

Knowledge and Attitude of Medicos about National Forensic DNA Database

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| Received: 23.12.2020 | Accepted: 04.01.2021 | Published: 08.01.2021

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Abstract

The existence of National Forensic DNA Database enormously helps investigations & control of crime. But criticisms have been raised at the ethical & social risks from misuse of DNA database. In India, there is no legislation on DNA profiling. Hence, peoples' support is required. So, we aimed to study the knowledge & attitude about the benefits & risks of National Forensic DNA Database among 400 medical students. We found that the knowledge about the use of DNA fingerprinting as an evidence is good. The knowledge about National Forensic DNA Database & its current status in India is poor. Most of them (87.5%) opinioned that it's a step forward in criminal investigations. 42% felt it's beneficial. Many of them doubted its efficiency (40%), safe guarding (53%) & its establishment (47.5%) in India. Many of them feel that they have privacy issues (62.7%) & it has potential to harm (39.3%). 51.5% felt it should be a permanent record. Most of them supported for inclusion of all crime scene stains, suspects, recordable offence, missing persons & unidentified dead bodies DNA should be profiled. 42.75% were willing to provide their DNA samples. Hence, we found that the knowledge of medical students about National Forensic DNA Database is not adequate. This will lead to lack of support & may be interpreted as violation of human rights. But most of them supported the need for such a database; hence creating awareness on our part will definitely help in improving the people's understanding.

Keywords: DNA database, forensic medicine, India, medical students, DNA fingerprinting, criminology.

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INTRODUCTION

Forensic genetic fingerprinting can be defined as the comparison of the DNA in a person's nucleated cells with that identified in biological matter found at the scene of a crime or with the DNA of another person for the purpose of identification or exclusion [1]. DNA fingerprinting has been extensively used in the court room for civil as well as criminal adjudication worldwide and to establish the individual identity [2]. By the late 1990s, DNA evidence is granted exceptional legal status [3]. However, DNA evidence may be used only as corroborative evidence and not as a conclusive proof especially in criminal cases. In the field of forensic genetics, there is no doubt that the existence of DNA criminal databases benefits the control and investigation of crime. However, certain criticisms have been raised at the ethical and social consequences resulting from the inappropriate use of such databases [3]. Indian courts are relying on DNA evidence both in civil and criminal matters but there is no legal regime on DNA profiling. Since nearly a decade, India is attempting to legislate on DNA profiling; the billing is waiting for placement in the Parliament [4]. In this sense, the support of the population is essential for

those regulations that propose the extension of police powers in the collection and storage of biological samples, as well as their corresponding DNA analyses. Without such backing, such measures may cause the society to distrust the nature of the protection afforded by the legal system and be interpreted as interference in the civil liberties and human rights of the individual [4]. In this backdrop of civil and criminal laws and changing ethical and societal attitudes, it is concluded that the DNA legislation in India and world-wide needs to be designed with utmost care [5]. So far, no such study has been conducted to know the public understanding and attitude about the forensic use of DNA in India to the best of our knowledge. So this study aims at knowing the medical students' knowledge about the use of forensic DNA fingerprinting as evidence in the judicial realm, National forensic DNA Database and its current status in India, their attitude about its efficiency, benefits, risks and difficulties in establishing of a National forensic DNA database, knowledge and attitude about inclusion and retention criteria for DNA profiles and their willingness to support it.

MATERIAL AND METHODS

Inclusion criteria: Medical students
 Exclusion criteria: Non-medical students and unwilling participants
 Sampling: Simple random sampling
 Study design: Cross sectional descriptive study
 Study area: Dhanalakshmi Srinivasan Medical College and Hospital, Perambalur, Tamil Nadu- 621 113, India.
 Sample size: 400

After obtaining Institutional Ethics Committee clearance, the data collection was started. Through online Google survey forms, the data were collected using a pre-tested, semi structured questionnaire. The questionnaire included questions regarding their sociodemographic data, knowledge about use of DNA fingerprinting as an evidence in judicial realm, National forensic DNA Database, their attitude about its efficiency, benefits, risks and difficulties in establishing of a National forensic DNA database, knowledge and attitude about inclusion and retention criteria and their willingness to support it.

After the submission of the questionnaire, information containing the details about the significance of use of DNA as evidence in establishing justice, the importance of National Forensic DNA Database in avoiding the miscarriage of justice, its benefits and risks and its current status in India were provided to all the study participants.

The data collected from all the participants were replicated in an Excel spreadsheet and a master chart was made containing all the information provided by the study participants. The data was analyzed using appropriate statistical methods and represented by tables, graphs and pie charts and various statistically significant tests were applied accordingly. IBM statistical package for social sciences SPSS version 21 was used for analysis.

All the data collected in the study was kept confidential and was used for research purpose only.

RESULTS

Sociodemographic data

Male - 197, Female - 203
 MBBS I year- 75, II- 159, III- 48, IV- 113, interns – 5
 Age range is 17 to 24.

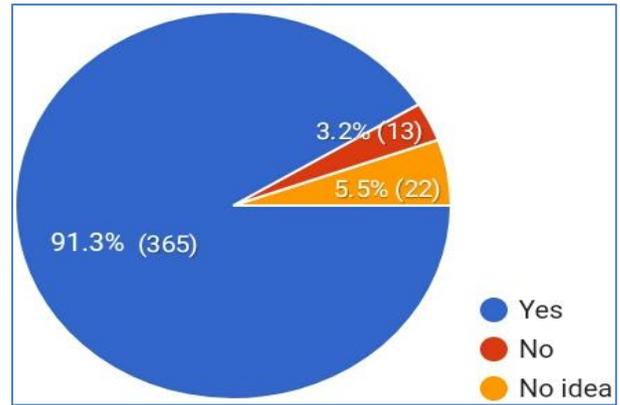


Fig-1: DNA as evidence

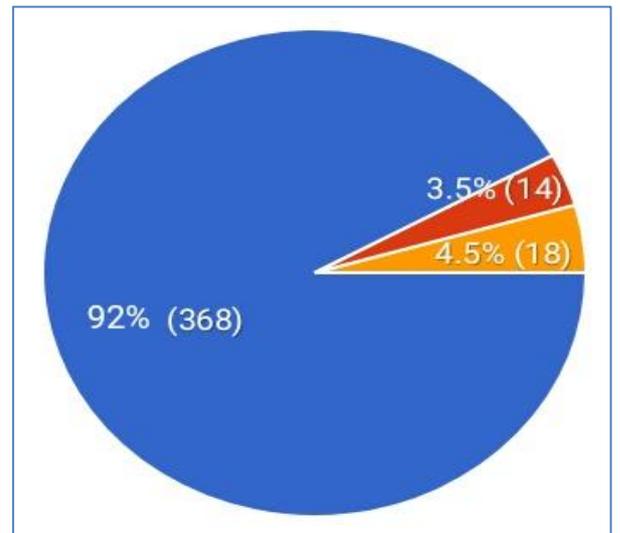


Fig-2: DNA fingerprinting is reliable evidence

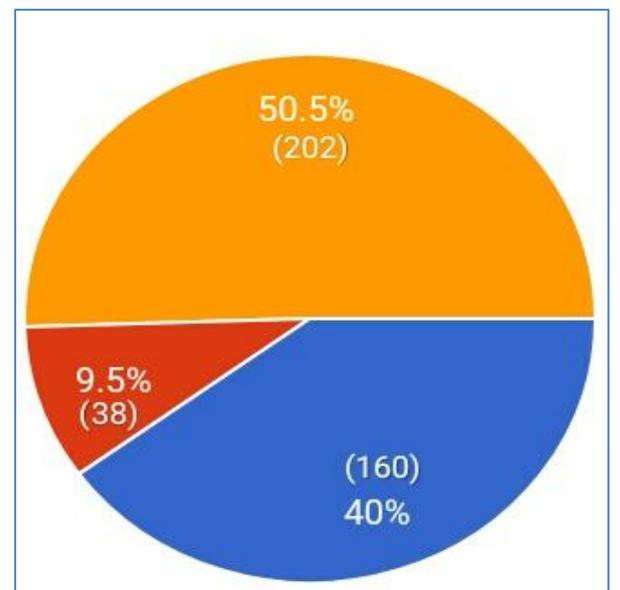


Fig-3: Legislation on use of DNA in India (in judicial system)

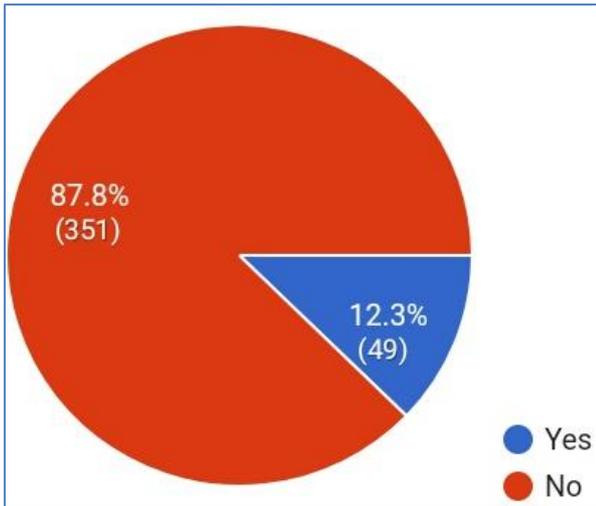


Fig-4: Have you heard about National Forensic DNA Database?

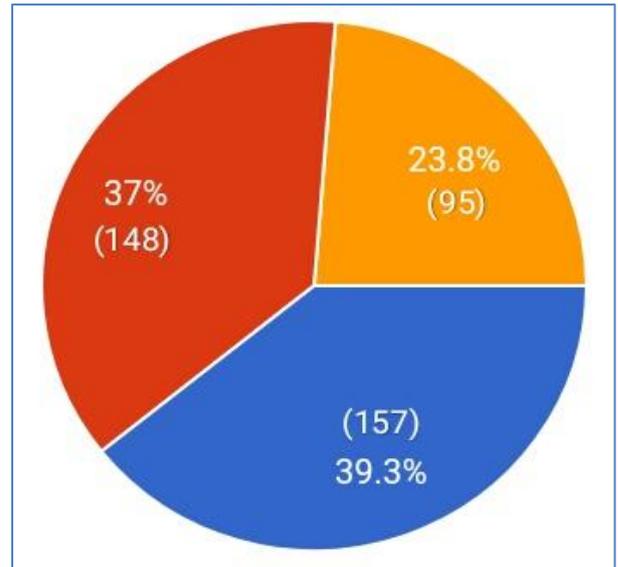


Fig-7: Genetic information has potential to harm

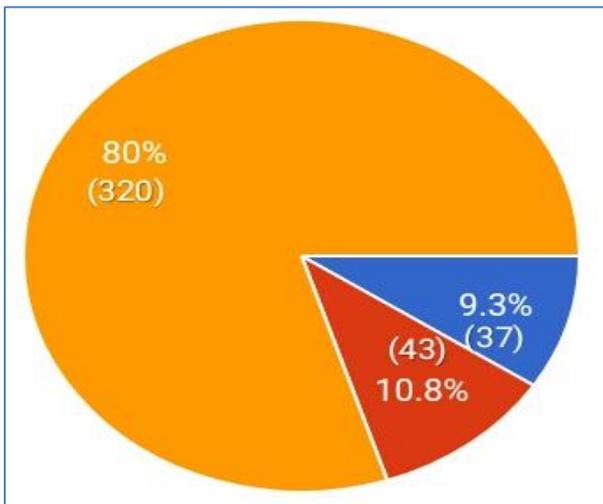


Fig-5: Is there any National Forensic DNA Database in India?

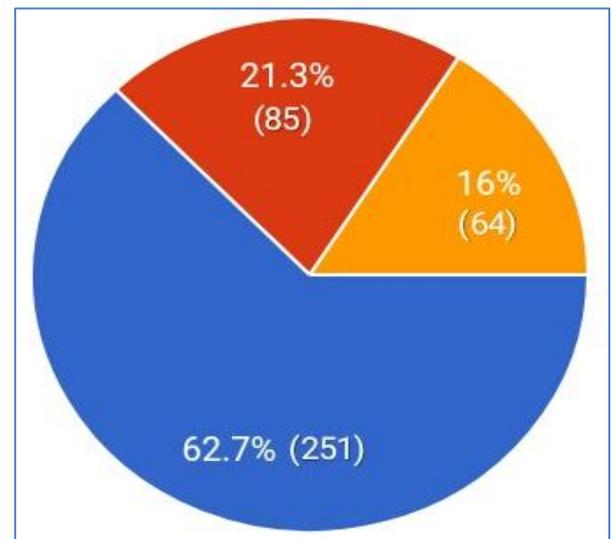


Fig-8: Privacy affected in sharing DNA profile

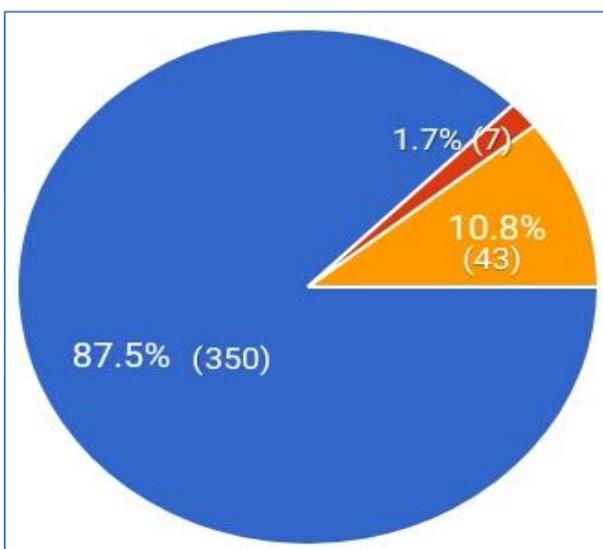


Fig-6: It is an important investigatory resource (crimes, unidentified bodies)

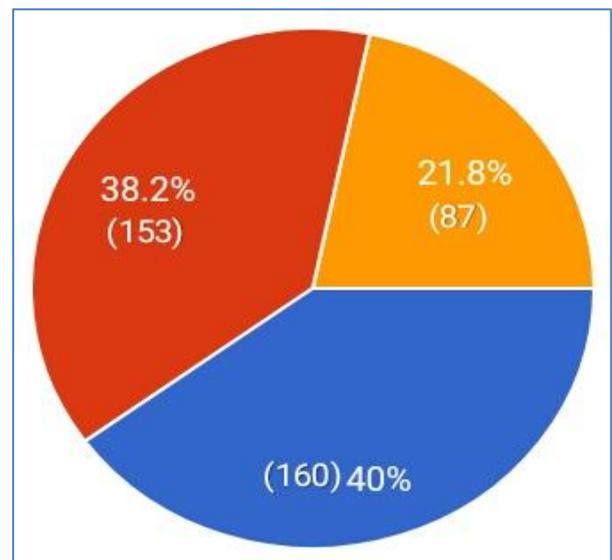


Fig-9: It will not be efficient

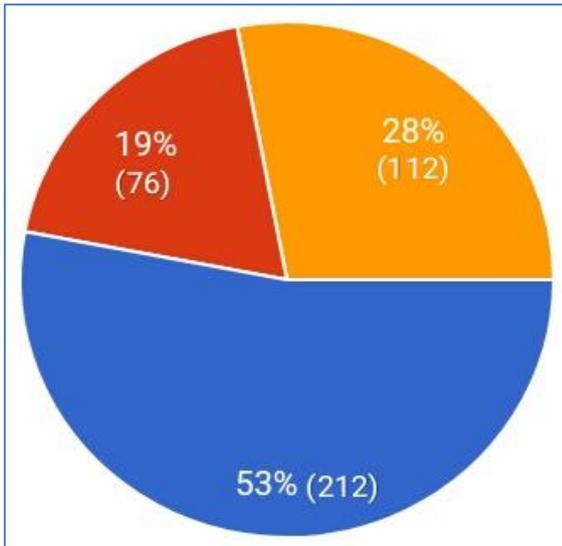


Fig-10: There will be lack of safe guarding

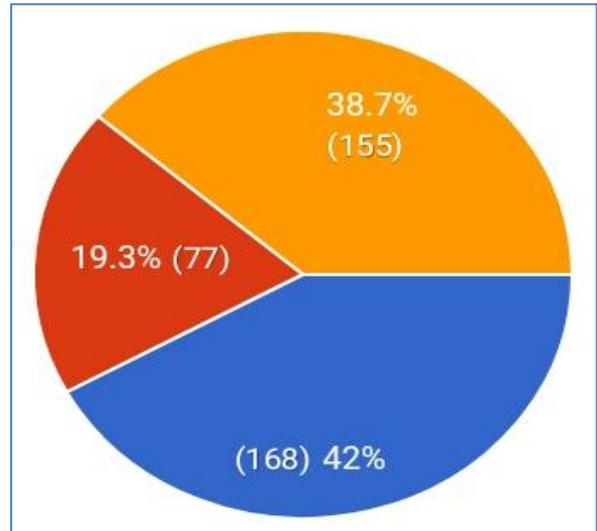


Fig-14: Benefits will override social & ethical costs

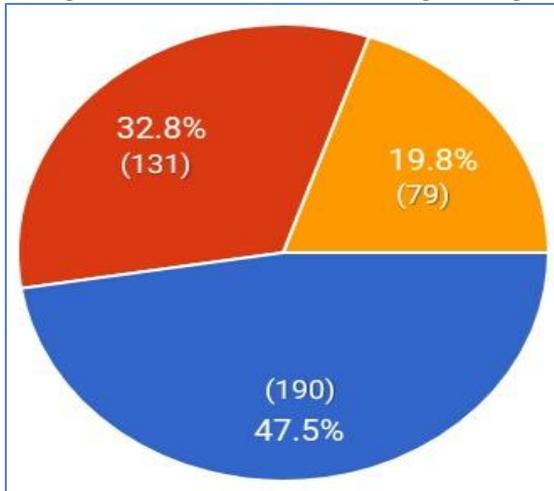


Fig-11: Not feasible for India

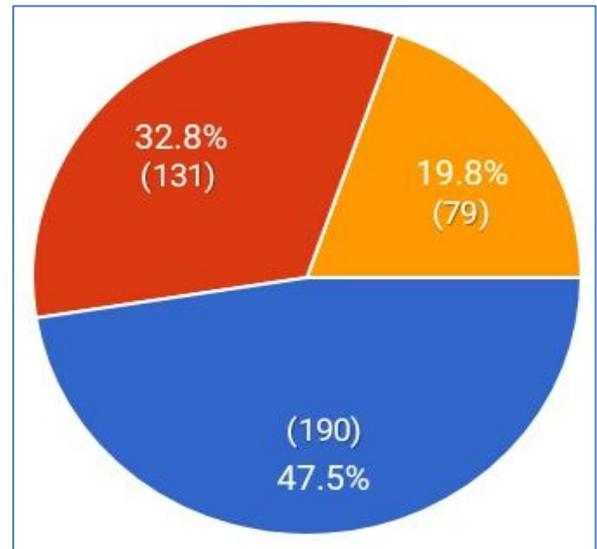


Fig-15: Willing to provide my DNA (if requested)

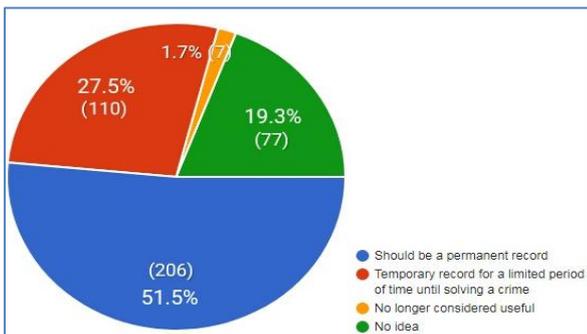


Fig-12: Retention criteria

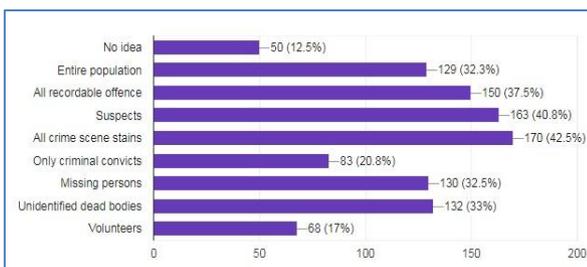


Fig-13: Inclusion criteria

DISCUSSIONS

365 (91.3%) of the study population know that DNA can be used as an evidence. In the study conducted by Curtis et al. in 2006 [6], 14 and 68% of the population strongly agreed and agreed respectively that they were fully confident in the use of DNA in crime solving. Yes, these days, DNA has been extensively used in solving civil and criminal cases and they have been granted exceptional legal status.

50.5% of the medical students have no idea of whether there is any legislation for the use of DNA in India. 40% of the people told yes. And only 38 (9.5%) of the people know that there is no legislation in the Indian judicial system for the use of DNA. This is mainly because Lok Sabha passed DNA Technology (Use and Application) Regulation Bill in January 8, 2019. Since the bill was a recent one and not publicized

much, the chances of people knowing it on their personal interest is less.

The idea for a DNA Bill was first advanced by the Department of Biotechnology (DBT) in 2003. The Bill is expected to fast-track criminal cases in which DNA evidence could prove especially conclusive. The use of DNA data is also likely to be useful in quickly identifying missing persons and resolving criminal cases in which repeat offenders might be involved.

The bill has two major components involved in discharging the specific duties. They are the DNA databanks and the DNA regulatory Board. There will be two kinds of databanks: national one and multiple regional ones. Every data bank will maintain DNA data in one of the following categories: the crime scene index, the suspects' or undertrials' index, the offenders' index, the missing persons' index, and unknown deceased persons' index.

The regulatory Board will comprise 12 members. Some of them will be experts in the field of biological sciences, whereas the others will be the director-general of the National Investigation Agency, the directors of the Central Bureau of Investigation. The heads of the Centre for DNA Finger printing and Diagnostics and the Central Forensic Science Laboratory and a member of the National Human Rights Commission.

Only 49 (12.3%) of the people have just heard about National Forensic DNA database. They mentioned it they have known it through medias live television and newspaper. This is the state among the medical students and it would be much more lesser in the general public. From this we understand that DNA biobank is relatively a new concept and awareness regarding it must be provided to the general public with mass media. In the study conducted by Zeiger et al. [6] 63% of the people know that there is a forensic DNA database in Switzerland [10]. 380 out of the 394 have heard about the National Forensic DNA database being used in New Zealand.

Only 43 (10.8%) students know that there are no DNA biobanks in India. 80% of the people have mentioned that they have no idea about the existence of National Forensic DNA database.

Almost 350 (87.5%) of the medical students believe that DNA biobanks will form an important investigatory resource and will help in reducing the crime rates and help to identify the unidentified bodies [10]. among the prisoners, they shared their view that DNA surveillance does not have any particular value and usefulness in terms of preventing and deterring crime [12]. 50.9 and 43% of the population strongly agreed and agreed that the use of DNA for fighting crime is a great step forward [7]. 36 and 61% of the population agreed and strongly agreed that DNA for fighting crime is a great step forward.

About 157 (39.3%) of the medical students believe that DNA has potential to harm. 5.3 and 52.5% strongly agreed and agreed respectively that DNA could be planted. While 32.6 and 1.3% of the population disagreed and strongly disagreed for the same [12].

About 62.7% (251) of the population had privacy issues in sharing their DNA profiles. This is much higher percentage than the persons who think DNA is harmful. So, storing DNA becomes a much more privacy issue for people [12]. 5.6% and 45.8% of the population strongly agreed and agreed that they are worried about the privacy issues. While 40.7 and 3.1% of the people disagreed and strongly disagreed it respectively [7]. 14 and 49% of the people strongly agreed and agreed about the privacy issues.

About 160 (40%) of the medical students doubted its efficiency [12]. 8.4 and 58.5% of the population are concerned about the errors that could be made with the National Forensic DNA database [7]. 6 and 53% of the population, strongly agreed and agreed that they were concerned about the mistakes that could be made.

More than half 212 (53%) of the students think that there will be lack of safe guarding [12]. 6.6 and 54.5% of the population strongly agreed and agreed respectively for that they trusted that these DNA samples would be used appropriately. While only 24.4% disagreed it [7]. 17 and 62% of the population strongly agreed and agreed that they don't have any concerns about the use of DNA and 8 and 66% of the population strongly agreed and agreed that they completely trusted that DNA will be used appropriately. 6 and 44% of the population strongly agree and agree that they completely trust those who own the DNA databank.

About half of the people (47.5% -190) told that it is not feasible in India. 206 (51.5%) of the students told that it should be permanent record and 27.5% (110) of the students opined that it should be a temporary record for a limited period of time till solving the crime. In the study conducted among 31 Portugal prisoners by Machado et al. [10] about 20 prisoners argued that DNA profiles should never be removed, even though the Portuguese law on the forensic DNA database stipulates the mandatory removal of DNA profiles from the data base at the end of the judicial proceedings or the end of the maximum statutory limit for the criminal proceedings stipulated in the Penal code [7]. 18 and 56% of the population strongly agreed and agreed respectively that DNA should be kept as a permanent record.

In a study conducted by Zeiger et al., [6] 45.5% opposed the idea of universal database that includes all Swiss residents. The reason given by them is lack of confidence in data security and the fear of loss of privacy. In the study conducted among 31 Portugal

prisoners by Machado et al.,[8] about 12 supported the creation of a Universal database containing the entire population [12]. 60.8% of the people disagreed that people should be made to give DNA [7]. 65% of the population supported for convicted criminal offenders regardless of the offence and 40% of the population supported for that those who are suspected of any crime and 28% said that everyone must be included and 27% said that all new born must be included. Almost all 75% of them are towards the suspected sexual offenders. This means that they have the knowledge that DNA forms an important investigatory tool in sexual offence [7]. The outcome of studies conducted in the UK and around the world show considerable public support for the retention of DNA from convicts, suspects and potentially all arrestees and the entire population. This observation is made upon the belief that DNA databases have crime-solving abilities, which they rate highly. There is clear evidence of privacy concerns and the potential misuse of DNA records among the public, with a significant number opposing the retention of DNA from innocent. This calls for well-informed public engagement by authorities to assure the public of the safeguards established for DNA databases. This is important because public opinion is mainly influenced by the media and television programs rather than facts of the system being implemented.

168 (42%) of the people believed that the benefits will be more than the social concerns [12]. 6.6 and 45.3% of the study population strongly agreed and agreed that they are concerned about the ethical issues around the use of the DNA. While 36.1 and 2.2% disagreed and strongly disagreed about the ethical issues respectively. In the same study, 24.6% were concerned about the cultural issues while 51.9 and 15.7% of the people disagreed and strongly disagreed about the cultural issues with the use of the DNA database [7]. 7 and 41% of the population strongly agreed and agreed respectively about the ethical issues of DNA use. 4 and 26% of the population strongly agreed and agreed respectively about the cultural issues.

About 190 (47.5%) of the people were willing to voluntarily donate their DNA sample. In a study conducted by Zeiger et al.,[6] 23.2% of the people were willing to donate their sample for forensic research purpose. In a study conducted by Hochschild et al. in 2012[11] about 31% were willing to donate their DNA sample for the enforcement of law [5]. 46.5% would accept the inclusion of individual genetic profile in the National Forensic DNA database. The reasons given by them mainly are they are law abiding citizens, regulation and human rights and for the social benefits. The reason for their refusal is they are not a criminal, lack of control over its use and access and the violation of their privacy and the lack of knowledge about it [12]. 24.7 and 51.1% of the population strongly agreed and agreed respectively to provide DNA sample if requested by the police. In the same study, 15 and 66% of the

population strongly agreed and agreed that they would be happy to provide a sample. 4 and 25% of the population strongly agreed and agreed respectively that people should not be made to give samples against their will under any circumstances while 50 and 13% of the population disagreed and strongly disagreed towards it.

In our study, we can see most of the people have given the answer “No idea” for most of the questions which implies that there is a lack of knowledge about the National Forensic DNA database among medical students [12]. 8.1 And 56.5% of the population strongly agreed and agreed that they don't have sufficient knowledge about the National Forensic DNA database [13]. A volunteer is an active noncriminal who agrees to give a sample on his or her own initiative, without being approached by an agent of the justice system. Samples are collected for volunteers on a basis of free and informed consent, following a sample collection request submitted in writing that must be addressed by the volunteer to the competent authority for DNA laboratory analysis. The profiles of volunteers can be cross referenced with profiles from crime suspects and convicted individuals and should be preserved for an unlimited period of time. A request by a volunteer for their DNA profile to be included in the database may symbolically signify maximization of choice and a sense of individual responsibility toward maintaining social order. In addition, the genetic profile of the volunteer is received by the state as a voluntary gift and as the citizen's contribution toward expanding a database designed to fight crime and ensure public peace and security.

CONCLUSIONS

368 (92%) of the population has mentioned that DNA fingerprinting is a reliable evidence. Knowledge about the use of DNA fingerprinting as evidence is good. Knowledge about National Forensic DNA Database & its current status in India is poor. Most of them (87.5%) opinioned that it's a step forward in investigations 42% felt it's beneficial.

Many of them doubted its efficiency (40%), safe guarding (53%) & its establishment (47.5%) in India. Many of them feel that they have privacy issues (62.7%) & it has potential to harm (39.3%). 51.5% felt it should be a permanent record.

Most of them supported for inclusion of all crime scene stains, suspects, recordable offence, missing persons & unidentified dead bodies DNA should be profiled. 42.75% were willing to provide their DNA samples.

Knowledge of medicos about National Forensic DNA Database is not adequate. This will lead to lack of support or else it may lead to distrust the protection of the legal system & may be interpreted as violation of human rights.

Suggestions

Popularizing through mass media with distinguished persons
Imparting adequate information in curriculum
Training adequate personnel & allocating resources.

Limitations

The study is conducted only among the medical students which is not the representative of the general population.

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