The results obtained after statistical analysis of judgments are discussed in this chapter. The judgments of Criminal Appeals delivered by Hon'ble Gujarat High Court pertaining to forensic evidence for the duration from year 1950 to 2015 are discussed in first section. In second section of this chapter, results after analyzing judgments delivered in rape cases by Hon'ble Supreme Court of India pertaining to forensic evidence are discussed. The statistical significance of forensic evidence in criminal trials is classified as; forensic evidence appreciated/withheld by court of law; if withheld, the level of drop and reasons are reflected along with discussion. Correlation between evidence status and verdict of the court is highlighted in this chapter. This will provide idea about attrition level of forensic evidence during criminal trial and the reasons behind that.

Results Pertaining to Gujarat High Court Judgments

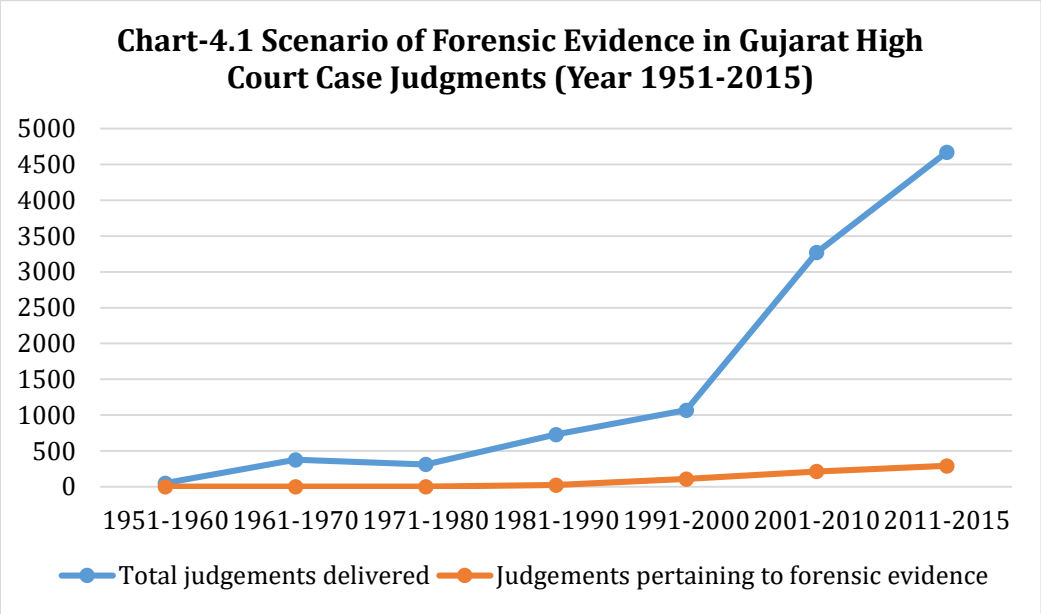
Below **Table-4.1** reflects decade wise classification of judgments delivered and among them number of extracted judgments mentioning the forensic evidence.

Table-4.1 Number of judgments pertaining to forensic evidence per decade

Year	No. of Judgments Delivered	No. of Judgments mentioning Forensic Evidence	Percentage (Cases Involving Forensic Evidence)
1951-1960	49	0	0.00
1961-1970	375	1	0.27
1971-1980	312	1	0.32
1981-1990	730	22	3.01
1991-2000	1069	107	10.01
2001-2010	3271	213	6.51
2011-2015	4672	290	6.21
Total	**10478**	**634**	**6.05**

Out of almost 10478 judgments delivered by Hon'ble high court of Gujarat (as retrieved from database of 'The Laws') during the period from year 1951 to 2015, total 634 case judgments were found in which forensic evidence assisted courts from investigation to dissemination of justice. Thus only 634 case

judgments were included in this study. This was approximately 6.05 % of the total cases. The decade wise total number of judgments delivered and number of cases in which forensic evidence was considered are represented in below **Chart-4.1.**



Above chart clearly reflects that in a span of 65 years only in 6.05 % of cases Forensic Sciences was utilized by justice delivery system in India. The crime figures reflected in the chart show a relative increase in crime over these years. The use of forensic science is increasing considerably, where number of cases pertaining to forensic evidence is on the rise from decade to decade but this rate is very slow compared to increasing crime rate which is evident from the above chart. The significant use of principles of science for criminal investigation in India started after 1980's and there is a sudden hike in use of forensic science in crime cases after year 2000.

An attempt was made to acquire information from State Crime Record Bureau (SCRB), Gandhinagar regarding number of crime cases registered and number of cases referred to FSL from the year 2011 to 2015. However, data regarding cases forwarded to FSL was not provided to the researcher. The application letter is enclosed in **Appendix – B.**

An attempt was also made to acquire furthermore data through a formal request letter as well as an application under Right to Information Act, 2005 from Directorate of Forensic Science (DFS), Gandhinagar regarding:

- Establishment of Forensic lab and each division
- Number of cases and number of samples received for analysis in each division from the date of establishment till December-2015
- Number of cases reported every year by each department of Forensic Lab
- Number of experts attended court as expert witness every year

This data was requested for the purpose of comparison with the above stated results of present study. The desired data from DFS, Gandhinagar was only numeral and no confidential data, like case details, was asked for the same. However, the requested data was not provided to the researcher mentioning the legal reason as below:

"According to notification no. SB-1/102001/8203/GOI-62-(part-file) Sr. no.11 dated 25/10/2005 by Home Department, Gujarat Government, Gandhinagar; Forensic Science Laboratory is exempted from providing the information under RTI Act,2005 and hence, DFS is unable to provide the requested information"

The application letters and response letter from the DFS is enclosed in **Appendix-C, D and E.**

Criminal Case Judgments, 1951-2015

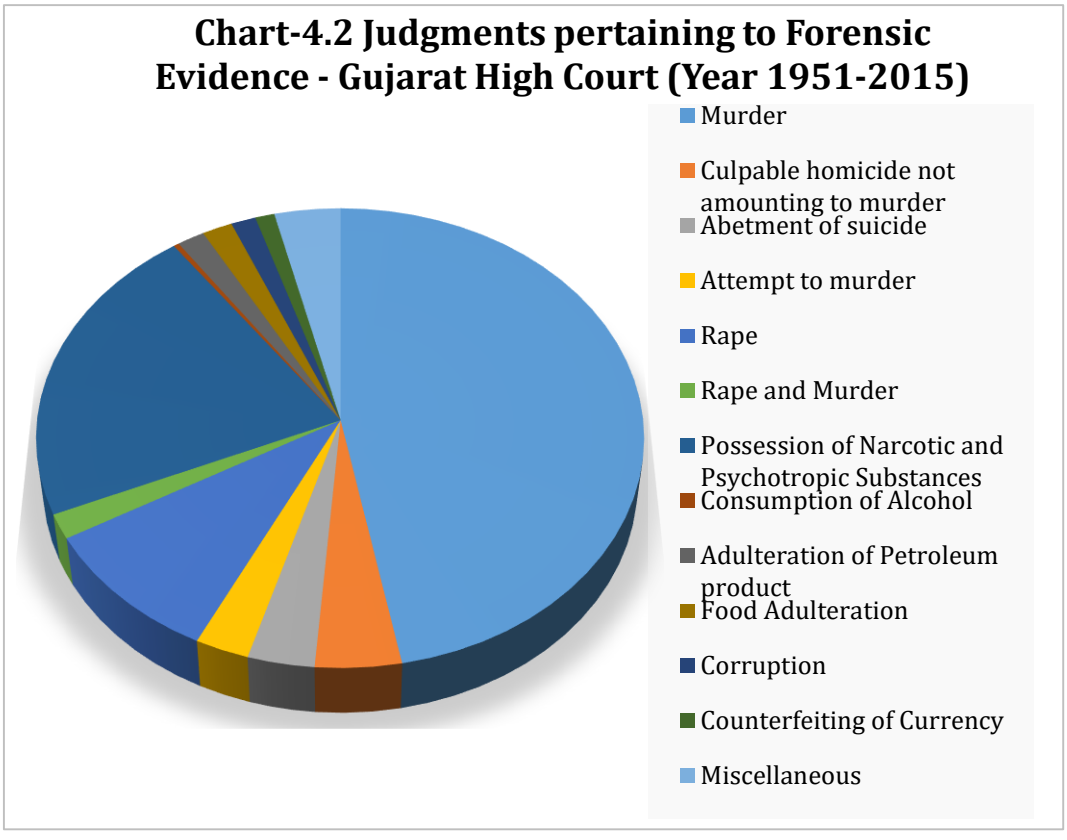
Below **Table-4.2** shows number & percentage of cases in different types of crimes wherein forensic evidences are mentioned in court judgments.

Table-4.2 Type of Crimes and forensic evidence mentioned in court judgment during the period from 1951 to 2015

Crime Type	No of Cases	Percentage
Murder	298	47.00
Culpable homicide not amounting to murder	27	4.26
Abetment of suicide	21	3.31
Attempt to murder	17	2.68
Rape	60	9.46
Rape and Murder	11	1.74
Possession of Narcotic and Psychotropic Substances	137	21.61
Consumption of Alcohol	2	0.32

Adulteration of Petroleum product	10	1.58
Food Adulteration	11	1.74
Corruption	9	1.42
Counterfeiting of Currency	7	1.10
Miscellaneous	24	3.79
Total	**634**	**100.00**

Above table reflects 634 judgments pertaining to different types of crimes which are Murder, Culpable homicide not amounting to murder, Abetment of suicide, Attempt to murder, Rape, Rape and Murder, Possession of Narcotic and Psychotropic Substances, Consumption of Alcohol, Adulteration of Petroleum product, Food Adulteration, Corruption, Counterfeiting of Currency and Miscellaneous. The significance of forensic evidence vary from one type of crime to other. Forensic evidences appears to have been considered maximum in murder cases (47%), followed by possession of Narcotic and Psychotropic Substances (21.61%), Rape (9.46%), Culpable homicide not amounting to murder (4.26%), abetment of suicide (3.31%), attempt to murder (2.68%), food adulteration (1.74%), adulteration of petroleum products (1.58%), corruption (1.42%), counterfeiting of currency (1.10%), consumption of alcohol (0.32 %) and miscellaneous crimes as reflected in High Court judgments.



The graphical representation regarding contribution of forensic evidence in to investigation of various crimes is shown in above **Chart-4.2.**

Forensic Evidence Considered in Different Criminal Cases

The primary objective of the study was to find out what kind of forensic evidence is collected, how it gets analyzed, and the impact of forensic report as evidence seen in court judgments. This section summarizes the different kind of forensic evidences collected in the different cases. Table 4.3 to 4.15 on the following pages provide information on the number and percentage of various types of evidences collected in different categories of crimes. Other evidences marked as 'Not Applicable (NA)' in the following tables are the evidences which are not hypothetically found in the particular type of cases. The importance of these exhibits is that they show the wide range of cases in which forensic evidence is collected. The types of forensic evidence also varied substantially depending on the type of offense.

Crime type–murder. In murder cases the type of forensic evidence and number of cases found in each type is represented in the below given **Table-4.3.**

Table -4.3 Types of Forensic Evidences found considered in Murder Crimes

Crime type - Murder (n = 298)		
Evidence Type	**No of Cases**	**Percentage**
Biological	212	71.14
Physical	186	62.42
Chemical	26	8.72
Firearm (Ballistic)	17	5.70
Finger print/ foot print	5	1.68
Questioned Document (Q.D)	4	1.34
Toxicological	15	5.03
Medical	168	56.38
Psychological	12	4.03

The maximum cases in which forensic evidence is mentioned in court judgment, are Murder crimes. The different categories of forensic evidences

considered by the court of law are Biological, Physical, Chemical, Firearm (Ballistic), Finger print/ foot print, Questioned Document (Q.D), Toxicological, Medical and Psychological. Among 298 cases of murder, biological evidences were found considered in 212 cases i.e 71.14 % of total murder cases. Blood is majorly discovered evidence in cases of murder. This biological evidence mostly comprise various forms of blood like blood pool, blood stains on different articles, dried blood, blood spatter etc. Physical evidences were found in 62.42 % of murder cases. In 56.38 % cases, medical evidence was considered which majorly comprises the wounds and injuries, nature and cause of injuries along with postmortem changes in the body of deceased person. Chemical evidences were found in 8.72 % cases. In 5 % of murder cases, Firearm evidence and Toxicological evidence were found. 4.03 % of cases had psychological evidences and only 1.34 % of the murder cases had questioned documents as forensic evidence.

Discussion of the results. Murder is the crime wherein blood is the most frequently found evidence, which is expected to be found in all most of case of murder ideally. But this results show that only in 71 % cases biological evidences are found considered. One can expect at least in another 20-25 % cases in which biological evidences could have assisted the courts in delivering their verdicts. Non-consideration of biological evidences in 29% cases suggests that there is a gap and the possible reasons could be failure to collect such sample from crime scene, or inability to get proper results at FSL, or the evidence produced before the court during trial may not of any use in the trial courts. However by analyzing and filling these gaps may help in addressing the remaining 20-25 % of cases wherein biological sciences could play an important role. Thus the loopholes which lead to non-consideration of biological evidence in these 20-25 % is the subject of inquiry which needs to be brought to the notice of all stake holders in the system.

Crime type – culpable homicide not amounting to murder.

Culpable homicide not amounting to murder is stated in section 304, Indian Penal Code (IPC). The below **Table-4.4** reflects the extent of different evidences collected in cases of Culpable Homicide not amounting to murder.

Table – 4.4 Types of Forensic Evidences found considered in Culpable Homicide not amounting to murder

Crime type - Culpable Homicide not amounting to murder (n = 27)		
Evidence Type	**No of Cases**	**Percentage**
Biological	15	55.56
Physical	14	51.85
Chemical	1	3.70
Firearm (Ballistic)	2	7.41
Finger print/ foot print	1	3.70
Questioned Document (Q.D)	0	0.00
Toxicological	1	3.70
Medical	22	81.48
Psychological	0	0.00

The different categories of forensic evidences came across during cases of culpable homicide not amounting to murder are Biological, Physical, Chemical, Firearm (Ballistic), Finger print/ foot print, Questioned Document (Q.D), Toxicological, Medical and Psychological. Total 27 judgment were found for the said offence during this period. It can be inferred that 81.48 % cases had shown medical evidence more considerable in comparison with 55.56 % cases having biological evidences, 51.85% cases having physical evidences, 7.41 % cases wherein Fire arms were discovered and in less than 4 % of cases other evidences were taken into consideration. The contribution of Medico legal (forensic medical evidences) experts is noteworthy.

Crime type – abetment of suicide. If any person commits suicide, whoever abets the commission of suicide, shall be punished under section 306, Indian Penal Code (IPC). The below **Table-4.5** reflects types of forensic evidence and number of cases pertaining to each evidence type.

Table-4.5 Types of Forensic Evidences found considered in Abetment of Suicide cases

Crime type - Abetment of Suicide (n = 21)		
Evidence Type	**No of Cases**	**Percentage**
Biological	3	14.29
Physical	3	14.29
Chemical	5	23.81
Firearm (Ballistic)	0	0.00
Finger print/ foot print	0	0.00
Questioned Document (Q.D)	0	0.00
Toxicological	9	42.86
Medical	9	42.86
Psychological	1	4.76

In judgments of total 21 cases of abetment of suicide, Medical and Toxicological evidences were found to be most considerable i.e. 42.86 %. Second most observed evidence type was chemical evidence i.e. 23.81 % of total cases. Whereas Biological and physical evidences were found in same percentage of 14.29. The percentage of Psychological evidence is in only 4.76%. It appears there is lack of awareness of capabilities of psychological services in such cases. This needs to be strengthened for prevention as well as rehabilitation of survivors.

Crime type – attempt to murder. As per Indian Penal Code, Attempt to murder is penalized under section 307. The below **Table-4.6** indicates the number of cases of attempt to murder involving various forensic evidences and their respective percentage.

Table – 4.6 Types of Forensic Evidences found considered in Attempt to murder

Crime type - Attempt to murder (n = 17)		
Evidence Type	**No of Cases**	**Percentage**
Biological	9	52.94
Physical	5	29.41
Chemical	1	5.88
Firearm (Ballistic)	6	35.29
Finger print/ foot print	0	0.00
Questioned Document (Q.D)	0	0.00

Toxicological	0	0.00
Medical	10	58.82
Psychological	0	0.00

Total 17 cases of attempt to murder were observed. Among which, 62.94 % cases had biological and 58.82 % cases had medical evidences. 29.41 % cases had Physical and 35.29 % cases had fire arm (Ballistic evidence). Chemical evidences were found in only one case of attempt to murder.

Discussion of the results. In cases of attempt to murder the victim being alive, medical evidences like wounds and injuries would be the most important evidence and such evidences are expected to be found in every cases. But, the present result depicts that forensic medical evidences are found only in 58.82 % cases. Remaining 40% (approx.) cases needs to be investigated and analyzed in detail to identify the gaps and loopholes.

Crime type – rape. Rape is defined under section 375 of Indian Penal Code (IPC). The rape offenders are punished under section 376 of IPC. Rape is violation of victim's fundamental right under Article 21 of the Constitution of India. Sexual violence, apart from being a dehumanizing act, is an unlawful intrusion on the right of privacy and sanctity of a woman. It is a serious blow to her supreme honour and offends her self-esteem and dignity as well. It degrades and humiliates the victim and where the victim is a helpless innocent child or a minor, it leaves behind a traumatic experience. A rapist not only causes physical injuries, but leaves behind a scar on the most cherished position of a woman, i.e. her dignity, honour, reputation and chastity. (Dhananjoy Chatterjee Vs State of West Bengal, 1994). The below **Table-4.7** reflects number of cases mentioning different forensic evidences and their respective percentage.

Table–4.7 Types of Forensic Evidences found considered in Rape cases

Crime type - Rape (n = 60)		
Evidence Type	**No of Cases**	**Percentage**
Biological	56	93.33
Physical	3	5.00
Chemical	1	1.67
Firearm (Ballistic)	0	0.00

Finger print/ foot print	0	0.00
Questioned Document (Q.D)	1	1.67
Toxicological	0	0.00
Medical	32	53.33
Psychological	2	3.33

Out of confronted 60 judgments of rape cases, 93.33 % of cases having biological evidence, 53.33 % cases having medical evidences and in less than 5% cases other evidences were found considered. In this type of cases, firearms, fingerprint and toxicological evidences were not observed. The reason behind this fact should be revealed.

Discussion of the results. Biological evidences are most apparent to be found in cases of rape. Moreover, this results also reflects that forensic biological evidences are found considered in 93 % cases which is appreciable. This shows that forensic evidences are vitally used in cases of rape. However, Forensic medical evidences are used in less cases compared to biological evidences.

Crime type – rape and murder. While studying judgments, certain cases came across in which rape was escorted by murder, another heinous criminal activity. Different type of forensic evidences and number of cases found in each type is shown in below **Table-4.8.**

Table–4.8 Types of Forensic Evidences found considered in Rape and Murder

Crime type - Rape and Murder (n = 11)		
Evidence Type	**No of Cases**	**Percentage**
Biological	9	81.82
Physical	2	18.18
Chemical	0	0.00
Firearm (Ballistic)	0	0.00
Finger print/ foot print	0	0.00
Questioned Document (Q.D)	0	0.00
Toxicological	0	0.00
Medical	5	45.45
Psychological	1	9.09

It can be inferred that 81.82 % cases had shown biological evidences more considerable in comparison with 45 % cases having medical evidences and 9 % cases of psychological evidences. In this type of cases chemical, firearms,

fingerprint, Q.D and toxicological evidences were not observed. The reason behind this is unknown.

Discussion of the results. Biological and medical evidences are most apparent to be found in cases of rape and murder. This results shows that forensic biological evidences were found considered in 81.82 % cases whereas forensic medical evidences were found considered in 45 % cases, which is less in comparison with biological evidences. This should be improvised up to 99 % by looking into loopholes and filling the gaps which might have obstructed the evidence reaching to court level. This is necessary to increase conviction rate.

Crime type - possession of narcotic drugs and psychotropic substances (NDPS). The Prevention of Illicit Trafficking in Narcotic Drugs and Psychotropic Substances is controlled under NDPS Act in India. Cannabis, Opium, Coca derivatives (Cocaine, heroin etc.), poppy straw etc. are defined under Narcotic Drugs and Psychotropic Substances Act, 1985. These are considered as Controlled substance. Control substance means any substance which the Central Government may, having regard to the available information as to its possible use in the production or manufacture of narcotic drugs or psychotropic substances or to the provisions of any International Convention, by notification in the Official Gazette, declare to be a controlled substances. (Narcotic Drugs and Psychotropic Substances Act, 1985) Cultivation, production, manufacturing, sale, purchase, storage, possession, transport, distribution or consumption of the controlled substances listed under NDPS Act, except for medical and scientific purpose as per license conditions, is illegal and hence an offence. (Rao)

Table-4.9 Forensic Evidences found considered in cases of Possession of Narcotic Drugs and Psychotropic Substances

Crime type - Possession of Narcotic Drugs and Psychotropic Substances (n = 137)		
Evidence Type	**No of Cases**	**Percentage**
Biological	1	0.73
Physical	1	0.73
Chemical	133	97.08
Firearm (Ballistic)	NA	NA
Finger print/ foot print	NA	NA

Questioned Document (Q.D)	NA	NA
Toxicological	NA	NA
Medical	NA	NA
Psychological	2	1.46

Among total cases prosecuted under NDPS Act, chemical evidences were found considered predominantly in 97.08 % cases. In two cases psychological evidences were found. Only one case had physical evidence. One case had biological evidence. This is reflected in above **Table-4.9.**

Discussion of the results. The present result shows 97 % contribution of chemical evidence in cases under NDPS Act. If botanical evidence is added to chemical evidence, it may reach up to level of 99 %.

Crime type - consumption of alcohol. Alcohol prohibition is in force in the state of Gujarat. The below **Table-4.10** depicts various types of forensic evidence and number of cases.

Table–4.10 Forensic Evidences found considered in cases of Consumption of Alcohol

Crime type - Consumption of Alcohol (n = 02)		
Evidence Type	**No of Cases**	**Percentage**
Biological	2	100.00
Physical	0	0.00
Chemical	0	0.00
Firearm (Ballistic)	NA	NA
Finger print/ foot print	NA	NA
Questioned Document (Q.D)	NA	NA
Toxicological	0	0.00
Medical	NA	NA
Psychological	NA	NA

Only two cases of alcohol consumption were observed in which forensic evidence was found considered. In both the cases, blood was taken as an evidence which is 100 %.

Discussion of the results. This result is plausible because of established full proof automated scientific method for alcohol analysis in the blood.

Crime type – adulteration of petroleum product. Petroleum products being mixed with extraneous material is considered as adulteration of petroleum products. Adulteration of petroleum product is maximum practiced in petrol and diesel which are used as fuel in vehicles. Petroleum products are commonly adulterated with cheap solvents by the dealers to earn huge profit. The Ministry of Food and Civil Supplies are assigned with powers to tackle adulteration of motor spirit and high speed diesel under different orders issued by the Government under the Essential Commodities Act, from time to time. The below **Table-4.11** reflects the number of judgments of cases of adulteration of petroleum products wherein forensic evidence is mentioned.

Table–4.11 Forensic Evidences found considered in cases of Adulteration of Petroleum Products

Crime type - Adulteration of Petroleum product (n = 10)		
Evidence Type	**No of Cases**	**Percentage**
Biological	NA	NA
Physical	NA	NA
Chemical	10	100.00
Firearm (Ballistic)	NA	NA
Finger print/ foot print	NA	NA
Questioned Document (Q.D)	NA	NA
Toxicological	NA	NA
Medical	NA	NA
Psychological	NA	NA

As it is apparent to find chemical evidences in such type of crime cases, this evidences were observed in all the found cases. 10 cases were found in this category.

Discussion of the results. The present result shows that chemical evidences are found considered in 100 % cases of adulteration of petroleum products. As far as full adulteration is considered chemical sciences are successful in developing full proof methodology and introduce to the system which is appreciable.

Crime type – food adulteration. If a food contains a poisonous or harmful substance that may turn it into injurious to health, it is considered to be adulterated. Food is adulterated by merchants to increase the quantity and make more profit. The below **Table-4.12** reflects different types of forensic evidence found considered in food adulteration cases and number of cases observed in each type.

Table–4.12 Forensic Evidences found considered in cases of Food Adulteration

Crime type - Food adulteration (n = 11)		
Evidence Type	**No of Cases**	**Percentage**
Biological	NA	NA
Physical	NA	NA
Chemical	11	100.00
Firearm (Ballistic)	NA	NA
Finger print/ foot print	NA	NA
Questioned Document (Q.D)	NA	NA
Toxicological	NA	NA
Medical	NA	NA
Psychological	NA	NA

Total 11 cases of food adulteration were observed during analysis and all the cases (100%) were having chemical evidence. The food itself serves as evidence during such crimes and hence need to be checked to prove presence of adulterants.

Discussion of the results. The present result shows that chemical evidences are found considered in 100 % cases of food adulteration. There is also a separate laboratory for food and drug analysis which takes care of majority cases. Only few relevant cases are referred to Forensic Sciences and hence the results are credible.

Crime type – corruption. Any dishonest or unethical act by anyone entrusted with a position of authority is known as corruption, which is usually to attain individual benefit.

Table–4.13 Forensic Evidences found considered in cases of Corruption

Crime type - Corruption (n = 09)		
Evidence Type	**No of Cases**	**Percentage**
Biological	1	11.11
Physical	3	33.33
Chemical	5	55.56
Firearm (Ballistic)	NA	NA
Finger print/ foot print	NA	NA
Questioned Document (Q.D)	NA	NA
Toxicological	NA	NA
Medical	NA	NA
Psychological	NA	NA

Among confronted 9 cases of corruption, 55.56 % cases had chemical evidences, 33.33 % cases had physical evidences and only 1 case had biological evidence. This is reflected in above **Table-4.13.**

Discussion of the results. In cases of corruption chemical evidence like phenolphthalein and anthracene powder are expected in almost 99 % cases. Here, it is considered only in 55 % cases, which shows some loopholes in handling of corruption cases.

Crime type – counterfeiting of currency. Counterfeit currency is fake currency produced illegally without the consent of government. Fabricating or using counterfeit currency or bank notes is a form of forgery, which is an offence as per Indian Penal Code. Whoever counterfeits, or knowingly performs any part of the process of counterfeiting, any currency-note or bank-note, is punishable under section 498A of Indian Penal Code (IPC). Using such counterfeited currency is also a punishable offence.

Table-4.14 Forensic Evidences found considered in cases of counterfeiting of Currency

Crime type - Counterfeiting of Currency (n = 07)		
Evidence Type	**No of Cases**	**Percentage**
Biological	NA	NA
Physical	5	71.43
Chemical	1	14.29

Firearm (Ballistic)	3	42.86
Finger print/ foot print	1	14.29
Questioned Document (Q.D)	NA	NA
Toxicological	NA	NA
Medical	NA	NA
Psychological	0	0.00

Above **Table-4.14** reflects various types of forensic evidences mentioned in judgments of currency counterfeiting cases. 7 case judgments were found of currency counterfeiting wherein Physical evidences, chemical evidences, firearm and fingerprints were mentioned. In 71.43 % cases physical evidences like materials used for printing process, printer etc. were found considered. Chemical evidences were found in 14.29 % cases. Firearm (ballistic) evidence were observed in 42.86 % cases. Fingerprint evidence was also found considered in one case.

Discussion of the results. This result is not of currency examination but it is of tools used for producing counterfeit currency. Thus, these tools were found considered as physical evidence in 71 % cases. This helps investigating agency in the prevention of crime.

Crime type – miscellaneous. In this section all the miscellaneous crime types, observed other than above listed crimes in which forensic evidences were mentioned, are considered. These category includes crimes like voluntarily causing hurt/grievous hurt, kidnaping, spying, possession of explosives, waging or attempt to wage war, cheating, dishonesty, forgery, supporting terrorist activity, possession of prohibited arms, assault, mal-practicing in petroleum product etc. Type of evidence varies according to type of crime.

Table–4.15 Forensic Evidences found considered in Miscellaneous cases

Crime type - Miscellaneous (n = 24)		
Evidence Type	**No of Cases**	**Percentage**
Biological	2	8.33
Physical	7	29.17
Chemical	7	29.17
Firearm (Ballistic)	2	8.33
Finger print/ foot print	2	8.33

Questioned Document (Q.D)	2	8.33
Toxicological	0	0.00
Medical	6	25.00
Psychological	0	0.00

The above **Table-4.15** reflects the number of case judgments wherein different type of forensic evidence were mentioned. Biological and Firearm evidences were found considered in 8.33 % cases. Physical and chemical evidence is found the predominant type which was taken into consideration in 29.17 % cases. Medical evidences were found in 25 % cases. Whereas fingerprint/foot print and questioned document were found in approximately 8 % of cases.

Quantitative Assessment of Types and Sub-types of Evidences

This Section deals with evidences of various categories, which were involved during investigation of crime. This will show the level of contribution of each evidence and its substrate in any kind of crime. Following tables show contribution ratio of various biological, physical, chemical, firearm, fingerprint, Questioned Document, toxicological, medical and psychological evidences.

Biological evidences. Biological evidences are very important kind of evidence in cases of crimes against human body. They are useful to provide information regarding personal identification using methods like blood grouping and typing, DNA profiling, age and sex determination from skeletal remains etc. Detailed breakup of various biological elements which were observed as evidence in all criminal cases mentioned in previous section are listed in the following **Table-4.16.**

Table-4.16 Biological evidence and subcategories

Total cases mentioning biological evidence 310		
Sub-categories of evidence	**No of cases**	**Percentage**
Blood stained material (Including clothes and weapon)	219	70.65
Blood Sample	183	59.03
Semen	26	8.39
Vaginal Swab/smear	18	5.81
Pubic hair	5	1.61
Saliva	10	3.23

Hair	5	1.61
DNA profiling	4	1.29
Nail	4	1.29
Bones	1	0.32

Blood stains on any type of material including clothes, weapon, and other physical items, are termed as "blood stained material" here. This type of evidences have contributed in 70.65 % cases among cases involving biological samples. Which has the highest contribution amongst all biological evidences. Blood samples were taken in 59.03 % cases. Semen, vaginal swabs/smears and pubic hair were observed in rape cases, which were contributed to 8.39, 5.81 and 1.61 % cases respectively. Saliva was obtained as evidence in cases like murder, rape and also in corruption cases, which put into 3.23 % case. Hair, nails and bones were used in 1.61, 1.29 and 0.32 % cases. DNA profiling for personal identity was also contributed in only 1.29 % cases.

Discussion of the results. Biological fluids like blood stained materials and blood samples, saliva, perspiration, semen etc. are mostly found in murder, culpable homicide, attempt to murder and rape crimes. Murder crime ratio is found highest amongst other crimes, thus it is apparent to get higher percentage of blood evidence. Semen, vaginal swabs/smears and pubic hair were observed in rape cases. DNA profiling is observed in smaller number. Biological evidence other than blood should also get equal importance as they also play vital role. However, it is evident from this result that other evidences are found considered trivially. The reason behind it can be failure in collection of such evidence, contamination or degradation of samples after collection, improper analysis or no proper results obtained.

Physical evidences. Any physical material, found from crime scene, suspect or victim, can be categorized as physical evidence. Here, any kind of weapon other than firearms, soil, electronic materials like mobile-phone, laptop, CD, hard-disk, printer etc., currency notes, vehicles and any other miscellaneous materials are retained in this class. The audio or video recordings used as voice samples for voice analysis are also categorized in this class. Physical materials often tend to connect the criminal with the place of occurrence or victim.

Table-4.17 Physical evidence and sub-categories

Total cases mentioning physical evidence - 229		
Sub-categories of evidence	**No of cases**	**Percentage**
Weapon	173	75.55
Soil	34	14.85
Currency notes	6	2.62
Electronic evidence	9	3.93
Vehicle	11	4.80
Voice samples	10	4.37
Miscellaneous evidences	39	17.03

As mentioned in above **Table-4.17**, in 75.55 % cases, out of total cases pertaining to physical evidence, weapons were obtained as an evidence. They were mainly seized in the cases like murder, culpable homicide not amounting to murder or attempt to murder. Soil is also important proof to establish the place of incidence. Soil was recovered in 14.85 % cases out of all. Currency notes are main evidences found in cases of counterfeiting and corruption. They were taken in 2.62 % cases, as frequency of such crimes was also limited. Electronic evidences were gathered as evidence only in 3.93 % cases. Vehicles like car, scooter etc. used during criminal activity were also seized in 4.80 % cases. Voice samples were recovered in 4.37 % cases. Other physical material found at scene like pieces of bangles, ornament, wood-piece, can, chappals etc. are characterized as miscellaneous evidences under this category. In 17.03 % cases such random evidences were found.

Discussion of the results. Among all type of physical evidences, weapons are found considered in greater number of cases in comparison with other physical evidences. Murder crime ratio is found highest amongst other crimes, thus it is apparent to get higher percentage of weapon evidence. Electronic evidences like mobile phones, CDs, hard-drives are found only in 3 % cases, which shows that there is a need for training and awareness of using these evidences addition to weapon and soil evidences to all stake holders.

Chemical evidences. Chemical evidences can also provide important information during investigation. They are usually obtained from crime scene or

from suspect, and then sent to Forensic Science Laboratory for identification and comparison. Details regarding various types of chemical evidences and their contribution to criminal case investigation is given in below **Table-4.18** as follows:

Table-4.18 Chemical evidence and Sub-categories

Total cases mentioning chemical evidence 201		
Sub-categories of evidence	**No of cases**	**Percentage**
Narcotic drugs & Psychotropic Substances	133	66.17
Petroleum hydrocarbons	25	12.44
Petroleum fuels	15	7.46
Food products	12	5.97
Phenolphthalein / Anthracene	4	1.99
Explosives	4	1.99
Alcohol	4	1.99
Miscellaneous	4	1.99

Generally, Narcotic drugs, Psychotropic substances, Petroleum products, fuels, explosives, alcohol, food products or unknown materials are found as evidence in this class. Narcotic and psychotropic substances are usually encountered in crimes under NDPS Act. They are generally illicit drugs like opium and its derivatives, charas, ganja, mandrex, methaquolone, lorezepam etc. Such substances were collected in 66.17 % cases out of total having chemical evidences.

Petroleum hydrocarbons, burnt clothes and empty tins for analyzing presence of petroleum hydrocarbon, soot samples etc. were obtained in 12.44 % cases. Petroleum products like petrol, diesel, furnace oil and kerosene were collected in 7.46 % cases of fuel adulteration. Different food products like, ghee, juices, ice-cream, butter, oil etc. were taken in 6 % cases of food adulteration. Phenolphthalein or anthracene powders were found as evidence in 2 % cases belonged to corruption.

Explosive were obtained as evidence in 2 % cases like terrorist attack and illegal possession of explosives. Alcohol samples were taken 2 % cases. Other chemical evidences were collected in 2 % criminal cases.

Discussion of the results. Petroleum hydrocarbons and burnt cloths etc. were mostly found considered in burning cases. Fuel samples were obtained as evidence in cases of fuel adulteration. During investigating corruption cases, phenolphthalein and anthracene powders are most likely found chemical evidences which can prove or disprove the involvement of offender in the crime. The presence of these chemicals on currency note and hands or clothes of suspect can confirm the involvement if the same person in the case. Alcohol was found in cases of "lattha-kand", in which people got poisoned due to consuming ethanol mixed with methanol.

Firearms (ballistic) evidence. Evidences pertaining to ballistic include firearm, any type of ammunition, blank cartridge cases, Gunshot residue (GSR), barrel wash etc. These evidence can help in identifying the firearm used in conduction of crime. Firearm evidences varied considerably depending on crime type.

Table-4.19 Firearm (Ballistic) evidence and Sub-categories

Total cases mentioning firearm evidence 30		
Sub-categories of evidence	**No of cases**	**Percentage**
Firearm	27	90.00
Any type of Ammunition or part	15	50.00
Gunshot residue/Barrel wash	8	26.67
Miscellaneous	1	3.33

Above **Table-4.19** reflects that firearms were found considered in 90 % cases involving ballistic evidence. Ammunition and empty cartridges were found in 50% cases. GSR and barrel wash were collected in 26.67 % cases. Other ballistic evidences were found in 3.33 % cases.

Discussion of the results. Among various ballistic evidences, firearms and empty cartridge cases are found considered in greater percentage of cases compared to other types like GSR and barrel wash. GSR analysis and barrel wash can help to identify the shooter whereas barrel wash analysis can establish the fact that if fire had been taken place before the seizure of firearm.

Finger print / foot print evidence. Below **Table-4.20** reflects number of cases mentioning fingerprint and footprint evidences.

Table-4.20 Fingerprint evidence and Sub-categories

Total cases mentioning fingerprint/footprint evidence 09		
Sub-categories of evidence	**No of cases**	**Percentage**
Finger print	7	77.78
Foot print	2	22.22

Fingerprint or footprint are universal evidences which can be found in any type of crime. As per the Locard's principle of exchange "Every contact leaves traces", any criminal while committing crime may come in contact with various articles. This will leave his/her fingerprints on those articles, which can be helpful to identify the person involved in crime later on. Nevertheless, disappointingly this evidences were recorded in only 9 cases out of all. Fingerprints were collected in 7 case of spying, which comprises 77.78 % cases pertaining to fingerprint evidences. Footprints were recorded in only 2 cases.

Discussion of the results. Fingerprint evidences have contributed trivially in the criminal investigation. The reason behind this fact should be uncovered. The possible reasons can be failure to collect fingerprint evidence from crime scene, improper methods of analysis.

Questioned document evidence. Any written or printed document, on which a question is raised about the authenticity or about the writer, is termed as questioned document.

Table-4.21 Q.D and Sub-categories

Total cases mentioning Q.D evidence 07		
Sub-categories of evidence	**No of cases**	**Percentage**
Handwritings	6	85.71
Forged Document	1	14.29

Q.D evidences were found only in 7 cases out of total 634 cases. Handwritings are the major kind of evidence found in this category, hence attains 85.71 % where it has been collected as evidence. Only one case had forged document as evidence.

Discussion of the results. The cases were found in cases of forgery, murder and rape. The handwritten document found were letter, written notes and some type of registers.

Toxicological evidence. The toxicological evidences were found frequently in cases of murder, culpable homicide not amounting to murder and abetment of suicide. Below **Table-4.22** reflects various types of toxicological evidences and number of cases wherein such evidences were found considered.

Table-4.22 Toxicological evidence and Sub-categories

Total cases mentioning Toxicological evidence 25		
Sub-categories of evidence	**No of cases**	**Percentage**
Viscera	22	88.00
Stomach wash/vomit	3	12.00
Any physical material	3	12.00

Viscera were found in 88 percent cases pertaining to toxicological evidences. Stomach was and vomit content were collected in 12 % cases for toxicological analysis. Other physical materials like any kind of drug was also collected for toxicological analysis in 12 % cases.

Discussion of the results. This results show that viscera examination is found considered adequately. Though toxicological evidences are used significantly, the contribution ration can be improved to increase conviction rate.

Medical evidence. Various sub-categories of medical evidences and number of cases wherein such evidences are found to be considered are reflected in the below **Table-4.23.**

Table-4.23 Medical evidence and Sub-categories

Total cases mentioning medical evidence 252		
Sub-categories of evidence	**No of cases**	**Percentage**
Wounds & Injuries	223	88.49
Medical opinion	34	13.49
Bones	6	2.38

Medical evidences were obtained in 252 cases out of total 634 criminal cases considered for this study. Among which, 88.49 cases pertained to wounds and injuries as evidence, 13.49 % cases belonged to medical opinion of expert regarding post mortem changes and 2.38 % cases pertained to bones for the estimation of age, sex and stature of the body.

Discussion of the results. Wounds and injuries, Post mortem changes related opinion by medical expert and bones for the age, sex and stature determination of dead body are the mainly found medical evidences during the present study. These evidences are found considered in the cases like murder, culpable homicide not amounting to murder, grievous hurt and rape. Though Medical evidences were found more as compared to Forensic science evidences. Crime scene evidences are most important type of evidences if found and collected in scientific manner, they can help to be corroborative evidence to medical evidence and thereby help in increasing the conviction rate.

Psychological evidence. Psychological evidences are categorized in two sub-types i.e. psychological tests like polygraph (lie detector test), Narco test, Brain mapping test etc. and report of insanity.

Table-4.24 Psychological evidence and Sub-categories

Total cases mentioning psychological evidence 19		
Sub-categories of evidence	**No of cases**	**Percentage**
Psychological Tests	18	94.74
Insanity Report	1	5.26

These evidences were mostly associated with murder and rape crimes. Among these cases, 94.74 % had psychological test report (Polygraph, Narco, Brain mapping etc.) and one case had report regarding insanity.

Discussion of the results. Psychological evidences have corroborated other evidences in most of the cases, which shows that this psychological evidences are supporting as corroborative evidence in 94% of cases which is appreciable. It also reflects the increased awareness in the importance of psychological sciences in crime investigation in investigating agency as well as judiciary.

Diverse cases. During analyzing the judgments, 8.71 % judgments were found in which exact type of forensic evidence was not mentioned, instead just a word 'forensic evidence' was used. These cases does not clarify forensic evidence or forensic medicine evidence. In such cases calculation of percentage of evidence type was not possible and hence, it was not considered in any of the above categories of forensic evidences.

Status of Evidence (Appreciated or Withheld by the Court)

The term status of evidence is used for the status, whether the forensic evidence is accepted and appreciated by court of Law or withheld by the court of Law.

Table-4.25 Status of Evidence

Status of Evidence	No of Cases	percentage
forensic evidences appreciated	458	72.24
forensic evidences withheld	131	20.66
appreciation/withholding status not mentioned in judgment	45	7.10
Total	**634**	**100.00**

The above **Table-4.25** reflects that from total cases, in 72.24 % cases the forensic evidences are accepted and appreciated by court of law. In 20.66 % cases these evidences are not upheld by the court due to some reasons. The reasons for

withholding evidences are discussed further in this chapter, in section 4.2.6.1. Some judgments are found where the status of forensic evidence, whether appreciated or withheld, was not mentioned. 7.10 % cases belonged to this category.

Quantitative Summery – Type of Evidences Withheld

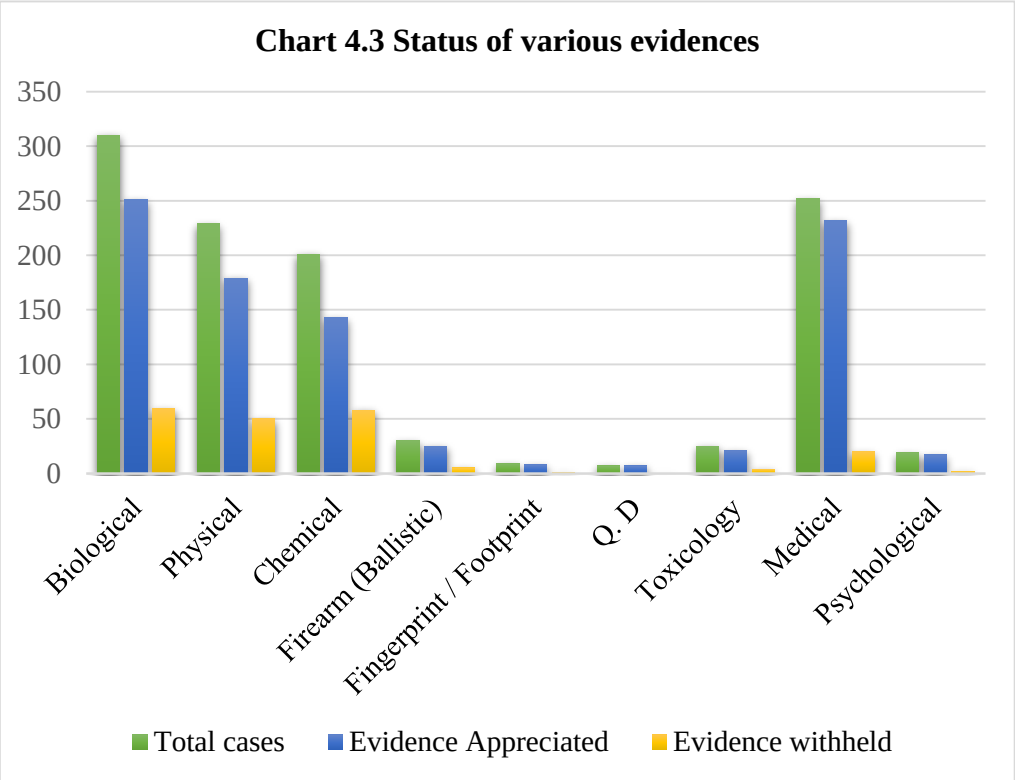
The below **Table-4.26** reflects the different type of forensic evidence and number of cases wherein those evidence were withheld by court of law.

Table-4.26 Type of evidence withheld

Type of evidence	No of cases pertaining to evidence	No of cases where evidence withheld	percentage of cases pertaining to withheld evidence
Biological	310	59	19.03
Physical	229	50	21.83
Chemical	201	58	28.86
Firearm (Ballistic)	30	5	16.67
Fingerprint / Footprint	9	1	11.11
Q. D	7	0	0.00
Toxicology	25	4	16.00
Medical	252	20	7.94
Psychological	19	2	10.52

Biological evidences are not upheld by court in 19.08 % cases. In 22.90 % cases physical evidences, 29 % cases chemical evidences, 16.67 % cases firearm evidences, 16 % cases toxicological evidences, 7.85 % cases medical evidences and 66.67 % cases psychological evidences are withheld by the Court of law due to various reasons.

Below **Chart-4.3** shows a graphical representation of status of various types of evidence. It shows that Biological, Physical, Chemical and Medical evidences have played major role where as other types of evidences have not contributed as much of them. However, this depends on type of crime. This may vary from case to case.



Level of Evidence Drop

As per mentioned in chapter-4, **t**he level of Criminal investigation and trial (i.e. primary investigation, FSL, prosecution and Court of law), up to which the forensic evidence is reached and rejected/discontinued as of that level, is termed as 'Level of evidence Drop' in the present study.

Table-4.27 Level of evidence drop in cases of withheld evidence

Total cases of withheld evidence - 129		
Level of evidence drop	**No of cases**	**percentage**
Investigating agency	45	34.35
FSL	37	28.24
Forensic Medicine	4	3.05
Prosecution	29	22.14
Court level	22	16.79
Hostile witness	16	12.21

The point of attrition of withheld evidences is quantified as per different level of drop, which is shown in the above **Table-4.27**. Among cases wherein forensic evidences were withheld by court of law, 34.35 % cases were dropped at

Investigation level, 28.24 % were dropped at FSL level, 3.05 % dropped at Forensic Medicine level, 22.14 % dropped at prosecution level, 16.79 % dropped at Court level and 12.21 % dropped due to hostility of witness.

Discussion of the results. The above results shows that the drop of evidence is majorly found at level of Investigation, FSL and prosecution. The loopholes found at these levels are discussed further.

Reasons of Evidence Drop or Attrition

The primary objective of the study is to spot the existence of lacuna, if any, among the procedural working of investigating agency, forensic experts and judiciary system. This section summarizes the reasons of evidence drop or attrition at various levels. The reasons which came into notice after critical analysis of the judgments are enlightened as follows:

1) Investigating agency Level

- Certain evidences lose their evidentiary value because of **failure in sending the evidences to Forensic Science Laboratory** for scientific analysis. It is observed that investigating agencies do not send the evidences collected from scene of crime to FSL within ascertained time limit or not send at all. Such lapse raise doubt of evidence tempering, and make evidence ineffective. Some of the relevant case examples are documented here.

  Bachubhai Mohanbhai Vs State of Gujarat [1997]

  It was stated in the judgment that the blood stained clothes of the accused were found but they were not sent to FSL by investigating agency. If this material was before the Court, it could have been determined with reasonable certainty, whether blood stains on the shirt connect the accused in any manner with the incident. Hence the accused gained benefit of doubt and acquitted.

State of Gujarat Vs Kumbhar Dhirajlal Mohanlal [1992]

In this case of murder and dowry death, the evidences – clothes of accused, deceased and quilt were not sent to FSL for chemical examination to check the presence of kerosene. They were only checked by smelling it and opined by Investigator that no smell of kerosene found.

Jethusingh Mangalsingh Bhati Vs State Of Gujarat [2007]

In this judgment, it was stated that there was no reason to keep the muddamal sample with investigating agency for a period of two days when the Forensic Science Laboratory is situated at Ahmedabad. This created a serious doubt regarding tampering of the muddamal. Hence the benefit of doubt given to accused and acquitted.

Savdas Rajsi Bhatu Vs State Of Gujarat [2007]

The seized samples were identified as High Speed Diesel (HSD) without sending it to FSL. In absence of report from the Chemical Analyser/Public Analyst, the accused could not be linked with the crime of mal-practicing in petroleum product. Hence, this evidence lost its evidentiary value.

Mamad Bhakhar Rayma Vs State Of Gujarat [2008]

This was a case of attempt to wage war. One diary was collected as evidence that could be sent to handwriting expert. It was not sent to FSL for handwriting comparison.

Jayubhai Jayram Somubhai Bhil Vs State Of Gujarat [2014]

The knife and the stone said to be stained with blood were collected as evidence. Yet it appeared that none of the muddamal articles collected in the course of investigation were sent to the Forensic Science Laboratory for chemical analysis. In absence of any such serological test report of the Forensic Science Laboratory, the court failed to rely on such evidences.

- Appropriate **sealing of samples** along with copy of seal in forwarding letter is very important consideration while dispatching samples to FSL. It is observed in several cases that such seal of police station was missing on evidence samples and/or forwarding letter. Under such circumstances the authenticity of samples turn out to be doubtful and evidence may get refused by court of Law. Some of the relevant case examples are as follows.

State Of Gujarat Vs Talabhai Versibhai [1999]

This was the case under NDPS Act, 1985. There was no seal of police station officer on the muddamal samples seized and sent to FSL for chemical analysis. It was found that such a seal was required under the said provision of the NDPS Act. Hence, the evidence was not considered by the court.

State Of Gujarat Vs Laxmanbhai Narsaiya Begmalla [2012]

The present judgment stated "There is nothing on record to indicate as to on what basis the FSL could have identified that the seals which were affixed on the muddamal were the same seals which had been affixed on the muddamal at the time when the panchnama was drawn. Under the circumstances, in the light of the discrepancies which have come on record, which cannot be said to be in the nature of minor inconsistencies, it is doubtful as to whether the muddamal which was sent for analysis to the FSL, was the very same muddamal which was recovered from the accused." By raising such doubt, the evidence was rejected by court and the accused got acquitted.

Sohanlal Kasiram Brahmin Vs State Of Gujarat [2006]

As per the judgment, the sealing procedure of samples narrated in the evidence of witness is found to be defective and possibility of tempering with muddamal cannot be ruled out. There is also contradiction with regard to the affixing of seal as the police witnesses have stated that there is only one seal affixed on the whereas F.S.L. Report says that there were

two seals on the said sample. Due to such discrepancies, the evidence was not considered by court of Law.

Mahadevgiri Mohangiri Goswami Vs State Of Gujarat [2013]

This was the case of rape and murder. Blood, semen and saliva samples were collected as biological evidences. The phials containing semen and saliva etc. had no proper seal or address of the sender except the case number. Before dispatching the articles to the FSL, a necessary entry is required to be made in the police record which had not been done in the present case. This rendered the value of evidence, consequently rejected by the court. The accused was given benefit of doubt and acquitted.

- Sample forwarded by investigating agency to Forensic Science Laboratory **without any case details and without proper panchnama** becomes of no value to court of law. As a consequence, such evidence results into suspicion and lose its evidentiary value. Many cases found having such circumstances, some of them are stated below:

Nagha Mahobatsinh Zala Vs State of Gujarat [1999]

This was the case under NDPS Act. The sample collected was first sent to FSL without any case details like case no., police station etc. and hence sent back. Then those samples again sent to FSL after corrections. So the evidence cannot be said to be flawless in this respect. And due to possibility of tempering in the samples they got rejected.

Dahyabhai Revabhai Chamar Vs State of Gujarat [2008]

This was the case of Murder. Murder weapon was recovered by investigators, but the recovery panchnama was not properly done. Hence, the recovery of the evidences were not permissible under sec 27 of Evidence act, therefore not useful for prosecution. This evidence turned of no use.

Merajbhai Kureshibhai Rabari Vs State of Gujarat [2014]

In a case of counterfeiting of currency notes, there was no evidence (panchnama) regarding proper seizure of fake currency notes confirming that notes are same which were recovered from the appellant only. The learned Judge stated that benefit of doubt was required to be given to the appellant.

- **Unguarded, Unprotected and unattended custody of evidences** make them worthless. A complete chain of custody with regard to journey of evidence samples right from seizure of that articles to receipt of that articles by responsible officer in the office of the FSL must be maintained. Due to lack of it, doubt of manipulation of evidence gets raised in court, and evidence got dropped. Following are some examples of such cases:

Ramanbhai Behcarbhai Rami Vs State of Gujarat [2002]

In the said case, there was an absence of proof regarding complete chain of custody to prove the journey of muddamal articles right from point of time when that muddamal articles were recovered and seized from the accused, till that muddamal articles were received by responsible officer in the office of the FSL. Hence evidences were not considered, Accused have been granted acquittal.

Lakhiram Narandas Bawasadhu Vs State of Gujarat [2002]

In this case, the evidence samples were handed over to the FSL but signature was not taken in mail book by policeman. Thus the chain of custody was not maintained properly. This creates a doubt as to whether the sample, which was sealed, had really reached to F.S.L. in the same condition or not. Benefit of doubt given to accused.

Ratnabhai Khetabhai Rabari Vs State of Gujarat [2012]

As per the judgment of this case, the conduct of the Investigating Officer of not keeping any notes in the register about sending the samples,

created doubts. In his cross-examination, he had admitted that he had not investigated about the entry in the register that on which date the samples were sent for analysis to the Forensic Science Laboratory. Due to Non-maintenance of proper chain of custody, benefit of doubt given to accused.

State of Gujarat Vs Jabbirsing Ratansing Indra Rajput [2013]

The learned judge stated in this judgment that the contraband articles seized in the case under NDPS Act, remained unguarded, unattended and unprotected for about five hours in the police station and, therefore, such lapse is rightly weighed against the prosecution and, therefore, benefit of doubt given to the accused.

- Specifically for crimes under Narcotic Drugs and Psychotropic Substances Act, 1985, there are some rules and conditions mentioned under which search of persons shall be conducted. Noncompliance of this conditions affect the reliability of evidence collected after search. Many cases are found in which such rules were not followed by investigators. Because of that evidence got rejected in the court. Some example cases are as follows:

Anvarkhan A. Pathan Vs State of Gujarat [1998]

In this case, As per FSL report, the substance was proved to be charas, a contraband as per NDPS Act, 1985. But the search carried out was not as per the Sec. 50 of the Act and would not prove possession of the illicit item or contraband substance. Evidence was not considered in the court and benefit of doubt given to the accused.

Himatbhai Pethabhai Vankar Vs State of Gujarat [1999]

As per FSL report, the substance was charas. But the search carried out by investigator was not as per the Sec. 50 of the NDPS Act and would not prove possession of the illicit item or contraband substance. Thus the evidence was not considered by the court.

State of Gujarat Vs Jagjivan Maganlal Valand [2013]

During court trial, the prosecution has miserably failed to establish compliance of section 50 of the NDPS Act, which compromises the conditions under which person shall be searched.

State of Gujarat Vs Mahebubkhan Firozkhan Pathan [2015]

In the said case, though the samples were proved to be ganja and charas by FSL, the evidence was not considered in court because the section 50, 52(3) and 57 of the NDPS Act and the Prohibition Act have not been properly followed.

- **Failure to collect some important forensic evidences** from the place of occurrence affects the case proceedings. Such cases may lack the proof to connect the offender with crime. Even improper collection of evidence and collection without taking help of forensic experts increases the chances of fragile evidence getting contaminated or destroyed. Such cases are mentioned here:

Lilabhai Khodabhai Bharwad Vs State of Gujarat [2007]

In the present case of murder, blood stained clothes were found as evidence but Blood of the complainant was not taken or sent to FSL. Therefore, blood grouping from clothes could not be matched with blood. Hence, the clothes lost its evidential value and not considered by court.

Mamad Bhakhar Rayma Vs State of Gujarat [2008]

In the judgment of this case, it was suggested by court that with the help of Forensic Science Laboratory experts, the Police could have collected better convincing evidence or at least could have collected some corroborative piece of evidence which can establish that admissions made by the accused in their respective statements are genuine and voluntary.

Ravibhai Bhupatbhai Baraiya Vs State of Gujarat [2013]

In this case, tyre marks were found as evidence. But FSL expert did not go to collect the tyre marks from the scene of crime. The marks of the motor cycle tyre which were received by the FSL were not in a sealed condition as well. Aforestated facts denote that the marks of the motor cycle tyre could not have been relied upon by the court.

State of Gujarat Vs Ashok Shaktidan Gadhvi [2015]

During the course of investigation, spots of blood was found between headlight and left side back door of the car. However, the said evidence turned doubtful and not reliable because F.S.L. Officers were not called for taking samples from the said car. Therefore, the said evidence was not helpful to the prosecution and rejected by the court.

- Photographs are those evidences which can be helpful in proving things at any stage of case trial. The Photography of crime scene and evidences at the time of investigation must be done in all type of crimes. Improper photographs or absence of photographs may come to be the reason of evidence drop. Following are some of the case examples to prove this fact.

Labuben Jayantilal Sagathaia Vs State of Gujarat [2013]

The photographs were presented in the court to prove the facts related to building structure of scene of crime. But they were not admissible as evidence because those photographs were taken after four years of the incident. And hence rejected by the court. If the investigators have photographed the place at the time of investigation, it would have been used as proof.

State of Gujarat Vs Ashok Shaktidan Gadhvi [2015]

No photography was done at crime scene, therefore the question raised on blood spots found on vehicle used in crime could not be proved. Thus lack of photographs disappointingly affected the case trial.

2) At Level of Forensic Science Laboratory

- Certain evidences lose their evidentiary value because Forensic Science laboratories failed to send Analysis Reports within ascertained time limit or failed to send reports at all, because of any kind reasons. Lack of FSL report also affects the preparation of charge-sheet. This renders the evidence collected by investigator unavailing. Some examples are,

  Ilaben Vs State of Gujarat [1992]

  In this case, the woman has murdered his husband with the help of servant and some friends, and confessed against court of law. The FSL report were not submitted within the prescribed time of 90 days and charge-sheet submitted awaiting FSL report. This hindered the criminal case trial. The woman convicted on her confession, if the case would be otherwise, the lack of Forensic Report would have affected more adversely to the case.

  Koli Gunabhai Kandhabhai Vs State of Gujarat [2000]

  Blood samples taken from the spot, blood stained clothes and weapons were also seized as evidence. Though these items sent to FSL, no report of Chemical Analyzer has come on record to indicate the blood groups of any of these articles. Hence, these evidences became ineffective.

- Forming an opinion and writing a report after scientific analysis of evidence is a crucial step for any Forensic Expert. Incomplete report lacking proper case detailing, mentioning of seal condition or any test procedure become reason for withholding of the expert opinion. If by chance in hurry or haste or through oversight, important details are not mentioned in the report, that is fatal to the prosecution as any ipse-dixit way of reporting cannot be accepted in criminal trial as it has no probative evidentiary value in the eye of Law. (Mahmad Hanif Shaikh Ibrahim vs State Of Gujarat, 1994). Several alike cases are found while critically analyzing judgments. Some of them are illustrated here.

Hathi Alias Mangalsinh Ramdayalji Vs State of Gujarat [1992]

In the present case, fragments of Poppy capsules were found from the accused in the crime under NDPS Act, 1985. FSL report proved the substance to be poppy capsules but it was not shown in the FSL report that opium or phenanthrene alkaloid can be extracted from this substance and such extract may be declared opium poppy by the Central Government. Thus as per court, the evidence were just fragments of poppy capsules (posna doda) by itself does not become opium poppy. This evidence was withheld by court.

Mahmad Hanif Shaikh Ibrahim Vs State of Gujarat [1994]

The particulars like reference number, details of samples received, no. of packets, weight of muddamal, date of analysis, details of seal, description of chemical tests carried out etc. was not mentioned in report by FSL. The report mentioned only conclusion, therefor not accepted by the court of Law.

Munnalal Mathuraprasad Vs State of Gujarat [1995]

In this case under NDPS Act, 1985 FSL report proved that the sample was of charas but court had not considered the evidence because sealing of the sample was not proved in the report and hence tempering could not be ruled out. The intact seal conditions on receipt of samples would have been mentioned in the report by Forensic Expert.

Natubhai Bhudarbhai Vs State of Gujarat [1998]

There were no physical identification marks described with regard to the gun recovered in the FSL report of ballistic expert. Thought the ballistic report showed that the gun was in working condition and, it was fired prior to its receipt in the laboratory, the report was not upheld by court because of the lack of details it was not possible to say that the gun

which was used for committing the offence was different than the one which recovered. Hence, benefit of doubt was given to accused.

Rajusinh Udesinh Vs State of Gujarat [2006]

This was a case of petroleum product adulteration. As FSL Report, the sample found to be adulterated, but the report did not indicate the percentage of two different liquids that were found mixed while analyzing the sample and therefore the report was not appreciated by the court. Thus due to incomplete report the evidence lost its value.

Chimanbhai Chhaganbhhai Gamit Vs State of Gujarat [2008]

In the present case, as per stated in the judgment, important documents like serological examination report and evidence of FSL that too incomplete were produced by the prosecution at the belated stage of recording further statement. Hence got rejected by the court.

Vishwasrao Madhavrao Patil Vs State of Gujarat [2013]

In the present case of consumption of alcohol, the blood samples were sent to FSL for alcohol content analysis. The FSL report proved the presence of alcohol content, but report was undated hence not considered by court. The accused Benefitted of Doubt.

- Failure of maintaining proper chain of custody give rise to question on authenticity of evidence. Such error makes the evidence unacceptable in the court. Some cases found with such error.

Lakhiram Narandas Bawasadhu Vs State of Gujarat [2002]

The samples were handed over to the FSL but signature was not taken in register book by policeman. It was the duty of person who received the samples at FSL to sign the register on receiving too. Thus the chain of custody was not maintained properly. This created a doubt as to whether the sample, which was sealed, had really reached to F.S.L. in the same condition or not. Benefit of doubt given to accused.

State of Gujarat Vs Govindbhai Vershibhai Thakor [2013]

In this case, there was no record in the Muddamal Receipt Register regarding the time when the muddamal was received or when it was sent for examination, which was a circumstance that raised other doubts, for which there was no satisfactory explanation. These aspects render the case of the prosecution suspicious.

- While conducting analysis of forensic evidences, appropriate methods must be used by experts. Some evidences can be used for more than one type of analysis, e.g. blood samples cab be used for both blood grouping and DNA analysis. An experienced forensic expert must use his knowledge as per the case details to decide the ways that how any case can be solved, and which type of tests should be conducted on sample received. The evidence becomes of no use due to analysis being not conducted by following proper tests and methodology. Some alike case examples are as follows:

Rajan Johnsanbhai Christy Vs State of Gujarat [1997]

This was a case of murder in which polygraph test was conducted on the accused. But the polygraph test was not considered because the FSL officer confessed that he had not followed the appropriate method while conducting the test.

Panchvati Auto Centre Vs State of Gujarat [2007]

In this case of mal-practicing of petroleum products, the sample was primarily tested on spot and then samples were sent to FSL for further analysis. But there was Inconsistency between findings in on the spot inspection and FSL report, due to this reason the court did not consider the evidence.

Prahlad Alias Prakash Vs State of Gujarat [2012]

During the investigation of this case, decomposed dead-body was found. The identification of dead-body was difficult. The biological samples

were analyzed but DNA test was not undertaken from viscera by the FSL, if done, the identification of the dead body could have been established.

- Several case trials under NDPS Act, 1985 are found in which Forensic analysis of evidence was carried out only to detect the unknown substance. However, the purity test to detect exact present in the substance was not performed. This test is very much necessary in cases of Narcotics and Psychotropic substances where the punishment content of active principle depends on the quantity of active principle. Some of the cases are stated below.

Maheraj Mayuddin Shaikh Vs State of Gujarat [2013]

The FSL proved the substance to be diacetyle morphin (heroin) but the purity test (to detect quantity of active principle) was not performed. Due to lack of evidence proving exact quantity, it was considered as small quantity and punishment given accordingly.

Anandi Gandori Thakur Vs State of Gujarat [2014]

In the present case, FSL report proved that the substance seized was ganja. But the evidence in the form of FSL report produced by the prosecution was incomplete. It was, therefore, not possible to come to a concrete conclusion whether the contraband seized was a small quantity or a commercial quantity or a quantity lesser than the commercial quantity but more than small quantity. Hence, punishment given considering small quantity.

Vallabh Narsaiya Malaiya and Other Vs State of Gujarat [2015]

As per FSL report, the substance was ganja but in the instant case, the laboratory test had not revealed the exact percentage of active principle in the substance. Hence benefit was given and quantity considered as small quantity and punishment was given accordingly.

3) At Level of Forensic Medicine

- Certain failure on the part of medical examiner like not mentioning proper details in Post mortem report and not collecting appropriate viscera evidence may result into unacceptance of evidence. The examples of such cases are,

  Ghanshyam Alias Ganiyo Dayaldas Pithani Sindhi Vs State of Gujarat [2008]

  In the present case, as per PM report, medical officer extracted 100cc of blood from dead body of deceased for analysis. On sample it was mentioned 120ml and when Forensic expert opened the sealed sample it was only 50ml. This discrepancy caused suspicion, as a result benefit of doubt given to accused.

  State of Gujarat Vs Anil Keshavji Ravani [2013]

  In the present case, the cause of death was found to be poisoning. The viscera analysis did not find presence of any poisonous material. It was stated in the judgment that if the stomach wash was preserved and sent to chemical analyzer, the exact nature of poison consumed could be traced.

4) Prosecution level

- Failure in presenting evidences in court during trial is the major disadvantage on the part of prosecution. Even if evidence was collected from scene of crime, analyzed in the FSL and then not considered just because of such failure of prosecution can cause major damage to the innocent. Some case examples are given as follows.

  Shakrabhai Valabhai Patel Vs State of Gujarat [2003]

  The evidences were collected from scene by investigator, provided exhibit status, analyzed at FSL, but not produced by the Prosecution. If the evidence would have been presented in the court, it would have corroborated other facts and assisted in the case trial.

State of Gujarat Vs Bhikhabhai Bholabhai Koli [2007]

In the present case, the prosecution did not place on record the serological record of the F. S. L. which ascertained blood group of blood on weapon as well as on the clothes of the accused.

Parshnath Asthana Vs State of Gujarat [2010]

In the present case of cheating and dishonesty, the signature was collected as evidence and sent to document examiner for comparison of writings. The report of document examiner was not produced by the prosecutor at court trial.

Ramgaud Arakti Gaud Vs State of Gujarat [2011]

This was a case of murder, in which blood samples were collected as evidence. But the report of the Forensic Science Laboratory was not placed on record by the prosecution.

- When prosecution fails in proving some facts regarding evidences during trial in court, those evidences may become futile. Some related case examples are given as follows.

State of Gujarat Vs Bhuriya Alias Kanaiyalal Dalpatram [1999]

During the trial of this case, the prosecution has failed to prove satisfactorily that the same substance which was seized from the respondent was sent to the Forensic Science Laboratory for analysis. This made the evidence ineffective.

State of Gujarat Vs Raj Bahadursinh Alias Raju Ram Balisinh [2014]

In the present case of NDPS Act, the FSL report stated that the seized muddamal was cannabis. But the prosecution had not followed the mandatory provisions. The possession of the said seized cannabis is not proved by the prosecution by producing cogent and material evidence. The prosecution has failed to prove its case beyond reasonable doubt.

State Of Gujarat Vs Jiva Daya Pandavadra [2015]

During the trial of the present case, the prosecution could not prove any single iota of evidence. Due to which all the evidences withheld by the court.

5) Court Level

- There must be a chain of evidence for complete incidence. It must not leave any reasonable ground for the doubt on conclusion consistent with the innocence of the accused or must show that in all human probability the act must have been done by the accused. (Ravibhai Bhupatbhai Baraiya Vs State of Gujarat, 2013). During trials of some cases, the circumstantial evidence needs other corroborative evidences. Courts do not rely upon only circumstantial evidence. Many forensic evidences are rejected by court due to lack of other corroborative evidences.

Ratansing Vs State of Gujarat [2011]

This was a case of murder in which firearms were found as evidence. These evidences were analyzed by Ballistics experts. But that there was no other proof of arms having been used by the accused for commission of offence and, therefore, ballistic report was of no significance.

Khodabhai Babubhai Gohel Vs State Of Gujarat [2012]

The FSL report proved that the bloodstains of the deceased were found on the pants of the accused as well as the bloodstains of the deceased were also found on the weapon. But no other evidence was there to support. Hence, FSL report was only one circumstance, upon which court couldn't relied for conviction.

Mukesh Shobharam Gupta Vs State of Gujarat [2012]

In the present case of rape, the serological report of Forensic Science Laboratory suggested that undergarment of the prosecutrix had sustained semen mark with bloodstains of Group "A. Though, the blood

groups of both the accused are of "A" group, it is difficult to believe that who was the accused and who committed the offence of rape, that too after collecting the said undergarment after 20 days, and that too in absence of any direct evidence of prosecutrix in a nature of her deposition. Hence, not considered by court. In this case, the evidence collections was done very late, and only ABO grouping was performed. Here, other blood grouping techniques could be used for further individualization.

State of Gujarat Vs Koli Nathu Keshav [2012]

In the present case, blood stains of deceased persons found on the clothes of the accused as well as weapon as evidence. This could be considered as one of the circumstances, but, in absence of other circumstances to complete the chain of circumstantial evidence, this was not considered by court of law.

6) Hostility of Witness/Panch

- Criminal Judicial System in this country is at crossroads, many a times, reliable, trustworthy, credible witnesses to the crime seldom come forward to depose before the court or even the hardened criminals get away from the clutches of law. Even the reliable witnesses for the prosecution turn hostile due to intimidation, fear and host of other reasons. Due to such witnesses who turned hostile, the evidences collected in their presence, also becomes worthless. A lot of cases are found where forensic evidence were not considered due to such reasons. Some of them are mentioned as follows.

State of Gujarat Vs Mer Kana Rinabhai Divraniya [2007]

The panchas of weapon recovery panchnama turned hostile. Hence recovery of weapon was not proved in the court and this evidence became worthless.

Jethalal Alias Batuk Alias Batko Dhanji Khamba Vs State of Gujarat [2011]

During the trial of present case, discovery of the weapon and the wearing apparel were not proved as panch became hostile. Hence, the fact that the blood appearing in the alleged wearing apparel tallied with the blood of the victim could not be taken into account for convicting the accused.

State Of Gujarat Vs Kalubhai Jivabhai Dungaria and Ors. [2013]

In the present case, the FSL proved the seized substance as ganja but the panch witness turned hostile upon being asked regarding the contents of the bag and the "Thaila". Thus, the Panch witnesses have been declared hostile and the Panchnama has not been proved. So this evidence also turned out to be ineffective.

Chimanbhai Bhuliyabhai Nayak Vs State of Gujarat [2014]

In the present case of murder, except the scientific officer, Circle Inspector, the Doctor who made the postmortem examination and the Investigating Officer, all the witnesses have become hostile during case trial and the evidences could not be taken into consideration.

Verdict of the Court

Below **Table-4.28** gives information about final decisions given by court in the criminal cases considered for the present study.

Table-4.28 Verdict of the Court

Final Verdict of the Court	No of Cases	Percentage
Convictions	389	61.36
Acquittal	212	33.44
Other than conviction and acquittal	33	5.21
Total	**634**	**100**

In 61.36 % cases, court delivered order of convictions and sentence accordingly. Whereas in 33.44 % cases, acquittals were given by the court. Out of total some criminal appeals were bail applications and PIL's where final verdicts were different from this. In some cases reinvestigation orders were given by court. 5.21 % cases belonged to this class.

Correlation between Status of Forensic Evidence and Verdict of the Court

Whether final verdict of court has any correlation with appreciation or withholding status of forensic evidence is the key hypothesis of this study. This question has been answered using cross-tabulation method and Pearson's chi-square formula of statistical calculation.

The cross-tabulation is shown in the below **Table-4.29**, which reflects that in 77.29 % cases where forensic evidences are appreciated, conviction is the final verdict. Whereas in 86.26 % cases where forensic evidences withheld by court, acquittal is the final verdict.

Table-4.29 Correlation between Status of Forensic Evidence * Verdict of court Cross - Tabulation

			Verdict of Court			Total
			Conviction	**Acquittal**	**Other**	
Status of Evidence	**Appreciated**	Count	354	75	29	458
		% within Status	77.29	16.38	6.33	100.00
	Withheld	Count	18	113	0	131
		% within Status	13.74	86.26	0	100.00
	Not mentioned	Count	17	24	4	45
		% within Status	37.78	53.33	8.89	100.00
Total		Count	389	212	33	634
		% within total	61.36	33.44	5.21	100.00

This shows that appreciation of forensic evidence influences the conviction rate positively. It is clearly evident that where forensic evidence is not considered, there is greater percentage of acquittal and also reduction in conviction rate.

Hypothesis Testing: Pearson's Chi-square Test

Hypothesis $H_0$1: There is no significant relation between status of Forensic Evidence and Final verdict of Gujarat High Court.

Table-4.30 Chi square test - Status of Forensic Evidence and Final Verdict of Court

	Value	d.f (υ)
Pearson's Chi-square Calculated χ^2 (α)	235.09	4
Pearson's Chi-square Tabulated χ^2	13.28	4

Tabulated chi-square at 4 d.f. is 13.28. Since calculated chi-square is much greater than the tabulated value, it is highly significant and null hypothesis is rejected at 1% level of significance. Thus, it is concluded that status of forensic evidence is related to final verdict of Gujarat High court.

Results Pertaining to Rape Case Judgments by Supreme Court of India

All the results pertaining to rape case judgments delivered by Hon'ble Supreme Court of India are discussed in this section. . The decade wise number of total delivered judgments in rape cases and judgments pertaining to forensic evidences is represented in below **Table-4.31.**

Table-4.31 Number of judgments mentioning forensic evidence per decade (Supreme Court of India – rape cases)

Year	No. of Judgments delivered	No. of judgments mentioning Forensic evidence	percentage (cases involving forensic evidence)
1951-1960	2	0	0.00
1961-1970	5	0	0.00
1971-1980	15	2	13.33

1981-1990	11	0	0.00
1991-2000	66	7	10.61
2001-2010	160	14	8.75
2011-2015	158	33	20.89
Total	**417**	**56**	**13.43**

A total of 56 rape case judgments disseminated by Hon'ble Supreme Court of India came across the study's inclusion criteria. Out of almost 417 judgments delivered by Hon'ble Supreme Court of India in rape crimes (as retrieved from database of 'The Laws') during the period form year 1951 to 2015, total 56 case judgments were found in which forensic evidence were mentioned. This was approximately 13.43 % of the total cases.

Forensic Evidence Considered in Rape Cases – Supreme Court of India

This section summarizes the different kind of forensic evidences collected in the rape cases trialed in the Supreme Court of India. Below **Table-4.32** reflects various types of forensic evidences and number of cases wherein such evidences are found considered.

Table-4.32 Forensic Evidence found considered in Rape Cases – Supreme Court of India

Total cases mentioning forensic evidence (n=56)		
Evidence Type	**No of Cases**	**Percentage**
Biological	47	83.93
Physical	5	8.93
Chemical	0	0.00
Firearm (Ballistic)	0	0.00
Finger print/ foot print	1	1.79
Questioned Document (Q.D)	2	3.57
Toxicological	0	0.00
Medical	35	62.50
Psychological	0	0.00

Biological and medical evidences are considered in maximum number of cases. They contributed to 83.93 and 62.50 % cases respectively. Physical evidence found in 8.93 % cases. Fingerprint evidence found in 1.79 % cases. Questioned Document were found in 3.57 % cases.

Discussion of the results. Biological evidences are most apparent to be found in cases of rape. Moreover, this results also reflects that forensic biological evidences are found considered in 83.93 % cases which is appreciable up to certain level. This shows that forensic evidences are fairly used in cases of rape. However, Forensic medical evidences are used in less cases compared to biological evidences.

Quantitative Assessment of Various Types of Evidences and its Sub-categories in Rape Crimes Trialed in Supreme Court of India

This Section deals with evidences of various categories, which were involved during investigation of rape crimes. This will show the level of contribution of each evidence and its substrate. Following tables show contribution ratio of various biological, physical, chemical, firearm, fingerprint, Questioned Document, toxicological, medical and psychological evidences.

Biological evidences (rape cases - supreme court of India).

Biological evidences like blood, semen, vaginal secretions etc. are very significant evidences during trials of rape cases. The following **Table-4.33** reflects various biological evidences and number of rape cases wherein these evidences found considered.

Table-4.33 Biological evidence and subcategories – Rape cases: Supreme Court of India

Total cases involving biological evidence - 47		
Sub type of evidence	**No of cases**	**percentage**
Blood stained articles (Including clothes and weapon)	38	80.85
Blood Sample	33	70.21
Semen	10	21.28
Vaginal Swab/smear	20	42.55
Pubic hair	7	14.89
Saliva	0	0.00
Hair	1	2.13
DNA profiling	1	2.13
Nail	0	0.00
Bones	0	0.00

Blood stained articles were found in 80.85 % cases and blood samples were collected in 70.21 % cases. Semen was found in 21.28 % cases whereas vaginal swabs had been taken into consideration in 42.55 % cases. Other evidences were pubic hair (14.89 %), DNA (2.13 %) and hairs (2.13 %).

Physical evidences (rape cases - supreme court of India). Physical evidences like Weapon of offence, soil and some other miscellaneous items were collected during the crime investigations. The **Table-4.34** reflects sub-categories of physical evidence and number of cases.

Table-4.34 Physical evidence and subcategories – Rape cases : Supreme Court of India

Total cases involving physical evidence - 5		
Sub type of evidence	**No of cases**	**percentage**
Weapon	2	40.00
Soil	2	40.00
Currency notes	0	0.00
Electronic evidence	0	0.00
Vehicle	0	0.00
Miscellaneous evidences	1	20.00

Weapon was found considered in 40 % cases. Soil was also found in 40 % cases. Other miscellaneous evidences were found in 20 % cases.

Fingerprint/footprint evidences (rape cases - supreme court of India). Following **Table-4.35** reflects number of cases wherein fingerprint evidence is found considered.

Table-4.35 Fingerprint/Footprint evidence and subcategories– Rape cases : Supreme Court of India

Total cases involving fingerprint/footprint evidence - 01		
Sub type of evidence	**No of cases**	**percentage**
Finger print	1	100.00
Foot print	0	0.00

Only one case was observed, in which fingerprint was found considered as evidence. Footprint is not collected in any cases. This was also observed in

judgments of Gujarat High Court. This result raise question about the presence of forensic evidence at crime scenes. The question is whether there was, in fact, no forensic evidence at these scenes or whether the evidence existed but was not collected.

Questioned document evidences (rape cases - supreme court of India). Below **Table-4.36** reflects number of rape cases wherein questioned Document is found considered.

Table-4.36 Questioned Document evidence and subcategories – Rape cases : Supreme Court of India

Total cases involving Q.D evidence - 02		
Sub type of evidence	**No of cases**	**percentage**
Handwritings	2	100.00

Any document found as evidence and question raised on its authenticity is considered in this category. Only 2 cases were found wherein such kind of evidence was found considered. The evidences were handwritten documents.

Medical evidences (rape cases - supreme court of India). Medical evidence is a crucial type of evidence during investigating rape cases. This category includes evidences like wounds and injuries, bones and opinion of medical examiner. The below **Table-4.37** reflects various types of medical evidence and number of rape cases wherein such evidences are found considered.

Table-4.37 Medical evidence and subcategories – Rape cases : Supreme Court of India

Total cases involving medical evidence - 35		
Sub type of evidence	**No of cases**	**percentage**
Wounds & Injuries	14	40.00
Medical opinion	28	80.00
Bones	0	0.00

This category of evidences were found in large number of cases. Wounds and injuries were observed in 40 % of cases. Medical opinion was found considered in 80 % cases. Bone are not collected in any of these cases.

Diverse cases. In 8.51 % cases, the exact type of biological evidence was not mentioned, they have contributed during investigation. Such evidences are mentioned here under the sub-category named 'some evidences'.

Status of Evidence (Appreciated or Withheld by the Court): Supreme Court of India

The term status of evidence is used for the status, whether the forensic evidence is accepted and appreciated by court of Law or withheld by the court of Law.

Table-4.38 Status of Evidence – Rape cases : Supreme Court of India

Status of Evidence	No of Cases	percentage
Forensic evidences appreciated	45	80.36
Forensic evidences withheld	5	8.93
Appreciation/withholding status not mentioned in judgment	6	10.71
Total	**56**	**100.00**

The statistics given in above **Table-4.38** reflects that from total cases, in 80.36 % cases the forensic evidences are found accepted and appreciated by court of law. In 8.93 % cases these evidences are not upheld by the court due to some reasons. The reasons for withholding evidences are discussed further in this chapter. Some judgments are found where the status of forensic evidence, whether appreciated or withheld, was not mentioned. 10.71 % cases belonged to this category.

All medical evidences and physical evidences were appreciated by the court. Approximately 11 % biological evidences were withheld by court due to

various reasons. The reasons behind this fact are discussed in the next section of this chapter.

Level of Evidence Drop – Rape Cases: Supreme Court of India

The levels considered are Investigation agency, Forensic Science Laboratory, prosecution and Court of law. Among these levels at which level, the forensic evidence is reached and rejected/discontinued, is termed as 'Level of evidence Drop' in the present study.

Table-4.39 Level of evidence Drop - Rape cases : Supreme Court of India

Total cases of withheld evidence - 5		
Level of evidence drop	**No of cases**	**percentage**
Investigating agency	3	60.00
FSL	1	20.00
Forensic Medicine	0	0.00
Prosecution	1	20.00
Court level	0	0.00
Hostile witness	1	20.00

The point of attrition of withheld evidence quantified as per different level of drop is shown in above **Table-4.39.**

Reasons behind Evidence Drop/Attrition

The reasons and loopholes found during the judgment study related to Supreme Court of India are similar to the High court of Gujarat. This strengthens the findings of the present study.

At investigating agency level, the reasons behind rejection or inadmissibility of forensic evidence by court of law comprises failure in sending evidence to FSL, improper collection of evidences and investigation done in slipshod manner. This lacuna on the part of the investigating agency proves to be fatal for the innocent and victim person.

Other lacunas are found at the levels of FSL and prosecution. The inadequate functioning of Forensic experts and prosecuting lawyers also affects

adversely to the utility of forensic evidences. The hostility of witness also turns the evidence ineffective during the case trials.

This reasons are found similar in both the parts of study, i.e. Judgments by High Court of Gujarat and Supreme Court of India. Detailed reasoning is mentioned in the previous section 4.2.6.1.

Correlation between Status of Evidence and Verdict of Court: Cross – Tabulation and Chi-square test (Supreme Court of India)

Whether verdict of Supreme Court of India has any correlation with appreciation or withholding status of forensic evidence is analyzed using cross-tabulation method and Pearson's chi-square formula of statistical calculation.

Table-4.40 Status of Evidence * Verdict of Court: Cross - Tabulation (Supreme Court of India)

			Final Decision of Court		**Total**
			Conviction	**Acquittal**	
Status of Evidence	**Appreciated**	Count	39	6	45
		% within Status	86.67	13.33	100.00
	Withheld	Count	2	3	5
		% within Status	40.00	60	100.00
	Not mentioned	Count	4	2	6
		% within Status	66.67	33.33	100.00
Total		Count	45	11	56
		% within total	80.36	19.64	100.00

The cross tabulation, in above **Table-4.40**, shows that in 86.67 % cases wherein forensic evidences are appreciated, conviction is the final verdict. Whereas in 60 % cases wherein forensic evidences withheld by court, acquittal is the final verdict. This shows that appreciation of forensic evidence influences the conviction rate.

Hypothesis Testing: Pearson's Chi-square Test

Hypothesis $H_0$2: There is no significant relation between status of Forensic Evidence and verdict of Supreme Court of India.

Table-4.41 Chi square test - Status of Forensic Evidence and Verdict of Court (Supreme Court of India)

	Value	d.f (υ)
Pearson's Chi-square Calculated χ^2 (α)	7.023	2
Pearson's Chi-square Tabulated χ^2	5.991	2

Tabulated chi-square at 2 d.f. is 5.991. Since calculated chi-square is much greater than the tabulated value, it is highly significant and null hypothesis is rejected at 5% level of significance. Thus, it is concluded that status of forensic evidence is related to verdict of Supreme Court of India.

Summary of Outcomes

In this chapter results and interpretations found on critically evaluating judgments by the Hon'ble High court of Gujarat and Hon'ble Supreme Court of India are discussed. The results are discussed in two different sections using descriptive statistics. Forensic Evidences majorly contributed in the cases of murder, rape and possession of illegal drugs. Major types of evidences came across are biological evidence, physical evidences, chemical evidences and medical evidences. An observation found, very contrast to general hypothetical belief, is fingerprint evidences are came across only in 9 cases out of total.

The relation between two variables i.e. status of evidence and final verdict of the court is established using cross-tabulation method. The Hypothesis formulated are tested using Pearson's chi-square formula and rejected the null hypothesis. Thus, a significant relation between status of evidence and final verdict of the court is proved by this study. This is clearly found that when forensic evidence is not considered by court, there is greater percentage of acquittal and also reduction in conviction rate.

The reasons for withholding of forensic evidence in court are explained in detail with case examples. Some of the errors excavated at various levels of investigation, analysis and prosecution are improper collection and packaging of evidences, improper sealing and overlooking important official bureaucracies, failure in sending evidences to FSL in time, improper techniques of evidence analysis, unprotected custody of evidences, not maintaining chain of custody etc., due to which evidences had lost its evidential value in court. This can be taken into consideration to make the forensic evidences more effective during criminal investigations and trials.

The conclusions of the present study drawn from these results along with suggestions and recommendations are expressed in the next chapter.