** and selling goods, citing transfer of posting, and creating fake Facebook profiles of senior ranking Police officers like IGs, Commissioners of Police and Superintendents of Police of various districts and demanding money by distress messages, thereby **leveraging on the goodwill earned by Police & defence personnel.**

Sample Operation Process

| 1st persons Posts fake ads and receives calls from prospective buyers | 2nd person calls the prospective buyer/victims and receives money in PayTM account | 2nd person sends money to 3rd person in his PayTm account (at times 4-5 layers of trasactions) - 3rd withdraws money at his own risk - gets some 20-30% share | 4th person - sells new fake SIMs, PayTM and bank account numbers |

Where do SIMs come from?

| Retailers use their FLEXI Sim to get list of all numbers not functional in last 3 months | From this list, they find out mobile numbers which are linked to Aadhar and PayTM accounts | Retailers then download Aadhar card from UIDAI website | Retailers with the help of some fraudsters prepare fake Aadhar card |

Money obtained from frauds is withdrawn from accounts by:

· Swiping Debit Card at Petrol Pumps,

· At remote ATMs and E-Mitras (Digital resource centres set up by government),

· By transfer to fake bank accounts

Winds of Change: Providing Last Mile Connectivity in letter & spirit

Police have now taken a mission mode to face this challenge and make successful interventions & crime control strategies. **This has come about by understanding of the fact that last mile connectivity has to be provided by local Police and there has to be no hiding behind the bushes anymore**. The support sought by teams of Police station and cyber units from outside states have been receptively received at the district headquarters and adequate help and handholding provided by the local Police

stations.

An **example at full throttle action strategy of Bharatpur** Police is summarised below:

1. With proactive Police action in 2 months – around 40 persons in 8 different cases have been arrested with more than 40 mobiles, 150+ SIMs, multiple bank passbooks and around > 3 lakh cash has been seized

2. A dedicated Cyber crime team at Bharatpur level to catch hold of these fraudsters was constituted under command of an officer of Inspector rank.

3. Cyber teams from Cyberabad (2), Hyderabad(2), Bangalore(2), Basti,UP (2), Mumbai, Uttarakhand, Aurangabad, Haryana have come in Bharatpur clearly indicating the improved trust of outer Police units in Bharatpur Police and sense of

cooperation improving tremendously.

4. By analysing the tower dump data of 2 villages involved in cyber fraud in Nuh, 780 fake/suspected mobiles numbers have been identified – in Bharatpur tower dump of >400 villages have been taken and work to identify such fake SIMs is underway (>3000 fake SIMs expected).

5. Regular mail is sent to Olx to check for fraud details on their website and proper coordination is established with Olx Fraud Analyst team.

National & Inter-State mechanisms already in place to check this nuisance

Cyber Crime being borderless, investigations of cyber crimes involves multiple jurisdictions. Given the inter-state ramifications of these cybercrimes, Inter-district and Inter-state coordination along with Centre-State Coordination for policy formulation and effective implementation is very much required. Many measures are already in place, some statutory and some as executive measures at different stakeholders' level:

• **I4C platform** – The Cyber & Information Security (C&IS) Division of the Ministry of Home Affairs (MHA) now houses Indian Cybercrime Coordination Centre (I4C) as a nodal centre for fight against cybercrime. It seeks to identify the needs of LEAs and suggest requisite support modalities, by way of R&D activities to develop new technologies or collaboration with academia, executive bodies and other investigative agencies.

Components of the I4C Scheme

· National Cybercrime Threat Analytics Unit (TAU)

· National Cybercrime Reporting

· Platform for Joint Cybercrime Investigation Team

· National Cybercrime Forensic Laboratory (NCFL) Ecosystem

· National Cybercrime Training Centre (NCTC)

· Cybercrime Ecosystem Management Unit

· National Cyber Crime Research and Innovation Centre

· **Constitution of Joint Cyber Crime Investigation Team (JCIT): -** One of the mandates of I4C is to establish a platform for a Joint Cybercrime Investigation to drive intelligence-led, coordinated action against key cybercrime threats and targets. Multiple JCITs have been initiated by MHA. Rajasthan is present in most of them.

· **Cyber portal of MHA**- The Ministry of Home Affairs, has put up this mechanism for easy accessibility and reach of common man in registering the complaints/FIRs , to dilute any benefit that can accrue to the criminal due to inter jurisdiction fight and lack of sharing of criminal intelligence.

- The use of digital and mobile banking has increased the risk of financial frauds through online banking system. Such frauds hamper growth of digital transactions and have an adverse impact on the economy. As part of the **National Cybercrime Reporting Portal**, this Ministry has also developed a separate module that is known as "**Citizen Financial Cyber Frauds Complaint Reporting and Management System**" for quick reporting of financial frauds and monetary losses, suffered due to the useof digital banking, credit/ debit cards, payments intermediaries, UPI, etc. Complaints can be reported through telephone or portal.

  In this portal, there is also a provision for "tagging" of complaints. The tagging of complaints is done by the portal automatically, where ever mobile number or URL or email address of fraudster is common. API based response from banks and other FIs in the above module is the next logical step.

- **CYCORD**- The Intelligence Bureau has also floated this Inter-MAC coordination mechanism, both as a web-link and close loop social chat group, which links all field level officers at district and state level to prevent misuse of cyber space for furthering the cause of extremist and terrorist groups.

- Mechanism of Inter-state border meetings with adjoining states/districts byPolice chiefs of various ranks.

- INTERPOL coordination for conducting investigation and raids of multi- national ramification

Further Suggestions

Community Level Interventions

- Since it is also a problem of social acceptance of such kind of crime, Community Policing initiatives have to be aligned in this direction also. There is a strong need to leverage CLG and Panchayat meeting to bring awareness and oppose these kinds of things done at village levels, persuade them to oppose persons involved in cyber frauds.

- In particular, sextortion involves moral turpitude and community can name-shame the perpetrators. The fact that the victims are poor andgullible is also point of creating moral pressure on youth.

- We also need to generate more employment opportunities for the locals to dissuade them from committing such kind of frauds. Promotion of Apiculture, Pisciculture and food and milk processing units in collaboration with local NGOs engaged in these sectors e.g., LUPIN Foundation was taken on board in Bharatpur.

- Fast tracking youth skill development programmes can improve things of this front. Also, State Government should promote small scale industries to promote local employment in this area.

- Mewat Development Fund and similar local area funds should be strengthened and better utilised.

Multi-Modal Interventions for better coordination in cyber crime control The issues faced by LEAs are on the front like:

1. Skill & Infrastructure Gap

2. Multi Jurisdictional Collaboration

3. Adopting reactive approach

4. E-Evidence Management

- There is a need to have mechanism for better data sharing among banks and financial institutions regarding fraudulent activities in bank accounts; persons found engaged in such activities should be dis-allowed banking privileges for a time period.

- Inputs be sought from search engines, especially Google on how to limit the misuse of Search Engine Optimization.

- Banks have started sharing advisories through their Apps regarding installation of remote access Apps. These needs to be bilingual/multilingual. PayTM detects such Apps and warns users.

- Issuing Alert or advisory to the concerned State on the basis of maximum frequency of calls originated from the mobile towers of hotspot regions.

- Though, there is a limit of maximum transaction of Rs 10,000/- per day on e-wallets, fraudsters conduct financial frauds by operating a large number of e-wallets. Hence, there is a need to monitor wallets and UPI ids registered from the hub regions.

- Asking for Data and compiling such data from all states whereby these frauds have been done from the hotspot area and then launching a mass exercise to catch these culprits. (Recently Cyberabad Police Commissionerate shared information of around 600 FIRs in their jurisdiction and scores of criminals/accomplices having specific latitudinal locations which led to specific intelligence led search/ raids leading to successful arrests of dozens of criminals in Mewat hotspot areas of Bharatpur district).

- Considering a special audit of E-mitra shops and mobile SIM retailers for breaking the operational chain.

- Coordination with Olx, Facebook to conduct a monthly audit report about fake or suspected Ads being posted should be regularized.

- More collaboration with the Cyber Fraud Analyst teams of Facebook and other e- market websites apart from Olx. Proactive steps by Olx like plan to have Geo-tagging of Ads being posted are welcome.

- Blocking and reverting the money transferred on special request of specially empowered representatives of Police department while full documentation can be done later.

- Special provisions for seizure of property (movable and immovable) of these fraudsters be made through introduction of new statutory provisions, if required.

- More frequent Interstate Coordination meetings between states, whereby, officers of all ranks meet, share their experience and exchange data and actionable intelligence. Recent communication from I4C regarding this to Chief Secretaries is a welcome move.

- **Massive outreach & Awareness programs for CYBER HYGIENE-** Public awareness programmes by all stakeholders need to be vigorously executed. Regular media outreach by SACHET mechanism of RBI and similar interventions by I4C and state Police are some examples which need to be augmented. Observance of Cyber awareness month is another example.

Domain Specific Suggestions

A) Action to be augmented by Police/LEA in states

- To ensure sharing of details with Police teams of other states and other agencies (like the details of criminals whose bank accounts have been frozen with the Regional offices of RBI and spurious SIMs with DOT and report on misuse of e-wallets, registration of domain names without verification by fraudsters.)

- Inter-state coordination for verification of physical addresses so that the CAF/ other details are verified quickly. Country-wide beat applications may be considered.

- Special SWAT/QRT teams to be at disposal of ERSS (112)/ District control room for a quick response on information received on cyber portal/155260 hotline. This is crucial as LBS is enabling an accurate location and location is all we have to catch the culprit.

- Strengthening of Police force like stationing of special reserves of armed battalions in hotspot areas for effective last mile connectivity of Police response.

B) Action to be taken by 14C (Central Home Ministry)[2]

- Nomenclature of the Joint Cyber Crime Investigation Team (JCIT) may be changed to Joint Cyber Crime Coordination Team (JCCT). Develop a portal with intelligent analytical mechanism, central repository of information, data, database of profiles of criminals, action taken by JCITs, modus operandi of fraudsters etc. for sharing the information with LEAs of various States/UTs in 3-4 months.

- Request all the States/UTs to provide videos, pamphlets, brochures, booklets etc. developed and used by them for creating awareness of citizens towards cybercrimes in a months' time, so that best practices can be replicated in all the States.

- Integrate all e-wallet service providers and remaining banks with Online Financial Fraud Reporting Portal.

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2   Some suggestions have been incorporated from- Minutes of Meeting, I4C(CIS Division ,MHA) headed by AS(UT)/ JS(IT) on 15.9.2020, 12.01.2021 & 08.09.2021 at MHA, North Block, New Delhi

RBI may issue directions in light of intimation of cybercrime.

· Obtain information of different financial cybercrime cases with modus operandi from Police officers of concerned states of hotspot regions to prepare a matrix on various types of cyber financial frauds, their modus operandi, proposed solution to each problem and subsequently, highlight issues where policy intervention is required.

· I4C to convene a meeting with some e-commerce companies so as to device methodology to prevent frauds on e-commerce platforms.

C) Action to be taken by DoT[3]

· DOT's LSA (**License Service Area**) of States needs to pull up its socks and start taking its audit task seriously and penalising the telecom operators if fraudulent or spurious SIM cards are found in circulation. This habit has not picked up despite statutory provisions in place has brought in lot of vacuum in which criminals operate merrily.

· Telecom Operators should block the IMEI number of the fraudster on a request from LEA, under intimation to I4C. Most of the mobile phones used by these fraudsters are expensive smart phones. Because it is easy to obtain multiple SIM cards, blocking an IMEI number will have a more desired impact. Rajasthan LSA has taken lead and has blocked identified IMEIs.

· To ensure that such deactivated/ surrendered mobile numbers (which had been tagged with UPI service providers/e-wallets or otherwise) are not allotted again, in connivance with the representatives of Telecom Service Providers so as to prevent the chances of their usage by fraudsters on priority. FIRs registered by Telecom Service Providers to be followed up by SPs.

· Telecom Companies to ensure that the Master SIM surrendered by a retailer after giving up his agency, should not be misused by the distributor or another retailer. The same should be allocated to another retailer through proper process.

· There needs to be a mechanism where E-wallets should capture IMSI number and the wallet should be deactivated as soon as the IMSI number changes. Also, examine the possibility of allowing e-wallets/UPI services only on the mobile numbers which are registered with the bank account of the citizen and also to capture the IMSI number during activation of e- wallet services, so that citizen can receive the details of financial transactions, including alerts at the time of change of IMSI number on priority. Limitations regarding capturing IMEI numbers remain a challenge.

· DoT to conduct detailed study for identification of more than 9 connections per individual. To identify the persons having such multiple

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3   Some suggestions have been incorporated from- Minutes of Meeting, I4C(CIS Division,MHA) headed by AS(UT)/ JS(IT) on 15.9.2020, 12.01.2021 & 08.09.2021 at MHA,North Block, New Delhi.

SIMs and to carry out verification of Customer Acquisition Form (CAFs) for authenticity of such mobile connections in Mewat and Jamtara regions. Device a mechanism to inform the user regarding number of SIMs issued in his name.

· To create Central Data base of mobile phones of various service providers to ensure proper verification and blocking of phones of criminals. CDAC to expedite the work on equipment registry.

· To ensure due diligence by telecom companies to ensure that their licensed distributors and retailers are KYC compliant and operate from registered address. It has also come to notice in some cases of frauds that the proprietor/retailer of the Point of Sale (PoS) unit has not been found at his registered location, once he is hands in glove with fraudsters. TSPs may beasked to keep a strict watch on proprietor/retailer of the PoS unit.

· To study the mobile numbers working on roaming for a fairly long period in hotspot regions i.e. Mewat and Jamtara regions. Verification for Customer Acquisition Form (CAF) at the point of issue of these mobile connections to be carried out and such numbers may be blocked/disconnected in case of failing in the verification.

· To impose penalty on Telecom Service Providers (TSPs) for non- compliance

of guidelines of DoT with regard to issue / sale of mobile connections and to file an FIR with the Police, in case of detection of fraud.

· To take up the matter with MeitY, Govt. of India for physical verification/ audit of e-Mitra centers, highlighting specific cases with requisite details fortnightly, under intimation to I4C.

D) Action to be taken by RBI[4]

· To consider issuing directives to Regional Offices of RBI to monitor suspected e-wallets/ UPI transactions in hotspot regions.

· To issue instructions to all banks for strict compliance of KYC norms;

· Opening and operationalization of accounts with **small payment banks** such as FINO Payments Bank, NSDL Payment Bank, etc. should be as per KYC with proper verification and preferably, the biometric authentication of account holder. It has also come to the notice that some of the **Cooperative banks, Small banks and Scheduled Commercial banks** are not strictly following the KYC norms and RBI needs to take strict action against such banks.

· Moreover, Scheduled banks and payment banks have made available ATM facilities through decentralised and outsourced entities to increase financial inclusion. But these entities connive with these cyber frauds to

4   Some suggestions have been incorporated from- Minutes of Meeting, I4C(CIS Division,MHA) headed by AS(UT)/ JS(IT) on 15.9.2020, 12.01.2021 & 08.09.2021 at MHA,North Block, New Delhi

put ATM/POs units at the residences of cyber criminals. Now imagine, in hub regions, whole settlements and villages are engaged in these criminal activities and hence the need to go out of their dwelling and withdraw money is obliterated by this smart strategy. RBI needs to penalise entities providing ATM facilities in violation of norms and connivance of fraudsters.

· To provide information/awareness to general public regarding compliance of KYC norms etc in Vernacular languages; to explore the possibility of giving a choice of vernacular language for receiving transaction related messages for new as well as existing bank account holders.

This will enable the persons who are not conversant with English, to understand the details of the transactions that have occurred in their bank accounts or are proposed to be made.

· To issue instructions to Banks/Financial Intermediaries for prevention of misuse of QR code etc;

· To issue instructions for active, real-time data sharing amongst banks to avoid fake accounts.

· To disable the account of E-wallets as soon as the mobile number is allocated to a new user or after getting the information from user;

· Proper fool proof mechanism to be developed for the facility of withdrawing money from payment bank accounts through field agents of the banks.

· E-commerce platforms to act as an Escrow and to ensure release of payment to the seller only after the transactions are authenticated and successful.

· RBI should maintain suspicious transaction reports for multiple **transactions with high volatility**. (The accounts associated with fraudsters have been found to witness unusual volatility and repeated credits and withdrawals).

· Analysis of such frauds have also revealed that fraudsters give their mobile numbers, instead of the mobile number of the actual bank account holder, during the opening of such bank accounts in villages and small towns. Subsequently, cash withdrawals take place through OTP / password of verifications, by the fraudsters themselves. Analysis of location of account holders and actual ATM transactions can give a check regarding misuse of banking channels.

· Many merchants and E-commerce entities force customers to store debit or credit card details which increase the risk of card data being stolen. This can be avoided with the RBI allowing TOKENISATION of cards while making payments. Companies can't store card data from next January. Digital lending and & Digital Payment platforms be brought on board for speedy implementation of this measure and strict compliance.

E) Action to be taken by MEITY (Policy Interventions)

1. **UIDAI Act and its special Clause:** Recently (August 2021) the Government has approached the Unique Identification Authority of India with proposal to permit Election Commission to use Aadhar for registration of new voters. The EC had initiated the exercise of linking Aadhar with EPIC (Electronic Elector's Photo Identity Card) in 2015. But the exercise was suspended that year when SC in interim till final judgment, restricted the use of Aadhar to PDS, Kerosene, LPG. In its final order in 2018, SC held that though Privacy is a fundamental right, it can be curtailed if either a specific law is in place to authorise the collection of Aadhar or if interest of state is involved or test of proportionality is satisfied.

In the meantime the MEITY has notified The Aadhaar Authentication for Good Governance (Social Welfare, Innovation & Knowledge) Rules 2020 on August 2020. The rule 3 of the aforesaid rules allow the request sent by concerned Ministry or entity to submit proposal to the Union Government which forwards it to UIDAI .The later will authenticate the proposal on the parameters of rules permitting authentication of Aadhaar *"in interest of good governance, preventing leakage of public funds, promoting ease of living of residents & enabling better access of service for them."* Once allowed, the downloading of e-EPIC cards shall be permissible and Aadhaar verification will be used for faster delivery of services such as change in address as well.[5]

Similar proposal should move from MHA to UIDAI for making Aadhar authentication a must for SIM & PAN, again which was suspended earlier as it qualifies each clause of Rule-3 of above-mentioned rules.

2. Moving to open API Environment in Authentication for Law enforcement agencies- Some Success stories Elsewhere -

- SANDBOX APPROACH OF HEALTH MINISTRY - The NHA (National Health Authority) has launched the NDHM Sandbox: a digital architecture that allows private players to be part of Digital Health Ecosystem as health information providers or health information users.

The private player sends a request to NHA to test its system with Sandbox environment. NHA then gives the private player a key to access the Sandbox & health ID API (Application Programming Interface). The private player then has to create a Sandbox health ID, integrate its software with API, and register the software to test link records and process health data consent. Once the system is tested, the system will ask for demo to NHA. After successful demo, NHA certifies & empanels the private player (hospital).

- INDIA STACK- It is a set of APIs that allows governments, businesses, startups and developers to utilise a unique digital Infrastructure to solve India's hard problems towards presence-less, paperless and cashless

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5   "Govt writes to UADAI, seeks Aadhaar use for new voters." Ritika Chopra, Indian Express, August 7, 2021

service delivery. Each API within India Stack collection is owned by a separate entity, which owns the specification, and the governance of that API. For instance, the Aadhaar authentication, and eKYC APIs are owned by the UIDAI. Similarly, the UPI API is ownedby the NPCI. Using Open APIs, small teams inside the Govt. or in the private sector can build relevant solutions to address Indian problems.

- OPEN NETWORK FOR DIGITAL COMMERCE to be implemented fast- the government is seeking to replicate the success of Open Network for E-Commerce hoping to put in place a backbone on which sellers and logistics service providers can connect with the buyers no matter what platform they use through open APIs. This need fastforwarding.[6]

4. Expand and clarify the mandate: Intermediary rules & Mandate to be complied with iron fist. To smoothen the e-Evidence management in tackling cybercrime, the MEITY should come out with a mandate/executive order similar to those as it hasdone to enable LEAs to garner information from ISP/ TSP in respect of normal crime once the parameters of storage of relevant IPDR logs for internet & GPRSservices are circulated by these mandatory orders. The intermediaries are not forthcoming with specific information citing privacy/encryption or other issues. Although recent Intermediary rules brought out by MEITY shall be

enabling for LEAs, regular mandate orders after discussion with I4C would be appropriate.

Some of the commonly encountered problems faced by LEAs are:

- Use of Google Ad Service by fraudsters for advertising fake websites-intermediary(Google) not forthcoming with details of Mail Id, payment details etc. of a person who posted these ads.

- Posting of fake customer care numbers in Google Ads- need to verify genuineness of customer care numbers posted in Google Ads before enabling their services- but intermediary(Google) not forthcoming and applying such filters.

- Usage of Google view form link services by fraudsters to collect bank/ UPI/Net banking credentials of gullible victims-need to add mandatory fields/ check boxes in links- intermediary not supportive so far.

- No contact information available online of YouTube channels spreading hateful/objectionable content, no deletion of such content even after repeated notices- intermediary (Google) aversive.

- Non availability of Geo-location, IP Logs, CDRs of fraudsters by WhatsApp, other social media intermediary (WhatsApp has not considered cyber crime as an imminent threat).

- Android Virtualisation (Apps e.g. - Parallel Space etc. providing similar

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6 "How will open network for E-Commerce work?"- Sidhartha, Times of India, 12.7.2021

fake numbers which are used to commit further crimes) - Intermediary should offload such Apps from OS – but action wanting.

5. Cert-in to be strengthened for better incident management.

BEST PRACTICES: We should adopt best practices of different states

- Bangalore Police have dedicated Cyber Forensic apart from State Cyber FSL. Though such measures have been mooted in Rajasthan at all Range levels, but still to see the light of day.

- Cyberabad Police have big data of all CDR details taken till date and search engine to search any number in India (while Rajasthan RajCop can search only Rajasthan numbers)

- Asking Telecom operators about details under Section 149 CrPC as done by Haryana Police – asking them to submit numbers, retailer, CAF details

- Some districts like Alwar had made it mandatory for banks to ensure a double check and effective implementation of KYC norms before opening a bank account of any individual.

Training & Capacity Building

- THE US Example in Creating CYBER SECURITY RESOURCES[7]

  - The National Cyber Security Alliance (NCSA) builds strong public/private partnerships to create and implement broad-reaching education and awareness efforts to empower users at home, work and school with the information they need to keep themselves, their organizations, their systems and their sensitive information safe andsecure online and encourage a culture of cyber security.

  - Powered by the U.S. Department of Homeland Security, the "Be Cyber Smart" campaign is designed to inspire the younger generation of Americans to take responsibility for their own cyber safety. Learn about cyber security basics, common scams, and how to report cyber security incidents by visiting the campaign online.

  - If one is looking for information about a particular cyber security position or course- The National Initiative for Cyber security Careers and Studies (NICCS) is a national resource for cyber security education, training and workforce development. NICCS features tools and information for current and future cyber security professionals, ranging from K-12 students and teachers to Federal employees to Veterans to Career Changers. These tools and resources are available for anyone seeking more information about the cyber security field and cyber security career, and more.

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7   Cyber security awareness month 2021 Toolkit- CISA (Cyber security & Infrastructure Security Agency), Department of Homeland Security, USA.

> **Developing specific Training Tracks**

The tracks for training of all stakeholders need to be developed after a careful analysis of skill needs- technical and legal. The major tracks will include, inter alia, all relevant stakeholders-

· First Responders Track.

· Digital Forensics Track.

· Investigators Track.

• General Investigator

• Cybercrime Investigator

· Intelligence track

· Management Track –District Chiefs and Heads of Police force.

· Judiciary track-Judges and Prosecutors

> **Platforms for Training**

• E-Learning Modules of BPRD(E-Ustad)

• UNODC Global e-learning platforms.

• INTERPOL global learning centre(IGCL)

• Distance education through MOOCs (Massive Open Online Courses) & E-Books of various universities.

• NCRB developed platforms. Potential of these platforms remain highly underutilised.

Parameters to measure trends of cybercrime and counter measures

1) Number of FIRs registered for cybercrimes originating from hotspot region in a year. It is often seen that IT Act is not included in FIR registrations as it entails mandatory investigation by an Inspector rank officer. These IT Act cases do not reflect FIRs as cybercrime. A better measure is reported on cybercrime reporting portal and calls on 155260.

2) Quantum of money recovered in financial frauds in FIRs of hotspot region.

3) Quantum of money transactions frozen by concerned Banks /UPI/ e- Wallet etc in hotspot on request of LEAs.

4) Number of cyber financial fraud criminals arrested (including representative of Service Providers) in hotspot region

5) Number of mobile phone numbers of fraudsters in hotspot Region blocked by DoT (please informed pendency also)

6) Number of URLs of fake websites blocked in hotspot Region by MeitY (with pendency)

7) The land prices and inflow of luxury vehicles in the hotspot regions. There was perceptible fall in land prices and new registries of land in hotspot areas where the LEAs were incessantly ruthless in their action against cyber criminals.

Silver Linings

• That JCIT has been helpful in sharing details of the accused persons, phone numbers, bank accounts, physical verification of addresses and assistance in conducting raids. Recently 49 persons have been arrested in multiple

raids by Delhi Police in Mewat region, 22 Bank accounts of cyber financial criminals have been frozen and over 14,200 mobile numbers linked to fraudsters of Mewat region have been sent to DoT for verification and blocking thereof.

- Recently, Bharatpur Police have arrested 102 cyber criminals and 1075 mobile numbers have been sent to DoT for verification and blocking.

- To date more than 2 lakh cybercrime incidents have been reported on National Cyber Crime Reporting Portal and more than 50% of these are financial frauds, followed by social media related crimes.

- Reporting on Portal and 155260 has helped agencies through coordinated efforts, save more than 5 crore of hard earned money of citizens going to cyber criminals.

- Web based requests generation form for IOs in hot beads at cybercrime (Jharkhand and Rajasthan Police Portals)

Conclusion

The increased cyber fraud across the country is an utmost concerning issue, which needs a coordinated proactive approach. Since the process involves multiple steps to break this chain at each level, there is a need to analyse all pieces of puzzle of cybercrime, including facilitated reporting of complaints to drive intelligence led coordinated action against key cybercrime threat and targets and develop ecosystems that will bring together academia, industry and government to spread awareness about cyber crimes and also generate standard operating procedures to contain the impact of cybercrimes. Not to mention the sustained last mile connectivity to be provided on continuous basis by the district Police.

Cyber criminals are using gaps in our own telecom networks, banking and payment infrastructures to dupe the helpless citizens. Bridging these gaps involve mostly policy decisions and coordinated efforts amongst key stakeholders. A united front against this menace will surely prove that it is a surmountable challenge. These steps will ensure that cyber crime is eliminated, to usher in a New Progressive India.

Leading the tough, gently: Helping the super heroes remain super through Mindful and Supportive Leadership

Prof. (Dr.) Vibhuti Gupta*
Amit Kumar, IPS**

Abstract

It is a well-researched and widely accepted fact that Police personnel work in extreme conditions and are highly stressed leading to physical and psychological ailments. Although numerous study publications have suggested various approaches, little has been done or accomplished, and the men in uniform continue to work in the same manner, leading to stress and burnout as well as detrimental mental and physical health consequences.

There is not much room for improvement when it comes to the nature of the work or the inherent stress, the outside world, how people see things, the media, etc. To ensure the psychological wellbeing of the men and women in uniform, various efficient organisational or internal procedures may prove helpful. The paper makes some suggestions for non-clinical psychological interventions at the organisational level, such as mindful leadership, supportive leadership, behavioural flexibility, and engaging in acts of compassion and empathy, which may help to ensure psychological wellness and, ultimately, effective policing and officer wellbeing. A Model has been suggested by the authors for the same. Given that there is minimal room for control over the external environment, the study makes an effort to shed some light on improving the internal working environment.

Keywords: *Mindful Leadership, Supportive Leadership, Psychological well-being, Behavioural Flexibility, Leadership Flexibility.*

Introduction

Numerous studies have shown that police is one of the most stressful professions both internationally and in India, and is positively correlated with negative health outcomes (Manzoni and Eisner, 2006; Violanti et. al., 2007 Richardsen and Burke, 2007). With increased criminal activities by smart

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planners and plotters who are non-habitual, not-fitting-the-profile offenders, in addition to habitual offenders and history-sheeters, use of sophisticated crime tools and techniques, COVID-19 pandemic, increasingly distressed social groups leading to mob violence, the ever-present issue of law and order and the occupational hazards like a threat to personal safety whether due to the pandemic or while dealing with a law and order situation, poor working and residential conditions, ensuring public safety at the cost of personal safety and the list is never-ending, the police force including officers, face severe physical and psychological challenges.

Although it is the responsibility of the Police to guard and protect the public, the fact that they themselves experience fatigue, stress, burnout, depression, anxiety, insomnia, physical ailments, suicidal ideation, and suicides, among other problems, as a result of these difficulties, calls for special attention and top priority. This afflicts the entire chain of command starting from the senior officers down to the constabulary. Though much needs to be done, small steps can make a big difference. We understand not much can be done in terms of various stressors or nature of the job, external environment, media vigil, public scrutiny as well as criticism etc., however, if we attempt to take some measures at the organisational level (Hart and Cotton, 2002) also termed as generic workplace interventions by Demou et. al. (2020)) and attempt to create a rather more conducive work environment,

some help can certainly be ensured, as has been proven by a host of research studies (Norris et. al., 1990; Backman et. al., 1997; Richmond et. al., 1999; Tolin and Foa, 1999; Carlier et al., 2000; Shipley and Baranski, 2002; Penalba et. al., 2008; MacMillan et al., 2017). By ensuring some organisational-level interventions, some positive outcomes may be observed. Research has demonstrated that supportive leadership (Muller et. al. 2009; Adams and Beck, 2001, Biggs et. al, 2003, Barath, 2016), mindful leadership (Tajeda, 2019) and leadership flexibility (Reb et. al., 2014; Roche et. al., 2014; Reb, et. al., 2015; Baron et. al., 2018) can help ensure officer wellness as well as psychological wellness amongst different ranks of Police personnel.

It is here that our leaders in the police force, even at the bottommost level (for example Head Constable to whom some Constables report), and higher levels as well, need to be trained and nurtured to become more mindful and supportive leaders. Display of a little compassion, and flexibility, practising effective listening skills, and being supportive, mindful and non-judgmental can play a big role in ensuring psychological well-being amongst the rank and files of the Police force.

"Between stimulus and response there is a space. In that space is our power to choose our response. In our response, lies our growth and our freedom" Viktor E Frankl

The leaders can be of great help to the Police force. We would not be wrong if we

put it this way, in Police, the real family is the people they work with 24x7, tirelessly and silently. It does have an impact on their family lives, and relationships vis-a-vis with parents, spouse, children and friends who might some of the time fail to be considerate or even understand the physical and psychological stress these men undergo. And the Police officers being trained to be disciplined may not express much, but might suffer emotional trauma silently; leaving a detrimental physiological and physiological impact on themselves. It is here that the internal environment and role of leaders come into the spotlight.

Huge literature is available on psychological distress (Brown et. al., 1999; Renck et. al., 2002; Brough, 2004; Hartley et. al., 2007; Martin, Marchand, and Boyer, Martin, 2009) including the special issue by BPR&D (2019) on Occupational Stress amongst Policemen. However, little has been achieved so far on the ground. The authors of this paper, therefore, wish to bring a fresh perspective towards officer and staff wellness and mental well-being in the police force. The paper attempts to bring attention to the value and importance of being supportive leaders to the force and practising mindfulness while leading, being compassionate to others as well as to self and being empathetic.

Let's rethink leadership in policing a bit, an organisation which is highly structured with roles and duties fixed, and reporting relationships, hierarchy etc. well designed.

Research Methodology

The authors searched literature related to supportive leadership, mindful leadership, leadership flexibility, psychological distress like depression, anxiety, stress, suicidal ideation etc. amongst the police force in India as well as globally and conducted a meta-analysis. The websites referred to were EBSCOhost, BPR&D, Elsevier, Taylor and Francis, Emerald, Sage Publications, PubMed, Police Magazines from around the world and open-access research publications related to police, occupational stress amongst policemen and health-related outcomes. From the results generated, only those were considered that met the above-mentioned criteria like supportive leadership, mindful leadership, stress, anxiety, etc. The authors found that though detailed work in terms of mindful leadership and some work in terms of supportive leadership is being done in countries like the UK, US and Australia, however, very few studies have been taken up in India where the focus is on the value and importance of mindful and supportive leadership. These concepts are in a nascent stage in India, therefore demand special attention and hence this paper.

Review of Literature- Challenges Police face in India

According to the Data on Police Organisations, DoPO published in 2020, Police per lakh of Population Ratio (PPR) against the total sanctioned Police strength (Civil + District Armed Reserve (DAR) +

Special Armed + India Reserve Battalion (IRB)) during the year 2019 is 195.39 as compared to 198.65. In the previous year, Police per 100 Sq. Km. of Area Ratio (PAR) against the total sanctioned Police strength (Civil + DAR + Special Armed + IRB) during the year 2019 is 79.80 as compared to 78.95 in the previous year. Population per Police person against the total sanctioned Police strength (Civil + DAR + Special Armed+ IRB) during the year 2019 is 511.81 as compared to 503.40 in the previous year. Area per Police person (in Sq. Km) against the total sanctioned Police strength (Civil + DAR + Special Armed+ IRB) during the year 2019 is 1.25, as compared to 1.27 in the previous year. The data is self-explanatory and speaks volumes about the workload on police personnel.

Stress and factors responsible to alleviate stress

Hans Selye in the year 1936 first introduced the concept of stress in the life sciences and defined it as "the non-specific response of the body to any demand placed upon it". Eres et al 2011 defined it, "when a person feels insufficient in dealing with demands and challenges faced in life, s/he experiences stress". The term stress has been derived from the Latin word "stringere", which means the experience of physical hardship, starvation, torture and pain. Stress, a natural phenomenon, a physiological response to any change, can either be good or bad. Good stress is termed as "eustress," providing energy and is essential for performance, while bad stress is termed as "distress" which generates harmful effects (Gupta et. al. 2015). Robert M. Yerkes and John D. Dodson, two Harvard researchers, first identified the relationship between stress and performance in 1908, termed as Yerkes-Dodson law, which says stress helps increase efficiency to a certain point only, beyond which stress becomes detrimental concerning performance.

When the Police personnel are concerned, they suffer from operational as well as organisational stressors (Evans & Coman, 1993; Purba & Demou, 2019). Operational stressors are stressors that are majorly due to policing specificities, like being first responders to crime sites, witnessing disturbing incidents, media and public scrutiny, critical incidents, a threat to the life of self and family, and the like. Organisational stressors are stressors that are caused primarily due to organizational rules and procedures, rigid hierarchy, conflicts with supervisors and/or colleagues, lack of material/human resources, leadership problems and the like. Organizational stressors have been found to be a greater contributor to psychological distress than operational stressors (Brown & Campbell, 1990; Brown et al., 1999; Kop & Euwema, 2001; Tyagi & Dhar, 2014).

Psychological Distress

It has been well established through research that police personnel of all ranks experience psychological distress (Leino et al., 2011; Korre et al., 2014; Strahler and

Ziegert, 2015; Violanti, 2017) due to their nature of work like extreme work conditions, long duty hours, visiting heinous crime scenes as first responders and the like. It has been found that these visualisations are disturbing for them and often come as flashes and nightmares as well, creating psychological distress like depression, anxiety, stress, grief, hopelessness, suicidal ideation, suicides, etc. These have been found to be positively correlated to physical ill effects, reduced quality of life, alcoholism etc. (Lahey 2009).

Stress and Depression, Anxiety, Burn-out

The Police personnel work in highly stressful conditions, (Kirkcaldy et. al., 1995) deal with human misery at large, causing at times heightened anxiety, recurrent sadness and depression, (Violanti et. al., 2009; Austin-Ketch et. al., 2012; McCanlies, Miller, Andrew, Wirth, Burchfiel, and Violanti, 2014; Ma et. al., 2015) post-traumatic stress disorder (PTSD) (American Psychiatric Association (APA), 2013), burnout, relationship and marital problems and even suicide (Burke and Deszca, 1986; Cooper and Davidson, 1987; Brandt, 1993; Jannik and Kravitz, 1994; Cooper, and Ruffalo, 1995; Brown, Cooper and Kirkcaldy, 1996; Biggam, Power, and MacDonald, 1997; Anshel, 2000; Kirkcaldy, Blazina, 2017; Grassi et. al., 2018; Costa et. al., 2019), cumulatively challenging positive mental health. Recent studies like that of Baldwin et. al., (2019), Wassermann et. al. (2019), and Ermasova et. al. (2020) have

studied stress amongst policemen and its negative impact on their physiological as well as psychological health.

Stress, the Health Epidemic of 21st century (WHO, cited in Fink, 2017) has been defined as "a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus and Folkman, 1984).

The stressful conditions under which policemen and women work can broadly be categorised into two: Job Content and Job Context (Shane, 2010). Job Content comprises extra-long duty hours; or rather no duty hours, they are always "on the job" (Police Act 1861, Sec.22), witness human misery at crime scenes, endangering both psychological and physical health and the like. The Job Context involves behaviours that are typical to any organisation and are termed as organisational stressors like bureaucratic structure, and relations with superiors, subordinates, peers and other stakeholders such as the judiciary, media and the general public etc. The stressors from Job Content, as well as Context, are found to affect the personal lives and relationships (Webster, 2013; Griffin and Sun, 2018; Magnavita et. al., 2018; Purba and Demou, 2019), of the uniformed men and women, leading to a further detrimental effect on their psychological well-being (Burke, 1993; Finn and Tomz, 1997; Wilson, Tinker, Becker and Logan, 2001) and the resultant effect on their performance. In addition to the above,

according to Finn and Tomz (1997), dealing with the public, victims and offenders is a vital source of stress for the policemen. They further focus on the criminal justice system which according to them is "overtly lenient" towards criminals. At times, such negative mental sufferings cause police misconduct (Patterson, et.al. 2012) as well leading to poor public image and negative perception of police in public. Sometimes apathy from the leader in service also causes lower productivity, morale and performance. There are several stressors readily available for the uniformed personnel, but we are so inclined to see police officers as toughness personified, that we ignore the "soft" side of their persona and that they are also human beings with common human emotions and feelings (Gupta and Kumar, 2020).

Impact of stress on the brain

Research has proved that stress can cause an increase in the size of the amygdala, due to which it becomes extra receptive towards negative events (Bernstein, 2016). Stress leaves a negative effect on the prefrontal cortex as well, which is responsible for higher-order cognitive abilities like planning, decision-making, social behaviour etc. Continued and acute mental stress can leave a detrimental impact on prefrontal cognitive abilities, even shrinking of prefrontal dendrites (Amsten, 2009; Bernstein, 2016).

Burn-out

To improve occupational health, it is important to recognize stress and burn-out regularly.

Recent studies on burn-out experienced by Police officers (Aguayo et. al., 2017; Adams and Mastracci, 2019), has added a new dimension to officer stress leading to their health concern causing compassion fatigue, physical fatigue, as well as moral sufferings (Basinska and Wiciak, 2012; Papazoglou, 2016; Violanti et. al., 2019; Papazoglou, et. al., 2020). Burn-out has been defined as a kind of psychological disorder which is caused by excessive exposure to work stress (Freudenberger, 1974, Maslach, 1976). WHO has declared burn-out as an occupational phenomenon and included it in the International Classification of Disease in May 2019.

Fatigue

Policemen have such duty schedules that they rarely sleep peacefully, but people generally don't realise this fact. Our bodies are not naturally programmed to work like robots and hence disturbing the circadian rhythm costs the police officers dearly with negative physical and mental health. According to recent research in New South Wales in Australia, it has been found that seventeen hours of wakefulness equals impairment and diminished performance as it is caused by 0.05% of blood alcohol concentration (BAC), which further deteriorates to 0.10% BAC after 24 hours of wakefulness (Williamson and Feyer, 2000).

Suicides

The issue of suicide by law enforcement officers remains a serious matter of concern

in countries like USA, UK as well as India. Despite several initiatives by the agencies, it still exists. In India, we keep reading about such tragic news. Several factors like work overload (gap exists between sanctioned and actual strength of police), bare minimum holidays, away from family, and lack of understanding by the near ones as well as the public for whom they work, have been found to be potential reasons for such extreme steps (Chopko et. al., 2015; Heyman et. al., 2018). We would like to add to this list, the lack of empathetic leadership as a very important factor. Going by the data from December 2018, over 940 policemen committed suicide in India between 2013-2018.

COVID-19 pandemic and its Impact on Officer Mental Health

The global pandemic COVID-19 has come up as yet another challenge to the men and women in uniform. It has been a long time now that these men are combating it bravely, in addition to regular duty. However silent these personnel may be, these challenges do have an impact on their overall well-being. But these challenges that the Police personnel face often miss the eye of the public.

Remedies

The US has been a frontrunner in introducing several mental well-being programs for law enforcement personnel to ensure officer wellness. A few of them are The Law Enforcement Mental Health and Wellness

Act of 2017, San Antonio, TX: Performance Recovery Optimization, San Antonio, TX: Peer Support Team, Camden County, NJ: Wellness Coach, Reno, NV: Resiliency and Wellness program etc.

Going by an extensive literature review, the authors of this paper realised that some inside, organisation-level, non-clinical, psychological interventions may be quite beneficial in ensuring psychological well-being amongst the policemen which would, in due course, have its effect on police performance and public image at large, in terms of better job outcomes and better public perception of police.

The leaders (across the hierarchy) in the police force itself can be trained to ensure psychological well-being through their measured but determined and concerted efforts. These small organisational interventions can prove beneficial. Let's accept it, not much at this stage can be done, in the immediate to short-term time horizons, regarding public perception, negative police image, ever so "breaking news" hungry media and the job pressure itself. With time and dedicated efforts, these may change as well. But as we know charity begins at home. It is therefore imperative to understand some of the steps that can be taken in the right direction.

Education to key stakeholders

One of the important steps shall be to sensitise the key stakeholders like those who are a part of the criminal jurisprudence system -

for instance the judicial department. They need to be sensitised and informed about the job responsibilities and the taxing nature of a policeman's job and not be governed by societal prejudices. If this effort in sensitising the key stakeholders succeeds, it can be a step towards mitigating excessive fatigue. In addition to it, some out-of-the-box thinking like allowing the concerned officer or policemen to attend the court proceedings through video conferencing may also help. While changing court procedures or official rules of business and standard operating procedure (SOPs) are an uphill task but unless there are incremental changes in attitudes and execution we cannot expect a sea change in the same.

Subjective Well Being

Psychological well-being is a very broad term and covers everything concerned with an individual's well-being (Diener, et. al., 2017). Subjective well-being (SWB) is a part or an extension of psychological well-being. SWB means how an individual evaluates his or her life and conditions and whether s/ he considers it desirable or undesirable. People who are high on SWB are found to be more happy and productive at work. It was found in studies that people who rate high on SWB, are happy, more energetic, curious, optimistic, resilient, hopeful, original and creative (Leitzel 2001; Peterson et. al., 2011; Amabile et. al. 2005; George and Zhou, 2007). As a result of this, SWB helps in positive organisational outcomes like improved productivity, goal orientation, and performance.

Mental Health researchers have suggested several measures/interventions to reduce depression, anxiety, stress etc. However, recent developments prove that enhancing positive emotions as interventions is quite helpful in maintaining mental wellness (Seligman et. al., 2005; Sin and Lyubomirsky, 2009; Parker, et.al., 2009; Moskowitz et. al., 2012; Parks et. al., 2013; Kushlev et al., 2017; Friedman et al., 2017) and reducing negative emotions; thereby enhancing the quality of life. It has also been found that SWB gets enhanced by supportive relationships in the work setting (Fossati, 2002) leading to positive organisational outcomes.

The authors of this paper have used the terminologies like Buoyancy (resilience, optimism), Exuberance (enthusiasm), Energy (energetic), Goal Orientation (productivity, performance) in their model as positive outcomes of psychological well-being.

Psychological well-being

Psychological well-being refers to an individual feeling good and as a result, working effectively. It encompasses SWB. To mitigate the ill effects of stress that are experienced by police officers and personnel across the hierarchy, the authors of this paper suggest the following few interventions that might help towards ensuring mental wellness amongst the uniformed men and women. The authors have attempted to explain the concept through the following Model: Fig. 1
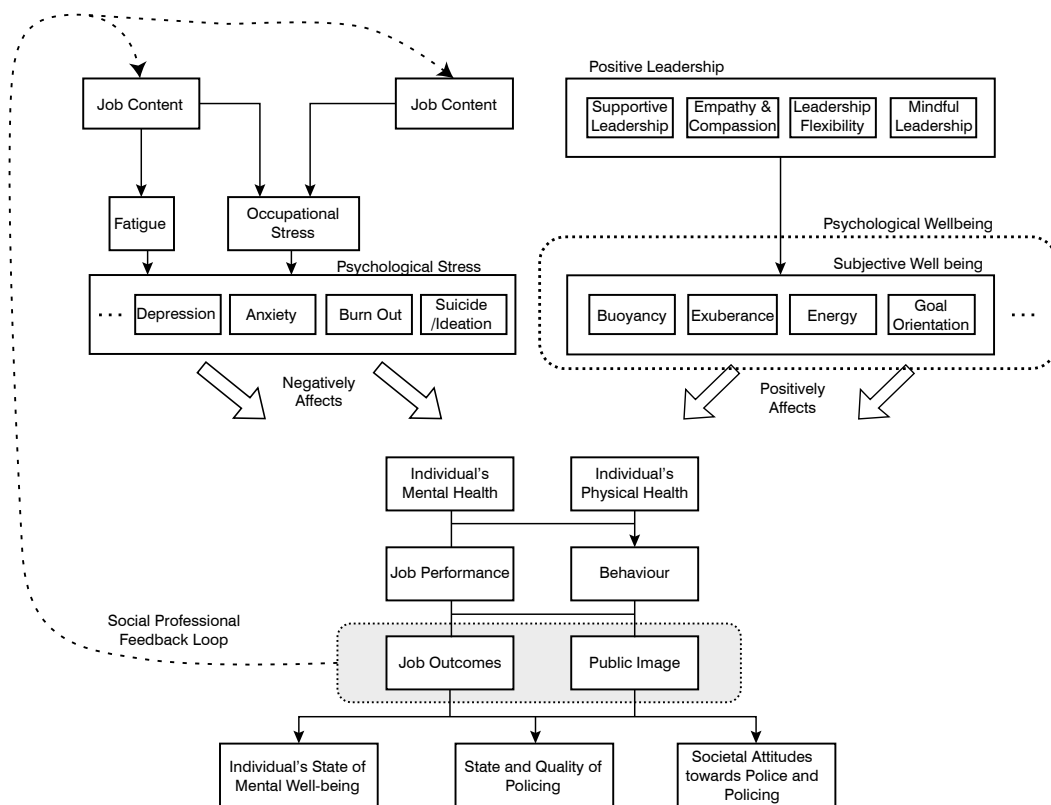
Leadership flexibility

Leadership is a phenomenon that is transactional as well as transformational in nature and occurs between the followers and the leader. According to Yukl (2006), leadership is "the process of influencing others to understand and agree about what needs to be done and how to do it, and the process of facilitating individual and collective efforts to accomplish shared objectives". When we discuss leaders in police services, it is no different, it is "a process whereby an individual influences a group of individuals to achieve a common goal" (Northouse, 2007), which may be law and order or crime prevention and control or nabbing the criminals and the like.

With the changing job environment, globally, the experts suggest that to become effective leaders, they must possess as well as practice behavioural flexibility. This will help them adapt to an agile workforce and situations that are typical to an organisation. This concept applies to the police equally well. Though much has to be studied in this area in terms of police, however, the available literature suggests that leadership flexibility is beneficial to organisations (Denison et. al., 1995, Kaiser and Overfield, 2010). Today, leaders have several complementary as well as non-complementary roles to play due to the rapidly changing work environment.

For example, if we talk about Police, the pandemic of COVID-19 has posed a severe challenge to the entire police force, globally. The Police were seen in an altogether different role, in addition to their regular duties and responsibilities. This included feeding the migrants, directing them, and ensuring essential supplies and the essential workers reach their destinations without inordinate delays. It has definitely contributed towards inculcating positive attitudes towards the police.

Leadership flexibility focuses on the integration of two important aspects, viz performance and human relationships and balancing them both well to ensure effective management. Research has demonstrated that such leaders are more successful and liked by their subordinates (Denison et al., 1995; Kaiser and Overfield, 2011) who in turn perform well in their respective jobs. Authors like Zaccaro et al. (1991) link it to cognitive abilities and according to him emotional intelligence can be linked to behavioural flexibility since the leader can understand the subordinate well and acts accordingly. Since the Police force is a huge structure, the leaders at each level can be trained to be flexible to an extent where the work and performance are not jeopardised and create a conducive work environment.

Mindful Leadership

Mindfulness is defined as being in the present moment, being non-judgmental and aware. It is the "self-regulation of attention so that it is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment" (Bishop et. al., 2004). It is "the adoption of a particular orientation toward one's experiences in the present moment, an orientation that is characterized by curiosity, openness, and acceptance", Bishop et. al. (2004). According to Brendel et. al. (2016), developing these capabilities help leaders develop "a mindful relationship with complexity". As policemen and women work in a highly complex and demanding work environment, mindful leadership may help them respond more effectively to the complex work environment related to police and not react. To respond and not react is the essence of mindful leadership and a sine non qua of the policing job. Mindful leaders try not to react to external and internal triggers but rather pause for a while, ponder and then respond. Mindfulness makes one aware of the thought mechanism and hence does not allow emotions to take control. Research has suggested that mindful leaders remain calm and focused when experiencing high stress or emotional intensity and hence get less affected by worry, fear and anger (Tannen, 2018). Hence the authors of this paper recommend training leaders across the hierarchy in mindfulness. This will help the force become more resilient, maintain positive mental health and thereby reduce stress (Schmeichel et. al., 2010; Bergman, Christopher, and Bowen, 2016; Jha et. al., 2017; Zanesco et. al., 2018, Gupta and Kumar, 2020).

Supportive Leadership

Since the Police department is a huge extended structure (the UP Police employs about 3,50,000 personnel) where the uniformed men and women are widely on

duty working in close coordination with each other rather than staying home with their families, it becomes imperative to take proper care within. Research has proved that it helps in a better form in ensuring psychological well-being. Psychological nurturing for the men and women in uniform is the need of the hour. In this context, we refer to Supportive Leadership as one of the effective remedies, wherein a pleasant organisational setting is maintained for the psychological well-being of the subordinates. A supportive leader displays behaviour towards the subordinates in which the leader is empathetic, shows concern and is considerate of their preferences. This helps in maintaining the psychological well-being of the subordinates as well as creates a pleasant organisational set-up in addition to healthy relations between superior and subordinate (House and Mitchell, 1974; Graen and Cashmen, 1975). Supportive leaders maintain a fine balance between initiation structure and consideration thus helping reduce job stress (Jam et al., 2010), and effectively achieve organisational goals. Supportive leaders create a conducive organisational environment to cultivate respect, trust, cooperation, and emotional support (Gibson et. al., 2000; Daft, 2005). According to House (1996) when the employees face physical as well as psychological stress at the place of work, supportive leadership can come as an effective remedy. During those testing times, supportive leadership instils self-confidence in the subordinates, helps lowering stress levels and anxiety and helps them cope with the unpleasant effects. Sutherland and Cooper, (2000) found that with supportive

relationships, workplace stress can be minimised.

Recent studies on Police Officers in New Zealand by Brough and Frame (2004), found job satisfaction and turnover intentions highly correlated. Adams and Beck (2001) studied the critical behaviours of police managers and found that encouraging behaviours like feedback and support given to staff were vital components of a perfect manager's behaviour. In India, in a study by Maurya and Agarwal (2015) on Civil Constables, it was found that supportive leadership amongst male participants was positively correlated to job satisfaction and psychological well-being amongst both males as well as female participants.

Practice self-compassion, compassion and empathy

People follow their leaders and if the leader is liked by the subordinates, they follow them even more. The leaders may practice some self-compassion and self-care. They may fix some exercise regime for themselves; engage in some wellness activities, etc. Research has demonstrated that compassion for others works too (Simmons, 2019). According to Dr. Fulwiler, a Professor, at the Harvard T.H. Chan School of Public Health, people follow their leader more when they believe that their leader is concerned about them. Being concerned for the subordinates, caring for their well-being and lending their ear when the subordinate wants to express something provides much-desired relief. Even if as a leader, s/he cannot do much, just active/effective listening does wonders and has been supported

by research, According to Dr Fulwiler, effective listening is a critical component in which the leader focuses on the person as well as the task and hence is more likely to inspire excellence and dedication from his employees compared to simply caring about the output. Active listening has been termed as attunement; when the leader listens actively and thinks about how others feel by Goleman and Boyatzis, (2008). Emotionally Intelligent leaders have been found to be far more successful than those with a high Intelligence Quotient (Goleman, 1995). The reason is simple, the moment leaders become self-aware, remain motivated in the face of adversity and handle relationships well, they win. Yet two major dimensions of being emotionally intelligent are managing others well and being empathetic. Research supports that when leaders are empathetic towards their subordinates, they develop strong emotional connections which eventually result in job satisfaction, enhanced productivity and resultant positive organisational outcomes (Goleman and Boyatzis, 2008). In Police as well, compassion and empathy have an important role to play. As Goleman and Boyatzis (2008) put it that positive behaviours like empathy create a positive connection between the leader and his/her followers' brains. According to them, new brain studies show that leaders can improve performance by understanding the biology of empathy.

Discussion

There are several stressors which significantly contribute to negative psychological and physical health outcomes amongst the men and women in the Police force. Recent literature suggests that if leaders practice behaviour flexibility, mindfulness and be supportive, it has a positive impact on not only psychological but physical wellness as well amongst the uniformed personnel because many health-related outcomes emerge as a corollary to psychological distress like stress, for example, thickening of arteries, ulcers, heart ailment, diabetes etc. (Violanti et al. (2017; Tajeda, 2019).

The challenge is huge, but some positive results can be expected with these small steps. Public perception, media hype and backlash cannot be controlled to a great extent; these are external factors, yet, some awareness can certainly help. When we are happy from within, when we know our efforts are acknowledged by our superiors, they are considerate and think about us and our well-being, it has its positive impact, not only on subjective well-being, psychological well-being, but physical health as well, both are crucial to be maintained in order to be a healthy Police personnel.

Conclusion

The ability to think calmly under fire is the hallmark of great leadership (Gupta and Kumar, 2020). With a conducive work environment, which largely depends upon organisational culture and leadership; positive mental health and officer wellness can certainly be ensured.

Non-clinical psychological interventions like mindful and supportive leadership, leadership flexibility, display of some compassion, and empathy may generate positive organisational as well as individual

health outcomes amongst the uniformed personnel.

The authors of this paper propose yet another important aspect that may be taken care of through supportive and mindful leadership is not only attempting to lessen depression, anxiety, stress etc. but also arresting the toxic emotions at work. Frost (2003) in his book, Toxic Emotions at Work and What to do about them, explains how toxicity at the workplace becomes detrimental not only to the employees but also to the organisation at a later stage. It negatively impacts the performance of the organisation if emotional pain is not handled because poorly managed emotions, in essence, become toxic. He proposes leaders at various levels can practice compassion, which will help the subordinates lessen their emotional pain. In the police force, the uniformed men and women face several challenges on the professional as well as personal front, which they try to manage quietly; also known as stoicism (Yeoman, 2017), according to research, certainly not always effectively, resulting in psychological distress and physical illness (Fiona et. al. 1997; Violanti et al., 2017; Tajeda, 2019). At such testing times, when the tough are weak, and go through those emotionally draining experiences, making them vulnerable to depression, anxiety, stress, burn-out, suicidal ideation, suicides, and the like; the leaders can just step in and handle them gently, display behavioural flexibility, show concern towards their well-being, be supportive and mindful i.e. non-judgmental but aware and in the present moment. These small acts of kindness, empathy and

compassion will certainly help bring much respite to the force, and ensure that the superheroes remain super.

Future research

The authors of this paper realised that there is much scope in this area since not much quality empirical research work has been done, especially in India. Therefore, more empirical research with respect to organisational interventions, mindful and supportive leadership is required.

Limitations

The authors in their meta-analysis of available literature specifically related to psychological distress amongst police and organisational interventions like supportive and mindful leadership to ensure psychological well-being could not find substantial-quality publications in India, however, there are quite a few studies in countries like the UK, USA, Australia and the like. This is a study base on meta-analysis. Empirical research may be conducted in future.

Practical Implications

The findings may be used in designing training programs for the officers on supportive and mindful leadership. This can be done in phases. The research can be done at the Outpost level, Police Station level, District level and State level and the findings may be taken into consideration for future courses of action. Research has demonstrated that these interventions help ensure psychological well-being. The findings may also be used in designing policy for the Police department.

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Nomological Network

The nomological networks for Supportive Leadership, Mindful Leadership, Stress, and Behaviour Flexibility need to be established.

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Note for Contributors

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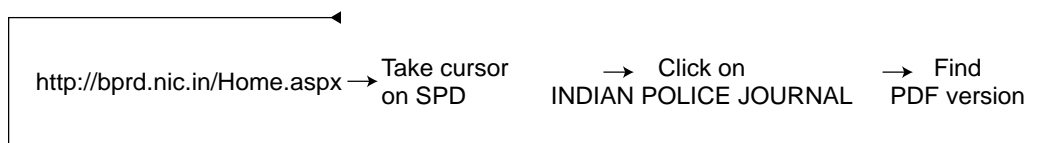
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