

A Study of Crimes Occurs in Kolhapur City Using Statistical Methods

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Abstract: Urbanization is that the human process whereby cities grow and their societies become urban. However, speedy urbanization contributes different have an effect on and crimes in one in all them. Recent inconceivable levels of the globe urbanization coincides with rise in urban crimes in several elements of the globe, because the rate of state had been on the rise and paired with exaggerated poorness among the urban poor. In order to study the nature and pattern of verities of causes and types of crimes occurred in Kolhapur city .we collected the information about the crime available in four different police station in Kolhapur city .and data is analyzed using different statistical tools and techniques . The violence and robbery are analyzed .our study shows Crime is independent from education , age , community , standard of living and gender. And most of case males are responsible for occurrence of crime as compared to female..

Key Words: Crime, Violence, Graphical Representation, Chi-square Test, Level of Significance.

1. INTRODUCTION:

In daily Newspapers and on TV News channels we see that there is a increase in number of crimes and criminals in our society . Crime is a one of the measure of standard of society. Urbanization is that the human process whereby cities grow and their societies become urban. However, speedy urbanization contributes different have an effect on and crimes in one in all them. Recent inconceivable levels of the globe urbanization coincides with rise in urban crimes in several elements of the globe, because the rate of state had been on the rise and paired with exaggerated poorness among the urban poor. One of the inevitable consequences of urbanization, particularly within the aggregation countries, is that the unfold of urban impoverishment (Schweitzer, Kim, and Mackin, 1999). The development of urban congestion, stretching of social services, and therefore the impossibility of getting enough employment opportunities among the urban dwellers contributes in no little live to the unfold of impoverishment within the urban areas (Bakerand Schuler, 2004).

This nearly always results in the unfold of urban crime and violence (Curley, 2005). One remarkable commonality among the occupants of all these criminal groups is their age and employment status in their communities: they are all youths and unemployed (Oyeshola,2005, p. 123) .The impacts of bad governance and unemployment in third world countries always result in the social segregation of some segments of the society, and its consequent fragmentation into different social classes (Masika, de Haan and Baden, 1997).Nature of crime is not uniform but varies from one geographical region to another. In some areas, property crime is additional common whereas in others, crime on person (violent) is prevailing. Crime isn't being tormented by a singular issue anyplace it occurred, there are variant factors that influence criminal activities. In any case, key variables that influence criminal practices of potential wrongdoers incorporates: unemployment, destitution, awful administration and shortcomings inlaw requirement or crime-control organizations. There are different reasons behind the crimes , like lack of education , need of money , wrong thinking etc. but are they actually responsible for the crime. Some time educated people also becomes criminals. So we interested to study the relation between education and crime ,standard of living ; age and crime , community and crime , gender and crime etc. using statistical methods such as Chi-Square Test for independence .

2. RESEARCH PROCESS:

2.1 DATA COLLECTION:

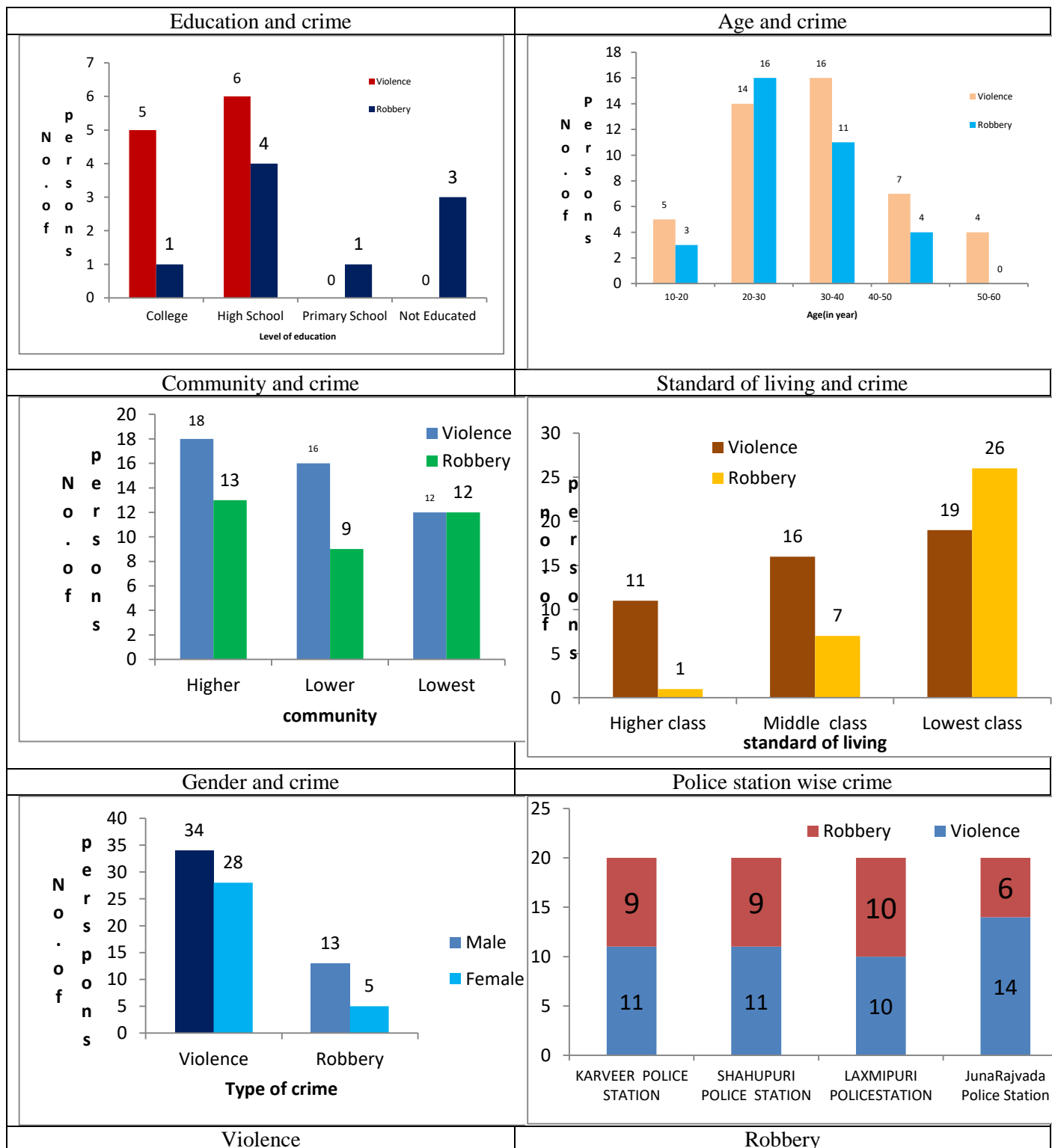
For our project we have collected the data of crime from 4 police stations of Kolhapur city . We have divided it into two crime cases namely Violence , Robbery . We have also collected the information of criminals with their Age, Education , Crime , Gender and their work from each police station. For study the independence of crime from these attributes.

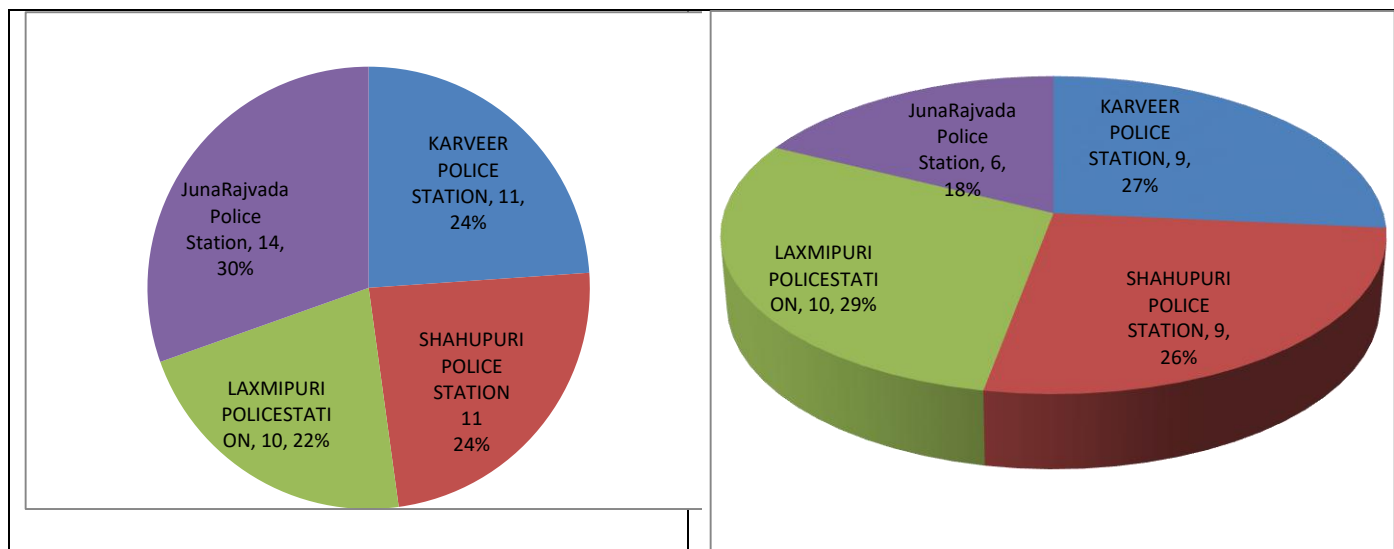
2.2 STATISTICAL TOOLS :

- Graphical Representation
- Testing of hypothesis.

2.3 SOFTWARES:

- Ms-Excel, Ms-word





Testing of hypothesis:

For calculations we have classified the Criminals using two attributes their Crime and Education or Age or Community or Standard of Living or Gender and made categories according to these attributes We represent it into contingency tables . Our interest is to test whether these whether Crime and Education or Age or Community or Standard of Living or Gender are interrelated or independent by making comparison between the observed cell frequencies and theoretical cell frequencies .

We set-up the null hypothesis ,

H₀=Two attributes are independent.

H₁=Two attributes are not independent.

Then we applied the Chi-Square test of goodness of fit . we accept H₀

If calculated value of χ^2 is less than tabulated value of $\chi^2_{[(n-1)(r-1), \alpha]}$ otherwise we reject H₀ .

a) To test whether the two attributes Education and Crime are independent or not

We state the hypothesis as follows:

H₀: Education and crime are independent.

H₁: Education and crime are not independent.

Level of significance= $\alpha=1\%$

OBSERVATION TABLE:

Level of Education	Crime		TOTAL
	Violence	Robbery	
College	21	6	27
High School	17	12	29
Primary School	4	7	11
Not Educated	4	9	13
TOTAL	46	34	N=80

$$\chi^2 (\text{calculated}) = \sum_{i=1}^{80} \left(\frac{O_i^2}{E_i} \right) - N$$

$$= 90.3662 - 80$$

$$= 10.3662$$

And $\chi^2 (\text{table}) = \sum_{i=1}^{80} \left(\frac{O_i^2}{E_i} \right) - N$

$$\chi^2 (\text{table}) = X^2 (r-1) (s-1) * \alpha\%$$

$$= X^2 (4-1) (2-1) * 1\%$$

$$\chi^2 (\text{table}) = 11.345$$

Therefore,

$\chi^2(\text{calculated}) < \chi^2(\text{table})$

b) To test whether the two attributes Age and Crime are independent or not.

We state the Hypothesis as follows:

H₀: Age and Crime are independent.

H₁: Age and Crime are not independent.

Level of significance α%=1%

OBSERVATION TABLE:

Age(in year)	Crime		TOTAL
	Violence	Robbery	
10-20	5	3	8
20-30	14	16	30
30-40	16	11	27
40-50	7	4	11
50-60	4	0	4
TOTAL	46	34	N=80

$\chi^2(\text{calculated}) = \sum_{i=1}^{80} \left(\frac{O_i^2}{E_i} \right) - N$

$\chi^2(\text{calculated}) = 4.6824$

$\chi^2(\text{table}) = X^2 (r-1) (s-1) * \alpha\%$
 $= X^2 (5-1) (2-1) * 1\% = 3.277$

Therefore, $\chi^2(\text{calculated}) < \chi^2(\text{table})$

c) To test whether the two attributes community and Crime are independent or not.

We state the Hypothesis as follows:

H₀: community and Crime are independent.

H₁: community and Crime are not independent.

Level of significance α%=1%

OBSERVATION TABLE:-

community	Crime		TOTAL
	Violence	Robbery	
Higher	18	13	31
Lower	16	9	25
Lowest	12	12	24
TOTAL	46	34	N=80

$\chi^2(\text{calculated}) = \sum_{i=1}^{80} \left(\frac{O_i^2}{E_i} \right) - N = 0.9884 - 80 = -79.0116$

$\chi^2(\text{calculated}) = 0.9884$

And $\chi^2(\text{table}) = X^2 (r-1) (s-1) * \alpha\% = X^2 (3-1) (2-1) * 1\% = 9.210$

Therefore, $\chi^2(\text{calculated}) < \chi^2(\text{table})$

d) To test whether the two attributes Standard of Living and Crime are independent or not.

We state the Hypothesis as follows:

H₀: standard of living and Crime are independent.

H₁: standard of living and Crime are not independent.

Level of significance α%=5%

OBSERVATION TABLE:

standard of living	Crime		TOTAL
	Violence	Robbery	
Higher class	11	1	12
Middle class	16	7	23

Lowest class	19	26	45
TOTAL	46	34	N=80

$$\chi^2 (\text{calculated}) = \sum_{i=1}^{80} \left(\frac{O_i^2}{E_i} \right) - N = 91.4001 - 80$$

$$\chi^2 (\text{calculated}) = 11.4001$$

$$\text{And } \chi^2 (\text{table}) = X^2 (r-1) (s-1) * \alpha\% \\ = X^2 (3-1) (2-1) * 1\% = 5.991$$

Therefore, $\chi^2 (\text{calculated}) > \chi^2 (\text{table})$

e) To test whether the two attributes gender and Crime are independent or not.

We state the Hypothesis as follows:

H₀ : standard of living and Crime are independent.

H₁: standard of living and Crime are not independent.

Level of significance $\alpha\% = 1\%$

OBSERVATION TABLE:-

Gender	Crime		TOTAL
	Violence	Robbery	
Male	34	13	47
Female	28	5	33
TOTAL	62	18	N=80

$$X^2 (\text{calculated}) = \frac{N[ad-bc]^2}{(a+b)(a+c)(c+d)(b+d)} = \frac{80[170-364]^2}{47*62*18*33}$$

$$X^2 (\text{calculated}) = 1.7394$$

And

$$\chi^2 (\text{table}) = \chi^2_{1} * 1\% = 6.636$$

Therefore,

$$\chi^2 (\text{calculated}) < \chi^2 (\text{table})$$

3. OVER ALL CONCLUSIONS:

We are study various attributes related to crime and the observed information are plotted by using graphical tools and using chi square test of independence to check for crime data collected from Karveer, Shahupuri, Juna Rajvada, Laxmipuri Police Station. Our study shows that the violence type crime is occur maximum than robbery and 59 % males and 41% females are evolved in crime. lower and middle age group persons are responsible for the crime. maximum educated persons are making crime. we conclude that the Crime is independent from Education, Age, Community, Standard of Living and Gender in individual police station recorded data. It is observed that Crime data of overall Kolhapur City we have noticed that the Crime is independent from Education, Age, Community and Gender and is not independent of Standard of Living.

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