Journal of Engineering Research and Reports

15(3): 6-16, 2020; Article no.JERR.59448
ISSN: 2582-2926

A Statistical Study of Crime in Ghana

Bosson-Amedenu Senyefia[1*], Eyiah-Bediako Francis[2] and Kusi Prince[3]

[1]Department of Mathematical Sciences, University of Mines and Technology, Tarkwa, Western Region, Ghana.
[2]Department of Statistics, University of Cape Coast, Cape Coast, Ghana.
[3]Department of Mathematics and I.C.T, Berekum College of Education, Berekum, Bono Region, Ghana.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JERR/2020/v15i317145
Editor(s):
(1) Dr. Leandro A. Pasa, Federal University of Technology – Paraná, Brazil.
(2) Dr. Guang Yih Sheu, Chang-Jung Christian University, Taiwan.
(3) Dr. Raad Yahya Qassim, Universidade Federal do Rio de Janeiro, Brazil.
Reviewers:
(1) Noor Hazfalinda Hamzah, Universiti Kebangsaan Malaysia, Malaysia.
(2) Smita Nirkhi, Rashtrasant Tukadoji Maharaj Nagpur University, India.
(3) G. Gokul Vigneswari, Presidency College, India.
(4) K. Ravichandran, Dr. M.G.R. Educational and Research Institute, India.
Complete Peer review History: http://www.sdiarticle4.com/review-history/59448

Original Research Article

Received 24 May 2020
Accepted 31 July 2020
Published 08 August 2020

ABSTRACT

Understanding the dynamics, patterns, and probabilities associated with the correlates of crime is a promising way to managing crime. In this study, a multinomial logistic regression was used to predict the propensity of individuals for committing particular crimes. The secondary data of 6702 prisoners was collated from Ghana Prisons Service for the purpose of the study. ANOVA and Brown-Forsythe robust tests of equality of means were employed, where the assumptions for homogeneity of variance were sustained and violated respectively. Pearson's correlation matrix was also used in the analysis. Our findings showed that religious affiliation and educational level of convicts significantly affected the odds that they would commit a particular crime. Multinomial logistic regression analysis indicated that illiteracy significantly affected the odds that one would commit the crimes of manslaughter, rape, theft, causing harm, and issuing death threats. On the other hand, religious affiliation of an offender significantly affected the odds to commit the crime of murder. Educational level ($r= -0.25$; $p< 0.05$) and religious affiliation ($r= -0.26$; $p<0.05$) correlated negatively with crime. There were no significant differences in the mean score of crime across

**Corresponding author: Email: sbosson-amedenu@st.umat.edu.gh, senyefia@yahoo.com;*

educational and religious levels. However, there were significant differences in the mean score of crime across age and gender. The mean difference from the post-hoc analysis showed a pattern of an initial rise in crime among the younger age group (8-25 years), a subsequent decline in the age group of 26-35, and a final surge in individuals beyond 35 years that did not surpass the initial peak. Females (M: 6.89, SD: 1.253) were found to have lower crime incidence than males (M: 7.43, SD: 3.008) for all crimes considered in this study. We recommend that Ghana's Prison Service consider incorporating further demographic information of inmates in order to support research; which could help identify avenues for the amelioration of crime locally.

Keywords: Crime; Ghana; correlates; multinomial; statistical study; ANOVA; demography.

1. INTRODUCTION

Criminology is a methodical means of identifying and assessing crime patterns. This has the tendency to aid in unveiling the complex psychological and socio-demographic dynamics associated with crime [1]. Multinomial logistic regression (MLR) model is a predictive model which has been extensively employed in predicting probabilities of outcomes of a categorically distributed dependent variable given a set of independent variables [2].

Lochner et al. [3], in their work used MLR to estimate the effect of education on participation in criminal activity, using changes in state compulsory schooling laws over time to account for the endogeneity of schooling decisions. Their findings revealed that schooling (education) significantly reduces the probability of incarceration.

Studies have shown that religious affiliation reduces participation in criminal activity in two essential ways: First, studies have pointed to how religious beliefs are associated with self-control. Second, factors such as level of participation and social support from participation in religion reduce criminal activity. Even though there has been a sizable number of studies examining the religion/crime nexus, the research has not attempted to examine the influence of the religion across crime levels [4].

In Ghana, multinomial regression has been previously applied to health research in order to arrive at probabilistic inferences. The study had six response variables and two independent variables which were nominal. The findings revealed that pregnant women were five (5.400) times more likely to renew their National Health Insurance Scheme (NHIS) cards compared to the reference category of people aged 70 years and above. With the informal category, they were seven (7.400) times more likely to renew their NHIS than the reference category. Again, Children aged four and below were found to be two times (2.067) more likely to renew their NHIS than the reference category [5].

1.1 Problem Statement

In light of the alarming crime rates locally reported by [6], there is a burgeoning need for intercessory measures to tackle the issue of crime at the grassroots. Despite the numerous reasons to expect a causal link between crime and its correlates, empirical research locally remains inconclusive. There remains a considerable gap linking correlates of crime to the predictive probabilities for future recidivism. This study will elucidate the need for such research in Ghana.

2. METHODS

The secondary data which was collated from Ghana's Prison's Service; consisted of the demographic variables of a sample of 6702 inmates of Ghana's prisons. These variables included sex, nature of crime, educational level, age group, and religious affiliation. Top 16 crimes in terms of prevalence per the records were considered in this study. These included assault, murder, manslaughter, rape, defilement, and robbery. Others were drug related offenses (possession or soliciting), stealing, causing harm, unlawful entry, driving offenses, conspiracy, threat of death, and fraud. The covariates included sex, educational level, age, and religion. The educational variable had 9 levels. These included illiterate, primary, Junior Secondary School (JSS), Senior Secondary School (SSS), Higher National Diploma (HND), Vocational, Technical and Graduate. Educational level has four levels; Christian, Moslem, Pagan, and Traditionalist. Sex had two levels (male and female). Age group had three categories of 18-

25, 26-35, and >35 years. The response variable was nominal with 16 categories. Multinomial Logistic Regression model enable us to deal with a response categorical variable with more than two levels and variety of explanatory variables. Multicollinearity, outliers, influential outliers and to evaluate the aptness of the model were verified. Multicollinearity in the multinomial logistic regression solution is detected by examining the standard errors for the regression coefficients or using the variance inflation factor. Outliers are extreme observations that may involve large residuals and often have dramatic effect on the fitted regression functions. Outliers in the multinomial logistic regression solution were verified using standardized residuals. SPSS version 25 was used for the analysis.

Multinomial Logistic regression Model

The basic equation for Multinomial Logistic regression Model is given as;

$$\pi_{ij} = \frac{exp\{\eta_{ij}\}}{\sum exp\{\eta_{ij}\}}$$

Where $\eta_{ij} = x'_i\beta_j$ is the systematic component of random variable; β_j represent the regression coefficients [7].

2.1 Research Questions

1. What are the significant correlates of crime among age groups, religious affiliation, educational level, and gender demographics of inmates?
2. What are the probabilities of risk associated with the significant correlates of crime across the levels of response variable and covariates?
3. Is there any significant difference in the means of crime levels across inmate demographics?

2.2 Objectives of the Study

1. To determine the significant correlates of crime among age group, religious affiliation, educational level,and sex.
2. To develop a multinomial logistic regression model to predict the probabilities of risk associated with the significant correlates of crime across the levels of response variable and covariates.
3. To assess the means of crime levels across inmate demographics.

3. RESULTS

Table 1 shows the correlation matrix for crime and the four explanatory variables of Educational level, Age group, religious group and gender (sex). The results showed that only Educational level (r= -0.25; p< 0.05) and religious affiliation (r= -0.26; p<0.05) were significant correlates of crime in Ghana. It is also noteworthy that Educational level and Religious affiliation correlated negatively with crime. This is understandable since increase is Education level of an individual is expected to reduce his or her tendency to commit crime [3]. The more religious a person is should make the person less probable to commit crime [3]. Sex and age group however, showed no significant correlation with crime. This corroborates with the finding of Ward, [8] that correlates and causes of crime do not interact with age. [3] also found explained that there should be a negative correlation between crime and education even if there is no causal effect of education on crime.

The Model Fitting information is basically a Chi-square test which assesses the fit of the model with the full complement of covariates relative to a null model with no predictors. A significant p-value (p<0.01) results in the acceptance of the alternative hypothesis; an indication of a significant improvement in fit of the model with covariates relative to the baseline null model with no predictors. This can be explained to mean that there is a relationship between crime and the covariates such as Education and Religion. The null hypothesis that claims no existing statistical difference between the model with covariates and the model without covariates was rejected.

Table 1. Correlates of crime (Pearson correlation matrix)

	Crimetype	**Edu. lvl**	**Agegrp**	**Relgrp**	**Sex**
Crimetype	1	-.025*	-.022	-.026*	.022
Edulvl		1	.523**	.500**	-.053**
Agegrp			1	.550**	.010
Relgrp				1	-.025*
Sex					1

**P< 0.05; **p<0.01*

Table 2. Model fitting information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	620.133			
Final	530.253	89.880	14	.000

Table 3. Goodness-of-fit

	Chi-Square	df	Sig.
Pearson	103.486	84	.073
Deviance	78.943	84	.636

Pearson Chi-squared goodness of fit and Deviance statistics are used to compare the overall difference between the fitted and observed values. These two statistics often produce different values although each is expected to be non- significant to indicate a good model fit. According to Collet, [9] the deviance is often preferred in logistic regression models since the maximum likelihood estimates of the success probabilities tend to maximize the likelihood function for the fitted model and thereby minimizing these estimates. Again, unlike the Pearson, the deviance has the capacity to be used in comparing hierarchical models. The results from Table 3 show that the goodness of fit statistics both indicated that the model is adequately fit.

Table 4. Pseudo r-square

Cox and Snell	.13
Nagelkerke	.14
McFadden	.03

The Cox and Snell's R squared and Nagelkerk R squared values suggests that the model respectively explains roughly 13% and 14% of the variation in the response variable (crime). This finding makes sense since only two out of the numerous other correlates of crime have been captured in this model due to sparse data. Flowers, [10] studied the relationship between crime and demographics of offenders; the study explored many demographics of offenders. These demographics included race/ethnicity; social class; employment, income, repeat offenders, family violence, alcoholism, parent-child relationship, religion, education, victimization patterns, marital status; and substance abuse.

Table 5 shows the Likelihood Ratio tests. The explanatory variables; Educational level and Religious affiliation have significant impact on crime, which is the response variable. Both variables were then used for model formulation.

The response variable (crime) consisted of 16 levels. These included assault, murder, manslaughter, rape, defilement and robbery. Others were drugs, stealing, causing harm, unlawful entry, driving offenses, conspiracy, threat of death, and fraud. The reference category of crime was unlawful entry. The Educational variable had 9 levels. These included illiterate, primary Junior Secondary School (JSS), Senior Secondary School (SSS), Higher National Diploma (HND), Vocational, Technical and Graduate.

Of all the sixteen levels of the response variable, only five (5) contributed significantly to the model (as shown in Table 6) when treated with Education levels. These five significant crime levels were manslaughter, rape, stealing, causing harm and threat of death. Again, only the educational level of 'illiterate" was significant among the nine (9) levels.

From Table 6, the first coefficient represents the comparisons between the crime level of rape and the reference category of unlawful entry.

Table 5. Likelihood ratio tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	1687.959	1157.706	14	.000
EDULVL	620.133	89.880	14	.000
RELGRP	664.912	189.193	14	.000

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0

Table 6. Parameter estimations

CRIMETYPE[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence interval for Exp(B)	
								Lower Bound	Upper Bound
Manslaughter	illiterate	.383	.116	10.910	1	.001	1.467	1.169	1.842
Rape	illiterate	.254	.123	4.268	1	.039	1.289	1.013	1.640
Stealing	illiterate	.085	.035	5.932	1	.015	1.089	1.017	1.166
Causing harm	illiterate	-.111	.047	5.469	1	.019	.895	.816	.982
Threat of death	illiterate	-.160	.066	5.873	1	.015	.852	.748	.970
Murder	traditionalist	-1.048	.347	9.114	1.003		.351	.178	.692

a. The reference category is: Unlawful Entry

Only illiteracy was a significant predictor (B=0.383, S.E = 0.116, p<0.01) in the model; across educational levels. The illiterates in the distribution were 0.383 times more likely (B 0.383 > 0) to commit manslaughter than the reference group of unlawful entry. The odds ratio 1.467 indicates that for every one unit increase educational level the odds of a person committing a manslaughter crime changed by a factor of 1.467.

With respect to the second coefficient, illiterate prisoners were 0.54 times more likely (B= 0.54>0) to commit the offence of rape than the reference group of unlawful entry. Regarding the third coefficient, illiterates were also found to be 0.085 more likely to commit offence of stealing than the reference category. However, regarding the fourth coefficient, illiterates were found to be 0.111 less likely (B= -0.111<0) than the reference category to commit the offence of causing harm. Also illiterates were again found to be 0.160 times less likely than the reference category to cause the offence of Threat of death than the reference category of unlawful entry.

The crime level of murder was the only significant contributor to the model when Religious affiliation was assessed. Traditional religious affiliation was found to be significant with crime (p<0.05). From Table 6, traditionalist were found to be 1.048 less likely (B<0) to commit the crime of murder with respect to the reference category of unlawful entry.

As evidenced from Table 7, homoscedasticity was violated through Levene's test of Homogeneity. To this end, the ANOVA results will be doubtful, so Brown-Forsythe robust test of equality of means was adopted.

From Table 8, Brown-Forsythe robust test of equality of means showed a non-significant p-value; an indication of no significant difference in means score of crime across educational levels.

The results in Table 9, homoscedasticity was violated through Levene's test of homogeneity when crime was assessed with religion. To this end, the ANOVA results will be doubtful, so Brown-Forsythe robust test of equality of means was adopted.

Table 7. Test of homogeneity of variances (crime versus education)

		Levene Statistic	df1	df2	Sig.
CRIMETYPE	Based on Mean	3.461	7	6694	.001
	Based on Median	2.904	7	6694	.005
	Based on Median and with adjusted df	2.904	7	6685.980	.005
	Based on trimmed mean	3.753	7	6694	.000

Table 8. Robust tests of equality of means (crime versus education)

	Statistic[a]	df1	df2	Sig.
Brown-Forsythe	.576	7	567.987	.776

a. Asymptotically F distributed

In Table 10, Brown-Forsythe test shows no significant difference between crime and levels of religion.

From the results of Table 11, the test of homogeneity of variances was non-significant. This is an indication that homoschedastity assumption was not violated.

With reference to the results from Table 12, there was a significant difference in between crime and age. The Tukey post-hoc test was carried out to ascertain which age group(s) was significant.

The post-hoc test in Table 13 showed significant mean difference between 18-25 and 26-35; and between >35 and 26-35.

The descriptive statistic of Table 14 shows that convicts within the age range 18-25 had the mean score of 7.55 with a standard deviation of 2.975 while those in the age of 26-35 had a mean score of 7.22 with a standard deviation of 3.032. The mean difference of 0.336 (Table 13) shows that, people within the age bracket of 18-25 tend to commit more crime than those within the age bracket of 26-35.

Table 9. Test of homogeneity of variances (crime versus religion)

		Levene Statistic	df1	df2	Sig.
CRIMETYPE	Based on Mean	54.060	3	6698	.000
	Based on Median	53.045	3	6698	.000
	Based on Median and with adjusted df	53.045	3	6613.663	.000
	Based on trimmed mean	55.407	3	6698	.000

Table 10. Robust tests of equality of means (crime versus religion)

	Statistic[a]	df1	df2	Sig.
Brown-Forsythe	.640	3	1932.009	.589

a. Asymptotically F distributed

Table 11. Test of homogeneity of variances (crime versus age group)

		Levene Statistic	df1	df2	Sig.
CRIMETYPE	Based on Mean	.639	2	6699	.528
	Based on Median	2.092	2	6699	.124
	Based on Median and with adjusted df	2.092	2	6694.956	.124
	Based on trimmed mean	.569	2	6699	.566

Table 12. ANOVA results (crime versus age group)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	140.587	2	70.293	7.861	.000
Within Groups	59905.001	6699	8.942		
Total	60045.587	6701			

Table 13. Post hoc test (multiple comparisons of means of age versus crime)

	(I) AGEGRP	(J) AGEGRP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
LSD	18-25	26-35	.336*	.085	.000	.17	.50
		>35	.111	.093	.232	-.07	.29
	26-35	18-25	-.336*	.085	.000	-.50	-.17
		>35	-.225*	.099	.023	-.42	-.03
	>35	18-25	-.111	.093	.232	-.29	.07
		26-35	.225*	.099	.023	.03	.42

Again, from Tables 13 and 14, convicts in the age group of >35 had mean of 7.44 with standard deviation of 2.963975 while those in the age of 26-35 had a mean score of 7.22 with a standard deviation of 3.032. The mean difference of 0.225 shows that, people within the age bracket of >35 tend to commit more crime than those within the age bracket of 26-35 years.

Fig. 2, shows that the younger age group of 18-25 peaked in all crime levels, except for the case of murder, defilement, and manslaughter.

Table 14. Descriptives of crime versus age group

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
18-25	2990	7.55	2.975	.054	7.45	7.66	0	15
26-35	2112	7.22	3.032	.066	7.09	7.35	0	15
>35	1600	7.44	2.963	.074	7.30	7.59	0	15
Total	6702	7.42	2.993	.037	7.35	7.49	0	15

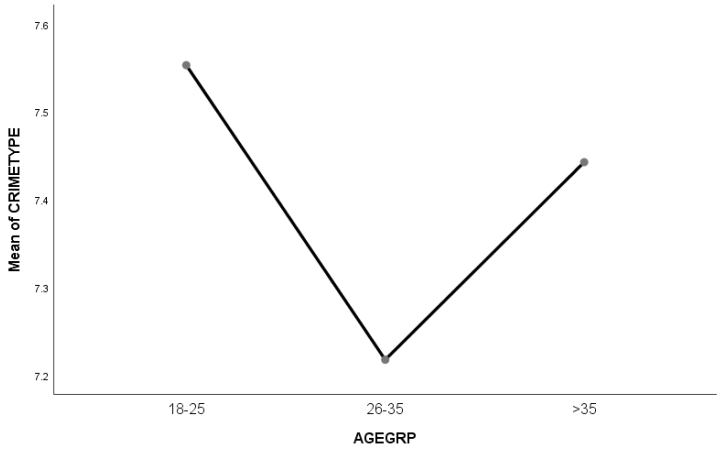

Fig. 1. Means plot of crime against age group

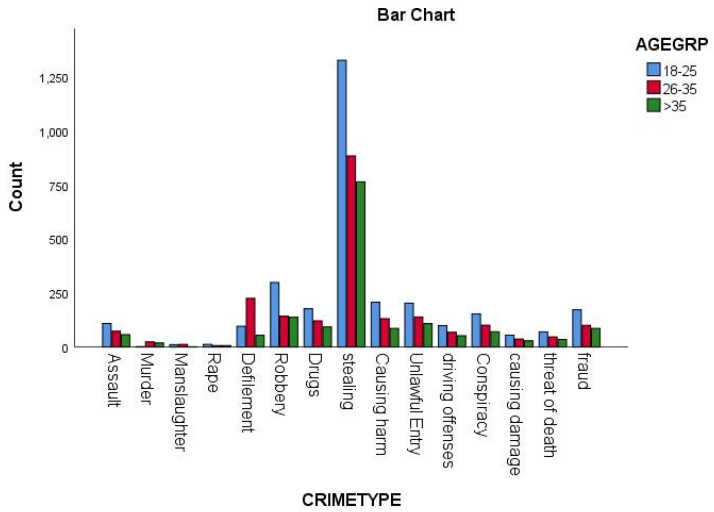

Fig. 2. Multiple bar chart showing crime across age group

Table 15. Independent samples test (gender versus crime)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
CRIMETYPE	Equal variances assumed	39.392	.000	-1.604	6700	.109	-.540	.337	-1.200	.120
	Equal variances not assumed			-3.727	90.381	.000	-.540	.145	-.828	-.252

It can be inferred from Table 15 that the homogeneity test is significant and that the null hypothesis of equal variances is rejected. It was concluded that there is a difference between the variances in the population in which case the p-value will not be reliable.

Table 16. Robust tests of equality of means (Gender versus crime)

	Statistic[a]	df1	df2	Sig.
Brown-Forsythe	13.889	1	90.381	.000

a. Asymptotically F distributed.

The Brown-Forsythe Robust Tests of Equality of Means shows a significant difference between gender and crime.

From Tables 16 and 17, there was a significant difference between gender and crime.

The Fig. 3 showed that females have lower crime incidence than males for all crimes considered in this study. It was also evident that aside the offences of stealing and robbery, females had almost no other noticeable crime.

4. DISCUSSION

Education and religious affiliation were used in the multinomial logistic regression modeling since they correlated significantly with crime. Although education covariate had 9 levels, only 'illiterate' was significant in the model with the crime levels of manslaughter, rape, stealing, causing harm and threat of death (out of 16 crime levels). Probabilities were estimated by the model: First, illiterates were 0.383 times more likely to commit manslaughter offence than the reference group of unlawful entry. Second, illiterates were 0.54 times more likely to commit rape offence than the reference group of unlawful entry. Third, illiterates were also found to be 0.085 more likely to commit offence of stealing than the reference category. On the other hand, illiterates were found to be 0.111 less likely than the reference category to commit the offence of causing harm. Furthermore, illiterates were again found to be 0.160 times less likely than the reference category to cause the offence of threat of death than the reference category of unlawful entry. On the part of religion covariate which had four levels, only 'traditionalist' was significant with the only crime of murder. In terms of

Table 17. Group Statistics (Gender versus Crime)

	SEX	N	Mean	Std. Deviation	Std. Error Mean
Crime Type	female	80	6.89	1.253	.140
	male	6622	7.43	3.008	.037

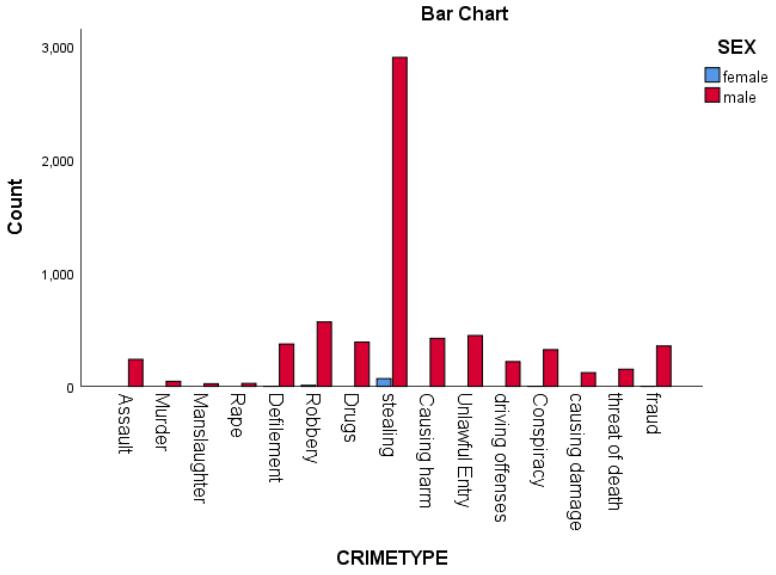

Fig. 3. Multiple bar chart showing crime across gender

probabilities, traditionalists were found to be 1.048 less likely to commit the crime of murder with respect to the reference category of unlawful entry. The above findings corroborate the study by Andresen, [11] who made similar predictions using multinomial logistic regression model for local crime.

Crime was found to be negatively related to age group ($r = -0.022$, $p>0.05$); this suggests crime increases lower ages. A significant difference was observed between crime and age group levels. The post hoc test showed that there was an initial rise in crime in the younger age group of 18-25 years, declined this peak for the age group 26-35 and then increased beyond >35 without surpassing the initial peak. Our findings corroborate the study of Steffensmeier, [12] found that crime has an initial rise in adolescence whilst certain crimes peak later, or decline slowly or both.

There was no significant difference between crime and education levels and between crime and religious affiliation. However, crime was negatively related to religious affiliation ($r = -.026$, $p< 0.05$) and Education ($r = -.025$, $p< 0.05$). Our finding corroborates the study of Pettersson, [13] who found a similar pattern between religion and criminality.

Regarding gender and crime, our results showed that females had lower crime incidence than males. Females (M: 6.89, SD: 1.253) were found to have lower crime incidence than males (M: 7.43, SD: 3.008) for all crimes considered in this study. Our finding corroborates the study by Steffensmeier [14], that found a gender gap in crime in favor of females.

5. CONCLUSION

Illiteracy significantly affected the odds that one would commit the crimes of manslaughter, rape, stealing, causing harm, and threat of death. On the other hand, religious affiliation of an offender significantly affected the odds that one would commit the crime of murder. There were no significant differences in the mean score of crime across educational and religious levels. There were however significant differences in the mean score of crime across age and gender. The mean difference from the post hoc analysis showed a pattern of an initial rise in crime among the younger age group (8-25 years), a subsequent decline in the age group of 26-35, and a final surge in individuals beyond 35 years that did not surpass the initial peak. Females were found to have lower crime incidence than males for all crimes considered in this study.

6. RECOMMENDATION

We recommend that Ghana's Prison Service consider incorporating further demographic information of inmates in order to support research; which could help identify avenues for the amelioration of crime.

7. LIMITATION OF THE STUDY

There are many known correlates of crime. However, this study only used education, religion, age and gender demographics of convicts due to the nature of the data available at the time of this study.

ACKNOWLEDGEMENT

We would like to acknowledge the Ghana Prisons Service for enabling this study by appropriately organizing records and making it available as public information.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Rajadevi R, Roopa EM, Kumar SV. Prediction of crime occurrence using multinomial logistic regression. International Journal of Innovative Technology and Exploring Engineering (IJITEE). 2020;9(3).
   ISSN: 2278-3075.
2. Luís M. Grilo HLG, Sónia P, Gonçalves, Ana Junça. Multinomial logistic regression in workers' health. AIP Conference Proceedings. 2017;1906(110010).
3. Lochner L, Moretti E. The effect of education on crime: Evidence from prison inmates, arrests, and self-reports. The American Economic Review 2004;94(1).
4. Sumter M, Wood F, Whitaker I, Berger-Hill D. Religion and crime studies: Assessing what has been learned. Religions. 2018;9: 193.
   DOI:10.3390/rel9060193
5. Bosson-Amedenu S, Nimoh V, Osei-Asibey E. Survival and multinomial logistic regression analyses of Sekondi-Takoradi

District Level national health insurance data in Ghana. American Journal of Mathematics and Statistics. 2019;9(2):109-114.
DOI: 10.5923/j.ajms.20190902.06

6. Stephen Wengam. Ghana Prisons Service Ten – Year Strategic Plan, 2015.
7. Rodr´ıguez R. Multinomial response models. Revised. September, 2007.
8. Ward DA, Charles R. The interaction of age with the correlates and causes of crime. Journal of Quantitative Criminology. 1993;9:3–53.
9. Collet D. Modelling binary data. Chapman & Hall, London. 1991;369.
Available:http://dx.doi.org/10.1007/978-1-4899-4475-7
10. Flowers RB. Demographics and criminality: The characteristics of crime in America. National Criminal Reference Service. 1989.
ISBN: 0-313-25367-6.
11. Andresen MA. predicting local crime clusters using (multinomial) logistic regression. Housing Discrimination Today. 2015;17(3):249-262.
12. Steffensmeier D. Gender and crime: Towards a gender theory of female offending. Annual Review of Sociology. 1996;22:459.
13. Pettersson P, Schmidt U, Jacobse BA. Religion and state: Complexity in change. In: Furseth I. (eds). Religious complexity in the public sphere. Palgrave studies in religion, politics, and policy. Palgrave Macmillan, Cham; 2017.
14. Steffensmeier DJ, Allan EA. Age and the distributionof crime. American Journal of Sociology. 1989;94(4):803-831.

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle4.com/review-history/59448