

Determining the Level and Impact of Forensics Awareness in Nigeria using University of Ibadan as a Case Study

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Abstract - The increase and urgent need in new methodologies and techniques in diverse forensic science disciplines recently led to the recognition and acceptability of forensic science. For this reason, this study was carried out in order to determine the level and impact of forensic science awareness in Nigeria, using University of Ibadan as a case study. A descriptive cross sectional study was carried out on 410 respondents, who were alternatively selected, in the University of Ibadan, Nigeria. A semi-structured interviewer-administered questionnaire was used in the study to obtain information on the socio-demographic characteristics of respondents, general forensics awareness of respondents, attitude or reactions of respondents and 'first responders' to crime scenes, and impact of respondents' level of awareness on society. Data collected was analyzed using Statistical Package for Social Sciences (SPSS) version 22. Descriptive statistics and cross-tabulation statistics was used to establish relationship between variables. The result showed that a larger number (55.4%) of the respondents were between the ages of 18-29 years, of which 52.9% were males while 47.1% were females. Most (66.1%) of the respondents were Christians and a larger number (53.4) of the respondents had tertiary education as their highest educational qualification. Majority (83.9%) of the respondents were students, with minority of the respondents (3.1%) from other occupations. 74.1% of the respondents were aware of forensics, and unlike the 'first responders', the general public seem to be rather spontaneous and radical in their reactions towards crime scenes. There was a significant relationship between the general forensic awareness of individuals and their attitudes towards crime scenes, and a significant but indirect relationship between the general forensics awareness of individuals and its impact on the society.

Index Terms - Crime scene, Forensics awareness, Geo-political, Population, Respondents, Socio-demographics.

INTRODUCTION

The term "forensic" is derived from the Latin word "forensis", which means public discussion or debate. In a more modern context, however, forensic applies to courts or judicial system [1]. It does not only involve the collection and analysis of physical evidence and the scientific association between them (these evidence), but it is also used to resolve disputes, assess blame, establish responsibility, enhance public safety and enforce laws and government regulations and statutes [2]. Therefore, Forensic Science has to do with the application of scientific knowledge and methodology to legal problems and criminal investigation. Though Forensic Science dates back to the 16th century from when European medical practitioners in army and university setting began gathering information on the cause and manner of death [1], modern forensic science originated in the late nineteenth century, when European criminal investigators began to use finger printing and other identification techniques to solve crimes [1], [3]. Since then, the development of forensic science has been used to uncover mysteries, solve crimes, and convict or exonerate suspects of crime. As the field of science expanded in scope throughout the twentieth century, its application to legal issues became more and more common, serving both defence and prosecution

arguments [2], [3]. The extraordinary scientific innovations and advancements in forensic science have allowed it to become a highly developed science that involves a number of disciplines and thousands of forensic scientists specializing in everything from DNA and botany to dentistry and tool marks [1]. This is so because nearly every area of science has a potential bearing on the law, therefore the list of areas within forensic science is extensive [3]. More so, the objective testimony of forensic scientists is based only and purely on scientific facts. As such, the testimony of forensic scientists has become a trusted component of many civil and criminal cases [1], [2] [3].

The use of forensic science in solving crime has been on for more than 1,000 years in Europe and North America. It is mainstream in their criminal investigation. In fact, it is almost criminal not to employ the use of forensics in legal disputes. Hence, great development has been made in the field [3]. However, in Nigeria, forensic science became known a few decades ago. An aspect of forensic science, forensic dactyloscopy, is widely used by the Nigerian Police Force (NPF) – the primary custodian of forensics. Fingerprints obtained from the 1920s are still available for use in the Central Criminal Registry of the Forensic Laboratory in Lagos State. The NPF also utilizes the forensic examination of Questioned

Documents. However, putting into consideration all facets of forensic science, the Police Force in Nigeria is still lagging behind. For Forensic science to take its rightful place in assisting the Judiciary in making efficient pronouncement, it has to be undertaken wholly. Forensics has to permeate the whole process of investigation. The NPF and the Judiciary still relies highly on the unscientific and biased eye-witness testimonies. However, the failure of Nigeria's Security agents in applying forensics in investigations is not mutually exclusive of the slow rate of scientific developments. It is no rocket science to know that countries that wholly practice forensics are those who pay premium attention to the scientific innovations. Therefore, the rate at which the NPF utilizes forensic science is a symptomatic reaction to the level of development of science in the country.

Awareness of the forensic process and the roles of all personnel at a crime scene can be applied to effectively control complex crime scenes. If these roles are not clear, conflicts can arise between personnel from different agencies and crime units, as seen in case study 2 of Julian *et al.*, [4]. Developed Nations like the United States are armed with increasingly sophisticated technologies, innovations and new techniques in forensic Science, thereby increasing the reliability and efficiency of forensic testing – particularly the growth of DNA testing – to produce results faster and at lower cost [5]. Shelton *et al.*, [6] states that people may develop higher expectations for the capability of forensic technology as technology improves and becomes more prevalent throughout society. However, in a developing Nation such as Nigeria where forensic science is on the verge of being fully employed as a crime-solving tool [7], there is need for research and development in forensic analysis. But this may seem impossible as there is little or lack of sophisticated technology for forensic analysis, hence, little or no awareness in forensics. In view of this and owing to the applicability of forensic science in Nigeria as a crime-solving tool, it is therefore essential to know the level of forensics awareness among individuals in the country, as this will subsequently aid in determining the impact of such awareness in the society and among its people. However, this should act as the basis of the practice of forensic science in Nigeria.

MATERIALS AND METHODS

Study Location and Population

This study was carried out using University of Ibadan as the study community, in order to reflect and provide a representative sample of the population of an academic setting in Nigeria. The University of Ibadan is located five miles (8

kilometers) from the centre of the major city of Ibadan with an estimated population of 33,481 [8].

Sampling Method and Data Collection Procedure

About 439 respondents participated in this study. Respondents were drawn from students, first responders which included; fire service officers, security officers, medical service personnel and personnel from other occupation within the study community. Selection of the participants was based on the willingness of the participants to participate. An interviewer administered questionnaire which contains both open and close ended questions developed by the researcher was used to elicit information from the respondents. The questionnaire contains the following sections:

Section 1: Socio-demographic data of Respondents

Section 2: General Forensic Awareness of Respondents

Section 3: Attitude of Respondents and first responders towards Crime Scenes

Section 4: Impact of Respondents level of Forensic Awareness on the Society

Sample Size Calculation

The sample size for this study was determined using Yamane, [9] sample size formula below:

$$n = \frac{N}{1 + N(e)^2}$$

Where: n= required sample size; N= estimated population of the University of Ibadan (33,481); e = level of error tolerance (5%)

$$n = \frac{33,481}{1 + 33,481 (0.05)^2}$$

$$n = \frac{33,481}{84.7025}$$

$$n = 395.27759 \approx 395$$

Adjusting the sample size for 10% attrition

$$n_f = \frac{n}{1 - f}$$

$$n_f = \frac{395}{1 - 10\%}$$

$$n_f = \frac{395}{1 - 0.1}$$

$$n_f = \frac{395}{0.9}$$

$$n_f \approx 439 \text{ respondents}$$

However, 410 respondents were used in the study.

Inclusion Criteria

Individuals below 18 years with informed consent from parent(s)/guardian and individuals aged 18 years and above

who gave informed consent, both male and female were included in the study.

Exclusion Criteria

Individuals below 18 years who lacked the capacity, individuals below senior secondary school levels, mentally deranged, and unenlightened individuals were excluded from the study.

Data Analysis

The statistical data analysis was done using Statistical Package for Social Sciences (SPSS) version 22. Descriptive statistics such

as mean with their standard deviation, ranges, percentages and cross-tabulation statistics was used to establish relationship between variables.

Ethical Consideration

Ethical approval was obtained from UI/UCH Institutional Review Ethical Committee. The objectives of the study were explained to the willing and eligible participants and a consent form was also given to them to fill.

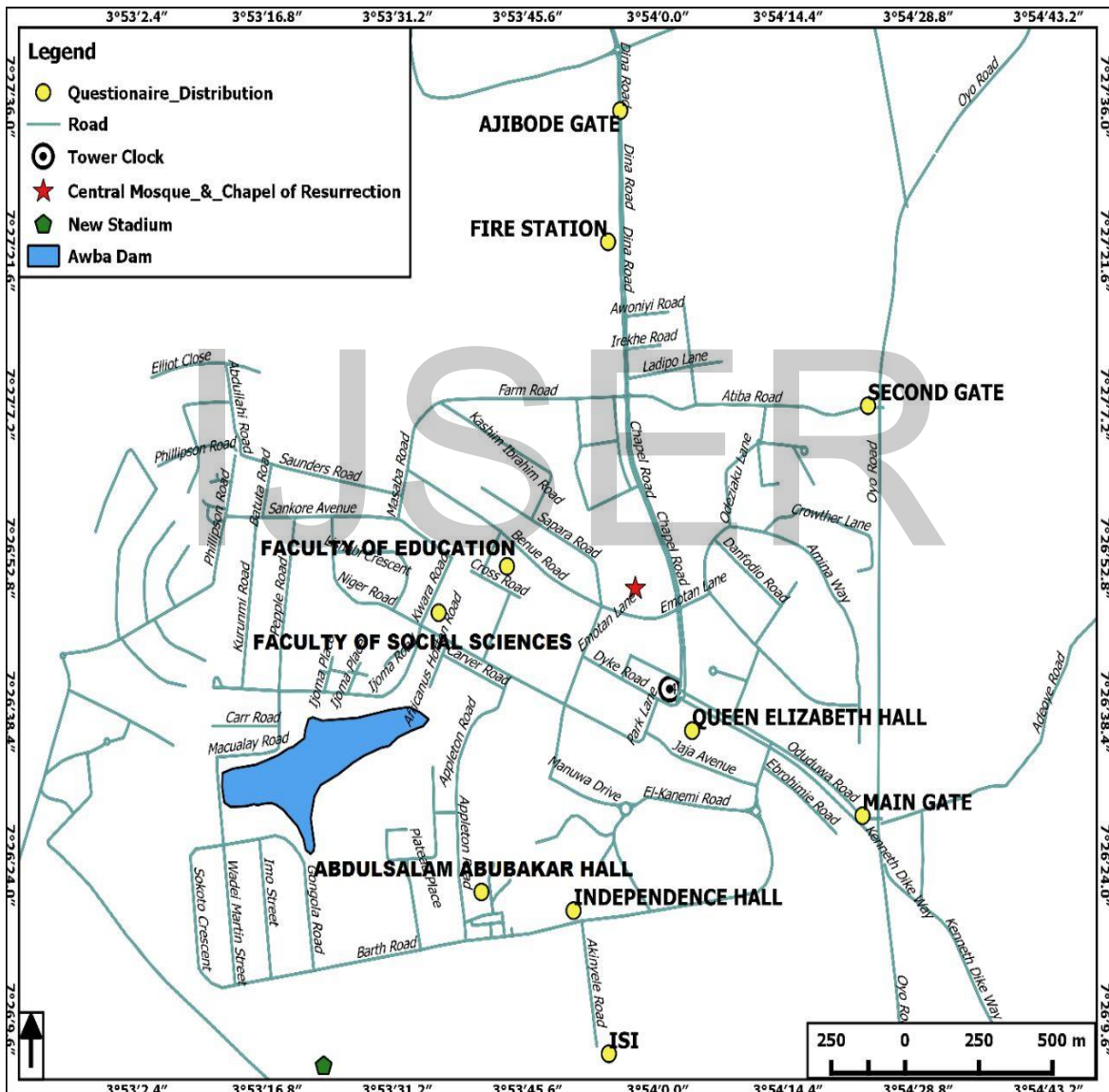


Fig. 1. Map of the University of Ibadan showing the points of Distribution of Questionnaire [10].

RESULTS

Socio-Demographic Characteristics of the Respondents

The result in Table 1 shows that a larger number 227 (55.4%) of the respondents were between the ages of 18-29 years, of which

120 (52.9%) were males while 107 (47.1%) were females. Most 271 (66.1%) of the respondents were Christians and a larger number 219 (53.4) of the respondents had tertiary education as their highest educational qualification. Majority 344 (83.9%) of

the respondents were students of which more than half 192 (56.3%) were males while 152 (43.7%) were females, with minority of the respondents 13 (3.1%) from other occupations. Within the socio-demographic characteristics of the respondents, no significant difference was observed between

males and females, except in those within the age-ranges of 18-29 and 30-39, in Christians, in respondents with tertiary education, and in students, were significantly different.

Table 1: Socio-demographic characteristics of the respondents

Characteristics	Male N=227 N(%)	Female N=183 N(%)	Total N=410 N(%)
Age (years)			
13-17	46 (54.1)	39 (45.9)	85 (20.7)
18-29	120 (52.9)	107 (47.1)	227 (55.4)
30-39	36 (66.7)	18 (33.3)	54 (13.2)
40-69	22 (56.4)	17 (43.6)	39 (9.5)
70-85	3 (60)	2 (40)	5 (1.2)
Religion			
Christianity	156 (58.3)	113 (41.7)	271 (66.1)
Islam	61 (48.4)	65 (61.5)	126 (30.7)
Others	8 (61.5)	5 (38.5)	13 (3.2)
Educational Level			
Primary education	8 (44.4)	10 (55.6)	18 (4.4)
Secondary education	52 (54.7)	43 (45.3)	95 (23.2)
Tertiary education	126 (57.5)	93 (42.5)	219 (53.4)
Post tertiary	41 (52.6)	37 (47.4)	78 (19.0)
Occupation			
Student	192 (56.3)	152 (43.7)	344 (83.9)
First respondent	17 (54.8)	14 (45.2)	31 (7.6)
Academician	12 (54.5)	10 (45.5)	22 (5.4)
Other occupation	6 (46.2)	7 (53.8)	13 (3.1)

Extent (in percentages) of respondents' awareness of forensics as distributed by age

The result in Table 2a shows that 75.3% of respondents between ages 13 and 17 are aware of forensics, 69.6% between 18 and 29

are aware, 83.3% between 30 and 39 are aware, 84.6% between 40 and 69 are aware while 80% between 70 and 85 are aware. Hence, awareness of forensics is high in this population of study.

Table 2a: Summary of cross tabulations showing age-range differences in extent of forensic awareness

Variables	Aware	Not Aware	Total Number of Participants
Age			
13-17	64 (75.3%)	21 (24.7%)	85 (20.7%)
18-29	158 (69.6%)	69 (30.4%)	227 (55.4%)
30-39	45 (83.3%)	9 (16.7%)	54 (13.2%)
40-69	33 (84.6%)	6 (15.4%)	39 (9.5%)
70-85	4 (80%)	1 (20%)	5 (1.2%)
Total	304 (100%)	106 (25.7%)	410 (100%)

The result in Table 2b shows that 41.2% of respondents between ages 13 and 17 are strongly aware of forensics, 42.7% of respondents between ages 18 and 29 are strongly aware of forensics, 25.9% of respondents between ages 30 and 39 are strongly aware of forensics, 46.1% of respondents between ages

40 and 69 are strongly aware of forensics while 0% of respondents between ages 70 and 85 are strongly aware of forensics. Thus, strong forensic awareness is highest between ages 40 to 69 and 13 to 29, while low forensic awareness is highest between ages 30 to 39 and 70 to 85.

Table 2b: Summary of Cross tabulations showing Age-range differences in Extent of Forensics Awareness

Variables	Strongly Aware	Fairly Aware	Aware	Total Number of Participants
<i>Age</i>				
13-17	35 (41.2%)	28 (32.9%)	22 (25.9%)	85 (20.7%)
18-29	97 (42.7%)	51 (22.5%)	79 (34.8%)	227 (55.4%)
30-39	14 (25.9%)	19 (35.2%)	21 (38.9%)	54 (13.2%)
40-69	18 (46.1%)	6 (15.4%)	15 (38.5%)	39 (9.5%)
70-85	0 (0%)	1 (20.0%)	4 (80.0%)	5 (1.2%)
Total	101 (33.2%)	78 (25.7%)	125 (41.1%)	304 (100%)

Percentage of male and female respondents who are strongly aware, aware, fairly aware or not aware of forensics

The result in Table 3a shows that 74.1% of the respondents are aware about forensics while 25.9% are not aware. This infers

that the level of awareness of Forensics is quite high amidst this population. However, amidst those who are not aware of forensics, 55.7% are males while the remaining 44.3% are females. This infers that males appear to be more aware of forensics than females.

Table 3a: Summary of Cross tabulations showing Gender differences in Extent of Forensics Awareness

Variables	Aware	Not Aware	Total Number of Participants
<i>Sex</i>			
Male	168 (55.3%)	59 (55.7%)	227 (55.4%)
Female	136 (44.7%)	47 (44.3%)	183 (44.6%)
Total	304 (74.1%)	106 (25.9%)	410 (100%)

The result in Table 3b shows that 25% of the respondents are strongly aware of Forensics, of which, 55.3% are males and 44.7% are females. Also, 31.3% are fairly aware of forensics, of which 54.7% are males while 45.3% are females. Further, 43.7%

are aware of forensics, of which 55.6% are males while 44.4% are females. Put together, a larger percentage of the respondents are aware of forensics.

Table 3b: Summary of Cross tabulations showing Gender differences in Extent of Forensics Awareness

Variables	Strongly Aware	Fairly Aware	Aware	Total Number of Participants
<i>Sex</i>				
Male	42 (55.3%)	52 (55.7%)	74 (55.6%)	168 (55.4%)
Female	34 (44.7%)	43 (45.3%)	59 (44.4%)	136 (44.6%)
Total	76 (25.0%)	95 (31.3%)	133 (43.7%)	304 (100%)

Percentage of respondents who knew about forensics through TV shows and Media, Internet, Friends, Workshops and Seminars, Forensic Training or other channels

The result in Table 4 shows that 64.5% of the respondents got aware of Forensics through TV Shows and Media, 23.7% through the internet, 6.6% through friends, 2.2% through workshops and seminars and 3% through forensic training. Hence, it can be subsumed that the most prominent source of forensic awareness is via TV Shows and Media.

Table 4: Summary of Frequency distribution showing the Sources of Forensics Awareness

Source of Awareness	Frequency (Number of Participants)	Percentage
TV Shows and Media	196	64.5
Internet	72	23.7
Friend	20	6.6
Workshops and Seminars	7	2.2
Forensic Training	9	3.0

Percentage of students, first responders, academics and/or other occupations are strongly aware, aware, fairly aware or not aware of forensics

The result in Table 5a shows that 25% of students are not aware of forensics, 27.3% of academicians are not aware of forensics,

76.9% of individuals with other occupations are not aware of forensics while 12.9% of first responders are not aware of forensics. Summarily, a larger percentage of individuals from other occupations are not aware of forensics.

Table 5a: Summary of Cross tabulations showing Occupational differences in Extent of Forensics Awareness

Variables	Aware	Not Aware	Total Number of Participants
<i>Occupation</i>			
Students	258 (75.0%)	86 (25.0%)	344 (83.8%)
1 st Responders	27 (87.1%)	4 (12.9%)	31 (7.6%)
Academics	16 (72.7%)	6 (27.3%)	22 (5.4%)
Others	3 (23.1%)	10 (76.9%)	13 (3.2%)
Total	304 (74.1%)	106 (25.9%)	410 (100%)

The result in Table 5b shows that 33.2% of the respondents are strongly aware of Forensics, of which, 81.2% are students, 8.9% are first responders and 9.9% are academicians. Also, 25.7% are fairly aware of forensics, of which 80.7% are students, 14.1% are first responders, 2.6% are academicians and 2.6% belong to other occupations. Further, 41.1% are aware of forensics, of

which 90.4% are students, 5.6% are first responders, 3.2% are academicians and 0.8% belongs to other occupations. Summarily, a larger percentage of first responders and individuals from other occupations are fairly aware of Forensics.

Table 5b: Summary of Cross tabulations showing Occupational differences in Extent of Forensics Awareness.

Variables	Strongly Aware	Fairly Aware	Aware	Total Number of Participants
<i>Occupation</i>				
Students	82 (81.2%)	63 (80.7%)	113 (90.4%)	258 (84.9%)
1 st Responders	9 (8.9%)	11 (14.1%)	7 (5.6%)	27 (8.9%)
Academics	10 (9.9%)	2 (2.6%)	4 (3.2%)	16 (5.2%)
Others	0 (0%)	2 (2.6%)	1 (0.8%)	3 (1%)
Total	101 (33.2%)	78 (25.7%)	125 (41.1%)	304 (100%)

Distribution of extent of Forensic Awareness across educational qualifications of respondents

The result in Table 6a shows that; 3.6%, 30.0%, 54.3%, and 15.1% of the respondents with primary school education, secondary school education, tertiary education and post tertiary education respectively, as their highest educational level are

aware of forensics. While, 6.6%, 15.1%, 64.2%, and 14.2% of the respondents with primary school education, secondary school education, tertiary education and post tertiary education respectively, as their highest educational level are not aware of forensics.

Table 6a: Summary of Cross tabulations showing Educational differences in Extent of Forensics Awareness.

Variables	Aware	Not Aware	Total Number of Participants
<i>Educational Qualification</i>			
Primary	11 (3.6%)	7 (6.6%)	18 (4.4%)
Secondary	82 (30%)	16 (15.1%)	98 (23.9%)
Tertiary	165 (54.3%)	68 (64.2%)	233 (56.8%)
Post tertiary	46 (15.1%)	15 (14.2%)	61 (14.9%)
Total	304 (74.1%)	106 (25.9%)	410 (100%)

The result in Table 6b shows that; 27.3%, 20.7%, 28.5%, and 74% of respondents with primary school education, secondary school education, tertiary education and post tertiary education respectively, are strongly aware of forensics. With these however, it can be seen that a larger percentage of those with post tertiary education is strongly aware of forensics. Though generally, forensic awareness appear to be highest

among respondents with tertiary education (54.3%), followed by those with secondary education (30%), then those with post-tertiary education (15.1%) and least are those with only primary education (3.6%). However, this skewedness could be due to the fact that the study was carried out in the premises of a university.

Table 6b: Summary of Cross tabulations showing Educational differences in Extent of Forensics Awareness

Variables	Strongly Aware	Fairly Aware	Aware	Total Number of Participants
<i>Educational Qualification</i>				
Primary	3 (27.3%)	2 (18.2%)	6 (54.5%)	11 (3.6%)
Secondary	17 (20.7%)	11 (13.4%)	54 (65.9%)	82 (30.0%)
Tertiary	47 (28.5%)	55 (33.3%)	63 (38.2%)	165 (54.3%)
Post tertiary	34 (74%)	10 (21.7%)	2 (4.3%)	46 (15.1%)
Total	101 (33.2%)	78 (25.7%)	125 (41.1%)	304 (100%)

Percentage of respondents in each religion who are aware or not aware of forensics

Table 7 shows the percentage and frequency distribution of forensic awareness as differentiated by religion. The result in Table 7 shows that 72.7% of Christians are aware of forensics as against 27.3% who are not aware. Also, 77.8% of Muslims are

aware of forensics as against 22.2% who are not aware. Further, 69.2% of those from other religions are aware of forensics as against 30.8% who are not aware. Put together, forensic awareness is lowest among those from other religions and highest among educated Muslims.

Table 7: Summary of Cross tabulations showing Religious differences in Forensics Awareness

Variables	Aware	Not Aware	Total Number of Participants
<i>Religion</i>			
Christian	197 (72.7%)	74 (27.3%)	271 (66.1%)
Islam	98 (77.8%)	28 (22.2%)	126 (30.7%)
Others	9 (69.2%)	4 (30.8%)	13 (3.2%)
Total	304 (74.1%)	106 (25.9%)	410 (100%)

Percentage of respondents in each geo-political zone who are strongly aware, fairly aware or aware of forensics

The result in Table 8a shows that 80.3% of respondents from South West geo-political zone of Nigeria are aware of forensics, 64.7% of respondents from South South geo-political zone of Nigeria are aware of forensics, 64.2% of respondents from South East geo-political zone of Nigeria are aware of forensics and 29.4% of respondents from

North Central geo-political zone of Nigeria are aware of forensics. Generally however, forensic awareness appear to be highest among respondents from the South West Geo-political zone (76.3%), followed by the South East (11.2%), then the South South (10.9%) and least is the North Central (1.6%). However, this skewedness could be due to the preponderance of south westerners in the population of study, being that the study was carried out in South West Nigeria.

Table 8a: Summary of Cross tabulations showing Geo-political zone differences in Extent of Forensics Awareness

Variables	Aware	Not Aware	Total Number of Participants
<i>Geo-Political Zones</i>			
South West	232 (80.3%)	57 (19.7%)	289 (70.5%)
South South	33 (64.7%)	18 (35.3%)	51 (12.4%)
South East	34 (64.2%)	19 (35.8%)	53 (12.9%)
North Central	5 (29.4%)	12 (70.6%)	17 (4.2%)
Total	304 (74.1%)	106 (25.9%)	410 (100%)

The result in Table 8b shows that; 29.3%, 51.5%, 44.1% and 20% of respondents from South-West geo-political zone, South-South geo-political zone, South-East geo-political zone and North-Central geo-political zone of Nigeria respectively, are strongly aware of forensics. With these however, it can be seen that a larger percentage of South-South and South-East geo-political zones tend to be more strongly aware of forensics than South-West and North-Central geo-political zones of Nigeria.

Generally however, forensic awareness appear to be highest among respondents from the South-West Geo-political zone (76.3%), followed by the South-East (11.2%), then the South-South (10.9%) and least is the North-Central (1.6%). However, as mentioned earlier, this skewedness could be due to the preponderance of the south westerners in the population of study, being that the study was carried out in the South-West of Nigeria.

Table 8b: Summary of Cross tabulations showing Geo-political zone differences in Extent of Forensics Awareness

Variables	Strongly Aware	Fairly Aware	Aware	Total Number of Participants
<i>Geo-Political Zones</i>				
South West	68 (29.3%)	55 (23.7%)	109 (50%)	232 (76.3%)
South South	17 (51.5%)	11 (33.3%)	5 (15.2%)	33 (10.9%)
South East	15 (44.1%)	10 (29.4%)	9 (26.5%)	34 (11.2%)
North Central	1 (20%)	2 (40%)	2 (40%)	5 (1.6%)
Total	101 (33.2%)	78 (25.7%)	125 (41.1%)	304 (100%)

Percentage of respondents who opine that forensics can be effectively practiced in Nigeria

Table 9 shows the percentage and frequency distribution of the opinion of respondents. The result in Table 9 shows that 42.2% of respondents opine that forensics can be effectively practiced in Nigeria as against 57.8% who opine that it cannot be effectively practiced. Hence, a higher percentage of respondents opine that forensics cannot be effectively practiced in Nigeria.

Table 9: Summary of Frequency distribution showing respondents opinion on the effective practice of Forensics in Nigeria

	YES	NO
Forensics can be effectively practiced	173 (42.2%)	237 (57.8%)

Percentage of respondents who believe the various reasons listed is why forensics cannot be effectively practiced in Nigeria

Table 10 shows the percentage and frequency distribution of the belief of respondents. The result in Table 10 shows that 19.4% of respondents opine that forensics cannot be effectively practiced in Nigeria due to lack of forensic experts, 16.5% for lack of funding in the area, 11% for attitude of eye witness, 12.7% for attitude of first responders, 2.1% for lack of political will, 16.5% for lack of awareness, 15.6% for lack of functional emergency number, and 6.3% for lack of state-of-the-art technology. It could be subsumed that lack of forensic experts,

awareness and funding are major reasons forensics cannot be effectively practiced in Nigeria.

Table 10: Summary of Frequency distribution showing respondents reasons Forensics cannot be effectively practiced

Reasons	Frequency and Percentages
Lack of forensic experts	46 (19.4%)
Lack of funding in the area	39 (16.5%)
Attitude of eyewitness	26 (11%)
Attitude of first responders	30 (12.7%)
Lack of political will	5 (2.1%)
Lack of awareness	39 (16.5%)
Lack of functional emergency number	37 (15.6%)
Lack of state-of-the-art technology	15 (6.3%)
Total	237 (100%)

Percentage of respondents who opine that forensics can be effectively practiced in Nigeria and know that the Nigeria Law Enforcement Agencies (NLEA) apply forensics in their investigations

Table 11 shows the percentage and frequency distribution of the opinion of respondents. The result in Table 11 shows that 47.4% of respondents who opine that forensics can be effectively practiced in Nigeria know that Nigeria Law Enforcement Agencies (NLEA) apply forensics in their investigation, while 52.6% of them do not know. Hence, most Nigerians do not know that Nigeria Law Enforcement Agencies (NLEA) apply forensics in their investigation.

Table 11: Summary of Frequency distribution showing respondents' knowledge of the application of Forensics in investigation by NLEA

	YES	NO
NLEA apply forensics	82 (47.4%)	91 (52.6%)

Percentage of respondents who went for option A, B, C or D in each of the cases in section 3

Table 12 shows the frequency and percentage of respondents' opinion. The result in Table 12 shows that for question one, 22% of respondents would immediately accuse her of arson, 21.2% would fetch water to quench the fire and inform the police later, 11.5% would do nothing and mind their own business and 45.4% would call emergency number and testify to the police.

Table 12: Summary of Frequency distribution showing respondents reaction/attitude towards crime scenes

	A	B	C	D	TOTAL
Question One	90 (22%)	87 (21.2%)	47 (11.5%)	186 (45.4%)	410 (100%)
Question Two	11 (2.7%)	79 (19.3%)	182 (44.4%)	138 (33.7%)	410 (100%)
Question Three	115 (28.0%)	97 (23.7%)	62 (15.1%)	136 (33.2%)	410 (100%)
Question Four	109 (26.6%)	48 (11.7%)	115 (28.0%)	138 (33.7%)	410 (100%)

Percentage of first responders who went for option A, B, C or D in each of the cases in section 3

Table 13 shows the frequency and percentage of first responders' opinion. The result in Table 13 shows that for question one, 9.7% of first responders would immediately accuse her of arson, 25.8% would fetch water to quench the fire and refuse to inform the police, 0% would do nothing and mind their own business and 64.5% would call emergency number and testify to the police.

For question two, 0% of first responders thought the victim should have gone home to take a shower, 12.9% thought she

For question two, 2.7% of respondents thought the victim should have gone home to take a shower, 19.3% thought she should have told a family friend, 44.4% thought she should have reported to the police and 33.7% thought she should have reported at a clinic for examination.

For question three, 28% of respondents would pursue the opponent immediately, 23.7% would walk away quietly, 15.1% would call first responders for help and 33.2% would attempt to revive the victim.

For question four, 26.6% of respondents would take photographs and recover evidence, 11.7% would secure and clean the crime scene, 28% would call for help and recover evidence while 33.7% would secure crime scene and preserve evidence.

should have told a family friend, 48.4% thought she should have report to the police and 38.7% thought she should have reported at a clinic for examination.

For question three, 22.6% of first responders would pursue the opponent immediately, 3.2% would walk away quietly, 41.9% would call first responders for help and 32.3% would attempt to revive the victim.

For question four, 32.3% of first responders would take photographs and recover evidence, 0% would secure and clean the crime scene, 29% would call for help and recover evidence while 38.7% would secure crime scene and preserve evidence.

Table 13: Summary of Frequency distribution showing first responders reaction/attitude towards crime scenes

	A	B	C	D	TOTAL
Question One	3 (9.7%)	8 (25.8%)	0 (0%)	20 (64.5%)	31 (100%)
Question Two	0 (0%)	4 (12.9%)	15 (48.4%)	12 (38.7%)	31 (100%)
Question Three	7 (22.6%)	1 (3.2%)	13 (41.9%)	10 (32.3%)	31 (100%)
Question Four	10 (32.3%)	0 (0%)	9 (29.0%)	12 (38.7%)	31 (100%)

Percentages of respondents who are aware of forensics but opine that the level of forensic awareness in Nigeria is adequate

Table 14 shows the frequency and percentage of respondents' opinion. The result in Table 14 shows that 10.2% respondents who are aware of forensics opine that the level of forensic

awareness in Nigeria is adequate while 89.8% opine that it is not adequate. Hence, a larger percentage of respondents opine that the level of forensic awareness in Nigeria is not adequate.

Table 14: Summary of Frequency distribution showing respondents opinion on the adequacy of Forensics Awareness in Nigeria

	YES	NO
Is forensic awareness adequate?	31 (10.2%)	273 (89.8%)

Percentage of respondents who believe that Nigeria does not have a functional National emergency number

Table 15 shows the frequency and percentage of respondents' believe. The result in table 15 shows that 90.7% respondents believe that Nigeria does not have a functional National emergency number while only 9.3% believe that Nigeria has a functional National emergency number. Hence, most respondents believe that Nigeria does not have a functional National emergency number.

Table 15: Summary of Frequency distribution showing respondents opinion about Functional National Emergency Number

	YES	NO
Functional emergency number	38 (9.3%)	372 (90.7%)

Percentage of respondents who are aware but believe that forensics awareness can improve the attitude of Nigerians towards crime scenes

Table 16 shows the frequency and percentage of respondents' believe. The result in Table 16 shows that 91.8% respondents who are aware believes that forensic awareness can improve the attitude of Nigerians towards crime scenes while 8.2% do not believe in such. Hence, a larger percentage of respondents believe that forensic awareness can improve the attitude of Nigerians towards crime scenes.

Table 16: Summary of Frequency distribution showing respondents' opinion about Awareness on reaction/attitude improvement towards crime scenes

	YES	NO
Improve attitude?	279 (91.8%)	25 (8.2%)

Percentage of respondents who are aware but believe that forensic awareness can improve the attitude of Nigerians towards crime scenes by 30% and below, 50%, 75%, and 100%

Table 17 shows the frequency and percentage of respondents' believe. The result in Table 17 shows that 28.3% of respondents who are aware of forensics believes that forensic awareness can

improve the attitude of Nigerians towards crime scenes by up to 30% and below, 34.1% believe it can improve by up to 50%, 22.6% believe it can improve by up to 70%, while 15% of respondents believe it can improve by up to 100%.

Table 17: Summary of Frequency distribution showing respondents' opinion about Awareness on extent of reaction/attitude improvement towards crime scenes

	30% and below	50%	70%	100%
Improve Attitude?	79 (28.3%)	95 (34.1%)	63 (22.6%)	42 (15.0%)

Percentage of respondents who believe a national emergency number should be lengthy, complex, difficult to remember and ineffective

Table 18 shows the frequency and percentage of respondents' believe. The result in Table 18 shows that only 1.7% of respondents believe a national emergency number should be lengthy, complex, difficult to remember and ineffective while 98.3% believe a national emergency number should not be lengthy, complex, difficult to remember and ineffective.

Table 18: Summary of Frequency distribution showing respondents' opinion about characteristics of National Emergency Number

	YES	NO
National emergency number should be lengthy, complex, difficult to remember and ineffective?	7 (1.7%)	403 (98.3%)

Percentage of respondents who are aware of forensics and know what chain of custody means

Table 19 shows the frequency and percentage of respondents' believe. The result in Table 19 shows that only 59.9% of respondents who are aware of forensics know what chain of custody means while the remaining 40.1% does not know what chain of custody means.

Table 19: Summary of Frequency distribution showing respondents' awareness of chain-of-custody

	YES	NO
Chain of Custody?	182 (59.9%)	122 (40.1%)

DISCUSSION

Over the years, forensic science has been successful, and in recent years, its popularity keeps increasing. This in part, is due

to the fact that there is an emergence and increase in new techniques and methodologies in the different forensic science disciplines. However, the wider scientific community is presently developing a strategy and an initiative towards forensics awareness. This can be seen in the formation and establishment of the different organizations and communities, such as, National Science and Technology Council (NSTC), Subcommittee on Forensic Science (SoFS), Organization of Scientific Area Committees (OSAC), National Institute of Standards and Technology (NIST), Scientific Working Groups (SWGs), etc [11], in order to deal with some of the problems and mitigate the challenges commonly faced in the fields of forensic science, as well as to ensure that most of the recommendations made in the 2009 National Academy of Science/National Research Council (NAS/NRC) report is being tackled [12]. One of such is the problem of literature review whereby researchers seem not to have enough literature to back up their research, which indirectly affects creation of forensics awareness [11], [12]. For this reason too, this study was carried out in order to also help build forensics literature and determine what measures to take to further create awareness about forensics in Nigeria. To proceed however, the results obtained from this study shall be evaluated and discussed comprehensively below.

Socio Demographic Characteristics of the Respondents

As earlier mentioned, within the socio-demographic characteristics of the respondents, no significant difference was observed between males and females, except in those within the age-ranges of 18-29 and 30-39, in Christians, in respondents with tertiary education, and in students, which was significantly different, and shows that the male respondents were significantly more in number than the female. This may explain, as shown in the next paragraph, why forensics awareness is highest among individuals within the age-range of 18-29, with tertiary education qualification and students.

Relationship between Socio-demographic Characteristics and General Forensic Awareness of Respondents

The result from Table 3a and 3b shows that males appear to be more aware of forensics than females. This may be due to the fact that the male child is more educated and hence more aware of the happenings within and around his environment and the world at large. This gender participation disparity bias in education could be due to socio-cultural norm, conservation in tradition and culture, parental influence, matrilineal social

system, cultural and social practices that discriminate against girls and the burden of household labor [13], [14], [15].

TV shows and Media, followed by the internet are the most prominent source of forensic awareness according to the result. This however could be correlated with the fact that they make up a larger part of our everyday lifestyle. It further explains why, from the result, strong forensic awareness is highest between ages 40 to 69 and 13 to 29, while low forensic awareness (individuals with a fair knowledge of forensics) is highest between ages 30 to 39 and 70 to 85. This could be said to be so because learning and pleasure are more rampant and inevitable between ages 0 and 30, and so individuals between this age-range resort to the media and internet for utmost satisfaction. While the cause in the strong forensic awareness between ages 40 to 69 could be due to the fact that individuals between this age-range also tend to resort to the media and internet for optimum knowledge in their learning experience and about the happenings in the world at large.

The result also shows that a larger percentage of individuals from other occupations are not aware of forensics, unlike students, academics and first responders. This bias may be due to the preponderance of students, academics and first responders in the population of study compared to other occupations. However, this result may be due to the fact that students and academics frequent the academic environment and so are exposed to academic tools and the term forensics. Also, majority of students and academics fall within the age-ranges where forensic awareness is highest generally. The first responders' awareness of forensics may be attributed to their innate training activities and their post-training practices as a first responder. Individuals from other occupations however, rarely frequent the academic environment and so are rarely exposed to academic tools. Moreover, most of these occupations do not include forensics training during their training session, hence, little or no awareness of forensics as a whole, or by and large the term 'forensics'.

That notwithstanding, the result also shows that a larger percentage of first responders and individuals from other occupations are fairly aware of forensics. For individuals from other occupations, this could be said to be so due to the reasons earlier mentioned above. While for first responders, this may be attributed to their inadequate training on forensics during their professional training.

With a total of 74.1% of respondents being aware of forensics, it could be assumed that a larger percentage of individuals in Nigeria are however aware of forensics. From this study

though, forensics awareness appears to be generally highest among respondents with tertiary education (54.3%), secondary education (30%), post-tertiary education (15.1%) and primary education (3.6%) as the least, respectively. As earlier mentioned, this biasedness could be due to the fact that the study was carried out in the premises of the university. That notwithstanding, a larger percentage of those with post tertiary education is more strongly aware of forensics than those with other educational qualification. This, interestingly, may be due to the much and unavoidable research in which they carry out that tends to expose them to new and foreign terms, ideas, as well as broaden their knowledge on other aspects outside their area of study.

It is also observed from this study that forensic awareness is lowest among those from other religions and highest among the Muslims notwithstanding that majority of the respondents are Christians. A simple explanation for this could be because majority of the respondents who are Muslims are elite, also putting into consideration the small sample size and the population of study.

Forensic awareness appears to be highest among respondents from south-west (76.3%), south-east (11.2%), south-south (10.9%) and north-central (1.6%) as the least, respectively. As earlier stated, this skewedness could be due to the preponderance of the south westerners in the population of study, being that the study was carried out in the south-west of Nigeria. On the other hand, it may be due to the fact that majority of the south-westerners are exposed, especially through scholarships, to the international community where forensics is being practiced. However, a larger percentage of south-south and south-east geopolitical zones of Nigeria tend to be more strongly aware of forensics than south-west and North-central geopolitical zones of Nigeria. This may be attributed to civilization and technology advancement in the south-south and south-east geopolitical zones, whereby strong enlightenment and awareness is achieved through the constant use of such technologies and constant practices in services accompanying such technologies. In addition, civilization in these zones may also be due to the development and implementation of certain policies, which is often not the case in the south-west and north-central geopolitical zones.

Relationship between the General Forensic Awareness and Attitude of Respondents

From Table 12, the result shows that a larger percentage of the respondents went for options; D in case study one; C in case

study two; and D in case study four. This shows that indeed a larger percentage of individuals are aware of the principles of forensics, and thus this result supports the result from Table 3a that 74.1% of respondents, which signifies a larger percentage of individuals in Nigeria, are aware of forensics. For case study three, a larger percentage of the respondents went for option D. This shows that order than being aware of the principles of forensics, the general public believes that life is paramount and more essential, and so rather than obey the principles of forensics to lose life in a life threatening event, safety should come first, hence, life-saving attempt against all odds. On the other hand, in addition to attaching more importance to life, the general public seems to be rather spontaneous and radical in their reaction towards crime scenes. This could be seen from the result in Table 12 where the second largest percentage of respondents went for options; A in case study one; D in case study two; and A in case study three.

From Table 13 nonetheless, it is observed from the result that a larger percentage of the first responders went for options; D in case study one; C in case study two; C in case study three; and D in case study four. This shows that, like with the general public, majority of the first responders are aware of the principles of forensics. This result also supports the result from Table 5a that 87.1% of the first responders that participated in the study (which signify a larger percentage of first responders in Nigeria), are aware of forensics. Also, the second largest percentage of first responders went for options; B in case study one; D in case study two; and D in case study three. This shows that like with the general public, life is also of essence and hence safety, being their primary responsibility, is also paramount to the first responders. But unlike the general public that seem to attach more importance to life, the first responders seem to take their line of duty very seriously and therefore do not hesitate to follow the principles of forensics come what not.

Relationship between General Forensic Awareness of Respondents and its Impact on the Society

Larger percentages of respondents (57.8%) opine that forensics cannot be effectively practiced in Nigeria due to lack of forensic experts, lack of awareness and lack of funding, as their major reasons. The respondents' opinion of lack of forensic experts could be related to the fact, and in accordance with the result from Table 11, that majority of them (52.6% of respondents who believe that forensics can be effectively practiced) believe that Nigerian Law Enforcement Agents do not apply forensics in their investigation. Meanwhile their reason for lack of

awareness may also be as observed in this study which shows that there seem to be a relationship between the general forensics awareness of respondents and their attitude towards crime scenes. This means that a negative attitude towards crime scene, which nonetheless, impacts on the effective practice of forensics, is due to poor or lack of the general awareness of forensics. However, a larger percentage of respondents (89.8%) who are aware of forensics, opine that the level of forensics awareness in Nigeria is not adequate; this may also explain why lack of awareness is the second major reason respondents believe forensics cannot be effectively practiced in Nigeria.

In addition, a larger percentage of respondents (91.8%) who are aware of forensics believe that forensic awareness can improve the attitude of Nigerians towards crime scenes. In respect of this however, 34.1%, which represents a larger percentage of these respondents, believe forensic awareness can improve the attitude of Nigerians towards crime scene by 50%, though very few respondents (15.0%) believe that forensic awareness can improve the attitude of Nigerians towards crime scenes by 100%.

Most respondents (90.7%) also believe that Nigeria does not have a functional national emergency number. This may conversely impact on the society through their ignorance (resulting from their believes) to report a case, even though this ignorance may be associated with inadequate awareness of the emergency number and also due to the broadcast of multiple and complex numbers for emergency purposes in the Nation. Nevertheless, the result also shows that 98.3% percentage of respondents believe that a national emergency number should not be lengthy, complex, difficult to remember and ineffective. This however, confirms the result from Table 3a that majority of Nigerians are aware of forensics, and as such believe that the simplicity of a national emergency number is one step towards the effective practice of forensics in Nigeria. More so, the knowledge of chain-of-custody from more than half of the respondents who are aware of forensics also supports the result from Table 3a.

CONCLUSION

In determining the level of forensics awareness based on gender, educational qualification, age-range and occupation, this study has revealed that a large percentage of individuals are aware of forensics in Nigeria, with males appearing to be more aware of forensics than females. Forensics awareness also appears to be generally highest among respondents with tertiary education, followed by those with secondary education as their highest level of educational qualification, and within the age-ranges of 40 to 69 and 13 to 29. It

also revealed that TV shows and Print media, followed by the internet are the most prominent source of forensic awareness for the above mentioned category of individuals who are aware of forensics. Majority of individuals from other occupations are not aware of forensics, compared to students, academics and first responders, even though majority of the first responders are only fairly aware. In determining the impact of the level of forensic awareness on the society based on attitude, it can be seen that majority of the respondents representing the general public are aware of forensics but tend to attach more importance to life and safety at the detriment of forensics principles. In addition, they seem to be rather spontaneous and radical in their reaction towards crime scenes, which in turn tend to impact negatively on the society, while majority of the first responders, with their fair awareness of forensics and primary responsibility to save life, seem to give credence to their line of duty as a first responder, notwithstanding the circumstance. This however may impact positively on the society, but the overwhelming negative attitude of the general public towards crime scene will likewise lead to an overwhelming negative impact on the society. Nevertheless, from respondent opinions, this shows that forensic awareness creation can improve the attitude of Nigerians towards crime scene by 50%. In determining the impact on crime investigation effectiveness, this study shows that the effective practice of forensics is negatively impacted by most individuals ignorance and negligence in reporting a case due to their believe that forensics cannot be effectively practiced in Nigeria, as well as their believe in the non-existence of a functional emergency contact. It could therefore be concluded that the level of forensic awareness affects the effectiveness and quality of investigations to obtaining justice, hence, the importance of awareness creation in forensic science, as a forensic enlightened society would have a positive attitude towards crime scenes and investigations.

Recommendations

Based on the observations from this study, it is recommended that:

1. Forensics training should be introduced in schools and institutions as a course work, as well as other occupations as part of their occupational training.
2. Both private and Government organizations and Agencies should ensure that forensics training is adequately instituted in the training program of first responders.
3. The term "forensics" should be frequently mentioned and used in the media, especially in situations involving investigation. Also, TV programs and shows portraying the practice of forensics in Nigeria should be produced or enacted, as what we frequently see or hear always sticks.
4. Adequate broadcast of only one simple number for emergency purposes should be implemented, with the prohibition of the broadcast of multiple and complex numbers for emergency purposes in the Nation.

Contribution to Knowledge

There is a significant relationship between the general forensic awareness of individuals and their attitudes or reactions towards crime scenes, therefore a considerable increase in the level of forensics awareness among individuals will significantly improve the attitude or reactions of individuals towards crime scenes. There is also a significant but indirect relationship between the general forensics awareness of individuals and its impact on the society. Therefore, a considerable increase in the level of forensics awareness among individuals will likewise positively impact on the society by promoting effective practice of forensics, through improving the attitude of individuals towards crime scenes and investigations.

Limitation of the study

1. Being a cross-sectional study, and due to the small sample size, limited duration of study, bias in population location and specificity of inclusion criteria, the study is limited.
2. There might have been bias of respondents in responding to the survey questions, especially in respondent's attitude to crime scenes; by responding to what they feel is the right thing to do instead of actually responding to what they might have done in a real live scenario. This however, might affect the result of the correlation between the general forensic awareness and the attitude of respondents.

Competing interests

No funding organization played any role in the study design; in the collection, analysis, and interpretation of data; in the writing of the report; or in the decision to submit the report for publication.

Conflict of Interest

The authors declare no conflict of interest, financial or otherwise.

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