

“Education for Knowledge, Science and Culture”

-Shikhanmaharshi Dr. Bapuji Salunkhe



VIVEKANAND COLLEGE, KOLHAPUR (Autonomous)

DEPARTMENT OF STATISTICS

A PROJECT REPORT

on

“Analysis of Crime of Juveniles by Statistical Method”

Submitted by

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Mr. Afanan A. Patil

Mr. Kishor B. Kashidakar

in partial fulfillment for the award of

the degree of

BACHELOR OF SCIENCE

in

STATISTICS

2020-21

“Education for Knowledge, Science and Culture”

-Shikhanmaharshi Dr. Bapuji Salunkhe



(स्वायत्त) कोल्हापूर

**VIVEKANAND COLLEGE, KOLHAPUR(Autonomous)
DEPARTMENT OF STATISTICS**

Certificate

This is to Certify that,

Sr. No.	Name	Roll No.
1	Mr. Abhishek D. Sabale	8180
2	Mr. Yashdeep A. Kasture	8168
3	Mr. Kunal S. Marathe	8169
4	Mr. Afanan A. Patil	8172
5	Mr. Kishor B. Kashidakar	8167

Have satisfactorily completed the project work on “**Analysis of Crime of Juveniles by Statistical Method**” as prescribed by *Vivekanand College, Kolhapur* in partial fulfilment for **B. Sc. III** skill enhancement course in **STATISTICS**, in the academic year **2020-21**.

This project has been completed under our guidance and supervision. To the best of our knowledge and belief, the matter presented in this project report is original and has not been submitted elsewhere for any other purpose.

Project Guide

(Mr. Pawar A. A.)

Examiner



Head

(Ms. Pawar V. V.)

HEAD
DEPARTMENT OF STATISTICS
VIVEKANAND COLLEGE, KOLHAPUR
(AUTONOMOUS)

ACKNOWLEDGEMENT

We take great pleasure in submitting this project report on “**Analysis of Crime of Juveniles by Statistical Method**”. It is our foremost duty to express our deep sense of gratitude and respect to the supervisor **Prof. Ajit Pawar Sir, Prof. Smt. V.V. Pawar madam** for their up-lifting tendency and inspiring us for making of this project work complete and successful. We are indebted to the library personal for offering all the help in completing the project work. Last but not the least we are thankful to our colleagues and those helped us directly or indirectly throughout this project work.

Sincerely,

Project Team

DECLARATION

We undersigned, hereby declare that the project report entitled “**Analysis of Crime of Juveniles by Statistical Method**” written and submitted to **Vivekanand college, Kolhapur (Autonomous)**, partial fulfillment of B.Sc. III (Statistics) under the guidance of **Prof. Ajit Pawar Sir** are our original work. The empirical results in this project are based on the data collected by ourselves.

We understand that any copying is liable to be published as the authorities deem fit.

Date:

Place: Kolhapur

Mr. Abhishek D. Sabale

Mr. Yashdeep A. Kasture

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Mr. Afanan A. Patil

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INTRODUCTION:

Our project Subject is “ANALYSIS OF CRIME OF APPREHENDED JUVENIL BY STATISTICAL METHOD”. A nation’s children are its supremely important asset and nation’s future lies in their proper development. As the present-day world, it is the center of all thinking to secure the next generation. “Juvenile crime” has been increased. “A healthy and Educated child of today is the active and intelligent citizen of tomorrow” hence it is need to study of children and there is also need to protect them but very little studied about Juveniles.

A juveniles or child means a person who has completed eighteen years of ago but in today’s time the Juveniles are committing various heinous crimes such as rape, robbery, theft, dacoits. For that matter they should be considered as adults and not minors.

The concept of Juveniles justice was derived from the concept of Juveniles’ delinquency. The young children’s fails to understand the abnormal situation of life so in this presentation we are going to focus into those thoughts. Therefore, study with regard to the living condition of the Juveniles in the particular area, their economic, social and educational status, their family background, their relationship between parents was studied.

So, we interested to study the relationship between age and type of crimes, year and number of crimes, family background and crimes by using Statistical Methods.

METHODOLGY AND DATA COLLECTION -

Our Geographical area under consideration is some of the metropolitan cities in India. For this project we have collected secondary data from Internet (Website: www.ncrb.gov.in). We collected data of 2 years (Year 2018 and year 2019). The collected information was later analyzed to obtain the required interpretation and findings. We have taken 19 metropolitan cities which represent rate of apprehended Juveniles in Metropolitan cities In India.

STATISTICAL TOOLS:

Graphical Tools:

- 1) Multiple Bar Diagram
- 2) Pie Chart
- 3) Radar chart
- 4) Line chart

Testing of Hypothesis:

- 1) Chi-Square test for attribute

AIM & OBJECTIVES

AIM:

Analysis of Crime of Juveniles by Statistical Method

OBJECTIVES:

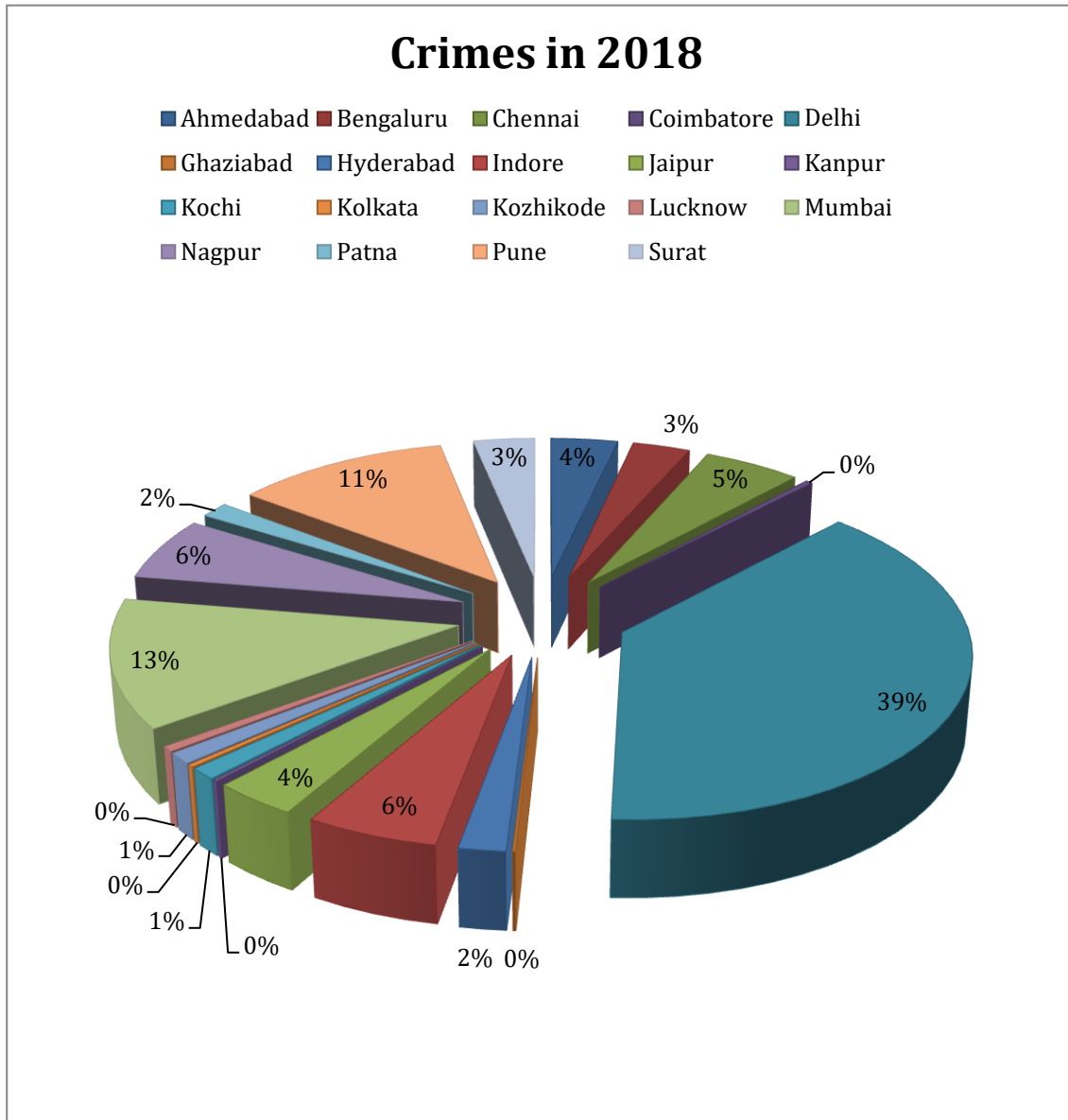
1. To study the Number of Juveniles apprehended in different metropolitan cities for Year 2018 and Year 2019.
2. To study the distribution of crime over different geographical region in India.
3. Statistical study of Juveniles by using Quantitative data.

GRAPHICAL REPRESENTATION

❖ Juveniles apprehended during the year 2018 and 2019 in Metropolitan cities

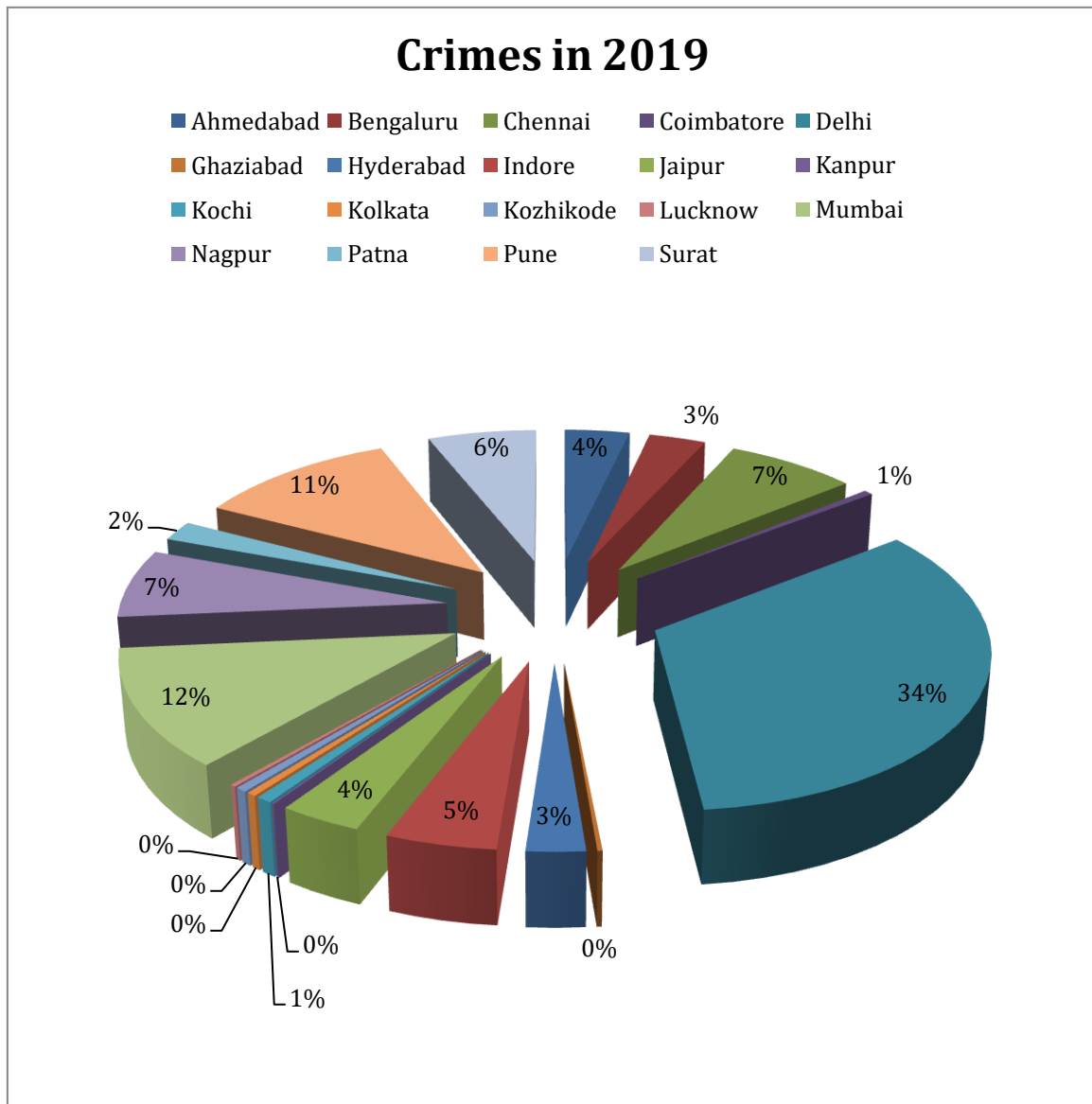
City	2018	2019
Ahmedabad	333	351
Bengaluru	287	308
Chennai	485	706
Coimbatore	35	50
Delhi	3610	3268
Ghaziabad	11	21
Hyderabad	181	245
Indore	514	459
Jaipur	329	344
Kanpur	14	9
Kochi	106	66
Kolkata	22	40
Kozhikode	99	48
Lucknow	46	24
Mumbai	1177	1170
Nagpur	578	680
Patna	142	197
Pune	1067	1090
Surat	305	588

❖ **Pie diagram showing number of crimes in different metropolitan cities during the year 2018**



Conclusion: Number of crimes in Delhi is maximum as compare to other metropolitan cities.

❖ **Pie diagram showing number of crimes in different metropolitan cities during the year 2019**

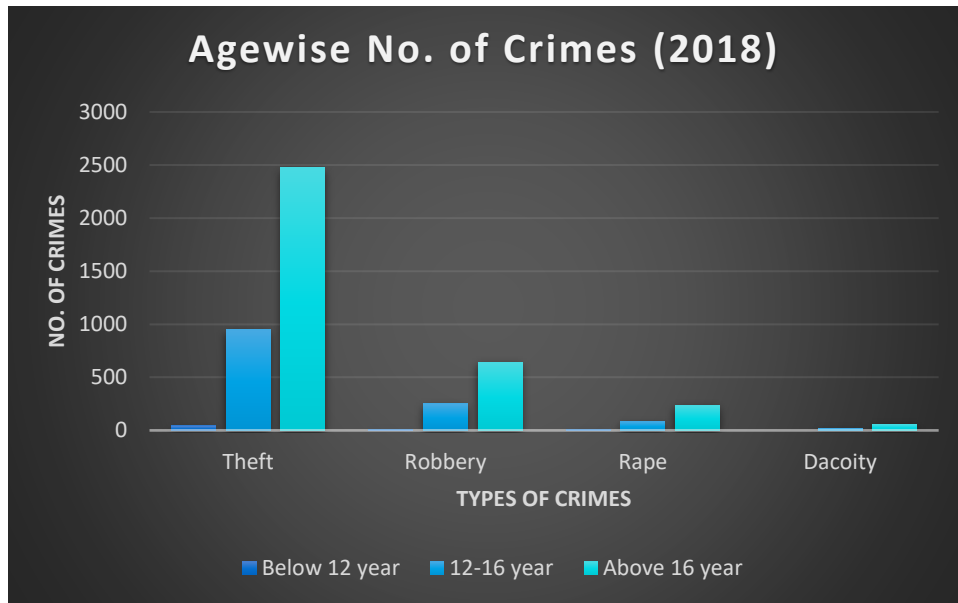


Conclusion:

Number of crimes in Delhi is maximum as compare to other metropolitan cities.

❖ **Multiple Bar Diagram for Type of Crimes and Age Group of Apprehended Juveniles. (2018)**

	below 12 years	12-16 year	above 16 years
Theft	43	947	2474
Robbery	5	250	642
Rape	6	85	236
Dacoity	0	22	59

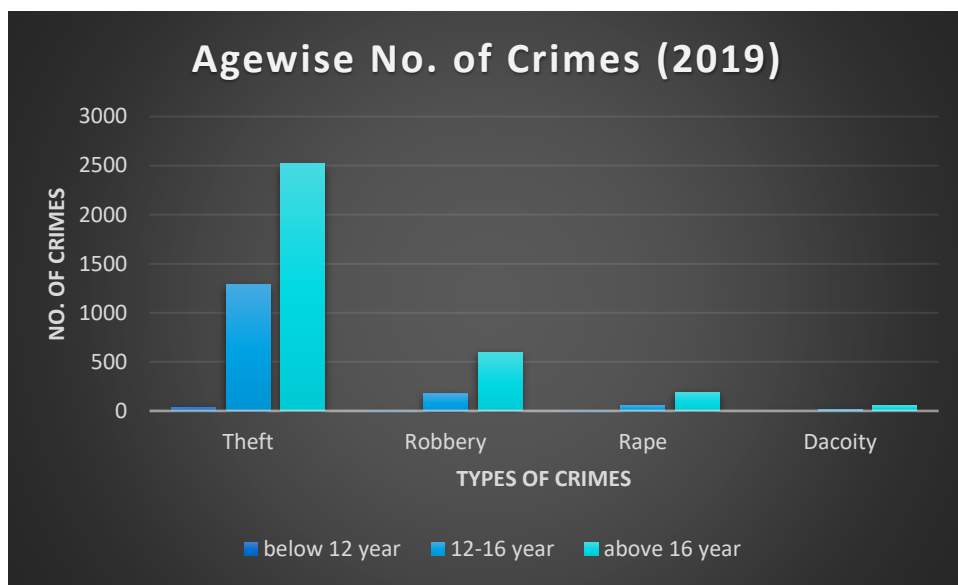


Conclusion:

- The theft crimes are maximum than other types of crimes in 2018.
- Maximum number of crimes are observed in age above 16 years.

❖ Multiple Bar Diagram for Type of Crimes and Age Group of Apprehended Juveniles. (2019)

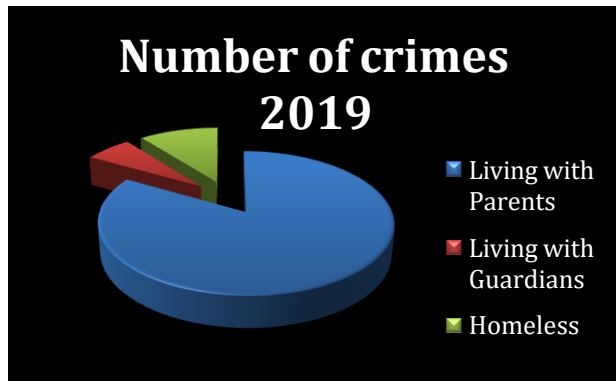
	below 12 years	12-16 year	above 16 years
Theft	37	1286	2520
Robbery	4	173	597
Rape	2	59	189
Dacoity	0	18	58



Conclusion:

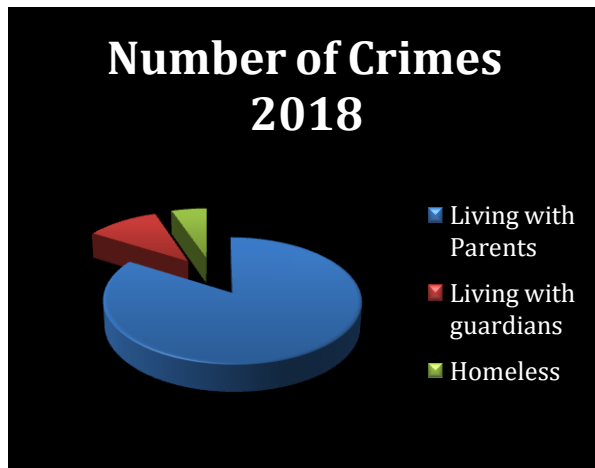
- The theft crimes are maximum than other types of crimes in 2019.
- Maximum number of crimes are observed in age above 16 years.

❖ Pie Chart for Family Background of Apprehended Juveniles.



Year 2019

Living with parents	Living with guardians	Homeless
8050	598	1016



Year 2018

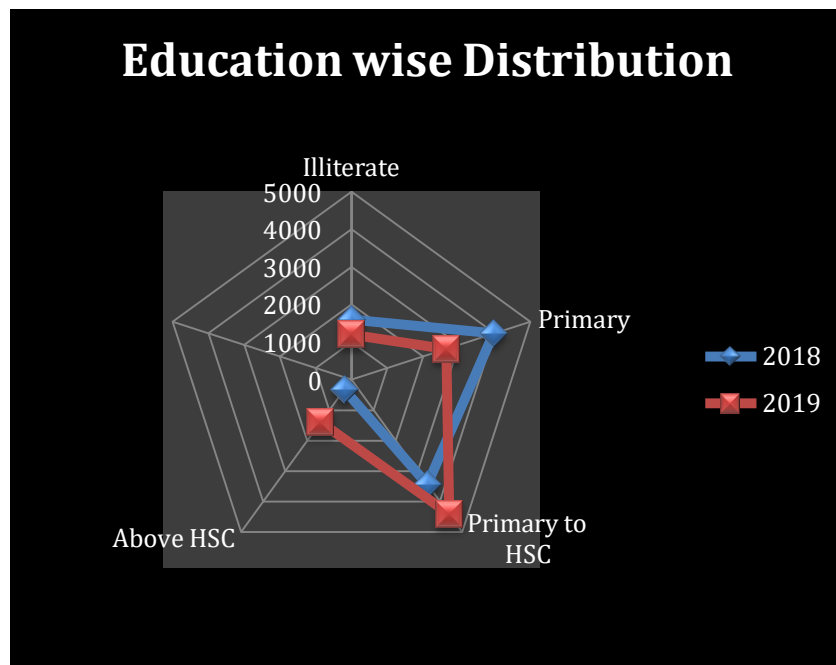
Living with parents	Living with guardians	Homeless
7842	1011	488

Conclusion:

Both the Pie Charts indicate that most of the apprehended Juveniles live with their parents.

❖ **Radar chart for Education & Crimes:**

Year ↓	Illiterate	Primary	Primary to HSC	Above HSC
2018	1601	3978	3441	321
2019	1201	2649	4421	1393

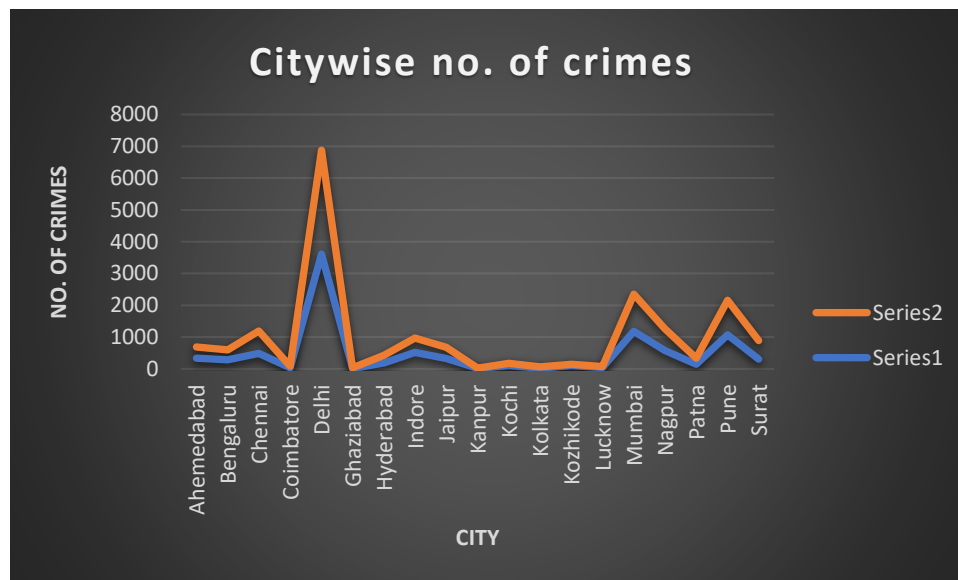


Conclusion:

Above chart indicates that most of the Apprehended Juveniles are in Primary in 2018 and Primary to HSC Educated in 2019 as compared to other stage of education.

STATISTICAL ANALYSIS:

CITY	2018 (X_i)	2019 (Y_i)
Ahmedabad	333	351
Bengaluru	287	308
Chennai	485	706
Coimbatore	35	50
Delhi	3610	3268
Ghaziabad	11	21
Hyderabad	181	245
Indore	514	459
Jaipur	329	344
Kanpur	14	9
Kochi	106	66
Kolkata	22	40
Kozhikode	99	48
Lucknow	46	24
Mumbai	1177	1170
Nagpur	578	680
Patna	142	197
Pune	1067	1090
Surat	305	588



Where, Series 1 = 2018 and Series 2 = 2019

Conclusion:

Number of crimes is increases in 2019 as compare to 2018.

□ **Family background (Year 2018)** □

City	Living with Parents (Xi)	Living with Guardians (Yi)	Homeless (Zi)
Ahmedabad	333	0	0
Bengaluru	283	4	0
Chennai	283	70	132
Coimbatore	21	11	3
Delhi	2977	405	228
Ghaziabad	9	1	1
Hyderabad	164	7	10
Indore	422	78	14
Jaipur	329	0	0
Kanpur	14	0	0
Kochi	88	7	11
Kolkata	17	5	0
Kozhikode	82	17	0
Lucknow	46	0	0
Mumbai	903	2350	39
Nagpur	519	29	30
Patna	105	30	7
Pune	942	112	13
Surat	305	0	0
Total	7842	1011	488

Aim: To test whether the two attributes number of crimes are independent or not on geographical region and family background.

Hypothesis:

H_0 : Geographical region and family background are independent on number of crimes.

H_1 : Geographical region and family background are dependent on number of crimes.

Here, we take 4 cities in different geographical region,

	Living with parents	Living with Guardians	Homeless	Total
Delhi	2977	405	228	3610
Kolkata	17	5	0	22
Chennai	283	70	132	485
Mumbai	903	2350	39	3292
Total	4180	2830	399	7409

O _i	E _i	$\frac{(O_i - E_i)^2}{E_i}$
2977	2036.6851	434.1330
405	1378.9040	687.8572
228	194.4109	5.8033
17	12.4119	1.6960
5	8.4033	
0	1.1848	2.1955
283	273.6267	0.3211
70	185.2544	71.7045
132	26.1189	429.2220
903	1857.2763	490.3111
2350	1257.4383	949.3039
39	177.2855	107.8649
	=7409	=2746.28

Test Statistics: Under H_0

$$\text{cal} | \chi^2 | = \sum_{i=1}^4 \frac{(O_i - E_i)^2}{E_i} = 2746.28$$

$$\begin{aligned} \text{tab} | \chi^2 | &= \chi^2_{(r-1)(t-1)-1, \alpha\%} \\ &= \chi^2_{(3-1)(4-1)-1, 5\%} = 11.0705 \end{aligned}$$

Here, $\text{cal} | \chi^2 | > \text{tab} | \chi^2 |$

Conclusion: χ^2 calculated is greater than χ^2 tabulated then we reject H_0 and we conclude that geographical region and family background are dependent on number of crimes in year 2018.

□ **Family background (Year 2019)** □

City	Living with Parents (Xi)	Living with Guardians (Yi)	Homeless (Zi)
Ahmedabad	351	0	0
Bengaluru	289	12	7
Chennai	646	34	26
Coimbatore	19	8	23
Delhi	2783	248	237
Ghaziabad	1	0	20
Hyderabad	226	3	16
Indore	301	78	80
Jaipur	276	6	62
Kanpur	3	0	6
Kochi	65	1	0
Kolkata	13	6	21
Kozhikode	43	5	0
Lucknow	64	0	0
Mumbai	775	92	303
Nagpur	507	30	143
Patna	152	45	0
Pune	1011	30	49
Surat	565	0	23
Total	8050	598	1016

Aim: To test whether the two attributes number of crimes are independent or not on geographical region and family background.

Hypothesis:

H_0 : Geographical region and family background are independent on number of crimes.

H_1 : Geographical region and family background are dependent on number of crimes.

Here, We take 4 cities in different geographical region,

	Living with parents	Living with Guardians	Homeless	Total
Delhi	2783	248	237	3268
Kolkata	13	6	21	40
Chennai	646	34	26	706
Mumbai	775	92	303	1170
Total	4217	380	587	5184

O _i	E _i	$\frac{(O_i - E_i)^2}{E_i}$
2783	2658.4020	5.8398
248	239.5525	0.2979
237	370.0455	47.8349
13	32.5386	11.7324
6	2.9321	3.2100
21	4.5293	59.8953
646	574.3059	8.9500
34	51.7515	6.0890
26	79.9425	36.3986
775	951.7535	32.8255
92	85.7639	0.4534
303	132.4826	219.4717
	5184	432.9985

Test Statistics: Under H_0

$$\text{cal} | \chi^2 | = \sum_{i=1}^4 \frac{(O_i - E_i)^2}{E_i} = 432.9985$$

$$\begin{aligned} \text{tab} | \chi^2 | &= 2_{(r-1)(t-1), \alpha\%} \\ &= 2_{(3-1)(4-1), 5\%} = 12.5916 \end{aligned}$$

Here, $\text{cal} | \chi^2 | > \text{tab} | \chi^2 |$

Conclusion: χ^2 calculated is greater than χ^2 tabulated then we reject H_0 and we conclude that geographical region and family background are dependent on number of crimes in year 2019.

Age and crime (2018)

Aim: To test whether the two attributes age and type of crime are independent or not.

Hypothesis:

H_0 : Age and type of crime are independent.

H_1 : Age and type of crime are not independent.

Observation Table:

	12-16 years	above 16 years	Total
Theft	947	2474	3464
Robbery	250	642	897
Rape	85	236	327
Dacoity	22	59	81
Total	1304	3411	4769

O _i	E _i	$\frac{(O_i - E_i)^2}{E_i}$
947	947.1704	0.0000
2474	2477.6062	0.0052
250	245.2690	0.0913
642	641.5741	0.0003
85	89.4125	0.2178
236	233.8848	0.0191
22	22.1480	0.0010
59	57.9348	0.0196
		=0.3543

Test Statistics: Under H_0

$$\text{cal} | \chi^2 | = \sum_{i=1}^{19} \frac{(O_i - E_i)^2}{E_i} = 0.3543$$

$$\begin{aligned} \text{tab} | \chi^2 | &= 2_{(r-1)(t-1)\alpha\%} \\ &= 2_{(2-1)(4-1)5\%} = 7.8147 \end{aligned}$$

Here, $\text{cal} | \chi^2 | < \text{tab} | \chi^2 |$

Conclusion: χ^2 calculated is less than χ^2 tabulated then we accept H_0 and we conclude that Age and type of crime is independent in 2018.

Age and crime (2019)

Aim: To test whether the two attributes age and type of crime are independent or not.

Hypothesis:

H_0 : Age and type of crime are independent.

H_1 : Age and type of crime are not independent.

Observation Table:

	12-16 years	above 16 years	Total
Theft	1286	2520	3843
Robbery	173	597	774
Rape	59	189	250
Dacoity	18	58	76
Total	1536	3364	4943

O _i	E _i	$\frac{(O_i - E_i)^2}{E_i}$
1286	1194.1833	7.0595
2520	2615.3858	3.4788
173	240.5146	18.9520
597	526.7521	9.3683
59	77.6856	4.4944
189	170.1395	2.0907
18	23.6164	1.3357
58	51.7224	0.7619
		= 47.5413

Test Statistics: Under H_0

$$\text{cal} | \chi^2 | = \sum_{i=1}^{19} \frac{(O_i - E_i)^2}{E_i} = 47.5413$$

$$\begin{aligned} \text{tab} | \chi^2 | &= 2_{(r-1)(t-1)\alpha\%} \\ &= 2_{(2-1)(4-1)5\%} = 7.8147 \end{aligned}$$

Here, $\text{cal} | \chi^2 | > \text{tab} | \chi^2 |$

Conclusion: χ^2 calculated is greater than χ^2 tabulated then we reject H_0 and we conclude that Age and type of crime is not independent in 2019.

CONCLUSIONS:

- 1) The number of crimes in Delhi in 2018 and 2019 is maximum as compared to other Metropolitan Cities.
- 2) The theft crimes is maximum than other type of crimes in 2018 as well as 2019.
- 3) Maximum number of crimes done by above 16 year juveniles in 2018 &2019.
- 4) The most of the apprehended Juveniles live with their parents.
- 5) Crimes are independent on education in year 2018 &2019.
- 6) Number of crimes are increases in 2019 as compare to 2018.
- 7) Number of crimes are dependent on geographical region & family background.
- 8) Age and type of crime is independent in 2018 & not independent in 2019 .

BIBLIOGRAPHY:

- ❖ Department of statistics, Vivekanand college, Kolhapur
- ❖ Fundamental of mathematical statistics by S. C. Gupta.
- ❖ Probability Distribution Theory and Statistical Inference by K C Bhuyan
- ❖ Programmed Statistics by B L Agarwal