

PREPAREDNESS AND CHALLENGES OF POLICE IN USING FORENSIC SCIENCE: A REVIEW OF SOME RELATED LITERATURE

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ABSTRACT

This article is a review of studies related to the application of forensic science in crime prevention and control. The aim was to summarise the preparedness and challenges of the police in the utilization of forensic science in crime prevention and control as reported by the studies. The article was also aimed at reviewing the various methods used by the studies. Systematic review was used as a method to achieve the aims. Fourteen articles were selected and reviewed. It was found that some of the literature reported on factors influencing preparedness of the police in using forensic science; others identified the lingering challenges faced by forensic science practitioners, police inclusive; while some of the literature reported both. However, most of the literature reviewed made no reference to any international standard guidelines in determining the preparedness; also, the methods adopted by most of the studies were not rigorous. Consequently, future research on preparedness and challenges of police in using forensic science should have frameworks of guidelines and adopt more suitable research methods.

Keywords: challenges of the police; forensic investigation; forensic science; readiness of the police; criminal investigation

INTRODUCTION

The use of forensic science to assist in the gamut of activities in the criminal justice system has been recognised worldwide (Lee & Pagliaro, 2013). Specifically, the use of forensics by the police to control, protect and manage criminal activities is recognised in developed nations, more so than developing countries (Mbaya, 2016; Ladapo, 2011). The field of forensic science, which is defined as a group of scientific disciplines that are concerned with the application of their particular area of expertise to law enforcement, criminal, civil, legal and judicial matters (Prahlow, 2010) has thus been absorbed as part of policing and national security as it helps in investigating almost all kinds of crimes, disasters and suspected behaviour of individuals.

The police, whose main duty is to maintain order and control crime (Rawlings, 2008), need forensics because in the discharge of their duties, rights and obligations of individuals are involved and efforts must be made to ensure none has been trampled upon. In particular, the police must make sure justice is done in the process of apprehension, investigation and prosecution of suspected criminals. This is because there have been situations where the application of forensics exonerates individuals who hitherto were seen by the public as guilty (Kelty et al., 2018; Robertson, Vignaux, & Berger, 2016; Roux, Crispino, & Ribaux, 2012) . In other cases, assumed innocent individuals were found to be the actual perpetrators of crime when forensic science was used (Ribaux et al., 2010).

Past and current utilisation of forensic science indicates that it may deter a would-be-criminal from committing crime, as she/he may fear that he could be traced and apprehended. It can also induce admission or confession, and in many cases saves much time in the investigation and prosecution of offenders (Prahlow, 2010). Importantly also, forensic science can restore and increase confidence in the minds of citizenry, who are sceptical about the justice obtainable within the system of justice administration. Forensic science is therefore important and relevant in the administration of justice.

Despite the enormous advantages of forensics in justice administration, certain things need to be in place if the benefits are to be realised. For example, police as a gateway to the criminal justice system must be prepared to understand, accept, and utilize the forensic science knowledge. Also, there is the need to identify challenges faced by the police in their efforts to use forensic science. Doing this may ease the work of police and pave way for other agencies to better perform their functions thereby making the whole system effective.

The importance of preparedness of police to utilise forensic science in performing their duties has been recognised by researchers, for example, Smith and Flanagan (2000); Lee and Pagliaro (2013); Irons and Lallie (2014); Motunrayo (2016); and Tengpongsthorn (2017). Consequently, studies were conducted to assess and describe the level of preparedness and the challenges that may hinder the preparation. The objective of this article was to review some of the literature on police preparedness in utilising forensic science.

METHOD

Data sources

The data - research articles used in this study, were sourced from four online data bases: Google Scholar, ScienceDirect, Wiley Online Library and ProQuest. These sources were selected on the basis of popularity and ease of access to information. The articles considered were those published between 2013 and 2018. Figure 1 depicts the flowchart for data collection that was used in

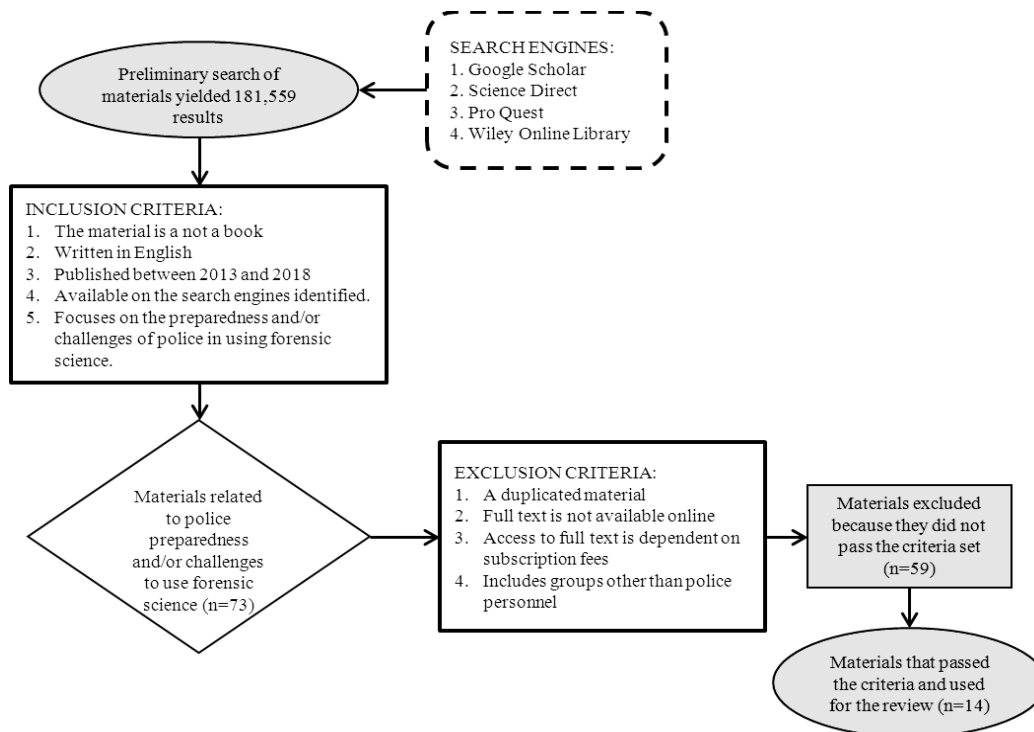


Figure 1: Flowchart for data collection

Inclusion and Exclusion Criteria

At the onset, inclusion criteria were set to ensure that only relevant materials to the objective of the study are included in the review. Shown in Figure 1 above, five inclusion criteria were set:

1. The material is not a book.
2. It is written in the English language.
3. It is published between 2013 and 2018.
4. It is available on the search engines identified.
5. It focuses on the preparedness and/or challenges of police in using forensic science.

After filtering materials using the inclusion criteria, 73 materials were selected. The next process involved filtering the materials using the exclusion criteria. Four criteria were established to increase the level of research rigour and relatedness to the subject matter. The exclusion criteria are shown in Figure 1 above.

Data Extraction

The data extraction, *ab initio*, was done using four keywords in every case of using each of the search engines. Two of the keywords were considered primary, i.e. “police in forensics” when searching for material to do with preparedness, and “challenges of forensic application” when dealing with challenges of forensic science. The other two keywords were seen as secondary: “preparedness of police in forensic science” and “challenges of police in using forensic science”

to represent searches for preparedness and challenges of police in using forensic science respectively. In all, 181,559 results were obtained. Table 1 presents the breakdown of the results.

Table 1: Breakdown of Results by Keywords and Search Engine

Keyword	Google Scholar	Science Direct	ProQuest	Wiley Online Library	Total
<i>PK</i>					
Police in forensics	14,000	11,439	4,792	1,650	31,881
Challenges of FS application	17,400	8,057	54,144	12,511	92,112
<i>SK</i>					
Preparedness of police in forensic	2,940	1,160	121	562	4,783
Challenges of police in using FS	17,700	3,151	27,535	4,397	52,783
Total	52,040	23,807	86,592	19,120	181,559

Key: PK = primary keyword; SK = secondary keyword; FS = forensic science

Out of the total results obtained, only 73 materials were closely related to police preparedness and/or challenges in using forensics. Considering the predetermined criteria for materials to be selected and included in the analysis, only 14 materials were suitable: two were removed because they were selected twice while the remaining 57 materials were not considered as they were beyond the scope of this review. Table 2 shows the materials considered for the review.

Data Analysis

After the final selection of the appropriate materials, analysis was done based on the objective of the article, which is identifying the preparedness and challenges of police in using forensic science. Two themes were consequently decided upon – “preparedness of the police in using forensic” and “challenges of police in using forensics”. The materials were thus read by the researcher first during which evaluation of their content was done vis-à-vis the themes. Claims, findings and conclusions of each material were principally scrutinised for thematic identification, though the general content of each paper was also considered. At the end, systematic arrangement of the data based on theme was done.

FINDINGS

Design and Method of Reviewed Literature

Three different methods and designs were adopted by the authors of the literature reviewed. The method mostly adopted in the literature, which included Puerto and Tuller (2017), Ireland and Beaumont (2015), Gabel (2014), Irons and Lallie (2014), Crispino et al. (2014) and Obafunwa et al. (2015), were perspective, commentary or opinion as published by the respective journals. Only four articles, i.e. Kely et al. (2018), Yoo et al. (2013), Tengpongsthorn (2017), and Campbell and Fehler-Cabral (2018) were original research articles that adopted survey and ethnography methods.

Table 2: Studies Included in the Review

STUDY	SETTING	DATA COLLECTION & SAMPLE SIZE	DESIGN/METHOD	FOCUS/INSTRUMENT	OUTCOME	
1	Puerto, M.S., & Tuller, H. (2017). Large-scale forensic investigations into the missing: Challenges and considerations. <i>Forensic Science International</i> 279 (2017), 219–228.	Not applicable	Published articles and books; number not stated	Commentary/opinion article	Literature review	Challenges of police in FS include (1) establishing the victims (2) the creation of working protocols (3) negotiating the form an investigation will take with various stakeholders (4) addressing cultural beliefs (5) working within prescribed economic, political, and time constraints.
2	Ireland, J.L., & Beaumont, J. (2015). Admitting scientific expert evidence in the UK: reliability challenges and the need for revised criteria – proposing an abridged. <i>Journal of Forensic Practice</i> , 17(1), 3-12.	Not applicable	Published articles and books; number not stated	Commentary/opinion article	Literature review	Indicated a range of difficulties with “expert” evidence admissibility, including inconsistency, an over-focus on narrow elements of evidence, difficulties in interpretation, and the potential to unfairly restrict evidence.
3	Gabel, J.D. (2014). Realizing reliability in forensic science from the ground up. <i>J. Crim. L. & Criminology</i> , 104 (2), 283-352.	Not applicable	Published articles and books; number not stated	Commentary/opinion article	Literature review	Forensic flaws persist and that deficiencies in forensic science have harrowing implications for criminal justice.
4	Irons, A., & Lallie, H.S. (2014). Digital forensics to intelligent forensics. <i>Future Internet</i> , 6, 584-596.	Not applicable	Published articles and books; number not stated	Commentary/opinion article	Literature review	Current investigative techniques as deployed by law enforcement, are becoming unsuitable for most types of crime investigation
5	Crispino, F., Rossy, Q., Ribaux, O., & Roux, C. (2014). Education and training in forensic intelligence: a new challenge. <i>Australian Journal of Forensic Sciences</i> . 47(1), 49-60.	Not applicable	Published articles and books; number not stated	Commentary/opinion article	Literature review	Perceived imbalance and actual understanding of forensic intelligence by police and forensic science managers, and that this imbalance challenge the utilization of FS
6	Obafunwa, J.O, Faduyile, F.A. Soyemi, S.S., Eze, U.O., Nwana, E.J.C., & Odesanmi, W.O. (2015). Forensic investigation of mass disasters in Nigeria: A review. <i>Nigerian Medical Journal</i> , 56(1), 1-5.	Not applicable	Official documents from the aviation industry, Nigeria news reports as well as the standard protocols for disaster victim identification of the INTERPOL	Commentary/opinion article	Literature review	Nigeria not fully prepared to deal with the multiple issues involved in successful forensic investigation of mass disasters
7	Kelty, S.F., Julian, R., Bruenisholz, E., & Wilson-Wilde, L. (2018). Dismantling the justice silos: Flowcharting the role and expertise of forensic science, forensic medicine and allied health in adult sexual assault investigations. <i>Forensic Science International</i> , 285, 21–28.	Pool of criminal justice system stakeholders/ personnel	Police, forensic scientists, lawyers, judges, coroners, pathologists and forensic physicians (n=121)	Survey	Interview and Focus Group Discussion	Disconnection among forensic stakeholders results at some points during investigation

8	Yoo, Y., Cho, O., Cha, K., & Boo, Y. (2013). Factors influencing post-traumatic stress in Korean forensic science investigators. <i>Asian Nursing Research</i> 7(3), 136-141.	Forensic Science Center at the Korean National Police Agency	forensic science investigators (n=111)	Survey	Questionnaire	PTS scores were positively correlated with personality type, fatigue from work, and death anxiety.
9	Tengpongsthorn, W. (2017). Factors affecting the effectiveness of police performance in Metropolitan Police Bureau. <i>Kasetsart Journal of Social Sciences</i> , 38 (1), 39-44.	Thai Metropolitan Police Division,	police officers (n=450)	Survey	Questionnaire and interview	motivator factors and hygiene factors had positive relationships with the effectiveness of work performance
10	Campbell, R., & Fehler-Cabral, G. (2018). Why police “couldn’t or wouldn’t” submit sexual assault kits for forensic DNA testing: A focal concerns theory analysis of untested rape kits. <i>Law & Society Review</i> , 52(1), 73-105.	Police in Detroit and Michigan cities	42 interviews and 93 individual documents	Ethnography	Observation, interview, and archival data	Police did not have the funding or staffing to investigate all reported cases.
11	Lee, H.C., & Pagliaro, E.M. (2013) Forensic evidence and crime scene investigation. <i>J.Forensic Investigation</i> , 1(2), 1-5.	Not applicable	Published articles and books; number not stated	Commentary/ opinion article	Literature review	Training, education and standardization of crime scene investigation are critical for the improvement of forensic services.
12	Iyamu-Ojo, E. A. (2017). Rapid detection, requirement of consent to DNA testing: A case for reform in Nigeria. <i>Int J Cri & For Sci</i> , 1(1), 11-17.	Not applicable	Nigerian Child’s Right Act	Commentary/ opinion article	Literature review	Preponderance of evidence test will help weed away frivolous claims in answering claims during paternity issues
13	Farah, M. J., Hutchinson, B., Phelps, E.A., & Wagner, A.D. (2014). Functional MRI-based lie detection: scientific and societal challenges. <i>Neuroscience and the Law — Science and Society</i> , 15, 123-131.	Not applicable	Published articles and books; number not stated	Commentary/ opinion article	Literature review	Development and use of facilities especially fMRI-based lie detection be managed in light of the scientific, legal, ethical and societal issues
14	Edmond, G. (2014). The admissibility of forensic science and medicine evidence under the Uniform Evidence Law. <i>Criminal Law Journal</i> , 38, 136-158.	Not applicable	Published articles and books; number not stated	Commentary/ opinion article	Literature review	Reliability should be read into “specialised knowledge” and trial judges should be provided with criteria that will assist with admissibility decision making in criminal proceedings.

Several studies (Broadbent, 2013; Déverge, 2016; Fagernæs, 2015) have, nonetheless, advocated for using cross-sectional survey method when one is researching on attitude, perception and things related to them, where typically data collection will be through questionnaire (Juslin & Laukka, 2004), Focus Group Discussion, or interview. The General Social Survey (GSS), which is a major research effort of the National Opinion Research Center that documents a large collection of Americans' attitudes and behaviors, used cross-sectional design and considered it more important and relevant, as it provides a highly valuable and timely look at what the population are thinking and doing (Ruane, 2005). Survey is seen most appropriate for studying general concern and specific personal feelings (Maxfield & Babbie, 2012), as in the cases of the studies reviewed. Survey gives opportunity to a researcher to get insight into the subject and its various facts and facets (Sahu, 2016). It is also recommended for assessing forensic facilities and services in police institutions. Thus cross-sectional survey could have been suitable as a method.

Preparedness of Police to Utilize Forensic Science

According to the literature reviewed, there are certain factors that determine whether or not a police organisation is prepared to not only use forensic science adequately and appropriately, but also to make policing activities effective. From the 14 articles reviewed, six factors were established. These were: the scope of digital forensic intelligence, empirical findings from forensic subspecialties, standardization of procedures, good relationships between agencies, promulgation of laws backing moral and human right issues, and motivators and hygiene factors.

Irons and Lallie (2014) believed that digital forensics intelligence is very relevant nowadays in realizing the advantages of forensics by the police. Its adoption by the police will make the police more ready to reap the benefits of forensics in crime prevention and control. Continued empirical research in some forensic subspecialties; certification, accreditation and quality assurance programmes in the forensic laboratory; increasing funding for laboratories; education for scientists; and standardization of procedures could also make the forensic practitioners, police inclusive, more prepared to utilise forensic science (Lee & Pagliaro, 2014).

However, Obafunwa et al. (2015) and Campbell and Fehler-Cabral (2018) were of the opinion that good relationship between the police in the forensic field and professionals from other disciplines, such as engineering, medicine, and law will see the police more prepared to utilise the benefits of forensics in the pursuit of justice. Iyamu-ojo (2017) added that the promulgation of laws backing moral and human right issues in investigation could assist in making the police more prepared to use forensics. In other words, the police could utilise collaboration or cooperation with various agencies in efforts to control crime and manage criminal cases; which would not only ease the investigative burden of individual police personnel, but also improve upon current standard operation procedures, and increase the level of knowledge and skills among police personnel.

More recently, Tengpongsthorn (2017) argued that two major factors determine productivity within the police organization. These factors were motivators and hygiene factors. The motivators include things to do with achievement, recognition, work itself, responsibility, promotion, and growth; while the hygiene factors cover policy, supervision, work conditions, salary, security, relationship with the boss, and relationships with peers. Currently it remains to be seen whether

having knowledge and skills in forensic science leads towards better organisational motivators and hygiene factors.

Despite the above findings regarding preparedness of police personnel in using forensic science, none of the 14 articles reviewed herein made reference to any standardised procedure or prerequisite as provided in the guidelines or constitution of recognized forensic science practitioners' associations, like International Association of Forensic Science and Association of Forensic Science Providers, INTERPOL protocols, or any other local association. The researchers should have used guidelines provided by any of these associations as a framework for their assessment or opinion as to police preparedness.

This depicts a lack of congruence between forensic science practice and police work, which may negatively impact evidence collection and subsequently have implications on court proceedings. Specifically, the chain and handling of evidence as well as its forensic analyses and interpretation may be open to contamination or violates recognised forensic science codes of conduct. It is for these reasons that the issue of preparedness of police personnel has to be addressed.

Challenges of Utilising Forensics in Policing Work

Issues that are seen as challenges hindering the effective utilisation of forensic science by the police were reported by the literature reviewed by the authors. From the articles reviewed, six challenges were identified. These are: post-traumatic stress, interdisciplinary differences, inadequate personnel and laboratories, lack of strong forensic intelligence and reliable databases, lack of standard regulation, and multiplier effect. Specifically, post-traumatic stress in cases involving murder was found to be a challenge faced by investigators as it was caused by years spent as a forensic science investigator, personality type, emotional intelligence, homicide experience, fatigue and death anxiety (Yoo et al., 2013).

Lack of strong forensic intelligence and reliable databases, which are especially relevant in proactive policing, are challenges facing forensic science as utilised by the police (Crispino et al., 2014). Other authors cited problems in the existing policing system as challenges in applying forensic science. For example, for Gabel (2014), Edmond (2014), and Ireland and Beaumont (2015), lack of standard regulation as to the operation and application of forensic outcomes prevent police and even other supposed beneficiaries of forensic science, from realising the advantage of the science. According to Kelty et al. (2018), interdisciplinary differences in the form of disharmony and misunderstanding during operations among investigation personnel from different fields is a serious challenge to the police in utilising forensic science. This is especially pertinent in crime cases that are transborder in nature, for example human smuggling and drug trafficking.

Inadequate personnel and laboratories were also seen as challenges affecting the police use of forensics. Power outages, inter-agency cooperation and corruption were also challenges faced by police in using forensic science (Obafunwa et al., 2015). Lee and Pagliaro (2013) had earlier found that questionable results arising from wrong methods, contaminations and lack of standardised procedures are problems faced in forensic investigation by the police and other practitioners. In another study, types of victims involved, nature of the crime committed, the form an investigation

will take as well as cultural, economic and political constraints all affect police in using forensic science (Puerto & Tuller, 2017). Issue of policy and specificity, accuracy and validity were found to be challenges associated with functional Magnetic Resonance Imaging (fMRI) based lie detection (Farah et al., 2014).

CONCLUSION

Forensic sciences, which can be used to solve both simple and complicated criminal cases, remain a relevant tool that cannot be ignored by law enforcement agents, especially the police. It was for this reason that the aim of this article was to review literature regarding preparedness and challenges faced by the police in utilising the science. Although the literature reviewed in the article were able to identify six factors that determine preparedness and six challenges confronting the application of forensic science by police personnel, principally, there were no reference to any standardized measurement of preparedness, except in one study where reference to INTERPOL's guide was made.

In addition, the factors identified may not be comprehensive enough to represent the determinants of preparedness and challenges of forensic science application by the police. Other factors that should be considered include personality of the officers, knowledge acumen, and rapport and collaboration between different government agencies. It is also likely that secondary factors influence both preparedness and challenges of forensic science application, in terms of personal cynicism regarding the value or admissibility of forensic science itself, chain of evidence handling, and bureaucratic protocols in criminal investigations.

As such, the methods adopted by most of the studies considered in this article might have been unsuitable putting into consideration the nature of information their works intended to find and report. It is recommended that more suitable methods, e.g. action research, actuarial assessment, and ethnography should be employed in conducting this type of research as these methods provide more empirical, valid and reliable information. It is also recommended that internationally recognised guidelines or procedures regulating the practice of forensic science, for example IAFS guidelines and INTERPOL protocols among others should be used as frames of reference.

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