

Determinants of Police Use of DNA in Rape Investigations in Nairobi County, Kenya

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Abstract— Use of DNA technology has become a critical tool for resolving investigations of rape cases. It helps police agencies to accurately identify perpetrators of sexual offences. However, in Nairobi County, this is not the case with incidences of rape being on the rise and low reporting rates. Thus, this study assessed the determinants of police use of DNA in rape investigations, in Nairobi County, Kenya. The objectives were; assessing the levels of rape cases and the influence of police training, availability of DNA facilities and police officers' attitude towards DNA on use of DNA in rape investigations. The study was based by Factor Theory of Motivation and Innovation Diffusion Theory. The study adopted descriptive research design. Qualitative data were analyzed thematically along study objectives and presented in narrative forms. Quantitative data were analyzed descriptively using percentages and frequencies with the help of Statistical Packages for Social Science (SPSS Version 23) and presented using tables and charts. The study established that rape cases among women is high in Nairobi County. It is also evident that there are many factors which determine the extent to which police officers use DNA in rape investigations. These include; training, availability of DNA facilities and attitude of police officers towards DNA. Thus, the study recommends that victims of rape cases should be quick to report. The police officers should also act with speed to solve already reported cases of rape to act as motivation for victims of such rape to report and be assured of getting justice. More training should be done to update police officers on all the aspects of DNA and how fast they can use it to unravel complex cases by identifying potential and real culprits. More resources should be allocated to ensure that enough facilities are provided and labs equipped with up to date equipment which can provide results from DNA samples as fast as possible. Police officers should show much interest in DNA by understanding how its aspects operate and function in unraveling truth about rape cases. National Police Service should redesign police training curriculum to include training on use of DNA in evidence gathering before being deployed from Police Training Colleges.

Index Terms— Rape investigations, Use of DNA, Police attitude, police training, availability of DNA facilities.

I. INTRODUCTION

Rape is a type of sexual assault usually involving sexual intercourse or other forms of sexual penetration carried out against a person without that person's consent. According to Strom, Ropero-Miller, Jones, Sikes, Pope and Horstmann (2013), the act may be carried out by physical force, coercion, abuse of authority, or against a person who is incapable of giving valid consent, such as one who is unconscious, incapacitated, has an intellectual disability or is

below the legal age of consent. In keeping with these assertions, Strom et al (2013) posit that violence against women is a major public health problem and a violation of women's human rights in the world. In the same vein, Tofte (2011) asserts that it is estimated that 35 per cent of women worldwide have experienced either physical and/or sexual intimate partner violence or sexual violence by a non-partner at some point in their lives.

In North America, for example, sexual violence amongst women has become a common phenomenon with close to 34.5% being victims of rape (Nelson, 2010). International Crime on Statistics and Justice by the United Nations Office on Drugs and Crime (UNODC) find that worldwide, most victims of rape are women and most perpetrators male. Rapes against women are rarely reported to the police and the number of female rape victims is significantly underestimated. According to Lonsway and Archambault (2012), the number of reported rapes in Great Britain is lower than both incidence and prevalence rates. Despite these statistics, the rates at which cases of rape are reported are low. For example, in Italy, a 2006 National Statistical Institute survey on sexual violence against women found that 91.6% of women who suffered this did not report it to the police.

In the same vein, in the United Kingdom, in 2010 there was a 33% rate of conviction, while by 2014 there was a 24 per cent conviction rate for rape trials in the UK, by 2004 the conviction rate reached 5% (Lonsway & Archambault, 2012). Lonsway and Archambault (2012) note that rape investigations involve gathering of facts on suspected case of rape, for purpose of identification of the perpetrator, the type of sex assault committed and material evidence to connect the perpetrator to the crime. To lend credence to these assertions, McEwan (2011) notes that rape investigation is the procedure to gather facts about a suspected rape, including use of DNA or forensic identification of a perpetrator, type of rape and other details. In DNA analysis, semen, blood, vaginal secretions, saliva, vaginal epithelial cells may be identified and genetically typed by a crime lab (McEwan, 2011). The information derived from the analysis can often help the police determine whether sexual contact occurred, provide information regarding the circumstances of the incident, and be compared to reference samples collected from patients and suspects. In India, medical personnel in many countries collect evidence for potential rape cases by using rape kits (Lisak & Miller, 2012). To corroborate these assertions, Peterson, Johnson, Herz, Graziano and Oehler (2012) assert that DNA analysis and profiling are used by crime laboratories for testing biological evidence, most commonly by means of the polymerase chain reaction (PCR), which

allows analysis of samples of limited quality and quantity by making millions of copies. This is critical since it enables investigators to match the samples with the traits of possible suspects and thus identify the real suspect whose traits matches the DNA results. According to Peterson et al (2012), an advanced form of PCR testing called short tandem repeats (STR) generates a DNA profile that can be compared to DNA from a suspect or a crime scene. Peterson et al (2012) further note that blood, buccal (inner cheek) swabbings or saliva should also be collected from victims to distinguish their DNA from that of suspects.

The National Research Council concluded that DNA is the only forensic method that has been rigorously shown to have the capacity to consistently, and with a high degree of certainty, demonstrate a connection between evidence and a specific individual source (Committee on Identifying the Needs of the Forensic Sciences Community, 2013). However, the police are yet to fully embraced use of DNA analysis while undertaking rape investigations due a number of factors ranging from training, facilities, police attitude and time for rape kits processing. Reiss (2012) notes that many police agencies can have issues implementing the expansion of DNA testing, in part because of limited resources for DNA analysis. Reiss (2012) noted that police agencies have limited budgets to increase crime lab capabilities to reduce the outsourcing of DNA tests and backlogs in the analysis of evidence and this makes investigations of rape cases slow and quite inconclusive. In Mexico, for example, Ritter (2012) posits that training of police officers, availability of facilities and police officers' attitude towards use DNA in rape investigations is critical for its success. According to Ritter (2012), there ought to be potential long-term cost savings by training patrol officers on how to collect DNA samples and thus improve processes of rape investigations.

In many countries in Sub-Saharan Africa, cases of rape are on the rise. For example, the rate of sexual violence in South Africa is among the highest in the world (Ritter, 2012). A humanitarian news organization IRIN claims that an estimated 500,000 rapes are committed annually in South Africa once called 'the world's rape capital' (Artz, Smythe & Leggett, 2012). South Africa has some of the highest incidences of child sexual abuse in the world with more than 67,000 cases of rape and sexual assaults against children reported in 2000, with welfare groups believing that unreported incidents could be up to 10 times higher (Artz et al, 2012). In Kenya and Nairobi County in particular, cases of rape are on the rise with many victims of rape being women of all ages ranging from 9-month-old to 105 years of age. Ajema, Rogena, Muchela, Buluma and Kilonzo (2010) posit that rape among women was more likely to be perpetrated by men unknown to them. Thus, among women who said they were raped during the post-election violence 40% were raped by unknown men as opposed to 20% who were raped by relatives or men who were intimate with the victims (Ajema et al, 2010). To conduct rape investigations, DNA technology has come in handy to unravel cases of cases and bring perpetrators to book. Ajema et al (2010) assert that DNA technology allows police to collect a wider range of compelling evidence, and DNA may also connect a suspect to

a crime scene and thus, strengthen investigations and prosecutions of sexual offences. However, use of DNA technology has had its fair share of challenges and many police agencies in Nairobi County are yet to embrace the technology. Many empirical studies have not interrogated the factors which influence use of DNA in investigations of rape cases, hence the need for this study.

II. STATEMENT OF THE PROBLEM

Use of DNA technology has become a critical tool for resolving investigations of rape cases the world all over. The technology helps police agencies to quickly and accurately identify perpetrators of sexual offences. The Kenyan government and other stakeholders have played their role of facilitating the Kenyan investigation agencies to embrace the use of DNA technology by constructing and equipping a modern police forensic laboratory. Despite these efforts, in Nairobi County, use of DNA technology while undertaking rape investigations has been low among police officers. This makes resolution of rape cases very slow and due to this many rape victims shy away from reporting the cases (Ajema et al, 2010). The deterrent factors to adaptation of the technology by police officers remain unknown. This study strives to interrogate the determinants of use of DNA in rape investigations.

III. THEORETICAL FRAMEWORK

This study was guided by two theories which included; the Factor Theory by Herzberg (1993) and Innovation Diffusion Theory (IDT) by Rogers (1995). The factor theory was postulated by Fredrick Herzberg (1993). This theory stipulates that there are certain factors in the workplace that cause job satisfaction, while a separate set of factors cause dissatisfaction. According to Herzberg (1993), job satisfaction and job dissatisfaction act independently of each other. In the context of this study, this theory focuses on the inner needs and their expressions in work behavior by police officers. Motivators cover achievement of police officers, recognition, work itself, responsibility, promotion, and growth and availability of work resources or facilities. In this study, this theory is relevant since it underscored the fact that job characteristics, in this case, use of DNA technology in rape investigations, related to what an individual police officer does, apparently have the capacity to gratify such needs as achievement, competency, status, personal worth, and self-realization, thus making him happy and satisfied.

Innovation Diffusion Theory advocated by Rogers (1995) was also used in the study. The concept is premised on and explains individuals' motivation to adopt new technology as a modality to perform a traditional activity. In the context of this study, this theory is adopted since the critical factors that determine the police adoption of DNA technology include; relative advantage, compatibility, complexity, and trainability and observation ability. In other words, this theory holds that the motivation of police users of DNA technology is established on apparent usefulness, apparent simplicity of use, and attitude toward use which can be determined as an unavailability and favorableness toward the technology.

IV. DELIMITATIONS OF THE STUDY

This research was conducted in police stations within Nairobi County only. Data were solely solicited from police officers who mainly perform investigation duties and Officers Commanding Police Divisions. This study exclusively concentrated on determinants of police use of DNA in rape investigations reflected through police training, police attitude and availability of DNA facilities.

Research Methodology

The study adopted descriptive research design. Target population comprised of 11 OCPDs, 11 DCIOs and 220 police investigators all totaling to 242 respondents from which 72 respondents were selected using the Central Limit Theorem. Stratified sampling was applied to create four strata based on the number of geographical regions in Nairobi County. From each division, one OCPD, one DCIO and 16 Police Investigators were selected using purposive sampling. This realized a sample four OCPDs, four DCIOs and 64 Police Investigators. Qualitative data were analyzed thematically along study objectives and presented in narrative forms. Quantitative data were analyzed descriptively using percentages and frequencies with the help of Statistical Packages for Social Science (SPSS Version 23) and presented using tables and charts.

Results and Discussions

The study sought to:

- i. To establish incidences of rape in Nairobi County;
- ii. To establish the influence of police training on use of DNA in rape investigations in Nairobi County.
- iii. To determine the influence of availability of DNA facilities on use of DNA in rape investigations in Nairobi County;
- iv. To assess the influence of police attitude towards DNA on use of DNA in rape investigations in Nairobi County;

Response Rate

In this study, 64 questionnaires were administered to Police Investigators after which 58 questionnaires were filled and returned. The researcher also conducted interviews amongst four OCPDs and four DCIOs. This yielded response rates as shown in Table 1;

Table 1: Response Rates

Respondents	Sampled Respondents	Those Who Participated	Achieved Return Rate (%)
OCPDs	4	4	100.0
Police Investigators	64	58	90.6
DCIOs	4	4	100.0
Total	72	66	91.7

Table 1 shows that OCPD, Police Investigators and DCIOs registered a response rate of 91.7%. This conforms with the assertions of Creswell (2009) that a response rate above 75.0% and above is adequate for generalization of the study outcomes to the target population.

Levels of Rape Cases in Nairobi County

The first objective of the study sought to assess the levels of rape cases in Nairobi County. Descriptive data were collected from Police Investigators, OCPDs and DCIOs and results are shown in Figure 1.

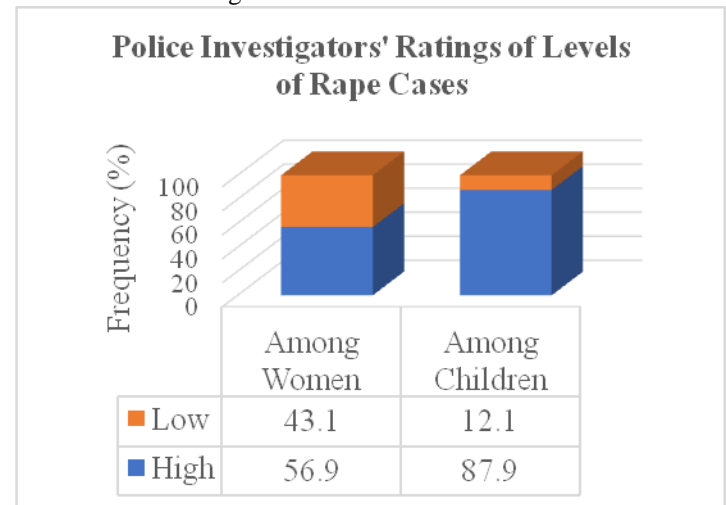


Figure 1: Police Investigators' Ratings of the Levels of Rape Cases in Nairobi County

Figure 1 shows that 33(56.9%) of the Police Investigators indicated that rape cases among women in high in Nairobi County whereas 25(43.1%) indicated that rape cases are low. However, 51(87.9%) of the Police Investigators indicated that rape cases among children are low in Nairobi County whereas only, 7(12.1%) indicated that such cases are low. During the interviews, the OCPDs and DCIOs were also in agreement with the view that cases of rape among women and children have a very common phenomenon. On further probing, one OCPD noted;

“Last year alone, we have witnessed a 16.9% increase in reported cases of rape among children, especially in the slum areas and their neighborhoods. The number could be high since many victims shy away from reporting such cases given some of the perpetrators are close relatives”

These findings lend credence to the assertions of Ajema et al (2010) that, in Kenya and Nairobi County in particular, rape cases are on the rise with many victims of rape being females of various ages and some toddlers. Ajema et al (2010) indicate that females are mostly raped by persons unknown to them. According to Ajema et al (2010), among females who alleged to have been sexually violated during the post-election violence 40% indicated to have been raped by male persons unknown to them as opposed to 20% who were violated by kinsmen or males who had previous intimate relationships with victims. Thus, these findings indicate that, despite the enactment of progressive sexual laws with severe penalties meant to deter would be offenders, the rate of rape and defilement incidents among women and children remain high and much concerted efforts need to be initiated to curb the menace.

Police Training and Use of DNA in Rape Investigations

The second objective of the study sought to establish the influence of training of police officers influence their use of DNA in investigations of rape cases. Descriptive data were collected from Police Investigators and the results are shown

in Table 2;

Table 2: Views of Police Investigators on the Influence of Police Training on Use of DNA in Rape Investigations

Test Items	Ratings				
	SA %	A %	U %	D %	SD %
Training of police officers on methods of collecting evidence has seen a reduction in rape cases amongst women and children	10.3	32.8	8.6	25.9	22.4
Police stations have witnessed increased arrests and faster prosecutions of rape perpetrators since police officers underwent training on use of DNA	20.7	31.0	20.7	12.1	15.5
Police officers have been trained on how to protect DNA evidence which has seen a reduction in the number of rape cases amongst women and children	17.2	25.9	15.5	15.5	25.9
Increased arrests and prosecutions of perpetrators have not been registered since police officers have not been trained on how to protect DNA evidence	12.1	12.1	10.3	27.6	37.9
Training of police officers on how to manage time for rape kit processing has reduced cases of rape amongst women and children	15.5	24.1	6.9	20.7	32.8
Arrests and prosecutions of rape perpetrators have not been intensified since no training of police officers has been done on DNA collection techniques	25.9	22.4	6.9	22.4	22.4

Table 2 reveals that 6(10.3%) of the Police Investigators strongly agreed with the view that training of police officers on methods of collecting evidence has seen a reduction in rape cases amongst women and children as did 19(32.8%) who agreed. However, only a paltry 5(8.6%) were undecided, slightly more than a quarter, 15(25.9%) disagreed whereas 13(22.4%) strongly disagreed. However, during the interviews, the OCPDs and DCIOs responded on the contrary. They indicated that cases of rape among women and children have reduced since police officers have been trained on methods of collecting evidence. On further probing, one DCIO observed;

“There may not be instant reduction in the number of rape cases among women and children, but with the training of police officers on methods of collection of evidence using DNA, the cases have seen a reduction of close to 9.3%”

Despite these contradictions, these findings point to the fact that training of police officers on methods of collecting evidence using DNA is a critical step in unraveling complex cases involving rape of women and children with a surety of bringing perpetrators to book. These findings corroborate the findings of a study carried out in India in which Bryden et al (2010) established that one of the major challenges to full exploitation of DNA potentials is the unawareness by police of the merits to be derived from the technology together with lack of specific training on use of DNA; both at practical and procedural levels. These findings are indicative of the fact that acquisition of skills on methods of evidence collection using DNA improves ability of police officers to solve complex cases of rapes among women and children whose perpetrators may go unknown and unpunished.

The study also revealed that 12(20.7%) of the Police Investigators strongly agreed with the view that police stations have witnessed increased arrests and faster prosecutions of rape perpetrators since police officers underwent training on use of DNA. 18(31.0%) agreed.

12(20.7%) were undecided, 7(12.1%) disagreed whereas 9(15.5%) strongly disagreed. During the interviews, OCPDs and DCIOs also responded in favour of the view that there have increased arrests of perpetrators of rape cases. One OCPD noted;

“From the moment police officers began undertaking training on use of DNA, arrests of potential suspects of rape cases have increased and faster prosecutions of such cases. Training on DNA has hastened the process of faster and factual evidence collection”

These views further corroborate the assertions of Ajema et al (2010) that, with the technology the investigator does not need to rely on external parties, or rather on memories of witnesses who witnessed the crime but with the relevant skills and facilities an investigator can solve case with ease and quickly. This indicates that training of police officers on use of DNA has increased the pace of evidence collection which leads to faster of the perpetrators of rape which eventually leads to faster prosecution of such suspects.

The study also revealed that 10(17.2%) of the Police Investigators strongly agreed with the view that police officers have been trained on how to protect DNA evidence which has seen a reduction in the number of rape cases amongst women and children whereas 15(25.9%) agreed. 9(15.5%) were undecided, 9(15.5%) disagreed whereas slightly more than a quarter, 5(25.9%)strongly disagreed. However, during the interviews, the OCPDs and DCIOs, responded on the contrary by stating that the number of cases of rape among women and children have gone down since police officers have been trained on how to protect DNA evidence. One OCPD observed;

“With training on protection of DNA evidence, rape cases can be fast-tracked and perpetrators are brought to book with speed. This ensures that victims of rape are handed justice faster than expected”

These findings are consistent with the assertions of Strom et al (2013) that polices’ ability to generate creative solutions

explains why police who have attained higher level of educated are more receptive attitudes towards use of DNA in rape investigations. Thus, these findings attest to the fact that police officers who are educated and trained on how to protect DNA evidence are associated greater ability to conceptualize and implement innovative solution to complex issues. Table 2 also indicates that 7(12.1%) of the Police Investigators strongly agreed with the view that increased arrests and prosecutions of perpetrators have not been registered since police officers have not been trained on how to protect DNA evidence whereas 7(12.1%) agreed, 6(10.3%) were undecided, 16(27.6%) disagreed whereas 22(37.9%) strongly disagreed. These views were not supported by the OCPDS and DCIOs who indicated that police officers are being trained gradually on to use DNA to collect and protect evidence.

These findings lend credence to the findings of a study conducted in Pakistan by Leary and Pease (2013) which established that practical training is crucial since it enables police officers to understand how to effectively and efficiently use and adopt DNA in rape investigations. Hence, these findings affirm the fact that, in order to gain more benefits from DNA technologies, investments need to be made not only on physical asserts but also equipping of officers with the prerequisite skills through continuous training. Table 1 also indicates that 9(15.5%) of the Police Investigators strongly agreed with the view that training of police officers on how to manage time for rape kit processing has reduced cases of rape amongst women and children whereas 14(24.1%) agreed, 4(6.9%) were undecided, 12(20.7%) disagreed whereas 19(32.8%) strongly disagreed. However, these views were refuted by OCPDs and DCIOs who stated that use of DNA has reduced waiting time for evidence gathering and management. On further probing, one DCIO noted;

“With training of police officers on how to manage time for rape kit processing, time for resolving cases of rape among women and children has been reduced to a great extent”

Despite these contradictions, these findings point to the fact that using DNA in rape investigations reduces time for management of evidence processing. This reduces time for resolving rape cases among women and children.

These findings corroborate the findings of a study carried out in India in which Bryden et al (2010) established that one of the major challenges to full exploitation of DNA potentials

is the unawareness by police of the merits to be derived from the technology together with lack of specific training on use of DNA; both at practical and procedural levels. Table 2 also indicates that slightly more than half, 15(25.9%), of the Police Investigators strongly agreed with the view that arrests and prosecutions of rape perpetrators have not been intensified since no training of police officers has been done on DNA collection techniques as did 13(22.4%) agreed, 4(6.9%) were undecided, 13(22.4%) disagreed whereas 13(22.4%) strongly disagreed.

During the interviews, the OCPDS and DCIOs concurred with police officers that, in situations where police officers have not been trained on use of DNA techniques, few arrests of potential rape suspects have been conducted with few conclusive prosecutions made due to lack of adequate evidence. As noted earlier, these findings affirm the fact that training of police officers on use of DNA in carrying out investigations on rape cases so that prompt arrests and prosecutions of rape suspects can be realized. In summary, training enables the police to understand what is involved in the entire DNA processes and procedures. These findings further indicate that training enables the police to understand what is involved in the entire DNA processes and procedures. Besides, training and awareness by police of the merits to be derived from the DNA technology together specific training on use of DNA is critical in its adoption in rape investigations. This points to the fact that police officers acquire skills on methods of evidence collection, evidence protection and time for rape kit processing using DNA through training in colleges and tertiary institutions.

Availability of DNA Facilities and Use of DNA in Rape Investigations

The third objective sought to assess the extent to which such facilities determine use of DNA in investigations of rape cases. Descriptive data were collected from police Investigators and results are shown in Table 3.

Table 3: Views of Police Investigators on the Influence of Availability of DNA Facilities on Use of DNA in Rape Investigations

Test Items	Ratings				
	SA %	A %	U %	D %	SD %
There are no labs for DNA analysis and this has not reduced cases of rape amongst women and children	6.9	6.9	1.7	27.6	56.9
Fewer prosecutions of rape perpetrators are often undertaken since there is no kits to collect DNA evidence materials	10.3	27.6	0.0	24.1	38.0
In police stations, there are no DNA Kits to collect DNA evidence for rape victims which make victims shy away from reporting and this has	20.7	31.0	8.6	19.0	20.7

increased rape cases among women and children					
Fewer prosecutions of rape perpetrators are often undertaken since there are not kits to collect DNA evidence material to help identify the perpetrators	12.1	25.9	3.4	29.3	29.3
In police stations, there are no specimen storage facilities and this has increased rape cases among women and children	19.0	24.1	8.6	20.7	27.6

Table 3 reveals that 4(6.9%) of the Police Investigators strongly agreed with the view that there are no labs for DNA analysis and this has not reduced cases of rape amongst women and children as did 4(6.9%) who agreed. However, only a paltry 1(1.7%) were undecided, 16(27.6%) disagreed whereas 33(56.9%) strongly disagreed. The study also established that 6(10.3%) of the Police Investigators strongly agreed with the view that fewer prosecutions of rape perpetrators are often undertaken since there is no kits to collect DNA evidence materials. 16(27.6%) agreed. 0(0.0%) were undecided, 14(24.1%) disagreed whereas 22(38.0%) strongly disagreed. During the interviews, the OCPDs and DCIOs also concurred with the views expressed by police investigators that lack of pre-requisite materials for DNA investigations of rape cases has always become a hindrance to prompt and efficient investigations of rape cases. One DCIO noted;

“Sometimes the police stations get overwhelmed with cases involving rape since some take time to identify the potential suspect since, in most cases, the resources are overstretched and one has to queue in order to have DNA samples run to identify the real suspect in a rape case”

These findings corroborate the assertions of Kim and Thuy (2011) that resources are required for the training of prosecutors involved in DNA cases to gain better understanding of both the applications and limitations of DNA evidence. Just as noted earlier, these findings point to the fact that, although there is clear testimony as to the value and validity of forensic science when resources are inadequate to enable timely delivery and accurate data to prosecutors and investigators, the efficiency of the process is greatly compromised. Data in Table 3 also show that 12(20.7%) of the Police Investigators strongly agreed with the view that, in police stations, there are no DNA Kits to collect DNA evidence material for rape victims which make many victims shy away from reporting and this has not reduced cases of rape amongst women and children. 18(31.0%) agreed. 5(8.6%) were undecided, 11(19.0%) disagreed whereas 12(20.7%) strongly disagreed. On the same breath, 7(12.1%) of the Police Investigators strongly agreed with the view that fewer prosecutions of rape perpetrators are often undertaken since there are not kits to collect DNA evidence material to help identify the perpetrators. 15(25.9%) agreed. 2(3.4%) were undecided, 17(29.3%) disagreed whereas 17(29.3%) strongly disagreed. However, the OCPDs and DCIOs responded on the contrary. They noted:

“Despite the fact that there are inadequate DNA facilities and kits for collecting DNA evidence materials,

investigations and prosecutions of rape victims still go on with cases leading to convictions”

These findings are not consistent with the findings of a study carried out in Sweden in which McPhedran (2012) revealed that apparent cost can be observed from two perspectives, those associated with procurement of the DNA technology and equipping police officers with the necessary expertise through training. These findings also do not corroborate the findings of Strom et al (2013) that the cost associated with acquisition and adaption of the technology are important factors in the adoption and utilization of DNA. These findings imply that lack of facilities and the higher the perceived costs of adoption of DNA technology, the slower the rate of adoption of DNA technology and less likelihood of expansion facilities.

Table 3 also shows that 11(19.0%) of the Police Investigators strongly agreed with the view that, in police stations, there are no specimen storage facilities and this has increased cases of rape amongst women and children. 14(24.1%) agreed. At the same time, 5(8.6%) were undecided, 12(20.7%) disagreed whereas 16(27.6%) strongly disagreed. During the interviews, the OCPDs and DCIOs, however, refuted such claims, but insisted there are specimen storage facilities, though not adequate. One OCPD indicated:

“Not that there are no specimen storage facilities, we have them, but inadequate to cater numerous cases under investigations. This usually stretches the capacity of the facilities”

These findings lend credence to the findings of a study conducted in Kumasi Metropolis of Ghana in which Ayalew and Berhane (2010) established that lack of adequate DNA facilities and financial constraints were the main challenges to adoption of DNA technology while undertaking rape investigations. Despite these contradicting viewpoints, these findings point to the fact that critical DNA facilities are either not available or if available, are inadequate to cater for the numerous cases of rape reported on a regular basis, but which need thorough and prompt investigations.

Police Officers’ Attitude and Use of DNA in Rape Investigations

The fourth objective of this study sought to assess the extent to which attitude of police officers determine use of DNA in investigations of rape cases. Descriptive data were from Police Investigators and the results are shown in Table 4.

Table 4: Views of Police Investigators on the Influence of Police Officers' Attitude on Use of DNA in Rape Investigations

Summary of Test Items	SA %	A %	U %	D %	SD %
Police officers do not believe that DNA can help reduce cases of rape amongst women and children	24.1	20.7	0.0	17.2	38.0
Belief of police officers in DNA as a tool for rape investigations has increased arrests and prosecutions of rape perpetrators	46.6	46.6	0.0	3.4	3.4
Police officers do not have any interest in knowing how DNA can reduce cases of rape amongst women and children	3.4	1.7	8.6	24.1	62.2
Police officers have no interest in understanding how DNA functions as a tool for rape investigations so as to increase arrests and prosecutions of rape perpetrators	3.4	5.2	3.4	27.6	60.3
Police officers lack the motivation to understand how DNA can reduce cases of rape amongst women and children	5.2	10.3	6.9	20.7	56.9
There is no motivation to make police officers understand how DNA functions as a tool for rape investigations so as to increase arrests and prosecutions of rape perpetrators	8.6	24.1	6.9	20.7	39.7

Table 4 shows that 14(24.1%) of the Police Investigators strongly agreed with the view that police officers do not believe that DNA can help reduce cases of rape amongst women and children. 12(20.7%) agreed. 0(0.0%) were undecided, 10(17.2%) disagreed whereas 22(38.0%) strongly disagreed. 27(46.6%) of the Police Investigators strongly agreed with the view that belief of police officers in DNA as a tool for rape investigations has increased arrests and prosecutions of rape perpetrators as did 27(46.6%) who agreed. None (0.0%) were undecided, 2(3.4%) disagreed whereas 2(3.4%) strongly disagreed. During the interviews, the OCPDs and DCIOs however, refuted the claims that there is no belief in the use of DNA as the best way of resolving cases of rape among women and children. One DCIO observed:

“Use of DNA in rape investigations in unravelling rape cases has been welcome by all police officers and many are ever enquiring when such full-fledged facilities would be provided to help solves cases of rape with ease and quickly. In fact, they believe in it as the panacea to long inconclusive cases of rape”

These findings corroborate the findings of a study conducted in Kenya in which Ruth (2014) revealed that effective use of DNA is primarily determined by police officers' attitudes and those of other stakeholders in rape investigations who develop attitude and feeling concerning DNA. According to Ruth (2014), attitude of police officers is a very powerful enabler or a barrier towards the use of DNA during investigations of rape cases. These findings point to the fact that personal beliefs of police officers are held as the main constrains limiting use of DNA technology in rape investigations.

Table 4 also shows that 2(3.4%) of the Police Investigators strongly agreed with the view that police officers do not have any interest in knowing how DNA can reduce cases of rape amongst women and children as did 1(1.7%) who agreed. 5(8.6%) were undecided, 14(24.1%) disagreed whereas 36(62.2%) strongly disagreed. 2(3.4%) of the Police

Investigators strongly agreed with the view that police officers have no interest in understanding how DNA functions as a tool for rape investigations so as to increase arrests and prosecutions of rape perpetrators whereas 3(5.2%) agreed. 2(3.4%) were undecided, 16(27.6%) disagreed whereas 35(60.3%) strongly disagreed. The OCPDs and DCIOs also strongly disagreed with the view that police officers have no interest in understanding how DNA functions in unravelling cases of rape. One OCPD, noted:

“Use of DNA in resolving rape cases among women and children has been embraced by all police officers with many interested in undertaking any training involving DNA technology and how it functions”.

These findings further support the findings of a study carried out in Seth Africa in which Artz et al (2012), in a study carried out in south Africa specifically Cape Province, revealed that perceived comparative merit of DNA innovation is directly linked to its rate of use. According to Artz et al (2012), perceptions of police in rape investigations and their expectations towards DNA technologies are a crucial element in the investigations of rape cases. These findings affirm the fact that the interest which police officers express in understanding how different functions of DNA are undertaken is a critical step in using DNA while investigations about rape cases among women and children. From Table 4, 3(5.2%) of the Police Investigators strongly agreed with the view that police officers lack the motivation to understand how DNA can reduce cases of rape amongst women and children as did 6(10.3%) who agreed. 4(6.9%) were undecided, 12(20.7%) disagreed whereas 33(56.9%) strongly disagreed. 5(8.6%) of the Police Investigators strongly agreed with the view that there is no motivation to make police officers understand how DNA functions as a tool for rape investigations so as to increase arrests and prosecutions of rape perpetrators as did 14(24.1%) who agreed. 4(6.9%) were undecided, 12(20.7%) disagreed whereas 23(39.7%) strongly disagreed.

However, the OCPDs and DCIOs refuted claims that police officers are not motivated and encouraged to

understand how DNA functions. These findings are consistent with the findings of a study carried out in East Timor in which Pacific Women against Violence (2014) revealed that motivation among police officers and the more positive attitude police officers have towards DNA, the more the likelihood that they would embrace DNA this affects their success in investigations of cases of rape. The findings imply that changing of police officers' behavior and their attitudes rather than the cost of DNA infrastructures the main determinant of the use of DNA. In summary, these findings are indicative of the fact that attitude, interest and motivation of police officers are among major determinants of use of DNA in rape investigations.

V. SUMMARY OF FINDINGS AND CONCLUSIONS

From the study findings, it is evident that rape cases among women is high in Nairobi County with many rape cases among women and children are rarely reported to the police and the number of female rape victims is significantly underestimated due to under reporting. From the study findings, police officers, though not all, have been trained on use of DNA methods of investigations which points to the fact that training is key to any successful use of DNA while conducting any investigation on rape cases.

Such training has focused on methods of collecting evidence, protection of DNA evidence and how to manage time for rape kit processing, though it has not fully led to a reduction in rape cases amongst women and children. From the study findings, labs, kits for collecting DNA evidence materials and specimen storage facilities are available, though not adequate which affirms the fact that, for successful adoption of use of DNA in rape investigations, facilities and resources such as crime and forensic labs, technicians, testing materials and other accessories ought to be available. Both quantitative and qualitative findings have also revealed that police officers have positive attitude, are interested and feel motivated to use DNA while conducting investigations involving rape cases among women and children. This implies that effective use of DNA is primarily determined by police officers' attitudes and those of other stakeholders in rape investigations who develop attitude and feeling concerning DNA.

VI. RECOMMENDATIONS

The study recommends that victims of rape cases should be quick to report. The police officers should also act with speed to solve already reported cases of rape to act as motivation for victims of such rape to report and be assured of getting justice. More training should be done to update police officers on all the aspects of DNA and how fast they can use it to unravel complex cases by identifying potential and real culprits. National Police Service should redesign police training curriculum to include training on use of DNA in evidence gathering before being deployed to police stations from Police Training Colleges. More resources should be allocated to ensure that enough facilities are provided and labs equipped with up to date equipment which can provide results from DNA samples as fast as possible. Police officers should show much interest in using DNA by understanding

how many of its aspects operate and function in unraveling truth about rape cases.

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