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This journal is published to expand the academic activities and spread the knowledge, ideas and latest research in the field of ethics, trauma, and victimology. This journal publishes original research papers, review articles, case reports, letters to the editor and review of books on ethics, trauma, and victimology. This journal is supported by the Society for Prevention of Injuries and Corporal Punishment (SPIC) and Indo Pacific Academy of Forensic Nursing Science (INPAFNUS). This journal is supporting the aims of the SPIC and the INPAFNUS. This journal also highlights the achievements of the SPIC, INPAFNUS and their members.

This journal covers the various aspects of ethics, evidence-based medical ethics, ethical dilemmas and various dynamic issues related to ethics. It also covers the ethical issues related to Forensic Nursing Science, Forensic Odontology, and Forensic Psychiatry. It also covers the ethical aspects of Toxicology including Environmental Pollution. It covers issues related to all sorts of corporal punishment and their prevention, particularly in schools. It covers physical as well as psychological aspects of trauma and clinical forensic medicine related to all types of injuries and prevention of injuries. It covers all aspects of victimology including etiology, crime scene investigation, and prosecution.

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From the Editor's Desk

It is my pleasure and privilege to publish the present issue of the journal which is the 12th issue of the International journal of the Ethics, Trauma & Victimology and we are completing 6 years of successful publication of this journal and entering the 7th year of its publication.

I am happy to announce that we have started the online submission and review of the submitted papers and making the process quick and more transparent. It will increase the credibility of the journal and help in the better indexing. We are also making it free access journal so that we may become eligible for many other indexing services who allow only free access journals.

I am thankful to the Society for Prevention of Injuries and Corporal Punishment and Indo Pacific Academy of Forensic Nursing Science for providing support to this journal and helping a scientific and academic cause. I convey my gratitude to the members of these organizations.

I also convey my gratitude to all the reviewers and editors who are helping in maintaining the standards of the journal. I also thank all the authors who are choosing this journal to publish their research.

Dr R K Gorea

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Forensic Nursing in Humanitarian Forensics

Rakesh K Gorea

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ABSTRACT

Humanitarian forensics has been established as a new entity, and it is bound to develop as a robust branch of science. It is a multidisciplinary subject with the involvement of experts from different fields of science. Forensic nursing too is an upcoming branch of nursing science and is a relatively new discipline of science. Forensic nursing science is expanding in various countries. This paper will describe and discuss the various important aspects of Humanitarian forensics and forensic nurses' utility in humanitarian forensics and discuss the future role of forensic nurses in humanitarian forensics.

Keywords: DVI, Forensic Nursing, Humanitarian Forensics, Socio-cultural crimes.

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INTRODUCTION

Forensic nursing science is a branch of science which is a combination of knowledge and the practice of nursing health care, the criminal justice system and Forensic Sciences including Forensic Medicine; when applied to criminal investigation and judicial system of a country.¹

Forensic nursing is now gradually making its presence felt in the different countries with the coordinated activities of different organizations like the International Association of Forensic Nurses [IAFN],² Indo Pacific Academy of Forensic Nursing Science [INPAFNUS],³ American Forensic Nurses Association [AMRN],⁴ American Association of Legal nurse consultants [AALNC],⁵ UK association of forensic Nurses [UKAFN],⁶ and Forensic Nurses Association of Canada [FNAC].⁷

Suppose we see the origin of Forensic nursing. In that case, it can be traced to the United Kingdom in 1950, and stronger evidence of this practice was providing care to the persons in custody who needed mental health care or were involved with psychotropic substances in 1979.⁸ In the USA, forensic nursing initiated counseling of victims of sexual assault in 1976 at Yale-New Haven Hospital.⁹ It was recognized as a specialty due to the consistent efforts of Virginia A Lynch in 1980.¹⁰ Now, this has extended to many other countries.¹¹ Forensic nursing science is scheduled to be part of the undergraduate nursing course in India, and post graduate (PG) course is being run by the Gujarat Forensic Science University.¹

Humanitarian forensic science is the application of the forensic sciences to humanitarian purposes so that with their skills and knowledge, they can benefit humanity. This is commonly being applied to the aftermath of conflicts and disasters.¹² It alleviates the sufferings of humans.¹³

Its actions dates back to the 2nd world war when identification was provided to the buried persons after examination of their documents and reburies in the named graves.¹³

Forensic humanitarians took its shape in 2000 when the International Red Cross society started taking help for the

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forensic scientists for its activities through it initiated in 1980 after the end of the War of Argentina and strengthened by the end of Yugoslavia in 1990.¹³ To identify the dead body in armed conflicts became important in 1996 with the passage of the resolution by the Interpol Standing Committee on Disaster Victim Identification.¹⁴ To give dignity and identification to the dead bodies in mass disasters or wars International Society of the Red Cross started Humanitarian Forensic Action. It worked in Haiti's 2010 earthquake with 230000 deaths, in Super Typhoon Haiyan in the Philippines in 2013, Falkland in 2016, in 2019 in Mozambique's 2019 typhoon involving the death of 1000 persons.¹⁵

Disasters maybe natural, manmade or hybrid.¹⁶ Natural disasters usually cause havoc e.g. floods, earthquakes, landslides avalanches and storms. Manmade disasters are due to the activity of human beings or their negligence e.g. terrorist activities. Hybrid disasters are due to activities of man which increases the effects of natural phenomenon and all types of disasters need warning and management system.¹⁷

Humanitarian Forensics works under the International Humanitarian Laws¹⁸ rather than the local laws of the country. When there is a mass disaster it may be a challenge for the local authorities to identify and dispose of the dead bodies in a dignified way.^{15,19}

The interaction with the victims and families of the bereaved persons is very important and will determine the

success or failure of the cases.¹³ Providing comfort and information to the relatives of the missing persons is one of the main objectives of forensic humanitarian forensics as the interviewer is the forensic persons.²⁰ The family members and friends have the right to know about the dead persons and this can be done by the examination of the remains of the dead bodies.²¹

Maintaining human dignity is very important for optimum results whether it may be dealing with survivors or their family members. All such people need psychological support. Investigating people must understand that such individuals have rights and they have the right to make decisions and right to elaborate during giving of the histories, which should be respected. Psychological support and psycho-social commitment help in the healing process.²²

Other goals of humanitarian forensics are estimating the individuals' age, document the torture in custodial settings, monitor the places of detention, and manage hunger strikes.¹³ There is a need to understand that social and cultural beliefs may be behind the crime. It needs to be tackled and humanitarian forensics may be able to interact and help reduce the crimes.²³ As people are migrating from one country to the other, the socio-cultural values are shifting and so are shifting the crimes and are not just limited to the one country.²⁴

In epidemics like Ebola too forensic humanitarian activities can be very useful by giving dignity to the dead bodies. People usually do not come forward for the final rites of the dead body. Proper disposal of the dead bodies can help in preventing the spread of the epidemics.²⁰ A total of 45 unsafe burials were reported in a paper, and on an average seven people were associated with each unsafe burial and 65% of such contacts became sick afterwards. Safe and dignified burial in Ebola epidemics limits the spread of the disease in epidemics.²⁵ Similarly, the dead body's safe disposal can also prevent the spread of COVID 19 and give dignity to the dead bodies.²⁶

There are victims of torture which may be victims of torture due to activities by terrorists or action by investigation agencies or security forces. Triad of blunt trauma i.e. bruises, patterned injuries and internal injuries; electrical and thermal injuries and injuries from prolonged suspension, which causes stress on the body. Due to this prolonged hanging stress, there occurs necrosis of muscles resulting in myoglobinuric renal failure and death. This may remain obscure until a proper autopsy is done especially of muscles of back, shoulder and knee joints and soles.²⁷

In terrorists' incidences identification of the terrorists is also facilitated by international coordination.²⁸ The pattern of injuries in surrendered terrorists may indicate they may have been killed e.g. firearm injuries and blunt trauma with opposing trajectories.²⁹ Survivors of sexual assaults can be benefitted by the domain of forensic humanitarian forensics. It needs a planned approach which is usually a multidisciplinary approach, and if provided in a timely manner can be very fruitful. Religious and cultural values of the victims must be respected when dealing with gender-based violence.³⁰

Trafficking of children is a serious issue affecting the rights of children and such child victims need to be identified. Mostly such children have a history of abuse, and such children should be removed from their sufferings and given a life of dignity and saved by ascertaining their identity so that they can be located and sent back to their families and rehabilitated. Those responsible for these crimes should be punished and compensation may be given to such children.³¹

Dignity of the dead is important so the dead bodies should be disposed of in a dignified way and one of the main step in the management of the dead.³² Various guidelines have been developed for the forensic pathologists to deal with the dead bodies in mass disasters- Interpol DVI Guide.³³ Four steps are highlighted for identification i.e. crime scene investigation; Postmortem data comprising of fingerprints, dental examination, DNA profiling and physical examination; antemortem data and reconciliation of PM data with antemortem data.²⁸

There are other guidelines too like "United Nations Manual on The Effective Prevention and Investigation of Extra-Legal, Arbitrary and Summary Executions, U.N. (1991)"³⁴ and "The Minnesota Protocol on the Investigation of Potentially Unlawful Death 2016".³⁵

International coordination in situations of disasters definitely improves the process of identification of the victims of disasters.²⁸ Persons with the right skills need to be identified as per DVI Guide³³ and forensic nurses have the right skills which can be utilized in such scenarios. There is an international commission on missing persons, and missing persons can be reported to the commission and they try to find that missing persons and forensic persons can submit their findings in a case to them. It has helped by identifying 70% of the missing persons in Yugoslavia.³⁶

In the case of missing persons, there may be multiple challenges, and all of them need to be tackled. The number of missing persons needs to be determined, and their identity needs to be established. Working protocols, a form of investigation as multiple stakeholders may be involved, need to address the cultural beliefs of the missing persons. All this has to do with time and funds constraints and keeping in mind the political establishment of that country where the investigation is being held.³⁷

The DNA profiling and DNA databank can be very useful in identifying missing persons.³⁸ Internationally accepted guidelines are lacking though Interpol guidelines are being applied at many places.³⁸ Statistical support about DNA markers of various communities is also non-existent, and there is a need to accept the lineage markers Y chromosome polymorphism and mitochondrial DNA for identification of parental lineage.³⁹

The DVI work is affected by many factors. One of the factors is if the dead body is the sea. People try to migrate through sea and accidents do happen and deaths occur. Identification in such situations may be really troublesome. Temperature, depth, salinity, currents and oxygen levels of



water may affect identification and factors like wearing of clothes, the stature of the person and status whether alive or dead when submerged in water and all these affect the retrieval of the dead bodies.⁴⁰ In one of Italy's studies about migrants in the Mediterranean Sea, 60% of such persons got buried in a stage of unidentified. The government and its various organizations are combining the services of Medico-legal, anthropological, forensic odontological, and forensic genetic services to identify the deceased persons.³⁹

Data management for DVI is also very important and involves collecting (antemortem and Post-mortem data) and archiving data, comparison, and analysis, and then reporting.⁴¹

Procedure of prevention, investigation and documentation of torture in the form of psychological and physical injuries in custodial places is mentioned in the UN manual and forensic science and forensic medicine play an important role in it.^{42,43}

According to the Declaration of Basic Principles of Justice for victims of crime and abuse of power, standards have been set for the victims' rights and protection. According to this access to the fair Justice access to treatment, restitution, compensation, and assistance have been identified.⁴⁴ But victims are not being treated with dignity and are not protected from intimidation.⁴⁵ Even rights have been given to the detainees for which officials have to take care to provide these rights e.g., Right to physical and moral integrity, right to an adequate standard of living, health rights of prisoners, making prisons safe places, making the best use of prisons, prisoners' contact with the outside world, complaints and inspection procedures.⁴⁶

Rights have been given to all persons that they will not be tortured under any circumstances will not be given any degrading treatment according to the Universal Declaration of Human rights.⁴⁷ Jail officials have been barred from this and in case of such treatment to the inmates, jail officials can be in trouble.⁴⁶

The capacity building of each nation for the DVI is very important, and in many circumstances, there is a need for exhumations and excavations. For the programs to succeed in local responsibility and local ownership of the mechanism is very important.⁴⁸

Forensic nurses are part of the death investigation in many areas. They mix their nursing education with criminology, law, and Forensic Medicine to help the investigation teams by carefully planning, going to the crime scene, observing and evaluating the crime scene.⁴⁹⁻⁵¹ The trained forensic physician may not always be available, and then a forensic nurse death investigator may be ideal in such situations, and forensic nurses are being utilized in many counties in the USA.⁵⁰ They are being posted as coroner, deputy coroner, death investigator, and nurse investigator to perform this role.⁵²

Forensic nurses are being utilized in mass disasters and situations of community crisis⁸ and can be very well utilized in humanitarian forensic work.

There are online courses for Professional Certificate in Nurse Death Investigation. The nurses learn to collect the evidence at the crime scene, which is important for the case, and then

preserve the evidence. They also are trained to photograph the crime scene and how everything is documented. They are also taught how to do the dissection of the dead body. They also look for the identification of the dead. They are also taught to look for the various signs of death and how they proceed with the time elapsed after death.⁵¹

The forensic nurses' attitude affects the intervention, optimism, and not to perform in a stereotype working in substance user services,⁵³ and this may be equally true for the forensic nurses in humanitarian forensic work. To succeed, forensic nurses also need effective and excellent written and verbal communication to deal with the victims, offenders, police officials and team members.⁵⁴ Violence survivors and victim advocates may have conflicts with the team members because advocates usually use indirect communication language whereas forensic nurses usually use direct communication languages, and good communication skills can effectively tackle these.⁵⁵

MATERIALS AND METHODS

Google Search and Google Scholar search using the keywords were used, and the relevant articles were selected.

DISCUSSION

Humanitarian forensics is the branch of science that involves using forensic science for humanitarian purposes. It may be the identification of victims of mass disasters or identification of missing persons after a war or identification of victims of war and epidemics.

Role of nurses for humanitarian purposes goes back to the origin of nursing when the founder of modern nursing Florence Nightingale the British nurse in 18th century was taking care of victims of war in the Crimean war⁵⁶ or Bhai Kanhaiya was giving water to the war victims earlier to the origin of nursing in the 17th century.⁵⁷

It also helps identify and prosecute the victims of socio-cultural crimes, including religious crimes.

Forensic nurses can help in photographic documentation of the injuries when a forensic pathologist is documenting these injuries in the medico-legal reports.

Forensic nurses can provide the right type of psychological support to the victims of torture and their families and families of the missing persons.

Forensic nurses can interview the victims of torture in a very compassionate manner, which is an essential aspect of DVI. Attitude and communication skills can play a very important role during interviews to elicit information from the victims which may be very useful for the case.

Autopsy in torture related deaths is important to find out the signs of torture and find out the injuries and find out the exact cause of death, which may be missed in a routine autopsy.

CONCLUSION

Forensic nurses can play a vital role in humanitarian forensics. They can play a crucial role in documentation and providing

psychological support as they are experts in dealing with the victims and their families. They can provide psychological support even to the team members. They can help in preventing the spread of epidemics and take care of forensic aspects when there are several deaths due to epidemics. When there is a shortage of forensic physicians, they can fill the gap in humanitarian forensic work. They can play a perfect role in disasters, whether it is human-made or it is natural. This discipline requires further research and development, and ultimately forensic nurses will be able to contribute significantly in humanitarian forensics. Forensic nurses should be a part of the humanitarian forensic teams. The attitude of the forensic nurses who wish to work in humanitarian forensics should be optimum as suboptimum attitudes will not bring the desired success rates. Forensic nurses need to have effective communication skills to be successful in humanitarian forensic work.

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Perceptions of Healthcare Professionals of Tertiary Care Centre of Eastern Nepal on Organ Trafficking to Aid in Formulation of Proper Organ Transplantation Regulatory System

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ABSTRACT

Organ transplantation is the only treatment option for the management of organ failure, and its success directly depends upon the balance between the demand and supply of the organs. However, the demand for organs far outpaces its supply. At the same time, most of the developed countries follow an altruistic way, which is organ donation with a will and without any form of benefit for organ supply. Thus, it can be seen that legally all who are involved in organ transplantation get some form of benefits except organ donors. Donating a vital portion of the body by putting at lifelong risk, just for the sake of altruism, can neither justify ethically nor help to meet the increased demand for organs. Ultimately this gives rise to the incident of organ trafficking in order to meet the organ demand. This research is done to know the perception of the healthcare professionals of the tertiary-care center of eastern Nepal regarding organ trafficking.

Keywords: Crime, Legal system, Organ Trafficking, Organ Transplantation.

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INTRODUCTION

Organ transplantation is one of the leading therapeutic innovations. Ever since the first transplant in 1954, organ transplantation has saved and extended the lives of thousands of patients.¹ With the aging of the populace around the world, expanded opulence, and development in burdens of illness such as diabetes, the request for transplantation is expanding exponentially.² Transplantation of organs is hence a life-prolonging and final resort intercession for numerous, but there's a grave disparity between supply and demand.³ The supply of organs for transplantation has been found to be controlled by diverse national and international organ transplantation regulatory systems. Despite the varieties within the laws directing organ transplantations, a single lawful principle that has picked up authoritative endorsement all through the foremost created nations is a supply of donated organs for transplantation must be a free and altruistic act of liberality. Be that as it may, as per numerous critics, such law consolidates an ethical thought of altruism that has not delivered an adequate supply of donated organs.^{4,5} In spite of measures to broaden the donor organ pool, global organ deficiency continues. With organs' increased value comes their increased potential profit, fuelling desire with some people to trade and sell. Subsequently, following to altruistic obtainment system of organ supply, a black market run by organ trafficking syndicates coexists to meet the request that altruistic systems fall flat to fulfil. Beneath these circumstances, frantic patients

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look for techniques to get organs by paying any sum through any implies, even in an illicit way.¹ The unlawful organ trade creates benefits between \$514 million to \$1 billion a year as per a report by Global Financial Integrity.⁶ Organ trafficking is an unlawful, however flourishing trade around the globe.⁶ In this way, transplantation is getting to be a casualty of its own success, with demand for organs far surpassing supply.¹ The increasing demand of people from developed countries seeking organs puts pressure on underdeveloped nations that seek to curb their own citizens from selling organs.³ Nations purportedly encouraging organ trafficking to incorporate Egypt, India, Iran, Pakistan, and the Philippines. Brokers reportedly thrive in Israel and in South Africa. As of late, India reported breaking up a ring of unlawful organ acquirement

that had included 500 illicit transplants; "donors" were paid up to \$2,500 for kidneys, and a few were constrained to give at gunpoint.⁷ At the same time, donors are also coerced, lied to, paid little, and all-too-frequently left with permanent disabilities and without treatment. Simultaneously, donors are coerced, lied to, paid small, and all-too-frequently left with permanent disabilities and without treatment.^{6,7} The foremost common reported form of organ trade is the live kidney trade.¹ In spite of the "donors" or sufferers have been found originating in numerous other developing nations, Nepal has been called a "kidney bank".^{8,9} Over the past 15 years, intergovernmental organizations, such as the United Nations,¹⁰ the World Health Organization (WHO),¹¹ and the Council of Europe,¹² and medical bodies, such as the World Medical Association¹³ and the Declaration of Istanbul Custodian Group,¹⁴ as well as an individual nation have increased efforts to prevent harmful practices related to organ procurement and transplantation. However, there's a common consensus that organ trafficking may be a crucial worldwide issue that remains under-addressed by both the appeals of worldwide organizations and individual states' domestic laws.³ Thus, this study has been done to know the perception of healthcare professionals of the tertiary care centre of eastern Nepal regarding organ trafficking.

MATERIALS AND METHODS

Ethical clearance has been taken from the Institutional Review Committee, BPKIHS, Dharan. It is a descriptive and cross-sectional study. A purposive sampling of 221 among health care professionals participated in the study. Inclusion criteria: Faculties, Nursing In-charges, lab-technicians, radiology technicians who gave informed consent. "pre-established self-administered close-ended questionnaire"¹⁵ has been

used among the participants (B. P. Koirala Institute of Health Sciences) from January–March 2020. Paper survey technique was used to collect data. The paper questionnaire doesn't include the information related to the personal identity of the participants. Collected data were entered in Microsoft Excel and coded accordingly. The statistical analysis was performed to calculate frequency by statistical package for social science (SPSS).

RESULTS

Total of nine questions from the questionnaire related to organ trafficking were used, and the outcomes of the questions expressed in frequency and percentage are presented in Tables 1 and 2.

DISCUSSION

Organ trafficking and trafficking in people for the reason of organ transplantation are recognized as significant universal issues. However, organ trafficking stays widespread—and is destroying those who are its victims.³ The selling of human organs for transplantation is a crime in Nepal under the Human Body Organ Transplantation (Regulation and Prohibition) Act, 2072.¹⁶ Furthermore, the Human Trafficking and Transportation (Control) Act, 2064¹⁷ clearly state that the extraction of human organs, except as otherwise determined by law, is an act of human trafficking and transportation. However, the punishment given by these different acts for the same crime that is organ trafficking is found to be different, and our study participants (87.78%) wish to see uniformity in the punishment. Despite these acts, several cases of unlawful kidney transplantation have been detailed by the media within the last couple of years and Kavrepalanchok district has created terrible notoriety as the "kidney bank of Nepal".¹⁸ during the

Table 1: Frequency distribution of the responses

Q. No.	Question(Q)	Response(R)		
		Yes (%)	No (%)	Can't say (%)
1.	Should the transplant surgeon be allowed to advise the recipient to contact a broker for a quick organ donation process?	90.5	5.42	4.07
2.	If the benefit to the donor is not legal, but the donor donated an organ in order to receive some benefits promised by the recipient or broker, and the promise was not made, should the recipient/broker be punished if the donor filed a case against them?	88.23	6.33	5.43
3.	If the benefit to the donor is not legal but the donor donated an organ in order to receive some benefits promised by the recipient or broker, and the promise was not made, should the donor be punished if the donor filed a case against them?	96.38	1.81	1.81
4.	If the benefit to the relative of the donor in cadaveric transplant is not legal but the relative of the donor was promised some benefits after donation and the promise was not made, should the recipient/broker be punished if the relative filed a case against them?	80.54	12.67	6.79
5.	If the benefit to the relative of the donor in cadaveric transplant is not legal, but the relative of the donor was promised some benefits after donation, and the promise was not made, should the relative of the donor be punished if the relative filed a case against them?	90.95	5.43	3.62
6.	Should the punishment system for the same crime addressed through different acts be made uniform?	87.78	7.32	4.97



Table 2: Frequency distribution of the responses

Q.N.	Question(Q)	Response(R)			
		Yes (%)	No (%)	No, if done in an emergency (%)	Can't say (%)
7.	If the broker system is not legal but the recipient used a broker, should the recipient be punished?	13.57	3.61	80.54	2.26
8.	If broker system is not legal, but the transplant team performed transplantation knowing that the donation was mediated through a broker, should each member of the transplant team be punished?	9.95	3.17	84.62	2.26
9.	What is your opinion regarding the effect of Public Awareness Campaigns (Presumptivity) on crimes associated with organ transplantation?	Increase crime (%) 9.05	Decrease crime (%) 84.16	No effect (%) 1.36	Can't say (%) 5.42

previous 5 years, more than 300 individuals have been detailed to be casualties of kidney traffickers in this district alone.¹⁸

Trafficking allegedly endures, in spite of the different worldwide and domestic endeavors, and the reason behind it in our nation can be realized from an encounter of a male victim, who is one among numerous casualties of Kavrepalanchok district.³ A broker counseled him by saying that he will be offered 30 lakh Nepali rupees for a piece of his meat, which will re-grow. Upon his agreement, he was escorted to a clinic in Chennai-India with a fake report expressing that he is a relative of a recipient. After transplantation, he was given 20,000 Nepali rupees, less than 1% of the agreed amount.¹⁸ It is interesting to note that in a study done on selected Village Development Committees in Kavrepalanchowk district by Forum for Protection of People's Rights Nepal⁹ 77.2% of participants, who expressed their view as the absence of government restrictions on the sale of kidneys responsible for organ trafficking, are unaware of the law of the land regulating organ transplantation. The same study⁹ has shown lack of knowledge and education (93.2%) as major reasons victims fall prey to kidney traffickers which is almost similar to our research finding where 84.16% of respondents expressed their opinion that public awareness campaigns decrease organ trafficking crime. When non-victim cases of the study done in Kavrepalanchok district⁹ were inquired why victims of kidney trafficking did not look for legal intervention even when they felt cheated, about all (95.6%) said that they feared the law, making both buying and selling a kidney unlawful which supports our study finding where donors (87.78%) and their relatives (85.06%) are supported for no punishment if they file a case of cheating. Similarly, in Punjab- India, a kidney seller that was not paid the sum guaranteed by brokers had been prosecuted and sentenced to two years in imprisonment for making a wrong affidavit.¹⁹

The UK's National Health Service cites WHO gauges that around 10,000 illicit transplants take place each year, with beneficiaries in nations like China, India, and Pakistan paying more than 50 times as much to purchase a kidney as the donors get for selling it.⁹ This is not reported because of the fear of the law that criminalizes the victim. Our study also supports for the legal protection of health professionals (84.62%) and

organ recipients (80.54%) for the emergency condition because health professionals may provide information to support an investigation of suspected transplant-related crimes, and recipients may become victims of shocking medical surroundings and incorrect procedures used in illegal organ transplantation. Legal systems should aim to hold those who profit from transplant-related crimes criminally accountable and to protect those who may be victims.²⁰ Similarly, this study criminalizes the recipients like brokers if they found cheating the donors (91.85%) or the donors' relatives (89.14%).

Legally permissible transplantation with any doubt of involvement of broker needs to be informed to the concerned authority. Still, if the patient's life is to be saved in an emergency condition, the team should not be punished. However, we recommend that this should immediately be followed by informing the concerned authority. Moral transplantation cannot be accomplished unless all health professionals abstain from engaging in or encouraging transplant-related crimes and giving data to help the concerned authorities prevent and prosecute such crimes.²¹ To be effective, legal prohibitions need to include a ban on brokers in organ transplantation.²¹ Similarly, 89.14% of participants of this study reject the brokering system. Law enforcement officers ought to work on viable ways of guaranteeing cooperation with health professionals in addressing these crimes.²²

Thus, in one hand, illiteracy is found to be the reasons for the flourishing black market of organ trade than in the other hand, criminalizing the so-called victim-donor, health care workers and recipients leads to under-reporting of the crime, both ultimately leading to the rise in organ trafficking. Healthcare professionals' opinions for donors, recipients, and their relatives act as an expert opinion, which is the strength of this research. However, they may be biased in giving an opinion for themselves, which is the weakness of this research. Thus, Educational and public media programs are recommended to educate average citizens on the issue of organ transplantation. Simultaneously, general public opinions should be considered while formulating the Organ Transplantation Act for their increased acceptance.



CONCLUSION

This study has found healthcare professionals' perceptions in increasing public awareness, in criminalizing those who are benefited illegally from transplantation and in protecting legally to those who are victimized from transplantation to aid in control and prevention of organ trafficking.

Ethical clearance

Taken from "Institutional Review Committee, B. P. Koirala Institute of Health Sciences, Dharan, Nepal."

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Correlation of Brain Weight with Cadaveric Weight, Length, and Cause of Death

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ABSTRACT

Individual patterns of growth vary widely because of differences in heredity and environment.

Introduction: Human growth from infancy to maturity involves great body size changes and appearance, including the development of sexual characteristics. The growth process is not a steady one; at some times, growth occurs rapidly, at others slowly.

Material and Method: Present study is the prospective examination of a total of 300 autopsy cases brought during the period from 2016-18. In this, 241 were males, and 59 were females.

Result: The data of internal organ weights were statistically analyzed. They are grouped into gender, cadaveric body weight, and cadaveric body length. The cause of death is further grouped into natural and unnatural causes leading to death. Unnatural deaths are grouped into traumatic, asphyxia, and poisoning deaths. Data is analyzed by determining mean, standard deviation, maximum, and minimum.

Conclusion: Brain weight is linearly related to cadaveric weight and cadaveric length. Internal organ weights are linearly related to cadaveric weight and cadaveric length.

Keywords: Autopsy, Organ weight, Bodyweight, etc

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INTRODUCTION

Individual patterns of growth vary widely because of differences in heredity and environment. Human growth from infancy to maturity involves great body size changes and appearance, including the development of sexual characteristics. The growth process is not a steady one; at some times, growth occurs rapidly, at others slowly. Weighing of organs at autopsy is not merely an exercise. Still, it has great medico-legal significance, as any deviation from normal range suggests some pathological change in the organ and thus helps in the interpretation of opinion regarding the cause of death and also in finding out the relationship between trauma and death. Children tend to have physiques similar to those of their parents or of earlier forebears; however, the environment may modify this tendency.¹ Susan Sprogøe-Jackobsen and Ulriksprogøe-Jakobsen *et al.* (1997) found that there is a positive correlation between body weight and body length in males, but not in females.²

The purpose of this study is to provide a practical collection of reference data on a variety of physical measurements like body weight, body length, and internal organ weights for its correlation with the cause of death in different population groups. The present study is a prospective examination of a total of 300 autopsy cases brought during the period from 2016–18 in the mortuary center attached to Forensic Medicine and Toxicology, Tertiary care Medical College and Hospital, Mumbai.

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Human growth from infancy to maturity involves great body size changes and appearance, including the development of sexual characteristics. The growth process is not a steady one; at some times, growth occurs rapidly, at others slowly. Individual patterns of growth vary widely because of differences in heredity and environment. Children tend to have physiques similar to those of their parents or of earlier forebears; however, the environment may modify this tendency.¹ Susan Sprogøe-Jackobsen and Ulriksprogøe-Jakobsen *et al.* (1997) found that there is a positive correlation between body weight and body length in males, but not in females.² JB Mukharjee (2007) and JP Modi (1994) found a positive correlation between body weight and organ weight.^{3,4} Gharpure PV and Jhala HI (1949-1958), in their study in Mumbai region found that lower heart weight in persons with lower body weight and weight of organs obtained in this study were lower than

European studies. In their opinion, neither malnutrition nor low socioeconomic status was the justifiable explanation. They proposed biological, genetic, environmental factors for the same. They also explained higher renal weight (199.45 gms for both kidneys) on the basis of plethoric constitutions, needs of heat loss, the water intake and other habits and conditions in Indians.⁵⁻⁷

MATERIALS AND METHODS

The present study is a prospective examination of a total of 300 autopsy cases brought during the period from 2016–18. In this 241 were males, and 59 were females. All cases of natural and unnatural deaths reported to the mortuary were considered in this study. The data of internal organ weights were statistically analyzed. They are grouped into gender, cadaveric body weight and cadaveric body length. Data is analyzed by determining mean, standard deviation, maximum and minimum. After that, Pearson’s coefficient was used to analyze the relationship between body weight and internal organ weight; body length and internal organ weight with statistical significance at $p < 0.05$. Simple linear regression was performed using the fitted equation ($Y = a + bx_1 + cx_2 + dx_3$) between the weight of internal organs (dependant) and body weight, body length, age and sex (independent) variables. The internal organ weight, bodyweight, bodylength, and sex together with age were correlated, and so is the reason to calculate them for simple linear regression in the present study.

RESULTS

The data of internal organ weights were statistically analyzed. They are grouped into gender, cadaveric body weight, and cadaveric body length. The cause of death is further grouped into natural and unnatural causes leading to death. Unnatural deaths are grouped into traumatic, asphyxia, and poisoning deaths. Data is analyzed by determining mean, standard deviation, maximum and minimum. The results are plotted in graphs to find out the trend and predict the relationship of these variables. After that, Pearson’s coefficient was used to analyze the relationship between body weight and internal organ weight; body length and internal organ weight with statistical significance at $p < 0.05$. Simple linear regression was performed using the fitted equation ($Y = a + bx_1 + cx_2 + dx_3$) between the weight of internal organs (dependant) and body weight, body length, age, and sex (independent) variables. Y-axis depends upon seven values: a is the “constant” and is the value of y when x is zero; b, c, d is the “slope” of the line, the amount by which the y value increases (or decreases, for

negative slope) for each unit of increase in the x value; x is the value of x itself. The four variables, including bodyweight, body length, age, and sex were important for analysis. The lowest age was 18 years, and the highest was 70 years.

The ranges of ages are 18–67 in males and 18-70 in females. The mean body weight among males is 61.4 kg while that in females is 55.6 kg. The body length among male is 160.6cm, while that in a female is found as 155.8 cm. Of the 300 autopsies performed in the study, 182 (60.7%) were having normal body mass index (BMI), followed by overweight 97(32.3%), underweight 14(4.7%), and 07 (2.3%) were obese (Figure 1).

In Table 1 it is seen that in natural deaths, brain size of 125 males (79.6%) and 37 females (86.0%) was seen as normal, while 21 males (13.4%) and 2 females (4.7%) showed increased brain size and 11 males (7%) and 4 females (9.3%) showed decreased brain size.

In unnatural deaths, the brain size of 43 males (51.2%) and 11 females (68.8%) was seen as normal, while 40 males (47.6%) and 5 females (31.2%) showed increase in brain size and 1-male (1.2%) and no female(0%) showed decrease in brain size.

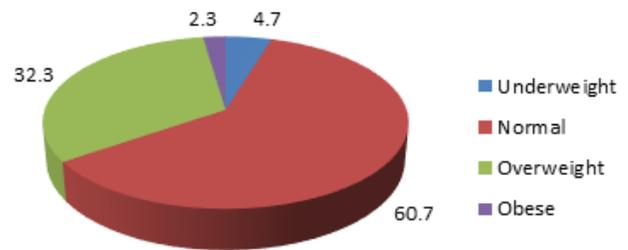


Figure 1: Distribution as per BMI

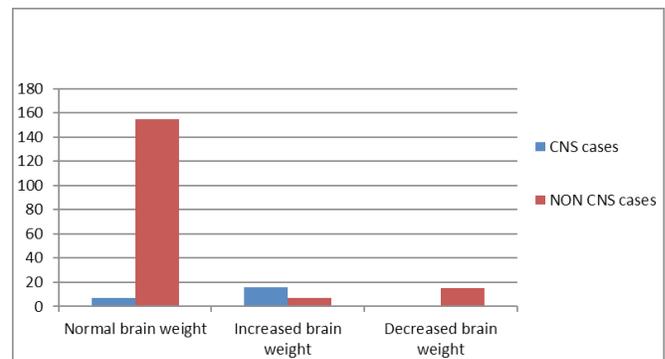


Figure 2: Correlation of brain weight with cause of death

Table 1: Correlation of manner of death with size of the brain

	Cause of death	Size	Male (%)	Female (%)	Total (%)
Brain	Natural	Normal	125 (79.6)	37 (86)	162 (81)
		Increased	21 (13.4)	2 (4.7)	23 (11.5)
		Decreased	11 (7)	4 (9.3)	15 (7.5)
	Unnatural	Normal	43 (51.2)	11 (68.8)	54 (54)
		Increased	40 (47.6)	5 (31.2)	45 (45)
		Decreased	1 (1.2)	0 (0)	1 (1.0)

Table 2: Correlation between organ weight and body weight and length of males (N=241)

Comparison with	Body weight		Body length	
	r (p value)	interpretation	r (p value)	interpretation
BRAIN	0.263 (0.001)	positive correlation	0.095 (0.141)	Weak positive correlation

Table 3: Correlation between organ weight and body weight of females (n=59)

Comparison with	Body weight		Body length	
	r (p value)	interpretation	r (p value)	interpretation
BRAIN	0.108 (0.413)	Weak positive correlation	0.248(0.058)	Weak positive correlation

Table 4: Regression equation of the relationship between internal organ weight with body weight, age and sex

Organ	Body weight ($Y = a \pm bx_1cx_2 \pm dx_3$)	R ²
Brain	Brain weight = 1145.79 + 5.25(body weight)-3.025(age)-69.64(sex)	0.169

Table 5: The norm of internal organ weights (gm) according to males and females.

Major Organ	Male (n = 241)	Female (n = 59)
	(Mean ± SD)	(Mean ± SD)
BRAIN	1270.8 ± 168	1174.7 ± 152

In both natural and unnatural deaths, there is no change of the shape of organ found. In all-natural deaths among males and females, the surface color of the brain was found normal i.e., grey white. While in unnatural deaths, 79 males (94%) and 16 females (100%) show the normal surface color of the brain, and 5 males (6%) showed pale white surface color of the brain. In Table 2 it can be seen a positive correlation of brain weight with the Bodyweight of males ($p < 0.01$) and a weak positive correlation with the length of the deceased.

In Tables 3 and 4, it can be seen that a weak positive correlation between brain weight with the body weight and length of females. There is no statistically significant association found. The regression equation of the relationship between internal organ weight with body weight, age, and sex was calculated statistically and found to be “brain weight = 1145.79 + 5.25 (bodyweight)-3.025 (age)-69.64 (sex).” The normal brain weight (Table 5), which was found after analysis of data in males, is 1270.8 Grams with a slandered deviation of 168 grams on either side, and in females, it is 1174.7 grams with slandered deviation of 152 grams on either side.

For estimating the correlation of organ weight with cause of death, the Chi-square test applied for natural causes leading to death in the direction of organ weights with a particular system involved in the cause of death. If we see as per cause of death 3.84% cases are due to asphyxial death, 41 cases (64.06%) deaths are due to trauma to brain, and in poison-related cases 3 (30%) cases and in all these cases weight was found to be increased.

DISCUSSION

The organ weight is a good diagnostic criteria of an autopsy if normality is accurately defined. It is seen that researchers are more interested in weighing organs directly as it is part and parcel of routine post mortem examination. Many conditions

like age, sex, cadaveric weight, cadaveric length, nutrition, socioeconomic status, geographic conditions, genetics, habits, diet, diseases etc are known to influence the internal organ weight as well as cadaveric weight and shows great variations.

In a study by Murty OP *et al.* (2007),⁸ there was a positive correlation between the weight of brain and cadaveric weight, which is consistent with our study. PiyanunMathuramon *et al.* (2009)⁹ observed weight of the brain and heart were slightly increased.⁹ The weight was distributed according to age range, and brain weight was reduced as age increases. This is because under-nutrition in the elderly has a relative effect on brain weight, probably because the brain contains only small amount of glycogen and neutral fat. The weight distributed according to the range of age; brain weight was reduced as age increases. This is because under-nutrition in the elderly has a relative effect on brain weight, probably because the brain contains only a small amount of glycogen and neutral fat. When compared with a study done by Vadgama KD *et al.* (2014),⁶ they observed a positive correlation between cadaveric weight and the brain's weight in both sexes. Santosh B Bhoi and RizwanAKamle *et al.* (2017)¹⁰ observed a positive correlation between the weight of brain with cadaveric weight in both males and females (p value < 0.001).¹⁰ The findings are consistent with our study

Our study shows a weak positive correlation between the weight of the brain and cadaveric length in both males and females; but no statistically significant association was found. When compared with study by Vadgama KD *et al.* (2014),⁶ there was a negative correlation between weight of brain and cadaver length. Piyanun M *et al.* (2009)⁹ found relationship between internal organ weight and body weight and body length of males whereas; in females, the weight of internal organs except kidneys were not related to body length. He also found that the weight of male brain had a positive correlation with both body weight and body length.



Bandyopadhyay Chandan *et al.* (2017)⁷ observed weight of the brain, in both males and females were positively correlated with cadaveric length, which means that as the body length increases, the weight of the brain under study also increases, but in this study the correlation is of minor degree; while the present study shows a similar result.

Among all natural deaths, the brain size of 125 males (79.6%) and 37 females (86.0%) was seen as normal, while 21 males (13.4%) and 2 females (4.7%) showed increased brain size and 11 males (7%) and 4 females (9.3%) showed decreased brain size. In the present study, the surface color of the brain is normal, i.e., grey-white in all deaths due to natural causes.

Among unnatural deaths, size of brain in 43 males (51.2%) and 11 females (68.8%) is seen as normal, while 40 males (47.6%) and 5 females (31.2%) shows an increase in brain size and 1-male (1.2%) and no female(0%) shows decrease in brain size. Increased size of brain is mostly attributed to cerebral edema, which results following acute CNS injury, cells of the neurovascular unit in particular endothelial cells and astrocytes resulting in maladaptive ion transport and generation of abnormal osmotic forces. The brain's surface color in 79 males (94%) and 16 females (100%) is seen as normal, i.e., grey-white. And 5 males (6%) showed pale white surface color of the brain, the condition associated with hemorrhagic shock.

CONCLUSION

The weight of brain in females is less than in males at all ages. Brain weights is linearly related with cadaveric weight and cadaveric length. Brain weight is directly affected with either increase or decrease of their weights in relation with cause of death, both in natural as well as unnatural deaths. This study can be considered as useful anatomical data to understand the disease property in this regional population. Weight of brain is useful tool to enlighten the pathological course undergone into the body of deceased, hence helping in establishing the cause of death for the better administration of justice in medico-legal cases. This study can be compared and correlated with many

similar studies by different autopsy surgeons, which may form a new era regarding morphological study of human organs and its correlation with cause of death.

Recommendations

The sample size is small in the present study, hence it should be increased to make the data more qualitative and reliable for reference purposes. It will be better if the number of females cadaver cases are increased because they are fewer in number in the present study, thus may affect statistical evaluation.

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Sex Assault and Offenders—An Overview of Victim-offender Relationship on Cases of Sexual Offences

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ABSTRACT

Sexual crimes against women and children are one of the most common crimes that occur in India today. Everyday newspaper articles, news shows on television, and social media keep reporting about sexual assaults and rape incidents. In all these crimes being reported, one thing constantly stands out: the relationship between the victim and the perpetrator. When any person thinks about a crime as vicious as rape, they generally associate the perpetrator being a stranger but in reality, what is seen is that the assailant is most often known to the victim. The aims and objectives were to study the relationship of the victim with the offender and analyze this relation further in terms of particulars of the relationship and social demographics. This study was conducted in the Department of Forensic Medicine, Guwahati Medical College, and Hospital for a period of one year in cases of female victims of alleged sexual crimes brought for medico-legal examination. From the 140 cases studied, it was found that 129 cases had known offenders, most victims were minors, illiterate, from rural areas, and belonging to lower economic strata, severity of injuries were higher with unknown offenders. It was concluded that most sexual crimes are thought to be perpetrated by strangers, but this study shows the opposite, and the people closest to the victim are often the ones who are the perpetrators.

Keywords: Sexual offenses, Victim, Offender, Rape, Perpetrator, Crime.

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INTRODUCTION

India is a country where the incidence of sexual crimes are increasing day by day and they occur irrespective of sex, age, religion, and economic status, though the scales are tipped more in the side of women and female children. Through data from police records, non-government organizations (NGOs), clinical settings and surveys, what has come to light is that in a large number of cases, the perpetrator is usually someone known to the victim; maybe family members, close relatives, friends, co-workers, neighbors, etc. However, statistics showing the percentage of stranger versus non-stranger offenders is considerably low. Usually, the maximum number of these 'known offender sexual assault' cases go unreported. The prime reason is the victim's fear of not being believed, a sense of guilt of somehow having invited the offender's attention, shame, pressure from other family members to remain quiet, to prevent bringing a bad name to the family, etc. Whatever the reason, the physical and mental trauma, humiliation, and post-assault consequences suffered by the victim are the same whether the offender is known or unknown.

According to the National Crime Records Bureau (NCRB) 2018 annual report, 33,356 rape cases were reported across India in 2018. Out of these, 31,320 were committed by someone known to the victim (93.9% of the cases).¹

This study was carried out to bring to light the trend of victim-offender relationships and their effect on the nature of sexual violence. These kinds of studies will help to understand the pattern of occurrence and the background information that gives us an insight into how these crimes occur. More insight gives us more power to understand and prevent these types of crimes. It helps us help the 'survivors' (to be more accurate)

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and help law enforcement agencies apprehend the criminals and deliver justice to the survivor.

Aims and Objectives

- To study the connection between the victims of sexual assault with the offenders being known or unknown.
- To study the demographics in cases of sexual assault concerning offenders being known or unknown, in terms of victim profile, offender profile, and degree of violence.

MATERIALS AND METHODS

The present prospective study was conducted in the Department of Forensic Medicine and Toxicology of Guwahati Medical College and Hospital in cases of female victims of alleged sex crimes brought for medico-legal examination, mainly from Kamrup District and nearby areas; for a period of one year, that is from 1st August 2015 to 31st July 2016, was included.

Inclusion Criteria

All-female alleged victims of sexual offense brought for

examination to the Department of Forensic Medicine, Guwahati Medical College.

Exclusion Criteria

All male alleged victims of sexual offenses and all-female alleged victims brought for examination who were unable to communicate or unwilling to give proper history were excluded from this study.

The data for this study was collected from the information gathered from police requisition and FIR copies, detailed history is taken from the victim and accompanying relatives/guardians, physical examination findings- both general and genital, dental data, radiological findings and microscope examination of slide findings for spermatozoa.

RESULTS

During the study period from 1st August 2015 to 31st July 2016, a total number of 749 cases of alleged sexual offenses

Number of Female vs Male victims

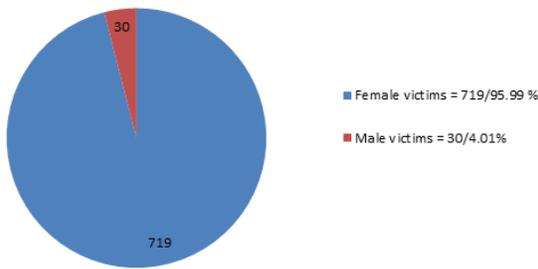


Figure 1: Total number of alleged victims of sexual offenses brought to GMCH and Distribution of females and males

Age group in which victims belonged

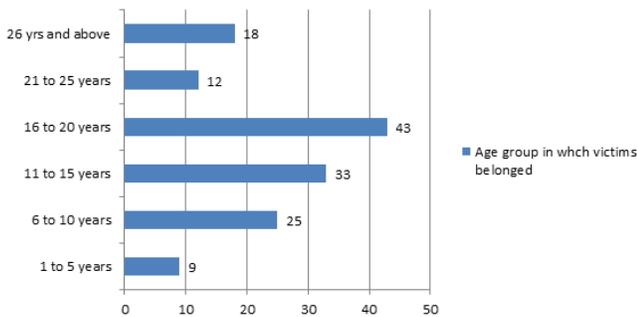


Figure 2: Age Group-wise distribution of cases

Area-wise Distribution of Cases

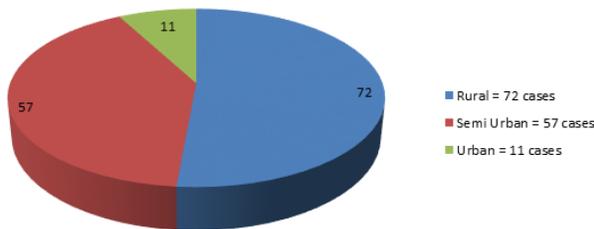


Figure 3: Area wise distribution of cases

Religion of Victims

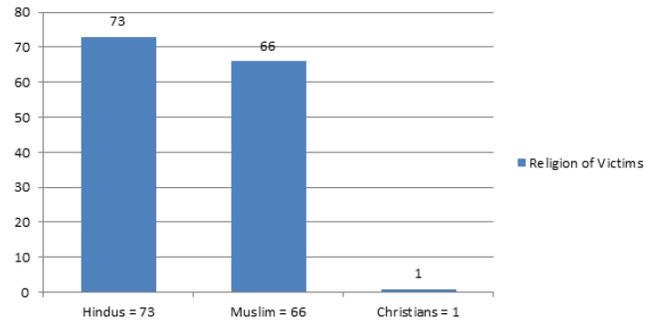


Figure 4: Religion wise distribution of cases

Occupation

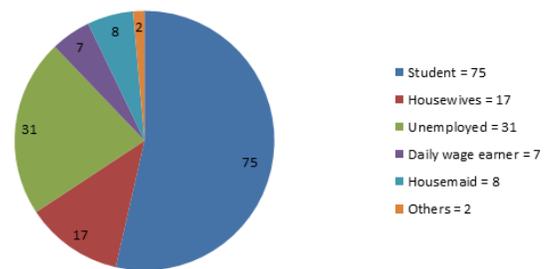


Figure 5: Occupation of the alleged victim girls

Table 1: Distribution of Alleged Female Victims

Distribution of Female Victims	No of cases	Percentage
Refusal to give consent	313	43.53
Elopement and consensual sex related incidents	266	36.99
Present Study	140	19.47
Total	719	100

Table 2: Educational background of the alleged victim girls

Educational qualification	No of cases	Percentage
Illiterate	44	31.43
Primary	47	33.57
High School	34	24.86
Higher Secondary	13	9.28
Graduate	2	1.43
Total	140	100

Table 3: Marital Status of the alleged victim girls

Marital Status	No of cases	Percentage
Unmarried	110	78.57
Married	26	18.57
Widowed	3	2.14
Divorcee	1	0.71
Total	140	100



Whether Known or Unknown Offender

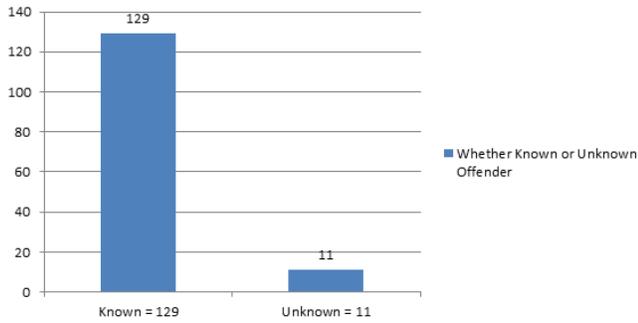


Figure 6: About the offenders

Relationship of Offenders with Victims

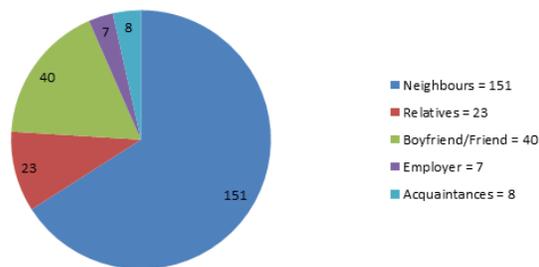


Figure 7: Victim Offender Relationship

Age group of Offenders in years

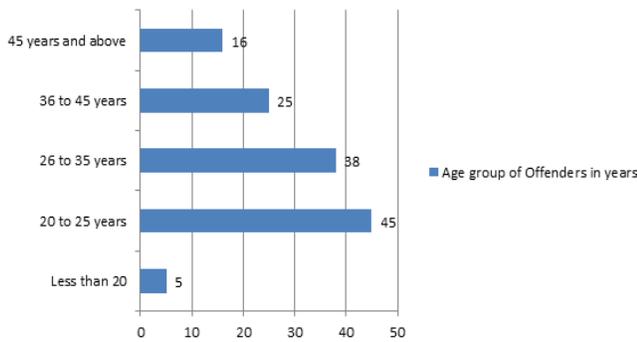


Figure 8: Age wise distribution of offenders

Distribution of Injuries

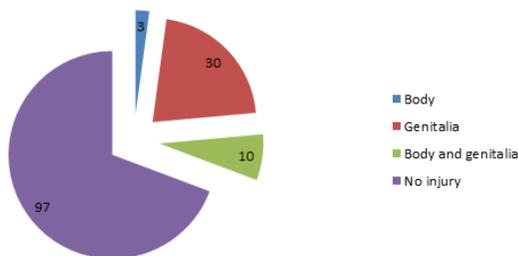


Figure 9: Distribution of injuries

Table 4: Religion wise distribution of offenders

Religion	No of cases	Percentage
Hindus	68	52.71
Muslims	60	46.51
Christian	1	0.78
Total	129	100

Table 5: Occupation wise distribution of offenders

Occupation	No of cases	Percentage
Unemployed	40	31.01
Daily wage earners	17	13.18
Business	19	14.73
Students	17	13.18
Government service	6	4.65
Professional	1	0.78
Others	29	22.48
Total	129	100

Examination of Vaginal Smear

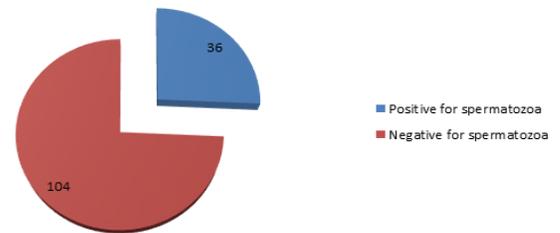


Figure 10: Examination findings of vaginal smear

were registered in the Department of Forensic Medicine and Toxicology, Guwahati Medical College, Assam.

DISCUSSION

Though sexual assault is a crime which is not dependent on sex of the victims, yet the numbers show that females are the more vulnerable part of society with number of female victims being a lot more than males as shown in Table 1 and most female victims refusing to give consent for examination as shown in Figure 1, the true picture still remains slightly obscure.

The main aim of this study was to show the relationship between the victim and the offender. And the results sadly show, that in maximum cases the offender was very well known to the victim, with 93.14% of the cases having known offenders and only 7.86% cases where the offender was unknown as shown in Figure 2.

Many studies have proved that known offenders are common in cases of sexual assault.³⁻⁵ Out of the known offenders, the maximum 39.53% cases had neighbours as offenders, friends and boyfriends constituted 31.015% cases. Relatives were next with 17.83% cases. Employers and acquaintances were almost



equal with 5.43% and 6.20% cases respectively as shown in Figure 3. These numbers show a similar pattern to the statistics shown by the latest NCRB Data.¹

Known offenders are common because being known to the victim leads to easy access to her. Being in close proximity leads to knowing her routine, about when can she be found alone or without supervision. Being around her will not raise any suspicion. Cases are seldom reported in case the offender is a family member. Sometimes victims fail to recognize the unwanted actions and take them as signs of affection from a trusted relation or friend. And last of all fear of social victimization for victim where victim blaming and shaming often goes hand in hand after a sexual crime.² A point to be noticed is that known offenders tended to be less violent with the victims and the injuries sustained by the victim also tended to be less as shown by Figure 4.⁶

Maximum victims were unmarried as shown in Table 2, coming from poor backgrounds as shown in Figure 5, most being less than 15 years of age as shown in Figure 6, having less or no education as shown in Table 3 and from rural backgrounds as shown in Figure 7, can be explained by a single fact; that is, lack of awareness. Lack of awareness in recognizing the crime, recognizing that they are victims, and lack of awareness of their rights and the fact that they can complain and take the help of law, all contribute to their being abused and assaulted.⁷

There was not much difference in the religion aspect of both victims and offenders as shown by Figure 8 and Table 4. Maximum offenders being young and unemployed explains that they had ample time on their hands to commit these crimes as shown by Figure 9 and Table 5. Out of the vaginal smears examined, most turned out to be negative as shown by Figure 10, which can be explained by either the use of condoms or absence of penetrative sex.

CONCLUSION

What has been seen in the general thinking is that sexual assault is generally associated with perpetrators who are vicious strangers with no mercy for their victims. But according to this study and many other studies like it, the threat of sexual assault usually comes from the people nearest to her. What prompts these people to take advantage of their victim's familiarity with them to molest her? The answer lies in the general male thinking, especially in India, that females are inferior to them and are meant for their pleasure and service. They do not respect women, nor do they give much importance to the women in their lives. This has resulted in sexual assault and rape to become the commonest crimes against women and children today. This trend of crimes, combined with very less reporting of these crimes to the authorities and the very low conviction rate has become a cause of grave concern to civilized society.

India is a country where the wheels of law and justice turn very slow. But lately, things have been changing. Out of the few things that have been done, some significant ones are

the Protection of Children against Sexual Offences Act 2012, change in the definition of rape, increases in the degree of punishments, etc. As seen in this study, the maximum victims were children. Before the POCSO Act, there was no act or law specifically targeted against sexual crimes against children. Child sexual abuse was prosecuted under Sections 375/354/377 of the Indian Penal Code (IPC). However, these IPCs could not effectively protect the child due to various loopholes. The Act provides for a variety of offenses under which an accused can be punished. It recognizes forms of penetration other than peno-vaginal penetration and criminalizes acts of immodesty against children too. The Criminal Law (Amendment) Act 2013⁸ proved to be a landmark change in rape laws. Before the amendment, rape definition included only peno-vaginal penetration, but after the amendment of the definition, penile penetration to any extent, penetration by any other object and also touching of his mouth to the vagina, urethra, anus of the woman constituted rape and became punishable by law. This new definition was very much needed because in many incidences of sexual assault, there was no actual peno-vaginal penetration, but the women got molested sexually, and because there was no penetration and no evidence of any of the other acts like touching, fondling, kissing, etc the culprit got away unpunished, because, according to the old definition, rape had not occurred. This had worked in favor of the perpetrators. But the new definition remedied that. The new Criminal law (Amendment) Bills of 2018⁹ has increased the punishments for rape and 2019¹⁰ has made the law gender-neutral. It is hoped that this increase in the severity of punishment for rape would act as a deterrent to the perpetrators. The gender-neutral laws will be beneficial to the victims of the third sex and also in cases where perpetrators are women, who till now, could not be punished for any act of sexual violence as there was no law citing women as perpetrators.

After this study, they know the victims and their perpetrators, a few measures that can be implemented. In schools, sex education should be taught to children at very young levels also. All schools, colleges, and workplaces should have plans and programs to manage sexual harassment and any form of sexual assault that may occur on the premises. In villages, where the reach of social media is less, trained workers must give audio and visual presentations to the people, especially to the women, educating them of their and their children's rights, no matter who the perpetrator is. Society has to be taught to change their perception that a victim of sexual assault is somehow at fault and stop the misplaced blame game. Boys right from a very young age must be taught to respect females, and this should start in their homes, with their mothers, sisters, and any females who are around them. Female children must be given a chance to better their future through education, which also teaches them to stand up for themselves, know their rights, and fight for themselves whenever necessary. Better facilities are required for providing necessary assistance and rehabilitation to a survivor of sexual assault. Properly trained counselors are required to give them

the support and advice to deal with the trauma and mental anguish. The fear that exists in the public's mind towards the police and the judiciary system must be removed. They have to be assured that the police are there for their assistance. And the whole procedure of filing a report and getting assistance thereafter must be made transparent and convenient so that the victim who is already suffering need not undergo further harassment. A fast and effective justice system should be in place so that victims get their due justice at the right time.

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Forensic Study of Child Abuse in Bangladesh

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ABSTRACT

Introduction: The future reflection of nation child has some common problem like under-nutrition, infections, as well as abuse or maltreatment is equally important. World Health Organization (WHO) reported that worldwide, approximately 20% of women and 5–10% of men report being sexually abused in childhood? In Bangladesh, a large number of children are exposed to severe forms of sexual, physical and mental abuses at home, in the work place, in institutions and other public places.

Methods and Results: A total of 96 children below 18 years above 5 years were included in this research. All the statements made by semi structured interviews and physical examination. About 6% child reported they are referred as idiot and called them foul name being considering them emotionally abused child. 34% child considering physically abused (by burn 34% and by beating 55%). 60% child considering sexually abused. Among them depending on the type of sexual abuse 12% reported someone trying to touch or kissing or even touched their private body parts, 27% reported someone trying to show naked or dirty pictures to them by using mobile, 61% reported that someone put or forced his private organ inside their mouth (11%), anus (32%) or vagina (57%).

Conclusion: Child abuse is a global problem. Not in the world but also in Bangladesh. So Bangladesh government should give special attention to safety of child. To prevent child abuse in social life like children on the street, children at work, and children in institutional is a punishable act as per the Protection of Children from Sexual Offences Act in our parliament.

Keyword: Child abuse, Rape, Sexual offence.

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INTRODUCTION

Children are the assets to every society and regarded as the future architect of a nation. In Bangladesh male and female children are abused sexually and physically. According to Mason and Purdue children are exposed to different forms of violence that impedes their mental, physical, psychological and moral growth.¹ About half of the populations of Bangladesh are under the age of 18 who are considered as children and more than 20 million of them are under the age of 5. Children of poor socio economic status, unemployed parents, young single parents and children having parental conflicts are usually at risk of being the victims of abuse and neglect. United Nations Children's Fund (UNICEF) reported that the percentage of girls marrying before 18 years was 65 and 29% girls marry by the age of 15 years.² Corporal punishment is unlawful in schools of Bangladesh according to a Supreme Court judgment issued on 13 January 2011.³ There is little singular law that looks at children in every vulnerable situation. Now a days, it has been estimated that the total number of domestic child workers in the country vary from 2,00,000 to a million. UNICEF reported that about 25% of housewives report that they physically beat child domestics to punish them for poor performance or ill behavior.⁴ It is also challenging Child trafficking in Bangladesh. According to Akter, criminal networks engage these children in commercial sex work, smuggling, stealing and distribution of drugs and weapons.⁵ Violence against children is causing increasing concern in

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Bangladesh and work as a vicious cycle where the abused or neglected children will eventually victimize their own children that altered brain maturation have long-term consequences for cognitive, language and academic abilities. Despite this, schools punishment is widespread in most of the schools. In reality different laws to protect the children from abuse and to ensure their rights but in practice these remained failure. Government should identify the scale of the problem and create stronger laws to protect the rights of our children by creating public awareness about child education and risky child labor, strengthening family ties, early reporting of child abuse.

MATERIALS AND METHODS

The present study was descriptive cross sectional type. The research was carried out in the Department of Forensic Medicine,

Sir Salimullah Medical College (SSMC), Dhaka during the period of January to June 2015 after approval from the Ethical Committee of Institutional Review Board (IRB), SSMC to measure the scenario of child abuse in Bangladesh. By searching documents, semi structured questionnaire was formulated in Bangla as well as in English also. After being informed about the study, participants were asked sign a written informed consent form that explained the nature and purpose of the study, as well as its likely risks and benefits. Afterward, the researcher asked questionnaire face-to-face of the victim in comfortable or preferred language (Bangla). Age of the recruited victims was equal or above 5 but below 18 years.

RESULT

A total of 96 victims were included in the research out of which 72 were female children and 24 were male children. The informations are shown in Tables 1 and 2.

Among these 96 victims, about 6% child reported they are referred as idiot and called them foul name being considering them emotionally abused child. A total of 34% child considering physically abused (by burn 34% and by beating 55%). 60% child considering sexually abused. Among them depending on the type of sexual abuse 12% reported someone trying to touch or kissing or even touched their private body parts, 27% reported someone trying to show naked or dirty pictures to them by using mobile, 61% reported that someone put or forced his private organ inside their mouth (11%), anus (32%) or vagina (57%). The research found mental, physical and sexual abuse of child are shown in Figure 1.

DISCUSSION

Child abuse is a silent epidemic.⁶ Child abuse can take several forms like physical abuse, psychological abuse, neglect and sexual abuse. According to the study 5–9 years children are

more vulnerable to child abuse. In present research, mental abuse 6%, physical abuse 34% and sexual abuse 60% were found. Under physical abuse, the research found 34% burn, 55% victims were affected by beating. Others found starvation, closed /door locking. Among sexual abuse 12% found some touch private part or kiss them. About 27% of sexually abused child complain that some enforced them to see dirty picture by non-contact activities. Most of the sexually victims child suffered someone forced his private organ inside his or her anus or vagina. Female children are more vulnerable for child abuse. Some studies have reported that female victims of Child abuse are three to five times more likely to suffer further sexual assault than those who have not suffered child abuse.^{7,8} In our study, 33(35%) victims were abused by neighbor, while 26(27%) victims were by relatives. Bangladesh is a densely populated country with populations about 160 millions. Most of the children of Bangladesh are deprived from basic rights like education, balance diet, health and nutrition, protection, participation, recreation, safe water, sanitation and abused sexually and physically. Street children and child always falls victim of verbal, physical, and sexual abuse from police, gangster and the general public. In the United States, the Centers for Disease Control and Prevention (CDC) and the Department for Children and Families (DCF) define “child maltreatment as any act or series of acts of commission or omission by a parent or other caregiver that results in harm, potential for harm, or threat of harm to a child.”⁹ Based on above definition, the present research found three major types of maltreatment against children. In Bangladesh, there exist different laws to protect the children from abuse and to ensure their rights but in practice these remained uncontrolled. Emotional abuse includes the failure of a caregiver to provide an appropriate and supportive environment about 6 children. So, this study found various of different type of elements use in child abuse. Although illegal, child marriage remains a widespread practice in Bangladesh before the age of 15 years. The present studies found about 50 children below 10 years were victimized more. Government alone can’t solve this problem alone. So differences in these cultural beliefs demonstrate the importance of examining the legal and cultural perspectives while studying the concept of child abuse.¹⁰ As in most studies that focus on the sexuality of children, adolescents, and young people, we must demand more and better education in this area, from an early age and without taboos.¹¹ The early experience of child abuse can trigger changes in child’s behavior including discipline problems, insomnia, nightmares, anxiety, and depression

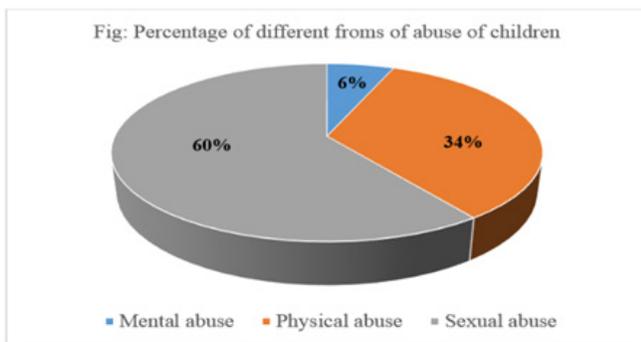


Figure 1: Percentage of different forms of child abuse

Table 1: Age and sex distribution of abused child in Bangladesh:

Age in year	Sex of victims	
	Male	Female
5-9	14	36
10-14	7	28
15-<18	3	8
Total number of victims	96	

Table 2: Child abuse victims according to the relationship to accused

Relationship to accused	Frequency	Percentage
Neighbor	33	35
Relatives	26	27
Stranger	15	15
Teacher	9	9
Friends	13	14
Total	96	100



etc. This also causes problem with mental development of a child which interrupt his feelings, empathy, sympathy, reasoning, rational thinking and benevolence. Children who have been abused or neglected are more likely to be arrested as juvenile offenders and are more likely to be a sadist and involve in criminal activities as an adult.¹ There is a range of laws in Bangladesh designed to protect children, but they apply varyingly to children indifferent situations. There is no singular law that looks at children in every vulnerable situation they may find themselves in. Government should recognize the scale of the problem and create stronger laws to protect the rights of our children by creating public awareness about child education and risky child labor, strengthening family ties, early reporting of child abuse cases to the law enforcement authority, developing and sustaining prevention programs and facilitating.

CONCLUSION

At last we can conclude that child abuse is a global problem. Female child are the most vulnerable to sexual violence, but recently male children are also sexually harassed. It is difficult to document intra familiar sexual abuse and manage, because the child must be protected from additional abuse and coercion not to reveal or to deny the abuse, while attempts are made to preserve the family unit. This study documented the childhood prevalence of emotional, physical and sexual abuse is increasing in town life. It is also noteworthy that school teachers were responsible for physical abuse recently considering it an important maltreatment for child. Situation demands that this issue of addressing child abuse should be given importance and their preventive efforts should be given

to strengthen care giver/parent–child interaction by ensuring strict implementation of law.

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Medical Negligence–Legal Narrative and Prevention in Malaysian Medical Practice

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ABSTRACT

Medical negligence cases in Malaysia are not far behind from other developed countries in terms of quantity and costs. The challenges of medical negligence in Malaysia have always been an enemy to both patients and doctors. Both parties may lose more than they gain from the adversarial adventure of medical litigation. Hence prevention of medical negligence is the best effort in ensuring the best medical practice for both parties. Practicing ethical medical practice and improving communication with the patient is some of the methods to avoid getting sued. If this fails, alternatives to medical litigation such as alternative dispute resolution in the form of mediation and no-fault compensation scheme. These alternatives may offer more to both parties rather than going through the litigation process.

Keywords: Medicolegal, Medical negligence, Medical litigation, Ethical practice, Alternative dispute resolution, Defensive medicine

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INTRODUCTION

The change of medical practice from medical paternalism to replacing patient's autonomy has been seen for the past few decades. Doctors can never know enough about patients to make decisions for them. Negligence in medical practice differs from other areas of tort due to medicine as an inexact science. Doctors cannot guarantee to cure patients all the time; the reasonable expectations are to provide the service with reasonable care and skill up to the acceptable standard of practice.¹ The complexity of medical negligence also is because it involves the life and functional capacity of the patients.

As per Baron Alderson,² negligence is the omission or commission to do something that a reasonable man would do or doing something which a prudent and reasonable man would not do. In law, negligence connotes the complex concept of duty, breach, and damage³ suffered by the person to whom the duty is owed, in a medical negligence case, the patient.

The problem with medical negligence compensation is that it may be unpredictable, and the success may not be due to the merits of the claims⁴ The outcome of a negligence case can be unpredictable. The availability and the dependability of evidence and witnesses and the quality and expertise of the legal representation are some of the reasons that the outcome can be unpredictable.⁵

Challenges of Medical Litigation in Malaysia

Medical practice in Malaysia has shown an increasing trend of medical negligence cases.⁴ Pursuing medical malpractice is proven to be challenging for both patients and doctors. The cost and lengthy-time period are difficult for both patients and

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doctors to bear. For example, an average for 15–25 years is taken for a case to be resolved in a Malaysian court.^{1,4,6}

Access to the medical record is among the procedural obstacles that are faced in medical litigation cases. Although the Guideline of the Malaysian Medical Council has mentioned that the medical record is the property of practitioner's and the patient, patients still have difficulty obtaining a medical record to use as evidence in court.^{4,6} The process of obtaining these records would delay medical litigation duration further as the records need to be obtained through a court order.

Other than the written evidence, obtaining the expert medical witness is also a challenging element in medical litigation. Doctors may be unwilling to provide evidence against their colleagues. Plaintiff may also have difficulty in obtaining their expert witness as the doctor may be reluctant to give evidence in court.^{1,4}

The limitation period for a medical negligence case is covered under the Malaysia Limitation Act 1953 (Act 254). This act aims to protect defendants from stale claims and encourage patients not to sit on an action when needed.⁴ However, in

some medical cases, the latent injury may not have damages, which may lead to the run out of time from the cause of action to take place.

The threat of litigation also destroys the doctor-patient relationship because of the adversarial nature of medical litigation. This introduces the confrontational elements between them.⁵ The adversarial nature of litigation denies both parties to have adequate explanations and apologies are difficult to be given in these circumstances. The hostile environment of the court may destroy both parties' trust in each other. In some studies, litigation threat can also cause doctors to deviate from their normal practice and lead to defensive medicine.

Defensive medicine is medical care performed primarily to reduce the risk of litigation and not for the benefit of the patients.⁷ The positive effect of defensive medicine is that doctors will perform more tests and procedures than necessary. However, from a negative point of view, defensive medicine leads doctors to avoid taking risks and hence avoiding treating patients. Doctors will ultimately choose a safer profession that has fewer litigations. Costs of practicing defensive medicine also are higher since more test and procedures are being done.

Change of the Standard of Care in Malaysian Medical Practice

In the court of law, the standard of care is divided into the doctor's duty to make the diagnosis, give information or advice, and provide treatment to the patient as needed. A breach in any of these care standards would satisfy the negligence elements, and the doctor is liable. The main source of medical negligence law in Malaysia derived from Section 3 of the Malaysian Civil Law Act 1956 wherein absence of written Malaysian law; the court shall apply the other Commonwealth country common law as they see fit. Thus, the medical cases from other countries especially from England have been the main reference to Malaysian medical litigation cases.

In England, the *Bolam* principle is based on the practice of the doctor accepted as proper by a responsible body of medical opinion skilled in that particular art.⁸ This principle came from a legal case, which is Mr Bolam, a mentally-ill patient who received electro-convulsion therapy without any muscle relaxant or proper restraint. Following the procedure, he suffered injury and sued the doctor.

Following this principle, the doctor would be found liable if there is another medical opinion that practice accordingly. Thus, this provides difficulty to the plaintiff patient to prove liability.

However, for the past few years, the transformation of the standard of care in Malaysian medical practice has been seen. From the *Bolam* principle, the medical-legal system has adopted other principles in medical litigation.^{1,6}

In the case of *Bolitho*,⁹ the court held that the defendant doctor is not liable only if the practice can demonstrate a logical basis. The expert medical opinion has to have a sufficient basis before being accepted as responsible in court. If the expert medical opinion does not withstand the logical

analysis, the judge is entitled to hold that the body of opinion is not responsible.

Australian judiciary is also quite determined in scrutinizing expert evidence. In the case of *Rogers v Whitaker*¹⁰ where it was held that the amount of information to be disclosed to the patient cannot be determined by the doctor but it would depend on the complexity of the nature of the treatment. In this case, the court found Dr Whitaker liable for not disclosing a very rare complication of a procedure which is proven to be significant for the plaintiff, Mrs. Rogers.

Examples of earlier medical negligence cases where the *Bolam* rule was followed are *Swamy v Mathews*,¹¹ *Chin Keow v Government of Malaysia and Anor*,¹² and *Elizabeth Choo v Government of Malaysia*.¹³ However, more recent cases have shown the impact of the Rogers case where Malaysian court had turned away from the *Bolam* principle. Examples of recent cases are *Kamalam a/p Raman v Eastern Plantation Agency & Anor*,¹⁴ *Foo Fio Na v Hospital Assunta and Anor*,¹⁵ and *Hong Chuan Lay v Dr Eddie Soo Fook Mun*.¹⁶ In these cases, the departure from the *Bolam* principle is seen in cases where it involves the duty to warn or disclose risks to patients.¹⁷

PREVENTION OF MEDICAL LITIGATION

As discussed, pursuing medical litigation is challenging for both patients and doctors. If given alternatives, patients and doctors may opt for other methods to resolve the dispute. Before litigation, there are several approaches in preventing medical practice to advance to the court of law. This includes good ethical medical practice and enhancing communication with the patient.

Suppose the dispute cannot be resolved at the early stage. In that case, an alternative to medical litigation, such as alternative dispute resolution, which is mediation to help the patient and doctor to settle the dispute outside the court, must be available.

Good Medical Practice

There are many aspects of good medical practice that can be followed in order to prevent medical litigation. Detailed and explicit documentation must be enforced in order to clear any miscommunication that may ensue later. In case of litigation, good documentation is a good defence for the defendant doctor.

Informed consent is a practice which has good value in preventing medical litigation. Consent can be either expressed or implied.¹⁷ Expressed consent may be in the form of verbal or written. Informed consent consists of three important components, which are real, capacity and voluntary.

In order for consent to be legally valid, the consent needs to be real. The patient must be given sufficient information about the treatment they are about to undertake. The risks and benefits of the treatment and also alternatives to the treatment must be informed to the. Secondly, consent is only valid when the patient can give consent. Capacity is presumed in an adult with a sound mind. Children under the age of 18 in Malaysia is legally considered as not having the capacity to give consent; hence the consent should be taken from their

parents or guardian. The third component is that consent must be voluntary from the patient's own free will with no duress or undue influence.¹⁷

Doctors need to be updated with the latest knowledge and skills. Evidence-based medicine needs to be applied to ensure that patients receive the standard of care they deserve. Doctors need to know the local policies or guidelines which applies at the place of their practice so that their practice will be in accordance with the standard among other doctors. Other than medical knowledge, they need to be aware of the medico-legal implications of their medical practice too. Knowledge of common miscommunication and medical malpractice would help in ensuring that the doctor would practice cautiously.

Communication

Poor communication is one of the commonest reasons given by patients to sue. Doctors often refuse or communicate poorly during their care of the patient. They are always in a hurry, dismissive and abrupt in their contacts with patients and family members. Patients and family members feel frustrated and angry with the lack of communication by the doctors.¹⁸ Any right treatment or even absence of any misconduct may sometimes lead to dissatisfaction from the patient due to the misunderstanding their experience.

As Malaysia is a multicultural country, communication between multilingual patients and doctors can be a challenge. Doctors should ensure enough time is spent communicating with patients and family members. They should not also leave the communication to the junior doctors or nurses to communicate on their behalf.

Alternatives in Medical Negligence

If preventing medical malpractice has failed and both patient and doctor are unable to achieve an agreement, before going to court, there may be some other alternative to resolve the dispute.

Alternative Dispute Resolution

Alternative dispute resolution (ADR) is a means to settle disputes outside of the court. The ADR may include negotiation, conciliation, mediation, and arbitration. ADR is easier and less complicated than litigation. In medical negligence, the best ADR to be applied is mediation. The application of mediation in Malaysian court was introduced in 2010 by the Federal Court in the Practice Direction No 5.⁶ However, there is no specific provision for its application in medical negligence. The main objective of mediation is to provide a platform for both dispute parties to discuss peacefully to achieve mutual agreement. Mediation can help because it is more economical, fast; in most instances, the parties perceive it to be fair, minimizes the risks for parties, and the outcome is confidential. Mediation empowers the parties to understand and control the outcome of the dispute.⁶ Instead of waiting and agreeing with the court's decision, both parties have a chance to find an agreement for the dispute.

No-fault Compensation Scheme

Medical compensation for medical injuries can be seen as a social problem in which the compensation may not be fair. Patients who have the time and costs to be able to infiltrate the legal system are likely to be compensated more than those who have no time and money for it. Court has difficulty in quantifying the compensation to be given to the plaintiff. Similar injuries may end up with different compensation. The lump-sum payment to the plaintiff maybe inaccurate.⁵ In this scheme, the fault of medical malpractice is seen as distributive justice rather than individual corrective justice.⁵ In this system, the resources for compensation is contributed among all members of a pool, and recipients are chosen in accordance with distributive criteria. Implementing this system requires a comprehensive national social welfare which controls the resources accordingly. Patients will receive compensation when injury or damages are done upon them. By applying this scheme, the responsibility to the personal injury is accountable amongst the members of the public and not to the individual doctor.

Although the compensation may be less than what the patient may get if they win in court, the compensation from the no-fault compensation will be spent only on the patient's well-being rather than to the legal costs. It will also spare both parties from the intense emotional experience of litigation.

CONCLUSION

Changes in litigation in Malaysian medical practice over the past few decades is evident. The challenges that are faced by patients and doctors are the high cost, time-consuming, difficulty in accessing medical records and expert witnesses, limitation period constraints, risking doctor-patient relationship and development of defensive medicine from the advancement of medical litigation.

For these reasons, prevention of advancement of medical litigation is fundamental to ensure that the practice of medicine can develop efficiently. In preventing medical malpractice, good medical practice is necessary. Good documentation, the use of informed consent and doctors' updated knowledge and skill would be some of the criteria of good medical practice. Other than this, effective communication ensure that less misunderstanding takes place during the practice.

However, even if the misunderstanding has grown into disputes between patients and doctors, there are still some methods to prevent medical litigation from going to court. Alternative dispute resolution by means of mediation has been suggested to be reasonable to be done to resolve a medical dispute. Another method is the no-fault scheme, which gives compensation to patients controlled by a comprehensive national social welfare. The resources would come from a pool contributed by the doctors.

Although all these preventions may have their own struggle to be implemented, doctors should always bear in mind that each and every one of medical practitioners plays a part in the overall prevention of medical negligence. Assistance and



support from the employer and the stakeholders in ensuring that the medical practice would not get through the litigation are also eminent.

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Medico-Legal Aspects of Covid-19: Microbial Terrorism

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ABSTRACT

The entire world is going through hard times because of the emergence of new pandemic named Coronavirus or COVID-19. The virus originated from Wuhan and has spread Worldwide. There are many questions arising regarding the origin of this fatal virus; whether it is natural or manmade. In the past years, many microorganisms were used as biowarfare agents for causing destruction. In 2001, anthrax attack took place in United States (US) by the use of bacteria, *Bacillus anthracis* which acted as a bioweapon and led to a number of deaths in Texas, US. This review summarises the origin, epidemiology, medico-legal aspects and the recent researches of the virus indicating its nature of being manmade or a natural virus.

Keywords: COVID-19, Identification, Epidemiology, Diagnosis, Bioweapon.

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INTRODUCTION

A newly emerged virus in the year 2019 is named Corona Virus (2019-nCoV) by World Health Organisation (WHO). It was discovered in 1960 and firstly reported in December 2019 when a tremendous number of pneumonia cases was reported in Wuhan, China. As a result, etiological research was carried out by the government of China for taking preventive measures to control this epidemic.¹ It is genomically analyzed and suggested that a strain of CoV (2019 n-CoV) has been named as Severe Acute Respiratory Syndrome CoV-2 (SARS- CoV-2) recently. This viral infection was suspected to be zoonotic in origin.² Coronavirus causes infection in respiratory and intestinal tracts in humans and non-humans.

In 2002-03 serious upsurge of severe acute respiratory disorder in the Guandong province of China made it highly pathogenic to humans. Familial mass of pneumonia upsurge append to the evidence of pandemic COVID-19. The graph of this disease is reaching heights because of human to human transmission of this viral disease.³ Infectious Bronchitis virus (IBV) was the first discovered CoV in chickens and human CoVs, causing respiratory diseases. Common cold in humans was caused by CoV-OC43 (HCoV-OC43). SARS CoV in 2002 was discovered after the arrival of HCoV-229E and HCoV-OC43.⁴

DIVERSITY OF CORONAVIRUS

Coronavirus belongs to subfamily *corona virinae* and member of *corona viridae* family and order *Nidovirales* as given by the International Committee on Taxonomy of Viruses. According to the studies, it is found that four genera of this subfamily are there namely, Alphacoronavirus, Betacoronavirus, Gammacoronavirus and Delta coronavirus. These subfamilies are designated based on their genomic structure along with the phylogenetic relationship.⁵

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Respiratory illness and gastroenteritis are caused by alpha and beta corona viruses in humans and animals. A study claimed that Betaconona virus infects only mammals. Gamma and Delta coronaviruses affect the bird species, but some of them are reported fatal for mammals also. These two genera of coronavirus induce mild upper respiratory diseases in the immuno-competent host.⁶

STRUCTURE OF CORONAVIRUS

This newly popped SARS-CoV-2 is a single-stranded ribonucleic acid (RNA) having a spherical structure consisting of spike proteins. Coronavirus is alleged so because the word corona is derived from *Latin* word *corona*, which means 'crown'. The virus has a royal crown-like appearance when it is observed under an electron microscope. The CoV is protected by a lipid bilayer and consists of certain proteins, namely, spike (S) protein, nucleocapsid (N) protein, membrane (M) protein, envelope (E) protein, and haemagglutinin esterase (HE).⁷ This haemagglutinin esterase protein increases the admittance and pathogenicity of the coronavirus. SARS-CoV-2 has an identical structure as that of coronavirus, including other constituents like poly-proteins, nucleoproteins, membrane proteins like RNA polymerase. Other enzymes present in

this virus include helicase, glycoprotein, accessory proteins, 3-chymotrypsin – like protease. It is studied that SARS – CoV-2 having spike protein consist of 3-D structure.⁶

IDENTIFICATION OF COVID-19

Coronavirus is a contagious disease; it is imperative to find the root cause of this epidemic. Dr. Zhengli Shi, also known as “Bat Women” from the Wuhan Institute of Virology and Biosafety, was one big suspect in this matter. She was suspected of being a creator of this virus. She was working on an experiment with her colleagues in which she did mutation of amino acid so that it got compatible with the SARS virus. Moreover, she had published many articles related to the SARS virus.⁷ On 3rd February 2020, Dr. Zhengli Shi claimed that the Wuhan virus is of bat origin. Liu et al. detected SARS-CoV from Pangolin lung samples (2020). According to their

study, dead Malayan Pangolins were carrying genomic as well as Darwinism evidence of a presence of identical CoV like that of SARS-CoV-2, namely Pangolin (Co-V). Pangolin CoV showed the most identical features with SARS-CoV-2 beside RaTG13.⁸ RNA–sequencing was performed on the lung samples of Pangolins. Furthermore, genomic characteristics of Pangolins were studied to find out the origin. Last but not least, the researchers made a phylogenetic relationship between the suspected animal species like Pangolin–CoV (from pangolin) RaTG13(from rodents), SARS–CoV-2.⁸

Secondly, bats are also considered as a probable species for the origin of this COVID–19. The study depicted that 96% of whole-genome sequencing was identical between SARS–CoV-2 and CoV of bats. Hence, bats species also came in the list of hosts of zoonotic viruses such as Nipah and Hendra virus. These hosts seldom show any clinical symptoms. The overall nucleotide sequence identity between SL–CoV Rp3 (bat) and SARS CoV Tor 2 was 92%.⁹ The current database sequence suggests that all human coronavirus have a zoonotic origin. SARS–CoV, HCoV–NL63, HCoV–229E, MERS-CoV originated from bat species.¹⁰

PHYSIOCHEMICAL PROPERTIES

The virus particle is oval-shaped and diameter varying from 60–100 nm (approx.) SARS–CoV, and MERS–CoV together gives information regarding physicochemical properties of CoVs. Ultraviolet light or heating at 56 degrees for 30 minutes inactivates SARS–CoV-2. This virus is also sensitive to chemicals like peracetic acid, chloroform, 75% ethanol, diethyl ether. This virus remains for 72 hours on surface like plastic and stainless steel.¹¹

GENOMIC VARIATION

Earlier, a study depicted that the largest RNA among all viruses is of coronavirus containing approx. 27–30 kb. Six to seven regions are present in a genome of a virus and all of them are well organized. Each region consists of one or more open reading fragmentss and are separated by junction sequence containing signals. These signals aid in the transcription of multiple sub-genomic mRNA's.¹² A recent study has described that RNA genome of CoV is the second largest in RNA viruses; largest genome is of Planarian Secretory Cell Nidovirus (PSCNV). It consists of 41.1-kilo base genome size. Structural along with the Non-structural proteins are coded by viral RNA.¹³ There is no interferences of recombinant events. RNA virus is unstable, and hence continuous scrutiny of SARS–CoV-2 spreading human to non-humans is very imperative for controlling the disease. In the entire genome of Wuhan-Hu-1 coronavirus (WHCV), a single strain of SARS – CoV-2 is of 29.9 kb. Moreover, the studies have suggested that the genome of CoVs contain fluctuating numbers of open reading frames (ORFs) ranging from 6–11. The positive sense RNA of SARS-CoV and MERS-CoV shows genomes of 27.9 kb and 30.1 kb, respectively.¹³ High mutation rates characterize all RNA viruses, the evolution of CoVs and transmission

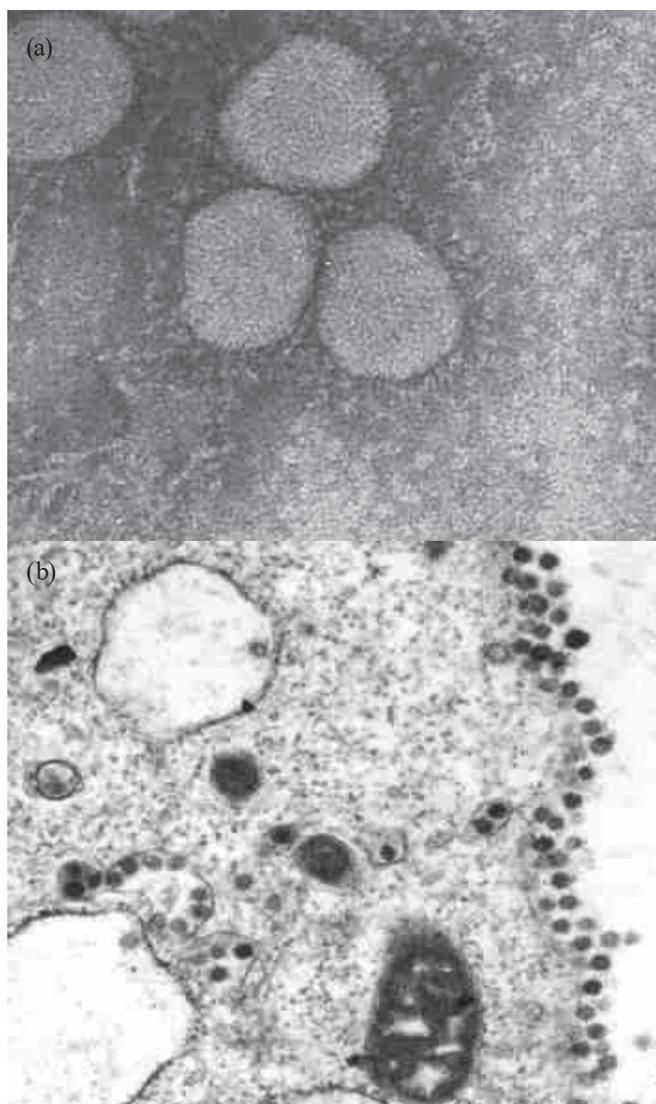


Figure 1: (a) and (b) Microscopic view of Coronavirus.

Source: Department of Microbiology, University of Hong Kong and the Government Virus Unit, Department of Health, Hong Kong SAR China.

from one species to another. Results and analysis by various researchers have proved that SARS and MERS- CoVs have emerged from ancestral CoVs nurtured by bats. It has been reported that animals are considered as intermediate hosts, and humans are terminal hosts.⁶

EPIDEMIC TO PANDEMIC

On 29th December 2019 four patients of acute respiratory syndrome were reported in Wuhan city of China. Wuhan Health Commission (WHC) reported that there is linkage of this virus with that of local seafood market. The Wuhan Institute of Virology of China claimed that out of 33, 585 environmental samples contained coronavirus nucleic acid depicting that this virus has emerged from the wild animals from that local market.¹⁴ In China, there were 11791 confirmed cases of coronavirus and 17988 suspected cases in 34 cities of China (as of 31st January 2020). A total of 213 deaths were reported globally since then. This epidemic was converted into a pandemic when the virulent disease affected 19 more countries all over the world. COVID-19 was regarded as a contagious disease. The identification, diagnosis, clinical course, management of this viral disease was done when this disease affected the US province. Globally, the positive cases as on 16th February 2020 were 51,857 in 25 countries as claimed by the World Health Organization (WHO).¹⁵

IS COVID-19 A BIOLOGICAL WEAPON?

In the past years, many microorganisms have been reported which have caused pandemic in the world. These microbes include; Plague Salmonella, Anthrax, and H5N1. COVID-19 is just one more epidemic that is spreading worldwide like a forest fire. The main reason behind this is that it is spread by human to human transmission hence; it is regarded as contagious in nature. Recent researches suggested that this virus is contagious even when the person does not show any symptom. The similarity between all the epidemics is that they are global and cause widespread destruction all around. One cannot deny the fact that these epidemics go hand in hand with globalization and has a barbarous effect on the economy, trade and tourism. This pandemic has been originated from Wuhan and affected the entire world. People are looking for

the reasons for the outbreak of these epidemics. It is sceptical that this deadly coronavirus affected the world in the short time span. It can be opined that SARS-Cov-2 is a manmade virus. *Virola* virus was not manmade; it undergone certain mutations and then got transferred into humans. So, it might be possible that COVID-19 might be a genetically modified virus, or it may be a recombinant virus.¹⁶

CLINICAL ANALYSIS

Yelin et al. used a pooling approach for standard RT-qPCR for evaluation of COVID-19. The researchers used swabs from the nostrils, throat for the analysis. Pooling works in conjugation with RT-qPCR but it gives 10% false negative results.¹⁷ Muhammad Farooq along with his co-worker Abdul Hafeez used radiographs for the analysis and claimed that chest X-rays of patients infected by COVID-19 depicted certain abnormalities in radiography.¹⁸ Hence, Laboratory detection of this virus included certain clinical findings like genome sequencing, RT-PCR technique and Serological methods like enzyme linked immunosorbent assay (ELISA). This method was based on SARSr - CoVRp3 nucleocapsid protein and was created to ascertain the immunoglobulins IgM and IgG. But the drawback came out when this test gave false positive results among human beta-coronavirus genus.¹⁶

VACCINES AND DRUGS

The viruses which are affecting the world severely with devastating effects include Ebola virus, Nipah virus, Zika virus have started a race of exploring and designing of new vaccines, drugs, therapeutics to get cure of these diseases. Many drugs and agents are detected under clinical trial by following adequate protocols, but efficacy has not yet been established for any drug therapy.

Remdesivir

It is an antiviral drug manufactured by Gilead sciences. It inhibits the replication of virus, and this drug is proved commendable for MERS-infected rats and monkeys.

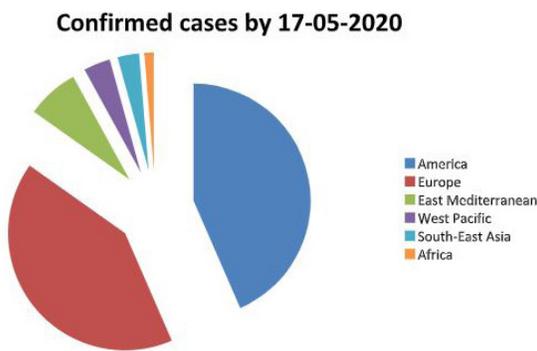


Figure 2: Confirmed cases of COVID-19 till 17th May, 2020
Source : WORLD HEALTH ORGANIZATION (WHO)

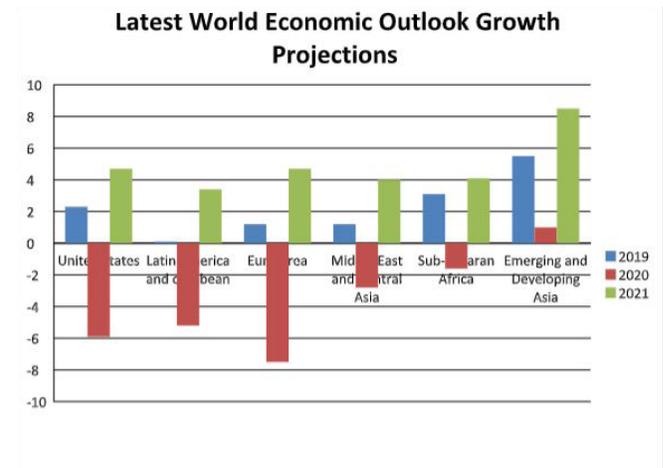


Figure 3: Graph depicting GDP of various countries.
Source: International Monetary Fund (IMF)



Table 1

	2019	2020	2021
United States	2.3	-5.9	4.7
Euro Area	1.2	-7.4	4.7
Latin America and The Caribbean	0.1	-5.2	3.4
Sub-Saharan Africa	3.1	-1.6	4.1
Middle East and Central Asia	1.2	-2.8	4.0
Emerging and Developing Asia	5.5	1.0	8.5
WORLD	2.1	-3.0	5.8

Source: International Monetary Fund (IMF)

Favilavir

Favilavir is the first drug approved for coronavirus in China. It is licensed as an experimental drug, and research is still going on for the effectiveness of this drug.

Lopinavir; Ritonavir

This drug is Human immunodeficiency virus (HIV) Protease inhibitor. It suppresses the coronavirus activity by binding with an enzyme which helps in coronavirus replication.

Covid-19 Convalescent Plasma

The blood plasma samples accumulated from patients retrieved from the viral disease, which might consist of antibodies against SARS-CoV-2.

Hydroxychloroquine

Hydrochloroquine is an anti-malarial drug. Clinical trials performed in China showed potency and pertinent protection by these drugs countering COVID-19 linked pneumonia.

Immune System Booster

Vitamin C and B6 are recommended for enhancing immunity. Vitamin B6 is important to sustain biochemical reactions. Vitamin E also act as an antioxidant and helps in fighting against infections.

Currently, no such drug, vaccine has been made to cure COVID-19.¹⁹

MEDICOLEGAL REPERCUSSION

The people infected by the coronavirus were kept under check to ascertain the symptoms caused by this disease. A study done in Wuhan, China, revealed that the major symptoms at the inception of illness were fever. A total of 98% of the sufferers were suffering from acute fever. A total of 76% of affected people were having cough. Fatigue was also a parameter that was proved as a major symptom. More than half of the patients were suffering from dyspnea.²⁰ Other Symptoms that were rarely present included headache, diarrhea, and hemoptysis.²¹ A study performed in hospitals of Wuhan proposed that hospital-related transmission of s2019-nCoV was doubtful in 41% of patients, and the mortality rate came out to be 4.3%. Adults and infants were subjected more to this viral disease and required ICU care.²² Currently no vaccine has been made

to cure this contagious disease. The safest way to get rid of this disease is to avoid viral exposure.⁶

WUHAN CORONAVIRUS: MANMADE OR RECOMBINANT

Wuhan coronavirus is strangely identical to 2 bat; ZC45 and ZXC21 as revealed by a study. Recombination has to take place twice during evolution of Wuhan coronavirus. The ancestor bat corona virus had to acquire through recombination with SARS like coronavirus.²⁰ On 2nd January 2020 Director-General of Wuhan Institute of Virology released a notice regarding the strict prohibition and disclosure of any information regarding this disease. There were a number of news and articles published against Wuhan Institute of Virology regarding origin of coronavirus from this lab.⁷ Through all the news and instances, COVID-19 doesn't seem to be a natural virus. There are lots of queries and conjectures on its mutation and manmade interventions.

CONCLUSION

- COVID-19 has proved to be a threatening virus. It is a pandemic which is spreading devastation all over the world. There are many controversies regarding the origin and spreading of this disease. The world is facing a severe crisis due to fall in economic GDP and globalisation along with high fatality rate.
- COVID-19 might be a Bio-warfare agent which has caused gigantic demolition in the world.

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Prevention of Sports Related Orofacial Injuries- A Review on Dental Perspective

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ABSTRACT

The field of sports dentistry mainly deals with the prevention and management of sports-related to maxillofacial trauma. There are many potential challenges to the oral health of athletes including exercise-induced trauma, dental decay due to specialized diet, lack of awareness, oral dehydration and lack of prioritization for dental care. However, there is good evidence that some oral diseases are preventable by simple interventions with good efficacy. Hence dentists today must respond to these patient's specialized needs, providing them with the quality of care that they deserve.

In this review article, we discuss the various preventive aspects of sports-related injuries and the impeccable role of dentist in preventing and managing the sport-related oro-facial injuries.

Keywords: Mouth-guards, Prevention of oro-facial trauma, Sports dentistry.

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INTRODUCTION

India is rapidly assuming a more health-conscious posture. As the interest and participation in exercise and sports is increasing, competitions like Olympic and professional sports have turned from mere dreams into goals.¹ With this increased participation, more emphasis is required to be placed on dental and orofacial injuries that accompany the particular sport. Injuries impact not only the athlete's contest and career but also the individual's life outside of sport as well. Fortunately, the use of proper equipment prevents many of these injuries.²

Orofacial injuries are the most common type of injury sustained during participation in a variety of sports. Hence, the dentist can play a crucial role in informing athletes, coaches, and patients and their parents about the importance of prevention, treatment, and diagnosis for orofacial injuries in sports.³

The term 'Sports dentistry' has been around for many years. It has been described as the prevention and treatment of orofacial athletic injuries and related oral disease, as well as the collection and dissemination of information on dental athletic injuries and the encouragement of research in the prevention of such injuries by the Academy for Sports Dentistry in the USA.⁴

This present review deals with the arena of prevention in sports dentistry and also suggests future areas for collaborative research.

NEED OF DENTIST IN SPORTS STAFF

The incidence of dental injuries is very high among sports players. Azami-Aghdash S et al., reported the average prevalence of dental injuries is 17.5% in children and

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adolescents worldwide and two times higher in boys than that in girls through a recent meta-analysis.⁵ Sports activities result in approximately 40% of all dental injuries.⁶

Vidhatri Tiwari et al., conducted a study on 320 athletes from central Indian population and found a prevalence of oro-facial injuries of 39.1% in contact sports (sports that require physical contact or tackling between players e.g. boxing, football). When compared to studies conducted in Brazil, Israel, and Birmingham, England where the prevalence of oro-facial injuries in contact sports was 28.8, 27, and 12% respectively, this study reported a relatively higher prevalence.⁷ The author stated that this could be attributed to lack of awareness and limited use of mouth-guards and other protective gears in India.

Also, given the esthetic value of the face, facial trauma often leads to heightened emotional distress and as this is a region of interest of dental professionals, the trauma to oro-

facial region can be prevented and treated appropriately with the help of dentist as shown in the Figure 1.

Due to the complex anatomy of the oro-facial region and the proximity to vital structures, including the brain, preventing this region from any trauma is of paramount importance. The recent and tragic death of international cricketer Phillip Hughes is a classic example of the same.⁸

PREVENTION OF SPORTS-RELATED ORO-FACIAL TRAUMATIC INJURIES

Use of basic protective devices such as properly-fitting helmets, facemasks and/or mouth guards is the most important aspect in preventing sports-related oro-facial injuries. The likelihood and severity of sports-related traumatic injuries to the head, face, and mouth of an athlete tend to reduce with the proper use of helmets, facemasks, and mouth-guards.⁹ This article discusses the significance of these protective devices.

Helmets

Helmets are designed in a way so as to protect the skin of the scalp and ears from abrasions, contusions, and lacerations. Also, the bones of the skull are protected from fractures and the brain and central nervous system from direct trauma which might lead to concussions, unconsciousness, cerebral hemorrhage, brain damage, paralysis and death.¹⁰

The first designed and used was a sturdy leather helmet during the decades between the 1920s through the early 1950s. The advent of synthetic resins brought forth plastic helmets with a protective rubber pad to protect the forehead and scalp. Suspension helmets and air helmets were recently introduced in the 21st century. Suspension helmets were covered internally by foam that absorbed traumatic forces and air helmets consisted of an inflatable bladder and possessed the capacity to spring back to original shape and enhance protection.¹¹

Face Guards

The use of face guards can prevent facial injuries to the mouth, nose, eyes, nasal pyramid and zygomatic arches. Different styles of face-guards are used depending on the anatomic location. They can be manufactured from plastic, rubber tubing, welded steel, or aluminum of different diameters and are generally covered with a coating of vinyl plastisol.¹¹

However, when a facemask is pulled or twisted by an opponent during the course of a play, serious physical consequences such as muscle, neck, or spinal column damage can result which is one of its major disadvantages.¹² A through research and development into restructuring this equipment would be required.

Mouth Guards

Woolf Krause in 1890 was the first to develop mouth-guards or "gum shields" as a means of protecting boxers from lip lacerations. It was made from guttapercha and was held in place by clenching the teeth.¹³ The use of mouth guards can prevent injuries to the teeth, lips, gingiva, tongue, and mucosa. They also prevent jaw fractures, dislocations, and trauma to the temporomandibular joint by cushioning. By maintaining a separation between the head of the mandibular condyle and the base of the skull, the mouth guards also aid in reducing the likelihood of concussion. They should generally be worn when there is a possibility of body-to-body or body-to-equipment contact.⁹

Three basic types of mouth guards are available¹⁴:

1. Stock mouth guard- Generic or readymade mouth guards are called stock mouth guards and are generally purchased over the counter. It is available in different sizes but it does not contour to an individual's mouth as it is not form-fitted. Biting down keeps it in place. They can be worn immediately and are the least expensive but are no longer sold.²
2. Mouth-formed mouth guard- Also known as the "boil-and-bite" mouth guard. It is more popular among athletes and quite economical. It is made of thermoplastic resin. Immersion in hot water softens the resin, which then is adapted in the mouth using tongue, finger and biting pressure. Biting down molds an imprint.^{15,16} However, both stock mouth guards and "boil-and-bite" mouth guards are bulky and are loose and hence, they require occlusal pressure for adequate retention.¹⁷
3. Custom-made mouth guard (Figure 2) - The custom-fitted mouth guard is fabricated by vacuum forming techniques, pressure lamination techniques, and combined vacuum-pressure techniques. It is customized for an individual's dentition by adapting a single layer of thermoplastic mouth guard material over the athlete's cast. These provide

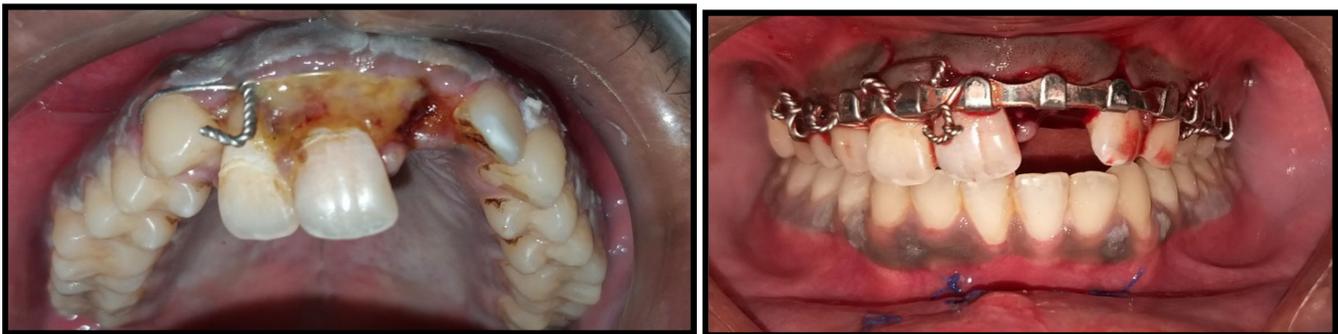


Figure 1: Dento-alveolar fracture to maxillary anterior teeth due to trauma from boxing punch raising esthetic concern (upper right). Inter-maxillary fixation and splinting with arch bar (upper left).





Figure 2: Custom made Mouth guard

Courtesy-Google (<https://images.app.goo.gl/bT87SnoqWGaJXH4A>)

better retention and comfort and less interference with speech and breathing and are more adaptable to orthotic appliances, but however, are expensive.¹⁵

A reduction in dental injuries has been reported when mouth guards are worn.² After the introduction of facemasks and mouth guards, the incidence of football orofacial injuries decreased from 50% to less than 0.5%.¹⁸ A study found that football athletes who wore mouth guards had a decreased prevalence of orofacial injuries (0.07%) as compared to basketball players who did not wear mouth guards routinely (34%).¹⁹ In a meta-analysis reported an increase in the overall risk of an orofacial injury by 1.6–1.9 times when a mouth guard was not worn.²⁰ Therefore, athletes are encouraged to wear mouth guards to prevent orofacial injuries.

Liew *et al.*, conducted a cross-sectional study on rugby players on preference to use a mouth-guard, factors contributing to the use and discontinuation of a mouth-guard. The overall use of mouth-guard was low at 31.1%. The least was for the custom-fitted mouth-guard (1.8%), followed by stock mouth-guard (7.7%). The most commonly used was the Boil-and-bite type (21.1%). Only 28% of previous users continued the use of mouth-guards. The discontinuation rate for Stock was 57.1%, boil-and-bite at 80.2%, and custom-made at 37.5%. Age was a significant factor for mouth-guard use. Significant factors for discontinuation were due to breathing disturbance and general discomfort. Discontinuation leads to increased incidence of injury.²¹

Thus from the above description, it can be said that even with the availability of protective gears, their usefulness could not be explored to the fullest. This stresses upon the need for continuous efforts from dental fraternity to improvise on these gears, which athletes can use effectively.

FUTURE SCOPE

Professional sports carry a risk of significant orofacial injuries. Hence, dental professionals can play a significant role in their prevention. In recent years, people have adopted a healthy outlook towards life, the younger and the older generations are more engaged in exercise and other physical activities. Thus,

that is one more aspect in which sports dentistry could look into. Also, with significant advancements in dental materials and imaging modalities, the field of sports dentistry is better equipped. A dentist should be considered to be a part of the sports team as they play a significant role in the prevention of dental injuries. Sports dentistry is an ever-expanding field and should not be limited only to professional players but its services should also reach to local players and school students to reduce the morbidity and permanent damage to dentition, supporting periodontium and oro-facial structures.

CONCLUSION

Dental and oral injuries ranges from mild to severe and might lead to permanent complications among athletes. With the increased incidence of oro-facial injuries and a dentist's expertise, they must also be available on site and physicians to stabilize the athlete. Proper education and prevention, including the use of mouth guards, can significantly decrease the risk of dental and oro-facial problems.

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Sexual Abuse: Investigation of Rape, Sodomy, and Murder

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ABSTRACT

There are widely increased in sexual abuse that becomes a severe predicament of every society. It has not only put permanent stains on the deceased, but as well as her entire family into degrades and shame. The sensual abuse cases' progressive contribution was being targeted mostly on women, infants, and homosexuals, by the disparate manner of assault-style like sodomy and the killer is male. Sadly, many children become the sufferer of sex-related homicides perpetrated by the individual who are intended to protect them from evil. Four categories of rapists are power reassurance, power assertive, anger retaliatory, and anger excitation. It is necessary to bring justice to society and should fear the consequences the criminals will face. We present a case study that will bring about the important facts and figures of how forensic science helps give conclusions to the cases. In some situations. Offender profiling has been debate on recommending psychiatric and psychological analysis of the sexual offender in such despicable crime.

Keywords: Chieloscopy, Forensic evaluation, Medico-legal examination, Physical evidence,POCSO: Protection of Children from Sexual Offence, SAECK: Sexual Assault Evidence Collection Kit.

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INTRODUCTION

Sexual abuse is a very common obstacle in every society.¹ It typically includes unwanted and inappropriate sexual solicitation of or exposure to; women mostly are of child which is done by a person through genital touching or fondling or penetration in terms of anal, oral or vaginal intercourse or attempted intercourse. In India, sexual offences are covered in different Indian penal code sections, and it does not distinguish between adult and child victims. In the case of rape, it is a natural offences, which comes under section of 375, I.P.C. which states that the unlawful sexual activity and any sexual intercourse which is carried out forcibly or under the threat of injury against a person's will or with a person who is beneath a certain age or incapable of valid consent because of mental illness, mental deficiency, intoxication, unconsciousness, or deception. Although, the Protection of Children from Sexual Offences Act (POCSO), 2012, which has been recently drafted to strengthen the legal provisions for the exploitation and protection of children from sexual abuse, defines a child as any person below the age of 18 years and protects all children under the age of 18 years of the offense of sexual assault, sexual harassment, and pornography. There are multiple reasons for the drastic increase in rape cases. The number of unemployment, peer pressure or influence, number of under-aged desires or fantasy and psychological issues is few reasons that can be named.²

Women and children all around the world are vulnerable to the most curl form of behavior known as sexual assault. This is the most in a human manner of crime, which is seen to be most injustice. According to the National Crime Records Bureau (NCRB), MHA, Govt. of India report of the year 2017, it is known that every 20 minutes, a woman is raped across the India. About 70% cases of sexual assault which have been

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targeted over the infants. The form of sexual attacks is getting intense and tremendous in different ways.³

The sexual abuse which is done by unnatural ways, which is called as sodomy, which comes under the section 377 of I.P.C. It is the anal intercourse between two males or between a male and female.⁴ It is called gerontophilia when the passive agent is an adult, and pederasty, when the passive agent is a child, who is known as catamite. Sodomy is a sexual activity that is found to be a strong activity which is found as a strong attack, which are a social as well as a religious crime. It is led by the failure of teeming the disciple of all sorts of sexual desires.

For the proper investigation of murder and rape cases, the investigative officer (I.O.) and forensic team need to be look over the undisturbed crime scene after the incident and start the collection of the shreds of evidence take place to link between the victim, crime scene, and the suspect for the triumphant investigation. They should ensure that they barricade the area and seal the area. Ensure that appropriate evidences are being sent with the proper chain of custody.³

7's of crime scene-

1. Securing the scene
2. Separating the witness

3. Scanning the scene
4. Seeing the scene
5. Sketching the scene
6. Searching for the evidence
7. Securing and collecting pieces of evidence

These are³

- a. Evaluation of the proper timely crime scene management.
- b. Videography/sketch of crime scene/record injury on the body and private parts.
- c. Collection of the cell phone of victim and the suspect to analyze call records.
- d. Type of strangulating materials like rope, wire, dupatta, long cloth etc. which are used during the crime.
- e. The strangulation mark on the victim's neck to be recorded with scaled photograph.
- f. The collection of biological evidence (vaginal/anal/oral swab) which is registered by medical officer using sexual assault evidence collection kit (SAECK)
- g. Seminal constituents on a sexual assault victim are important evidence that sexual intercourse has taken place, but their absence does not necessarily mean that a sexual assault did not occur. Physical injuries such as bruises and bleeding tend to confirm that a violent assault may be occurred. The forceful physical contact between the assailant and the victim may result that a transfer of physical evidence such as blood, semen, hairs, and fibers. The presence of these types of evidences helps us forge a vital link in the chain of circumstances surrounding a sexual crime.
- h. Condom used during the assault is collected, if present, and be swabbed separately from the inner and the outer surface.

- i. The sexual assault victim must undergo a medical examination as soon as possible after the assault; all the outer garments and undergarments from the victim should be carefully removed and packaged separately in paper (not plastic) bags.³

Case Report

On Tuesday, July 11, the nude and battered body of Margaret, a 43-year-old white female, was discovered in the basement of her home by her 21-year-old son, Jeremy. Her daughter, Angela, became concerned when she couldn't reach her mother by phone. She had gone to the house earlier that day. When she did not receive an answer to her knocks on the door, she contacted Jeremy. Jeremy, who had moved out of the house on Friday, July 7, had relocated in an adjoining town, and had a key to the house. Responding to Angela's call, Jeremy went to his mother's house. Using his key, he entered through the back door, which had been locked. He proceeded into his mother's bedroom and found the room in slight disarray with various dresser drawers open. The telephone was on the bed with the cords ripped out. He also noticed that one of the pillowcases from the victim's pillows was missing. He then walked through the house, looking for some note or message from his mother. When he entered the basement area, he discovered his mother's nude body lying on the basement floor with a pillowcase over her head and her hands and feet bound. He immediately realized that she was dead and called 911.⁵

Police Response

The initial response to the crime was by the Pontiac Police Department, who subsequently requested the Oakland County Sheriff's Department to assist both in the crime scene process

Table 1: Procedure to collect items of physical evidence from the sexual assault victim¹

<i>The sampling Area</i>	<i>Forensic evidence</i>
The swabs were taken from the mouth and upper lips	The detection of the suspect fluids like saliva, semen or blood stains. There could be bite marks or lip prints and scratch marks around the mouth region. There can be smothering attempts that could be observed.
Swabs were taken from the skin	There could swabs taken from the skin to find the starch marks, bloodstains, and semen samples around the thigh region, suction marks, bite marks, and bruise marks. These swabs should be taken in 72 hours.
Hair around the pubic region	The important technique to collect the semen sample could be done by combing the hair. It can detect impurities and foreign hair samples.
Swab from the genital area	It is important to take within 72 hours; it is taken from the top valve region. It is important to find the presence of semen sample collection as well as the possibility of the sign of penetration in the anal or vagina.
Swabs taken from the outer area of the genital area	It's important to check the outer area of the anal region; there could bruise observed. Blood and semen samples could be found around the public hair and the buttock regions.
Clothing samples	Ensure that luminal is used and cut the region with semen samples are being taken and the swabbed.
Nail and scratch marks	The scratch marks are photographed are recorded, and the nail scaped out from the nail bud.
Blood	DNA samples collection using FTA card. With blood sample we can detect the any sort of drug abuse was involved. The detection of any sexually transmission has occurred.
Urine	This is mainly helpful for the detection of the drug abusers if any.
Swabs for patients below 10years	The vaginal is tending to have more blood and internal rupturing.



and the subsequent major case investigation. The Pontiac Police Department worked jointly with the Oakland County Sheriff's Department on all major crimes. Detective Sergeant William Harvey of the Oakland County Sheriff's Department eventually became the officer in charge of the homicide investigation, which occurred in the City of Pontiac, County of Oakland, in the State of Michigan.³

Description of Crime Scene

The scene was described as a single-story, white house located on the north side of Peacock Street. The victim was described as a white female, later identified as Margaret. Her body was found in the southeast corner area of the basement floor. The victim was lying on her right side. Her body was totally nude, and a multicolored pillowcase had been wrapped around her head and tied at the neck area with a telephone cord. Her hands were tied very tightly with a telephone cord, which had been knotted. Her feet were also tied tightly together with telephone wire. There was a pooling of blood, which appeared to emerge from the head area (Figures 1 and 2). There were also signs of a struggle in the area where the victim's body was lying. The north-side basement window, above a washtub, was found open, and a dark-colored paint chip was found on the basement floor just in front of the washer. The basement wall, just below the opened basement window, had spray-painted on it, which

investigators recognized as some type of gang graffiti. There were also signs of a struggle in the northeast bedroom.⁶

- The phone and answering machine were lying tossed on the bed with their cords removed and/or ripped out.
- There was a brown wallet-type purse on the bed, which appeared to have been dumped onto the bed. The contents were strewn across the sheet.
- There was one pillow missing, a pillowcase at the side of the bed, and another pillow with a multicolored pattern on top of the bed. This matched the pillowcase tied on the victim's head.
- It also appeared that the dresser drawers had been gone through in the northeast bedroom.
- Investigators observed a pair of light-colored flowered panties and a black negligee lying on the bedroom floor next to the bed.
- There was a phone base, missing its cord, which had been apparently ripped from its connection.

The rest of the house was neat and clean with no signs of forced entry except for the basement window. A number of items of evidence were recovered from both the victim's body and the crime scene. Among these items were hairs, including suspected pubic hair, swabs from the victim's buttocks area, blood samples from the crime scene and victim, and hairs and fibers from the basement window. Preliminary examination revealed multiple hair types foreign to the victim.³

Autopsy Findings

An autopsy was conducted on July 12 by a Deputy Chief Medical Examiner for the Oakland County Medical Examiner's office. The cause of death was listed as blunt force head trauma. The autopsy findings are listed as follows (Figure 3).

Blunt force head trauma with

- Abrasions and lacerations on the face
- Extensive subscapular hemorrhage
- Skull fracture
- Bilateral subdural and subarachnoid hemorrhage
- Brain contusions
- Brain edema and herniations



Figure 1: Body at scene. The victim's body was totally nude. Her head was covered with a pillowcase and her hands and feet were bound.



Figure 2: Body examination. The pillowcase on the victim's head was saturated with blood. She had been stomped to death.



Figure 3: Autopsy photograph. The brain edema and herniation were suggestive of survival following impact on the head. Note a large amount of hemorrhaging.

- Small focal areas of hemorrhage in the soft tissue of the neck
- Contusions in vagina and anus.
- The vagina had contusions near the introitus as well as on the middle part of the posterior wall of the vagina.
- The anus has contusions all around the external opening—abrasions and contusions on the back and extremities.

Opinion

Margaret died of blunt force head trauma. Although there were small areas of hemorrhage in the soft tissue of the neck, there was no fracture of laryngeal cartilage or hyoid bone and there was no evidence of conjunctival petechiae indicating strangulation. The injuries in the vagina and anus were indicative of sexual assault. The medical examiner further opined that the brain edema and herniation were suggestive of survival following impact on the head. This meant that the victim lay there suffering on the floor for some time after the assault. The manner of death was determined that it may be a homicide.⁷

CONCLUSION

Rape is definitely a substantial issue in the community with a lot of political influences, ignoring the victim rights for justice. Thereby, the importance of bringing all the evidence pieces to be a strong close for the victim. It is a justification for the public society with prevention and control of these issues. The cases provided show the stringent requirements for the significance of having forensic science in the legal system. Rape murder

is a complicated issue that is found in the present cases. It is unbelievable to perceive under what situation the rapist, after sexual gratification, could kill the girl. However, in such case the accused are required psychiatric analysis to know more about their criminal behavior. The strong limb for the cases with to be brought about is with the significant evidence. Mass communication plays an important to make the number of awareness for society. With the advancement in science, now it's possible to bring the justifications and provide stringent measures day by day.⁸

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Autopsy as well as Nano-technological Study of a Suicide by Firearm

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ABSTRACT

Background: The case brought to the department was of a 34 years old man, he had a history of alcohol and drug abuse. He had shot himself in the forehead with an unlicensed locally made firearm. The family members were reluctant in giving any further information and said they had no idea why he committed suicide.

Case Report: A thorough post-mortem examination was conducted in the Mortuary of the Department of Forensic Medicine, Institute of Medical Sciences, Banaras Hindu University (IMS BHU). Ballistic findings as well as gunshot residue (GSR), were collected to support the claim of suicide. SEM-EDXA was performed on the collected hand swab.

Conclusion: It is important to state the manner of death, in any case, to provide justice to the deceased and hold the indictable person accountable. To prevent such suicides by the use of improvised firearms, strict and stringent laws should be formulated on the manufacturing and sales of such firearms.

Keywords: Contact Shot, GSR, SEM-EDXA, Suicide, WHO.

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INTRODUCTION

According to the World Health Statistics 2019 published by World Health Organization (WHO), India's suicide rate stood at 17.8 suicides per 1,00,000 people in 2016, much higher than the global suicide rate of 10.5.¹ About 800,000 people die by suicide worldwide every year, of these, 135,000 (17%) are residents of India, a nation with 17.5% of the world's population.² Suicide is the third leading cause of death in the 15–19 years of age group.

A total of 79% of global suicides occur in low- and middle-income countries. Ingestion of pesticides i.e., poisoning, hanging and firearms are among the most common methods of suicide globally.³ Whoever attempts to commit suicide and does any act towards the commission of such offence, shall be punished with simple imprisonment for a term which may extend to one year [or with fine, or with both].⁴ Although section 309 is still in effect, the Mental Healthcare Act, April 2017 (enacted July 2018) has restricted its application. The relevant provision of the new act states: Notwithstanding anything contained in section 309 of the Indian Penal Code, any person who attempts to commit suicide shall be presumed, unless proved otherwise, to have severe stress and shall not be tried and punished under the said Code.⁵

A study published by Sachil Kumar et al. In 2013 Out of 5204 suicides were reported in January 2008 to October 2012. A total of 16% of males and 3% of females preferred firearm for committing suicide.⁶

In a study reported by Anik Kohli in 2006 in the Delhi region, of the seven suicidal victims, six were males. Of these,

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four were in the age group of 20–30 years, and two were in the age group of 40–50 years. The wounds in all the suicidal cases were contact wounds.⁷

Three methods—hanging, pesticide suicide, and firearm suicide—dominate country-specific suicide patterns. This indicates that hanging is the most preferred method of suicide as it causes painless death when no other major method is available. The proportion of hangings typically decreases as either pesticide suicide or firearm suicide increases. Readily available poisons like opium compounds and barbiturates (cause painless death) and firearms facilitate unplanned suicide acts, which are typical of impulsive suicide. This probably explains why the proportion of firearm suicides in individuals with severe mental illness background is distinctly below average.⁸ In India, there has been the rapid proliferation of illegal firearms with a sharp increase in firearm fatalities, especially in Bihar, Jharkhand, and Uttar Pradesh.⁹

Proving a gunshot fatality's manner of death is an important aspect of medico-legal investigation. It is common to portray a homicide as a suicide to fool the law enforcement agencies and escape the harsh punishment. It becomes crucial in such suicide cases to prove that they indeed were suicides and no foul play is involved. To determine the manner, a well-coordinated collaboration between the police officials who had visited the crime scene, the medico-legal expert and ballistic experts' opinion is paramount.

Here in this case study we are presenting a typical example of suicidal gunshot fatality. The medico-legal evidences and ballistic evidences point towards the manner of death with complete clarity.

MATERIAL AND METHODS

The case was brought to the Department of Forensic Medicine, Institute of Medical Sciences, Banaras Hindu University. Post-mortem findings including gross analysis was diligently explored as well as samples of GSR were collected in the Department's mortuary. The gunshot residues were collected from the site of entrance of the bullet as well as from the hands of the victim.

Separate cotton balls dipped in dilute hydrochloric acid were used to swab the area around wound and palm of right hand. The swabs were air-dried and placed in separate, sterile and labeled containers. The swabs were then sent to the Department of Chemical Engineering Indian Institute of Technology, Banaras Hindu University, Varanasi for SEM-EDXA. The analysis is both qualitative and semi-quantitative.

RESULT

Autopsy Findings

External examination

On external examination of the wound, a stellate-shaped or cruciate-shaped entrance wound in the forehead's frontal region and in the mid-line, 7 cm above the glabella, is present in the deceased as depicted in Figure 1.

The diameter of the circular entrance wound is 1.2 cm.



Figure 1: Stellate shaped contact shot wound with scorching effect.

The cruciate wound dimension is diagonally 11 cm in length, and vertically, it is 3.8 cm, and horizontally, the length of a wound is 5.4 cm in length.

As it is contact shot due to blast effect, everything, i.e., burning, blackening, and tattooing, which are characteristic features of the entrance wound, went inside the track.

The exit is of 0.7 cm in diameter and is present in the occipital region. It is 3.5 cm below the occipital protuberance and 10cm outer to right ear. This exit wound is smaller than the entrance wound and this is a typical example of a contact shot where the blast effect exit wound is smaller than an entrance wound.



Figure 2: Tattooing on the dorsal aspect of hand



Figure 3: Presence of Black Powdery substance on the palm and fingers.

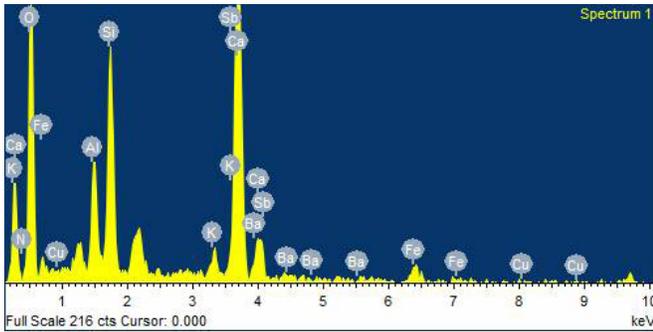


Figure 4: SEM-EDX Spectrum of GSR showing its elemental composition

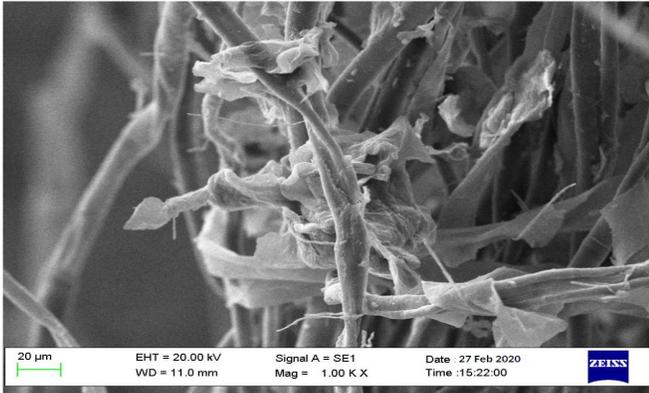


Figure 5: SEM image showing small diffused particles of GSR detected on the swab.

Due to the rupture of anterior cranial fossa in this shot i.e., contact shot, ectopic bruise in the form of a black eye or panda's eye is present and bleeding through both the nostrils.

On examination of the dorsal aspect of hand, unburnt gunpowder particles are present in the form of tattooing or peppering effect this is depicted in the Figure 3.

On the palmar aspect of the hand, GSR residues were present, and it was collected for SEM-EDXA by swabbing. The residues can be clearly seen in Figure 2.

Internal Examination

On opening, the skull dura matter was ruptured. Prior to skull and dura matter, blackening was present in sub-galeal regions and subperiosteal regions due to the blow-black phenomenon.

On further removing the dura matter, subarachnoid and subdural hemorrhage was present profusely over both the cerebral hemisphere.

The inner table of skull shows a bevelling effect with fracture of anterior cranial fossa with a dimension of the fracture is 1.2 cm in length and 0.7 cm in breadth. This anterior cranial fossa fracture internally is responsible for a black eye and bleeding through nostrils.

In this case, it is evident from the wound's position that it is one of the commonest sites of infliction of firearm entrance wound in suicidal cases.

The wound's nature is contact shot which is stellate shaped or cruciate shaped injury suffices the criteria of contact shot wound.

Ballistic Findings

No bullet was recovered. The bullet got exit from the occipital region of the skull. It had created an exit, which was smaller than the entry.

Gunshot Residue Findings

The samples were scanned for the image of gunshot residue, and EDXA was utilized for the determination of elemental composition.

Detected Elements

The GSR was subjected to SEM-EDX analysis for detection of its elemental composition. The elements detected from the sample consisted of nitrogen, oxygen, aluminum, silica, potassium, iron, copper, strontium, and barium. Figure 5 shows the SEM-EDX spectrum. Particles of 20–100 micrometers of small spherical, conical or rectangular and of various sizes were detected in the GSR spectrum image of the swab as shown in the Figure 4. GSR was mainly collected from front and back of the palm of the deceased. The elements analyzed in the image were mainly:

Oxygen, which is derived from barium nitrate and lead peroxide. These act as a propellant in the gunpowder. Its weight percentage is more than 50% of entire constituents of GSR detected by SEM-EDX.

Aluminum detected in the elemental analysis is used to stabilize the gunpowder, and it also acts as a source of energy for GSR. The nitrogen detected in the sample was derived from potassium nitrate, which is 75% of the total gunpowder.

Copper in the sample is derived from jacket of the bullet and the iron detected is from the metallic fowling present in gun barrel as it was in tight contact with the skin.

The three major components of GSR, antimony-lead-barium were detected in the spectrum produced during GSR analysis in various percentage i.e., antimony was 1.63% by weight, barium was 0.78% and lead was 0.04%. The presence of spherical particles of Sb-Pb-Ba are the three main constituents of GSR. The presence of all these three in one spectrum confirms that GSR particles were present in the swab samples taken from the hand of the victim. This SEM-EDX test confirms the presence of GSR as it is the most sophisticated and sensitive test for the detection of GSR in present time. Hence it is inferred that along with post-mortem analysis, detection of GSR favors the manner of death to be suicidal.

DISCUSSION

The distinction between suicidal, homicidal, and accidental firearm injuries is the most difficult as well as the most frequently asked question. Sometimes it is even impossible to point out. One of the crucial factors in it is the range of fire. A distant shot usually eliminates suicide unless any special circumstances are involved.

As per a study conducted in 2007-08, 5% of the total firearm injuries were suicide. In India, where the preferred method of suicide is hanging and poisoning, these statistics indicate an increase in the trend of firearm suicides. Easy

availability of unauthorized firearm is one of the prime cause of this increase.

The characteristic shape of the entry wound is an example of firm contact of firearm with the skin having a shallowly situated bone underneath. When a discharge from firearm occurs, the gases and other effects, including soot, unburnt, or partially burnt powder, penetrate the skin, in our case scalp. Still, the bone disrupts their entrance, further acting as a barrier and reverts it back. The large expanding gas's dome then splits the skin causing the eruptive appearance or cruciate shaped or stellate shaped wound.¹⁰ This effect of the formation of cruciate, stellate, or ragged laceration is also called the Blast effect.¹⁰ In case of contact shot, contrary to the normal finding of exit wound being larger than entry wound, exit wounds are smaller. This is due to elastic nature of the skin.¹¹

Another factor which plays an important role in all suicidal infliction of injury is the accessibility of the body part on which the injury was inflicted. The vast majority of the shots are in the head and chest region. Among these the right temple area is preferred most frequently, followed by the floor of mouth and forehead. Forehead is the third most common site.¹²

One of the three most common cause of bruising in the eye lid, which is also known as the black eye, racoon eye or panda eye is the entering of blood in orbit from behind or above due to a crack in the walls of orbit, mostly due to fracture of floor of anterior cranial fossa.¹³ The fracture in our case was caused due to penetration of bullet through the anterior cranial fossa of the skull.

The presence of gunshot residue on hands also proves to be helpful when corroborative with circumstantial evidences. This GSR originates in parts from the blowback associated with blast effect as well as from the frame work of the firearm used. In India use of desi kattas or improvised firearm weapons is also common. These being cheap and easily available are easy to keep in possession than a licenced firearm. They are not built according to standard firearm manufacturing protocols. Presence of tattooing on the hand of the victim is a result of back fire from this type of substandard but lethal weapon. Laboratory experiments involving handguns have shown that the index finger, thumb, and connecting web of the shooting hand are most likely to be positive for GSR.¹⁴ Amongst several techniques which are present for the evaluation of GSR, SEM-EDXA is considered to be the best for the analysis of characteristic trio of elements Pb-Sb-Ba. The scanning electron microscope uses a focused beam of high-energy electrons to generate a variety of signals at the surface of solid specimens. The signals that derive from electron-sample interactions reveal information about the sample including external appearance. EDX, an accessory device, has increased the utility of the instrument many times by providing elemental composition.¹⁵ In suicides with handguns, primer residues on the palm may be due to cradling the gun with hand at the time of firing. In regard to collection of GSR, a study by DeGaetano and Harrison presented at the conference revealed that GSR collection from the hands of suicide victims at the scene was

positive 92% of the time whereas GSR collected from the hands of suicide victims at the morgue was positive 76% of time.¹²

CONCLUSION

Suicide by means of firearm is increasing at an alarming rate. Possession of illegal firearms is one of the leading cause. Easy availability of this lethal weapon leads to suicide when a person is in rage or sometimes it is just an impulse. Most of the men who commit suicide are young aged men who had their whole life in front of them. Men who were capable of contributing to society for good. Strict laws should be made and a complete ban on manufacture and sale of such illegal firearms should be imposed. Heavy punishment should be foisted on people who do not abide by these laws.

ETHICAL CONSIDERATIONS

Compilation with Ethical Guidelines

The present study was approved by Institutional Ethical Committee of the Institute of Medical Sciences, Banaras Hindu University. As this case report was prepared from medico-legal autopsy performed at our departmental mortuary, we have statutory right to conduct post- mortem examination and to publish the findings.

Funding

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Author's Contribution

Both the authors have contributed explicitly in preparation of this paper.

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COVID-19 and Forensic Research: A Major Disruption and Potential Opportunity

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Int J Eth Trauma Victimology (2020).

Dear Editor,

The global crisis of a new coronavirus (nCoV) pandemic emerged in Wuhan (China), in December 2019, from a local fresh seafood market.¹⁻⁴ This new strain has been named "severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)", also referred to as COVID-19.⁴⁻⁵

Through this letter I would like to sensitise readers (specially students) who are stake holders in research and academics to work safely but in an effective and customised pandemic adaptive pattern.

There has been an ongoing crisis in the management of this novel coronavirus (CoV), as few characteristics of this virus are still unknown. Health care workers (HCWs) are at a comparatively higher risk of getting infected due to the nature of their work such as sample collection and close association with infected patients. Wang D 2020 found a high percentage of hospitalized patients infected with COVID-19 in Wuhan to be healthcare workers (40 out of 138).⁶ Even amongst health care professionals at-risk, dental surgeons and ophthalmologists are at a higher risk due to proximity to patient's face and oral cavity while performing procedures, specifically which generate aerosols and lead to consistent exposure to saliva and blood.⁷⁻⁸

The method of transmission of SARS-CoV-2 is broadly by two modes, direct or indirect.^{3,9} Direct transmission is basically person to person contact or via body fluids while coughing, sneezing, talking etc. Direct transmission can also happen from aerosols generated during various surgical and dental procedures. Indirect transmission happens through coming in contact with contaminated surfaces, objects such as a stethoscope or thermometer used or present near an infected person.⁹

In an article authored by my team "Strengthening health care research and academics during and after COVID19 pandemic-an Indian perspective" we have already compiled the positive impact and opportunities provided by COVID-19 crisis to health care research and academic set-up.⁴

We have to surely apply ethical, effective and practical SOPs in our colleges, laboratories, clinics and schools to mitigate the impact on health care related research and academic front because of this pandemic. Since the evidence based data keeps on increasing and changing, these SOP can be altered as per needs and situations, especially in forensic context. These protocols can be designed and applied at national or international level.

I am sure HCW or the so called "corona warriors" shall sail through these critical times smoothly, with loads to learn and apply in future.

All the best and Be safe.

Jai Hind!!

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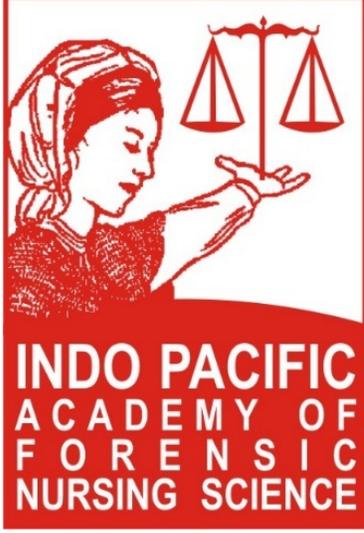
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