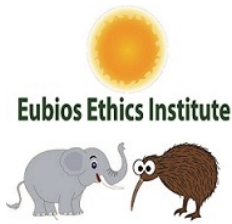


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Editorial address, and all correspondence to:

Prof. Darryl Macer, Ph.D., Hon.D.
President,
American University of Sovereign Nations (AUSN)
Email: darryl@eubios.info

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Registered address of EJAIB: P.O. Box 16 329, Hornby, Christchurch 8441, New Zealand

Editorial: Ethics, knowledge and body functions

This is the issue of *EJAIB* is extended to 44 pages to include several lengthy papers that present aspects of biomedical ethics in areas which are not often, if ever, explored. We can ask questions about the application of the knowledge of our body, and how this may be and should or should not be explored in new ways.

The ethical impacts of routine use of digital eyeglasses on the doctor-patient interaction are explored by Sody Naimer. As our lives are driven to render most of us some form of cyborg (even by wearing basic sight or hearing aids), we are presented with technology that can provide us new information about our daily interactions. The data could be gathered to better monitor what we do – but do we all consent to such data gathering? This comes at a time when there is concern over the data collection of social media platforms.

Two papers explore dentistry. Kasuma et al. show how palatal rugae pattern identification has been used determine family lineage in Minangkabau, West Sumatera, Indonesia. This also raises questions of privacy versus familial solidarity.

Despite legal bans, the practice of female genital cutting continues, and some of the reasons for this continued abuse of often young women and girls are explored by Joseph Nkang Ogar and Basse Samuel Akpan. Sexuality and culture are themes in common with the analysis of interviews described by Bikash Thapa in his Masters 's thesis research on the bases of Early Marriage and Consequences on the Well-being of Mother and Child in Jhirubas, Palpa, Nepal Despite the many health problems, early marriage is still common in many countries.

Md. Anower Hussain Mian et al. conducted a dental and oral hygiene survey among Illicit Drug Abusers in Dhaka, and we can see that this is a neglected group who are also neglecting their teeth.

. - Darryl Macer

The ethical impacts of routine use of digital eyeglasses on the doctor-patient interaction

- Sody A Naimer, M.D.

Department of Family Medicine, Siaal Research Center for Family Medicine and Primary Care, Division of Community Health, Faculty of Health Sciences, Ben-Gurion University of the Negev, Beer-Sheva, Israel
Email: sodyna@clalit.org.il

Abstract

In parallel to society at large, the past three decades have seen a dramatic rise in adoption of computer technology in the medical field. As rival commercial enterprises compete in developing the most ideal "digital eyeglass", the time is ripe to prepare an ethical approach to this phenomenon and its impact on the doctor-patient consultation. Wearing a multimedia system will carry with it both advantages and inherent disadvantages. Particularly worrisome issues lie within the domain of autonomy, confidentiality, and spontaneity. In this paper, the ethical questions raised by the use of digital eyeglasses in the course of the medical office visit are addressed. The choice of use by the physician and the patient are discussed separately. There is a need for guidelines of an appropriate approach by medical staff and their patients in preparation for this novel phenomenon.

Introduction

"Digital eyeglasses" (DEG) are already here, and now is the turning point for preparation before its technological finesse becomes a social phenomenon creeping under the door into the doctor's office. What patients seek is personal attention, compassion, understanding, and care until the presenting problem is resolved. The care provider's prime concern is to provide the patient with undivided attention, recognise the essence of the problem, employ the necessary resources to deliver the most favourable resolution, and feel satisfied that the individual received correct care. However, the environment in which this interaction is conducted has changed.

With growing restraints of time and the escalating burden of tasks, the physician must become more concise and problem oriented. A balance is needed to minimize the discrepancy of catering to the patient's needs and feelings, conferring an immense influence on patient's health behaviours, and limited resources to fulfil these goals. Adoption of any one of a number of solutions is welcome to bridge these gaps. We have recently resorted to incorporating advanced technology into primary care on a national level.

However, we often pay a high price for the advantages of implementation of a further computerized environment. Electronic medical record documentation is an example where many aspects of patient care have been sacrificed in order to propagate better storage and more convenient access to the medical database (1-3). We cope with the consequences that our digitalized society has on us. This transition bears considerable impact on the doctor-patient dynamic. It seems the end of this journey is yet to be determined.

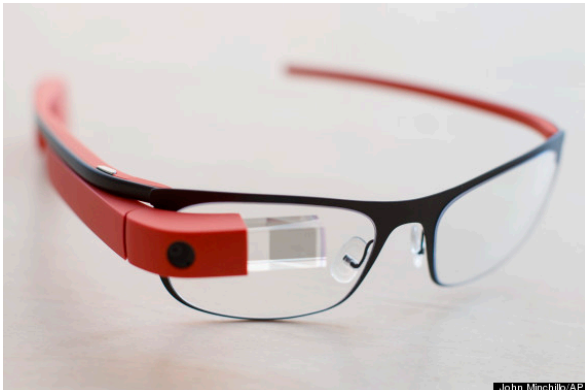
The revolutionary hand-held cellular telephone has evolved into a smartphone that is a multi-function multimedia appliance with all the capabilities of recording and documenting audio and visual stills or motion pictures in perfect colour for reproducibility in various forms. Computerization has become ubiquitous and encompasses almost all branches of clinical medicine. From ordering tests, to sifting through research results, memory storage, data comparison, records of previous consultations, diagnostic modalities, cautionary signs of hypersensitivities, and information mining all the way to transcontinental robotic surgical procedures. In this paper we would like to delve into a single aspect of this development, namely the inseparable conformation of the gadgetry into part of the individual self. We may now cope with the new phenomenon of DEG, or "augmented reality", of which the most advanced device is Google Glass (Google Inc., Mountain View, CA).

What is Google Glass?

Google Glass is a wearable android-powered computer coupled with an optical head-mounted display (OHMD). Information is displayed in a smartphone-like hands-free format onto a prism-like rectangle at a corner of one's field of vision utilizing innovative liquid crystal on a silicon field-sequential colour system. The technology enables still or video photography with a camera built into spectacle frames. Communication is possible with the Internet via voice commands, head tilts, and a touchpad on the side. It can run special applications, make video calls, and facilitate hands-free web searching. It is planned to open endless options of design to wirelessly accommodate personal medical documents that have been archived or data from transmitted monitors such as blood glucose measurements (4), from the patient's perspective and face recognition, to hazard warnings of drug interactions from the perspective of the physician.

Google started selling a prototype of Google Glass to qualified "Glass Explorers" in the US on April 15, 2013, for a limited period for \$1,500. Currently off the market, the company continues its efforts to perfect the device into a more feasible appliance

that corrects technical problems that arose such as short battery life and inconsistent functioning. The assumption is that just as it has evolved from a 3,600 g prototype in mid-2011 to the 2013 model that is lighter than the average pair of sunglasses, soon it may turn into a custom artefact as popular as the smartphone. If so, it should be in order to delve into morally setting rules and limitations before becoming overwhelmed by a new phenomenon reaching our doorstep before adequate preparation. In this work we concentrate on the impact it may have on primary care consultations.



Advantages of DEG and its utilization in various medical scenarios

Increasing fields of medicine are utilizing this device as a wearable and special-purpose device for various purposes. A number of proof-of-concept projects and studies using DEG have been undertaken in the medical field. Its applications include remote collaboration between doctors, heads-up viewing of vital signs, medications, and lab reports, as well as live streaming of operations to medical students (5). A recent report demonstrates its advantages in the care of chronic wounds (6).

Wearable augmented reality systems have also been demonstrated in a range of clinical application areas such as image-guided surgery, pre-operative imaging training, health-related behaviour change, and clinical education (7). Studies have examined the use of DEG systems for both in-patient and remote medical procedures (8).

Problems arising with DEG technology

The most recent development deserving fundamental scrutiny arrived with the current progress in developing a similar device with the capacity to activate any of its components hands free. The fearful aspect of this change is that if accepted, and if applied without restraint, these devices can potentially dominate human attire to an extent that may lead to universal violation of privacy. Worn recording electronics carry with them advantages as well as disadvantages

regarding both the professional aspiring to provide the most updated care as quickly as possible, and to the patient expecting to receive the highest quality of treatment (9). Along with the staging of this device, safety issues such as driving while donning such a device raise many concerns (10). A large professional team invited by the Office of the Privacy Commissioner of Canada met to judge the implications of such an item on privacy issues and immediately demanded resolution by the executive director of the marketers.

Issues to be addressed

Transformation into a world where any movement or voice can be recorded for personal or other use raises indeterminable social issues as it challenges human behavioural ethics in general. The medical field is only one aspect of the technical cyber universe in the making. For example, two very important aspects that confound this transition are, firstly, the actual process of documentation that may become completely undetectable, since without a functioning blinking indicator activated when recording is in progress, the party facing the lens or microphone remains ignorant of this ongoing process. The traditional vocal commands or fingertip tap of the frame arm needed to activate or deactivate any of the device's functions are now replaced by a mere head tilt or a programmed wink sequence. Secondly, as use of the computer spectacles advances to become the norm, a regular human attire may be sought as opposed to current instances of asking for permission to carry a cellular telephone into a visit and place it on the desk or raise it to a position to facilitate photography; instead, the demand will be to remove the device in order to create the desired atmosphere.

Both the upside and downside should be considered in order to determine the desired extent of tolerance towards device use in order to reap the benefits that may be derived from this new technology. The questions we would like to raise include social and ethical issues, for example, the surreptitious collection of information about other individuals and its possible use by a third party for quality care or medical education purposes. Is there such a thing as a general permissive attitude in an era where all is exposed and information accessibility so simple? Yesterday's gimmick becomes today's normative behaviour. Will we all become victims of privacy and intimacy invasion on a regular basis? From Google Earth to public domain camera surveillance practically every motion and instant recording will prevail. Suddenly our subconscious becomes aware of the fact that an intruder has become part and parcel of the physician-patient encounter, brought in by either

party or both. This can result in an obstacle that will shed new meaning to the famous nursery rhyme written long before the computer chip was devised:

"I do not like thee, Dr. Fell; The reason why I cannot tell; But this I know, and know full well, I do not like thee, Doctor Fell!" (Mother Goose).

Despite an abundance of accounts of the reinforcement of care with DEG, authors have not contributed a discussion to the literature on the need to define their uses in keeping with an ethics code or set of values. An overt rejection of the recent introduction of mobile devices into health facilities on the basis of fears of breach of privacy has failed, as an anonymous hospital administrator explained:

"Acceptance of personal mobile devices by the hospitals was predictable, as there are three things in life that are inevitable: death, taxes, and technology. Technology is trying to eliminate the first two items on the list."

Thus, we must improve our vigilance by expecting such innovative technology as imminent and prepare ourselves accordingly.

Ethical considerations

Despite efforts to improve patient care in the process, we must safeguard ourselves into minding not to breach ethical principles. Fundamental principles in need of attention that immediately rise when considering this encounter relate to the atmosphere and confidentiality of the visit.

1. *"Effective communication is critical to a secure patient-physician relationship. The physician has a duty to promote patient understanding and should be aware of any barriers"* (11). Are we certain that the introduction of DEG does not impede their communication?

2. *"Confidentiality is a matter of respecting the privacy of patients, encouraging them to seek medical care and discuss their problems candidly ..."* (11). Is the use of a multimedia recording device in the centre of the communication "space" not a threat to that Holy Grail?

Systematic analysis of the benefits versus the drawbacks of a new practice of DEG adoption will only be possible if we analyse separately its use by each of the involved parties and then weigh benefits versus risks in each category.

Physicians' use of digital eyeglasses in the course of medical consultation

Physician-related pros: The motivation to use this technology seems obvious. To begin with, the facial recognition application can prevent the discomfort of forgetting the patient's identity. Misguided documentation in the wrong file can be overcome and a more personal atmosphere can prevail when

the patient's name is used. Documentation is easier for future reference and multimedia options facilitate following up on dynamic conditions where detailed alterations need comparison. This will not only improve patient care but it can safeguard against allegations of misconduct as risk management is fortified by proof of circumstances that led to decisions taken. In addition to the advantages of a standard computer with Internet access to the patient's previous material and updated medical literature, scientific therapeutic guidelines as well as the health plan's directives are easily accessed. In addition, real time specialist or even peer remote consultation is possible. Rather than describing findings, this way the signs of disease are exposed and all audio and visual cues can be picked up by the contacted physician and recommendations can be immediately implemented.

Voice activated commands can save time. Information can be accessed or perceived in the course of hands-on care such as removing dressings, preparing equipment, or examination. In free moments during a visit various means can be employed in order to enhance productivity, similar to the evidence of increased work productivity in the atmosphere of pleasant music (12).

Patient-related pros: Primarily, a computer screen already exists in many systems where the electronic medical record has been incorporated into practice. Decreasing the size of this screen and changing the attention to body language as if the physician is looking directly at the patient throughout the encounter is a clear advantage. Surely the patient prefers to sense that all technological progress is recruited to ensure that the best care is delivered. Patients stand to benefit from the fact that another perspective is called in to review their case, which will encourage utilizing the consultation potential of this system.

Physician-related cons: The learning curve is as yet undetermined. Just as with any newly introduced technology, mastery is time consuming. Often, use of multi-modalities intended to facilitate work may become a hindrance itself. Hence, we still lack the experience of the benefits of this new option in primary care. Multitasking is actually the complete premise of this whole project and not everyone is suited for such changes. The physician may personally be distraught by the perception that the patient is receiving complete attention while in fact the screen demands a significant bulk of it. Dependence on media may be faulty, missing, or exhibit malfunction. We are often overly dependent on electricity and a discharged battery can cause great inconvenience.

Patient-related cons: During a visit the patient may actually experience the doctor's divided

attention. Furthermore, the presence of a superfluous “visitor” may create a new barrier and interfere with the discrete personalized atmosphere where all secrecy and privacy is respected. This new physical medium can impose a technical impersonal contact between the two individuals and can pose a sense of threat. Patients may also fear their caregiver’s distraction from traditional cues, body language and other obscure messages. If especially sensitive issues are raised in the encounter, distrust or fear of reproducing uncomfortable subjects may lead to conditions unfavorable to open disturbing topics of major concern by the patient.

Patients’ use of digital eyeglasses in the course of the medical consultation

Physician-related pros: It is always preferable for the physician to provide a pleasant atmosphere by allowing the patient to dictate the terms and conditions of the visit. As current status stands, the nature and content and depth of the visit are always guided by the patient’s will. Therefore it may seem equally legitimate that the terms of the encounter are also patient centred. Language or communication barriers may call for the participation of an additional family member or acquaintance who was not available to physically escort the patient, in which case it may be in the patient’s best interest to have an additional party present to assist in ensuring that the message is conveyed, for the sake of compliance. Instances where instructions are complicated or lengthy will benefit from a short take-home video for review at a later time. The two-way transfer of material is facilitated.

Patient-related pros: The technology may allow the encounter to be as casual as possible and extend complete liberty to the patient in choosing dress and behaviour. Some individuals’ esteem is boosted – if they have a tendency to boast, a sense of importance, keeping up with the times – when they are convinced that gadgetry is a status symbol. Such a recording tool can enhance a sense of security of accessing any information required and documenting information instantly. For instance, instructions can be recalled instantly at a later time. Any distantly located party can immediately join the consultation at will and assist in communication, clarifying issues or even offering moral support.

Physician-related cons: Again, with the burden of time constraints outright frustration will result from suspicion that the patient is not completely attuned to the physician’s explanations and recommendations, just as antagonism may arise if while communicating the patient fidgeted with another electronic device. The physician may fear recording of any part of the encounter as it may

perhaps be used against him in the case of a lawsuit and thus this will bring about overly careful unnatural conduct not necessarily to the benefit of the patient, for instance over-testing or superfluous medication dispensing.

Patient-related cons: Patients with DEG may offer a divided attention throughout the visit while appointments are scarce and their unperturbed character should be preserved at all costs. The presence of a superfluous visitor may create a new barrier and may interfere with the longed-for discrete personalized atmosphere where secrecy and privacy are respected. Any technical faults occurring with device activation or ongoing function may preoccupy the patient and result in omission of important visit content.

There are possible solutions, for instance an agreement that mutual permission should be obtained before undertaking DEG use during the encounter, just as other institutions invoke policy-driven limitations on recording devices. This must be personalized towards the care seeker and the situation. To be applied smoothly, consent should be willingly sought by both parties.

Despite the fast pace of evolution into a mostly computerized environment, resolving the most pushing aspects and the sanctity of the doctor patient consultation is within our reach. We can safely assure that with perseverance we may pave the path to solve communication barriers as with other aspects of the medical consultation (13).

Conclusions

In this paper problems in the use of digital eyeglasses during the classic doctor’s visit are discussed. A high-tech environment contributes many benefits to varied fields, and medicine is obviously no exception. Provisions must be made to mitigate breach of ethical principles and possible harm to interpersonal communication, especially of medical content, before becoming overwhelmed by hazards the new paraphernalia may present. Suggestions for resolving issues may be obtained by brainstorming, creating a model, global institution of social demand for consent and tailoring use according to situation and subject.

This issue poses a new challenge crossing our path on the way to making our world a better place. Nevertheless, every precaution must be taken to ensure that this is not at the expense of jeopardizing the essence of the doctor–patient encounter. With perseverance and joint effort these goals seem achievable.

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- drg. Haria Fitri,

Faculty of Dentistry, Andalas University, Indonesia

hariafitri5@gmail.com

Abstract

Background: This paper discusses palatal rugae patterns and their contribution in the identification of individuals and the determination of family lineage in West Sumatera, Indonesia. Identifying an individual is very useful for postmortem examination, for personal, social and legal purposes. The most common techniques used in this context are dental records, fingerprint and DNA comparisons. However, these methods cannot be used under certain circumstances. But interestingly palatal rugae patterns are preservable because they are stable, and impervious to disasters and hostile conditions and therefore can be used as alternative human identification techniques. This paper argues that the study of palatal rugae (rugoscopy) not only help reveal a person's identity but also help determine their family lineage.

Objective: The present study was carried out to ascertain whether there are any hereditary patterns in the palatal rugae patterns of the mother, father, and the offspring in one family.

Method: This is a cross sectional study of 48 samples consisting of 12 families in *Luhak Nan Tigo*. The parents and offspring (son or daughter) of each family were randomly selected. Palatal rugae impression was recorded using alginate, while palatal rugae patterns were noted and recorded. *One Way ANOVA* test (SPSS 17) was used for statistical analysis.

Result: The study shows that there is a significant similarity in curved, wavy, and straight rugae patterns ($p > 0.05$) as well as in primary, secondary, and fragmented rugae based on the family tie between the father, mother, sons and daughters of the *Minangkabau* ethnics. Unilateral and circular rugae tests are insignificant ($p < 0.05$).

Conclusion: This is a cross sectional study whose results are only based on 48 samples consisting of 12 families, therefore further studies are needed with a larger sample quantity. The results of this study indicate the role of factors in palatal rugae patterns.

Introduction

In the last few decades, Indonesia has dealt with more than 400 natural disasters of which floods, fires, typhoons and landslides are the most common. In addition to this, disasters such as earthquakes, tsunamis and volcano eruptions also occur on a yearly basis.¹ These natural disasters have caused the death of tens of thousands of people in West Sumatran, one of the disaster-prone areas in Indonesia. Sadly however, many of these

Palatal rugae pattern identification to determine family lineage in Minangkabau, West Sumatera, Indonesia

- Dr.drg. Nila Kasuma, M.Biomed,

Faculty of Dentistry, Andalas University, Indonesia

nilakasuma10@gmail.com

- Dr. drg. Dewi Elianora, Sp KGA,

Faculty of Dentistry, Baiturrahmah University, Indonesia

dewielianora12345@gmail.com

- drg. Aida Fitriana, M.Biomed,

Faculty of Dentistry, Andalas University, Indonesia

aidanoferi@gmail.com

- drg. Fildzah Nurul Fajrin,

Faculty of Medicine, Andalas University, Indonesia

rin.inoochi@gmail.com

victims were not identified due to the lack of financial or material means to conduct identification procedures.

In order to issue the death certificate of an unknown/unidentified deceased person, or for personal, social and legal reasons, DNA test, retina, fingerprints and dental characteristics are the most common techniques referred to in forensic science. However, many of these methods may not be totally effective or conclusive.² Hence the need for the study of palatal rugae as an alternative method for the scientific identification of individuals. Palatal rugae can be very useful for the identification of victims of mass disasters such as earthquakes, landslides and tsunamis, etc., crime investigations, ethnic studies, and in the identification of decomposed and disfigured bodies as a result of drowning, burns, and accidents.³

Rugoscopy, cheiloscopy, bite marks, tooth prints, radiographs, photographic study, and molecular methods are various methods employed in forensic odontology. When these methods of identification are unavailable, however, palatal rugae may be considered as an alternative source of information to facilitate the identification process.² There are several classifications of palatal rugae. But the most frequent used is the classification given by Thomas and Kotze,² which classifies Palatal rugae in three categories based on their length: Primary rugae (more than 5 mm in length), secondary rugae (3-5 mm in length) and fragmented rugae (<2 mm in length).

The patterns of the rugae are classified into curved, wavy, straight and circular types. Straight patterns have a direct course from the point of origin to their insertion in a straight line. Curved patterns have a crescent shaped pattern with a mild curvature. Wavy rugae are serpentine in shape. Rugae with specific continuous ring type morphology are classified as circular. Unified rugae are united either in their origin or in their insertion giving a forked appearance. These are the patterns involved in this study conducted to assess the association of palatal rugae patterns among family members of the *Minangkabau*, a subgroup of the *Deutro Malay* ethnic, which consist of *Aceh, Malay, Minahasa, Bugis, Makasar, Sasak, Bali, Java, and Minangkabau*.⁵

Methods

This research was conducted in *Luhak Nan Tigo* located at *Guguak, Situjuh, and Tanjung* Sub-districts in the District of *50 Kota, Tanjung Baru* subdistrict situated at the District of *Luhak Tanah Datar*, and in *Baso, Banuhampu, and Tanjung Raya* Subdistricts located at the District of *Luhak Agam*. The study was conducted from January to June 2017. A total of 489 palatal rugae were observed

in 48 palatal rugae models from 12 families. The study was conducted with the door to door system in each subdistrict. Prints of jaws of the respondents were obtained after the research was explained to them and informed consent was provided. The Committee of the Research Ethics of the Faculty of Medicine, Andalas University, with regard to the protection of human rights and welfare in medical health research has carefully reviewed the research protocol with Ethical Clearance number 073 / KEP / FK2017 on March 2nd 2017.



Figure 1: Delineation of palatal rugae pattern on dental casts

Maxillary impression was done using irreversible hydrocolloid alginate. The impressions were cast using dental stone type 3. The jaws were printed using irreversible hydrocolloid material i.e., alginate. The result of the jaw printing was cast using dental stone type 3. The maxillary cast analysis was performed single-blind by two different observers to get accurate measurements and reliable results, then classified based on Thomas- Kotze and Sunita Kapali classification method. Observers are dentists of the Faculty of Dentistry University Andalas who have good eyesight, understanding and perception. The same procedure was used in length measurement and observation of palatal rugae patterns. The Result Measurement of each observer was tested using Technical Error of test Measurement (TEM), intra-observer and inter-observer. TEM test was performed on 20 samples of maxillary cast having primary rugae and secondary rugae.

Results

This study was conducted to assess the similarity of palatal rugae patterns between family members, i.e., father, mother, sons and daughters of the *Minangkabau* ethnic. A total of 489 palatal rugae were observed in 48 palatal rugae models from 12 families. *One Way Anova* test results of curved, wavy, and straight rugae are $p > 0.05$, which indicates that there is a significant similarity in the shape patterns. The results of the unilateral and

circular rugae form test are $p < 0.05$, which indicates there is an insignificant similarity in the patterns of uniform and circular form. The results of the primary, secondary, and fragmented rugae test are $p > 0.05$, indicating a significant similarity in the palatal rugae patterns based on the family tie between the father, mother, sons and daughters of a *Minangkabau* family. The average number of palatal rugae and p value in this study are as follows:

Tabel 1: Average Amount of Palatal Rugae

Rugae Pattern	Mother	Father	Son	Daughter	P	
Shape	Curve	2.92±1 .67	4.08±1 .92	3.08±1 .78	2.92±1 .37	0.28
	Wavy	2.92±1 .67	3.42±1 .92	4.05±2 .19	4.75±2 .52	0.11
	Straight	2.00±1 .70	1.75±1 .28	2.50±1 .44	1.83±1 .11	0.56
	Unified	1.50±1 .16	0.50±0 .90	1.08±0 .99	0.50±0 .67	0.03
	Circular	0	0	0.08±0 .28	0.42±0 .66	0.02
Size	Primary	7.25±1 .81	7.83±1 .26	8.33±1 .07	8.17±1 .26	0.24
	Secondary	1.67±1 .37	1.83±1 .40	2.17±1 .74	1.75±1 .13	0.83
	Fragmented	0.42±0 .66	0.08±0 .66	0.75±1 .71	0.05±0 .90	0.47

Discussion

Sumatra is the second biggest island in Indonesia after Java Island, and the sixth biggest in the world. Its Western coast, known as *Sumatera Barat* (West Sumatera), is home to the *Minangkabau* people whose culture (*budaya Minang*) is handed down in regions such as *Luhak Nan Tigo -Luhak Agam, Luhak Tanah Datar and Luhak Lima Puluh*.⁶ This is the reason why the research was conducted at these locations.

Palatal rugae are irregular, asymmetric ridges of mucous membrane of the incisive papilla and the anterior part of the median palatal raphe, located behind the maxillary central incisor teeth.⁷ Harrison Allen was the first to suggest the use of palatal rugae as a method of personal identification in 1889. But it was not until 1932 that the term "palatal rugoscopy" was brought up by Trobo Hermosa, a Spanish investigator.² Palatal rugae normally begin to form towards the third month of prenatal life. Palatal rugae patterns are unique. The uniqueness of palatal rugae patterns may facilitate their use in postmortem identification. This is due to the fact that palatal rugae is stable and can resist postmortem decomposition changes for up to 7 days after death and can withstand great thermal insults like third degree burns.

Because palatal rugae is protected by the tongue, dentition, and cheeks, it can resist other forms of

massive trauma.⁸ The identification of a person through DNA examination has limitations such as contamination and high cost, while the use of palatal rugae can provide ideal parameters because of its uniqueness, stability, resistance, and simple and inexpensive methods. The potential use of palatal rugae in forensic identification has advantages because it is sufficiently able to discriminate between individuals as no two palatal rugae configurations are alike. Certain rugae patterns are specific to a particular population and may also have utility in population differentiation.⁹

Observing rugae patterns, Selvamani et al found that wavy patterns are common in males and females, followed by curved and straight patterns. Circular patterns are very few in number but significant ($P = 0.05$).¹⁰ Some scientists claim that environmental factors are unlikely to affect the formation of rugae and believe that its patterns are determined by genes. Genes influence the orientation of the collagen fibers during embryogenesis and govern rugae patterns in different populations.¹¹ Observing the length of rugae, it appears that primary rugae are most prevalent than secondary and fragmented rugae.¹² Examining the types and origins of palatal rugae according to the Lysell classifications, the study of Beatrice's (2013) showed that the palatal rugae of males is different from that of females. Primary and Secondary rugae are all found in males compared to females, whereas fragmented rugae are more common in females than males. Primary rugae derived from raphae are found in males, whereas medial origin is found in many women, the study concludes.

Another study was carried out by Patel to assess whether there is any hereditary pattern in palatal rugae patterns between the offspring and their parents. The study showed that there is a positive correlation of palatal rugae patterns between the offspring and either of their parents.¹³

Finally, a study by Indira suggests that the comparison of palatal rugae patterns among family members also shows different patterns. Although in one family few forms were similar, rugae patterns are not identical. This means that the role of heredity is uncertain in determining the orientation of rugae patterns.

Conclusion

The patterns of palatal rugae in *Minangkabau* family has the same number of rugae based on the significant shapes i.e., curved, wavy, and straight, and based on the significant length i.e., primary, secondary and fragmented. Because the results of this study are rather partial as they rely on a data consisting of only 48 individuals from 12 families, a more detailed follow-up study is needed with a

larger sample size to reach an ultimate conclusion. The results of this study indicate that there are hereditary factors in the rugae patterns, which makes them very useful for the identification of individuals. Chemicals, disease, heat, and trauma cannot alter palatal rugae patterns. Cheeks, lips, tongue, buccal pad of fat, teeth and bones protect palatal rugae from trauma and high temperature. Although we acknowledge that the limited number of families studied does not allow us to reach a final deduction, it is important to note that rugae patterns may be used as genetic markers for further research. We hope this research is a contribution of data in the field of forensic odontology on individuals, especially ethnics of the *Minangkabau* and the *Deutro Melayu*.

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Female genital cutting: a philosophical exposition

- Joseph Nkang Ogar

- Bassey Samuel Akpan

Department of Philosophy, University of Calabar,
Cross River, Nigeria

Email: samuelbassey15@yahoo.com

Abstract

Female genital cutting as practiced in most African countries has attracted wide condemnation. This practice involves partial or total removal of the external female genital organ for nonmedical reasons. Consequently, it causes damage to healthy or normal genital tissue and thus, interferes with the natural function of the girls or woman's body. Female genital cutting is usually carried out on girls within the ages of 10 and 22 years old. Most health experts attribute so many infections suffered by women of child bearing age to it. Also, barrenness, excessive bleeding during child birth or delivery is sometimes blamed on female genital cutting. A lot of infections including HIV have been associated with this cruel practice. It is the position of this paper that, such act is barbaric, and a violation of the human rights of the girl child and womanhood. Therefore, it should in all quarters be discouraged and possibly stopped because it violates a person's right to health, freedom from torture and security, and integrity.

Introduction

Female genital cutting is a subject that attracts much concern from many disciplines including religious, philosophical, sociological, legal and medical aspects. This kind of practice usually finds support in some traditional and cultural beliefs. It is usually performed by traditional practitioners who have no formal training on the proper use of equipment and surgical procedures, hence the practice is both against medical practices and

unhygienic. It was observed that implements or tools for these practices include knives, razors and blades made from bamboo trees (Nicoletti 2007). Again, in most cases it is carried out in the bush or a highly infectious environment thereby making the victim more prone to infections and danger. Some enlightened citizens who still want to follow the culture of their people, may still deploy the service of community health care providers to perpetrate such barbaric practices. It is the position of this paper that female genital cutting even if it were to be carried out in the best hospital in the world, is wrong and should be stopped.

Female genital cutting

Female genital cutting includes various strategies that include the incomplete or aggregate cutting of the female outer genitalia as well as damage to the female genital organs for social or other non-therapeutic reasons (Nour 2008). Female genital cutting is portrayed as a traditional practice among various societies. In studies among the individuals who practice it, female genital cutting is regularly ascribed to traditions, albeit different reasons may be given (for example, reducing ladies' sexual desires, expanded sexual performance for men and the health of infants). This practice has existed for a long time; it might have been practiced for as long as 5,000 years in some societies (Wade 2012). An examination in Sudan in 1983 showed that nearly 83% of consulted women affirmed female genital cutting paying little heed to the type (Alien 2005). In 1985 a body attached to the UN Commission on Human Rights, the Working Group on Traditional Practices Affecting the Health of Women and Children, uncovered that 54% of people advocating female genital cutting claimed they do it because it is their tradition (Obermeyer and Carla 1999). A type of clitoridectomy was practiced in the USA and Europe amid the last half of the nineteenth century; it was seen as a 'cure' for female masturbation and mental illness (Duffy 1963).

Some time ago there was a medical view in western nations that clitoral or labial adjustment was in some cases fundamental to enhance aesthetic look, upgrade sexual pleasure, solve matrimonial issues and to cure psychosomatic sickness (Tepper 2000). A few women's magazines advanced such thoughts in the mid-1970s. The present medical view is that such claims can't be substantiated (Rushwan 2013). Infibulation is the practice of excising the clitoris and labia of a girl or woman and stitching together the edges of the vulva to prevent sexual intercourse. In a few nations where infibulation is honed, before the lady is married, it is a customary practice for women from the grooms' family to visit and examine the bride. The women check to guarantee that the lady

has been infibulated and that she is still a virgin (Ford 2001). In some societies, the woman is probably going to be alienated and marriage within her society would be not likely if she is not circumcised. Toubia explains that for an African lady who accepts female genital cutting, it is a fashionable thing to do to become a real woman like an American lady who has breast enlarged to look more attractive. However, "*a critical distinction is that it is principally performed on kids, with or without their consent*" (Toubia).

Female genital cutting is practiced in more than 40 countries, including 27 African nations, the southern piece of the Arab Peninsula and the Persian Gulf (Hosken 1998). It is practiced by a few people in India, Indonesia, Malaysia and Brazil. The number of nations where female genital cutting is practiced is expanding as a result of migrations to Western nations from nations where female genital cutting is customarily performed. Nations with migrant populaces, including the United Kingdom, France, Canada and Australia are such cases. In the meantime about 88% of men sampled randomly in different countries in Africa support the practice (Leonard 2000). The primary explanations behind endorsement were tradition and religion. Customs and traditions were by and large acknowledged beyond a shadow of a doubt. Note that the tradition is bound up with the ethical code of the group and is a critical factor in identification with the entire group.

In numerous undeveloped nations, particularly in Africa a lady must be a virgin to be married and her financial survival for the most part may depend on marriage. In the minds of the individuals who practice female genital cutting, to be different is to be isolated from the group. Also, a study shows that Eritrean women trust that female genital cutting shields them from rape (Bennett 2011). Thus, there are profound and convincing connections to the tradition among the people concerned and those ties won't be easily broken.

Types of female genital cutting

There are basically four major types of female genital cutting as seen below:

Clitoridectomy: This is said to be the most widely recognized type of female genital mutilation (Slack 1988). This is a partial or total removal of the clitoris, and in rare instances only the fold of skin surrounding the clitoris is removed.

Excision: in this genital cutting, the clitoris is either partially or completely removed along side with the labia minora, with or without excision of the labia majora, that is 'the tips' that surround the vagina (Antonazzo 2003).

Infibulation: The most serious type is infibulation. This includes removal of all external female

genitalia. The whole clitoris and labia minora and a significant part of the labia majora is removed or scraped (Weston 2017). The remaining raw ends of the labia majora are afterward sewn together. In remote areas acacia tree thistles are used and held in place with catgut or sewing string. Sometimes a glue of gum arabic, sugar and egg, is utilized to close the vulva. The whole area is closed with only a little opening, about the measure of a match stick, left to pass pee and menstrual liquid. A straw, stick or bamboo is embedded in the opening so that as the injury recuperates the tissue won't grow together and close the little opening. As of late in a few territories, a few persons who play out the system sew together the labia without cutting (Antonazzo 2003).

Others: Includes all other harmful procedures to the female genitalia for non-medical purposes such as pricking, piercing, incising, scraping and cluttering of the genital area (Ekeke 2010:161).

Arguments for female genital cutting

Some reasons have been presented to justify why many cultures in Africa and Asia still practice this barbaric and dehumanizing practice not minding the wide condemnation by the World Health Organization (WHO).

Family autonomy: The general right of parents to choose what is best for their youngsters has existed for a long time and there is a desire that the State won't meddle in choices which are in the area of individual families. In other words, the "privacy" of the family has by and large been ensured by society (Petronio 2013: 46).

The right to cultural integrity: The individuals who defend the privilege of parents to have their little girls "circumcised" allude to their customary values and their entitlement to cultural integrity without impedance from people who hold different customary values. Notwithstanding, there is a distinction between neo-colonialist endeavors to force western human rights norms on Third World nations and social practices which are the same as practices in the West through which ladies are respected less than men (Regier 1991).

Psychosexual argument: To this group, female genital cutting is encouraged as an activity or practice aimed at curbing women's sexual desires. According to this, if only the prepuce of the clitoris is removed, it automatically reduces the female's or woman's sexual desire and by this guarantees her chastity or staying or maintaining her virginity until she is married (Carr 2015). To Osarenren, female genital cutting or mutilation should be sustained because it encourages fidelity as such as practice stops women from getting sexually aroused (Carr 2015: 163). But the question here is whether this heinous practice has successfully tamed women

because experience has shown that woman who wish to be promiscuous have not stopped being so on excuse of genital mutilation. The psychosexual argument leaves us with little to be desired. And rather leaving us to think that chastity, fidelity or otherwise being promiscuous is related to human will and choice, rather than praised or blamed on the removal of the clitoris (Ogar and Asira 2011: 327).

Mythological argument: This argument hinges on superstitious beliefs surrounding the practice. Especially those of Yoruba is the perceived belief that when the clitoris is not cut, it will harm the fetus when it touches it during child delivery. Also, there is the belief that if the clitoris is not cut, it will grow to the size of a penis (Toubia). But as we all know, superstitious beliefs have not been proven scientifically. Again, no established case of female infertility has been traced to not cutting of the genitalia. Hence, this argument is less satisfactory as built on superstition.

Religious argument: Despite the serious campaigns against female genital cutting by activists and healthcare workers, this argument is one of the most potent one in support of the female genital cutting. In Africa for instance, many practitioners of traditional religions see it as one of the rites of passage required by their religion. That is a necessary condition to be fulfilled by young girls who are about to pass from puberty to adulthood in preparation for marriage (Toubia). According to this argument, this practice is done to reduce a women's libido, so as to help her resist illicit sexual act which is a taboo with the consequences of bringing the wrath of the gods against the community. According to this position when a virginal opening is covered or narrowed, the fear of pain of opening it, alongside the fear that this will be found out, is expected to further discourage illicit sexual intercourse among women with this type of female genital cutting (Rushwan 2013). However, World Health Organization (WHO) debunked this as lacking credibility, merely motivated by beliefs about what is considered proper sexual behavior related to premarital virginity and marital fidelity (Toubia). Neither the Christian or Islamic religion has any doctrinal basis for female genital cutting. This scripture reference in Genesis 17; 10-12 is made specifically to the (male gender), and not (female gender). "This is my covenant with you and your descendants after you, the covenant you are to keep. Every male among you shall be circumcised on the 8th day of birth. While Abu-sahieh argued that there is no doctrinal basis for female genital cutting in Islam and Christianity. Therefore, there is no substantive evidence that female genital cutting is a religious requirement (Gronnvoll 2008).

Social argument: This argument is a result of wanting to work in conformity to the social behavior of peers. That is, being attune with the practices of the time and community. Female genital cutting in some cultures is a qualification or requirement for participation and enjoyment of full privileges and rights to the female folks in the community. In some communities, a woman whose genitalia are not cut, would be denied marrying any man in the community because they interpret uncut clitoris as a penis in a woman which must necessarily be cut to show that she is a woman (Bennett 2011: 136). This position is indeed abnormal because given an understanding between the function of penis in men and clitoris in women, no matter how big clitoris may be, it can never become penis and vice versa. So it is an unfounded position that lacks evidence.

Aesthetic argument: In Kenya like in many communities in Nigeria and Africa at large, this unhealthy trend of genital mutilation is still highly upheld. They maintain the position that unless a female or woman clitoris is cut, she is sacrilegious (Bennett 2011). This argument upholds the view that until the female clitoris is cut, she is not truly beautiful and is followed with grim consequences such as causing a lack of arousal or feeling of sex even when they are married with the result that many of them end up in broken marriages because of constant or near constant sex apathy in their spouses.

Medical and ethical arguments against female genital cutting

There are numerous immediate and long haul health results of female genital cutting, both physical and mental. Inconveniences from the method can bring about barrenness. Issues can remain with the girl into adulthood and prompt obstetrical challenges which imperil the life of both the woman and her wards. It is likewise understood to be regular for infibulated ladies to under-eat amid pregnancy with the goal that they will have smaller kids. Doctors in Sudan have evaluated that the number of fatalities because of infibulation is around 33% of all young ladies in zones where anti-infection agents are not accessible (Lyman 2013).

Death because of female genital mutilation is one of numerous variables adding to the high infant mortality rates in these nations (Slack 1988). For instance, Somalia, which has one of the highest rates of circumcised ladies on the planet, has the world's fourth most noteworthy high infant mortality rate (Nour 2008). The medical issues related with female genital mutilation are more noteworthy with clitoridectomy and infibulation because these procedures include more radical surgery. The health impacts of female genital

mutilation, particularly infibulation, can incorporate acute infection, shock, hemorrhage (attributable to the instruments utilized and medications set on the injuries), tetanus, harm to nearby organs, death, and septicemia. Most times after infibulation the young lady's excrement is caught by bandages and this fuels different complication issues.

It has been proposed that more than 100 million women are "missing" in Africa and Asia as a result of an absence of medications, health care and nourishment (Slack 1988). A huge proportion of these could well be ascribed to the act of female genital mutilation. Numerous young ladies bleed to death in light of the fact that clumsy operators have cut into the pudendal corridor or the dorsal vein of the clitoris. Other young ladies die of post-operative shock because of not being able to revitalize the girls or take them to the doctor's facility or center (Pauls). Studies in Sudan demonstrate that all infibulated women detailed critical issues in urinating. The normal timeframe it takes an infibulated lady to urinate is 10-15 minutes (Nour 2008). They need to compel the urine out drop by drop. Extreme infections can prompt incontinence. Sometimes the gap left after infibulation is too little and keeps the stream of menstrual blood which gathers in the abdomen.

There have been occasions where young ladies have been murdered to safeguard their family's respect when the swelling of their bellies and the nonappearance of feminine cycle have been wrongly translated as pregnancy (Armstrong 1999). In an examination in Sudan in 1983 it was discovered that almost all infibulated women announced anguishing periods, in which the menstrual stream was blocked to some degree. This brought about clotted tissue requiring surgical intervention (Armstrong 1999). Troubles in childbirth for infibulated women happen much of the time and can be serious because of scarring and solidified tissue hindering the section during childbirth. Deferred births are normal and there can be brain damage and death of the infant due to absence of oxygen. Sometimes the lives of both the mother and youngster can be undermined in light of the fact that the opening is too small (Slack 1988). There have been few investigations of the full mental outcomes of female genital mutilation to date, however suicides have been accounted for among young ladies in Burkina Faso (Youngblood 2014). Slack proposes that such extraordinary torment in an amazingly sensitive, unpredictable and vital physical zone, when experienced by young ladies in their developmental years could bring about significant mental issues (Slack 1988).

Whether these issues would cause emotional damage isn't clear. When they are mature enough

to understand what female genital cutting includes, the young ladies regularly experience nervousness before, and in expectation of the procedure. The occasion itself is likewise alarming as the young ladies are held down by force and frequently no pain reliever is utilized. Torment is said to keep going for quite a long time and may continue throughout life; for instance, the pain of menstruation, intercourse amid the primary periods of marriage and at labor (Slack 1988).

Before having the procedure done, the contention of sentiments in the child are said to be impressive. From one viewpoint, there is the desire to please guardians, grandparents and relatives by accomplishing something that is exceptionally esteemed and endorsed of; and there is a desire to be normal. The feeling is compared to the young lady's expectation of torment, the stories of anguish and the sheer dread of hearing the shouting of other girls being circumcised. At last, there is simply the experience: being held down with force while part of the body is cut off (Toubia).

The clitoris is an essential female sexual organ. The tip of the clitoris has a thick supply of nerve endings which are extremely sensitive to the touch. The vagina has limits with regards to sexual reaction. Therefore, female genital cutting aims to evacuate the lady's sexual organ while abandoning her conceptive capacity in place (Toubia). Following marriage the spouse must penetrate the infibulated vulva. Regular penetration is troublesome and an opening must be made with a blade or knife. Some ladies experience a slow procedure of entrance which can take a few months.

In a few nations the infibulated vulva is opened routinely with a blade before marriage is concluded. In Somalia the spouse utilizes his fingers, a blade or a razor to extend the opening in his wife. In different societies the spouse's mother or grandma measures his penis, makes a wooden copy of a similar size and cuts the infibulated opening of the bride as needed. This permits penetration, which in the beginning will be frequent, to keep the opening injury from closing once more (Slack 1988). On account of infibulation, the primary reason is by all accounts to ensure the bride's virginity. The small opening left after infibulation makes sex for all intents and purposes unimaginable without reviving the vagina.

Women's and children's rights: Female genital cutting is a critical infringement of human rights - especially ladies and children's rights - and results in serious difficulties, including but not limited to death, premature delivery, disability, sexual dysfunction, stillbirth, hemorrhage, discharge, sepsis and post-traumatic stress disorder. Distinctive researchers have examined human rights harmed by the act of FGM. For instance, Efua

Dorkenoo contended that female genital mutilation is an exhibit of sex based human rights infringement, which means to control women's sexuality and flexibility (Laurance 2014).

Right to health: The International Human Rights law including the Universal Declaration of Human Rights (1948) advocates the privilege for every single individual to live in conditions that enable them to appreciate healthcare and good health. The issues related with the methodology of FGM frequently have brutal results for a woman's physical and emotional well-being. A wide range of FGC caused health complexities result from the technique frequently being performed outside healthcare facilities by non-experts utilizing unsterile cutting instruments (Evans 2002).

The privilege of the child: The casualties of this unsafe conventional practice include children and young girls. Joined States Department of State, Ethiopia additionally contended that FGM disregards the privileges of children since it is generally performed on young women. This implies the practice of FGM negates Art. 3 of CRC which instructs that "...the best interests of the child shall be a primary consideration which is a central notion of the Convention on Rights of Child" (Riggio 2002).

The privilege to sexual and physical integrity: Female genital cutting damages the privileges of women and girls to sexual and physical respect (Johnson 2002). Violations of the privilege to physical integrity are most evident when girls and women are coercively controlled amid the procedure. FGM is performed without women and girls full consent. An unapproved attack on someone's body speaks to elimination of that basic right.

Right to be free from discrimination: The act of FGM is likewise sex-based victimization for marriage. Many persons will allow it since it is essential to increase financial and social security. For example, in Gikuyu society there is a convention that disallows men to wed uncircumcised women (Helland 2013).

Freedom from torment, unfeeling, barbaric and degrading treatment: The UN Special Rapporteur on Violence against women has unmistakably expressed that FGM adds up to torment. The report "*views cultural practices that involve pain and suffering and violation of physical integrity*" as amounting to torture under customary international law, attaching to such practices strict penal sanctions and maximum international scrutiny regardless of ratification of CEDAW or reservations made thereto (Morgan 2015).

Generally, FGM is a customary hurtful practice that disregards the rights and dignity of ladies and girls, the rights to wellbeing and life (in cases where

it results in death), sexuality and physical respect of the individual, and the privilege to be free from torment and degrading treatment.

Conclusion

The paper, after a careful analysis and evaluation of the subject of female genital cutting with reasons to justify such practices such as religious, social, psychosexual, mythological and aesthetic, found all as lacking credibility in their arguments, leaving women with long and short term consequences like excruciating pain, loss of blood resulting in anemia, hemorrhage, shock, infections, fibrous scar, shrinking of artificial opening in vaginal, pelvic pain, sex phobia, depression, anxiety, etc. This ugly trend has no medical support, neither has it any sustained social and scriptural justification for such cruelty against females. It is the position of this paper to conclude that female genital cutting is unequivocally inhumane, hence a clarion call on women activists to step up their effort and advocate it outright condemnation.

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Bases of Early Marriage & Consequences on the Well-being of Mother and Child in Jhirubas, Palpa, Nepal

- Bikash Thapa, MBGPH

Executive Member, Youth's UNESCO Club, Nepal

Email: bthapa1985@gmail.com

- Darryl Macer, Ph.D., Hon.D., MPH

President, American University of Sovereign Nations, Arizona, USA

Email: provost@ausn.info

Abstract

This research explores the causes of early marriage and assesses the consequences of early marriage on maternal and child well-being in a district of Nepal. A two week long field operation was carried out to collect data where 126 respondents were selected through convenience sampling methods on the basis of two criteria, including 1) being a married women only who got married before 19 years of age; and 2) those who have children below three years. The interviews were mainly focused on those who have a neonatal child. A structured interview schedule found that early marriage is still prevalent among the illiterate group. A paradigm shift was found in some aspects, such as the shift in decision-making from parents to children, a shift from arranged to love marriages, and from parental pressure to marry to love and fulfillment of sexual desire as reasons for marrying. Most of the respondents have no idea about the legal marriage age and punishment for underage marriage. Most of the respondents suffered from different physical health-related problem including poor maternal and child well-being, weakness, immaturity, miscarriage, sexual problems, no prenatal check up, and/or low birth weight.

To deal with the problem a number of strategies have been suggested, mainly providing economic opportunities to young girls, improving the strictness of legal strategies about marriage age, promoting education of girls, and using mass media to increase the awareness of the whole community about the consequences of early marriage on girls themselves and on her children along with their

family. Efforts need to be made in the community and other parts of Nepal where early marriage and child marriage is prevalent.

1. Early Marriage in Nepal

Early marriage, also referred to as child marriage or entitled marriage of young adolescents remains prevalent in many parts of the world despite repeated efforts by national governments and international development agencies to discourage and end the practice. According to the State of World Population Report 2005, 48% of women in Southern Asia, and 42% of women in Africa in the age group 15-24 years had married before reaching the age of 18 years of age (UNFPA 2005). Early marriage is likely to lead to early pregnancy and associated health risks for the mother and the child; and force the marriage partners, especially the bride, to terminate schooling prematurely (UNICEF 2001; UNICEF 2005).

Nepal is placed among the least developed countries of the world. The poor health and well-being status is one of the main problems of the Nepalese society. Nepal, being a slow progressing country, faces various well-being and health problems. The major well-being and health problems in Nepal are malnutrition, high child mortality rate, maternal mortality rate, rapid growth of population, early marriage, environmental pollution, lack of health facilities and health service, high prevalence of communicable disease, lack of education and information, and so on. The demographic variables like fertility and mortality are responsible for population growth. Mortality has been playing a vital role in determining the growth of population. The growth of population affects well-being, health, education, social security, ecological condition, economic condition and cultural entity. Therefore, the population itself has become multi-dimensional factors in the socio-economic setup of a country.

Nepal has passed a law of marriage age. Previously it was 20 years of age without consent of parents and 18 with consent of parents. Now it is 20 for both male and female. Beyond that if any person (male or female) does and/or a third person is involved in making marriage under age it is against the law and shall be punishable. Many researchers here show that there is a higher rate of miscarriage among early child bearers under the age of 18 years as child and early mothers. Therefore, there is an extra risk to child and mother's health. Presently according to the Constitution of Nepal, "Forcing children, especially girls, into early marriage can be physically and emotionally harmful", UNICEF Executive Director Carol Bellamy said in a statement "It violates their

rights to personal freedom and growth" (UNICEF, 1992).

Early has been defined the World Health Organization as the period of life spanning the age between 13 to 19 years. Early is a period of transition from childhood to adulthood. Early is a distinct and dynamic phase of development in the life at an institutional. There are the formative years when maximum amount of physical, psychological and behavioral change take place. Thus, the future of the Early depends upon how their growth and development take place (WHO, 2001).

Marriage is an important part of human life. It is an institution, which demands maturity, capacity and responsibility. Young girls still in her childhood cannot be expected to appreciate the union called marriage and to know conjugal bliss in an enforced early marriage. The physical and emotional trauma she has to undergo in comparable to that of the victim of any heinous crime and she ends of leading a repressed, insecure and submission existence. Early marriage referred to child marriage is determined by culture, education, economic status, social status, character, love and honors, enjoyment, discrimination, and so on, and one of the consequences of early marriage is that it leads to early pregnancy. This is a health risk for young woman and children. Rapid growth in population creates problems in education, economic status, social adjustment and also physical and mental health. Early marriage invites or develops higher maternal and child mortality rates, and a higher rate of abortion.

Early marriage is the most common social problem in developing countries like Nepal. In Nepal, 138,015 have married below 10 years and 7,880,398 married during 10-19 years among 13,338,496 married couples (CBS 2011). According to the Nepal Family Health Survey in 2016, 22% of women have ever experienced physical violence since age 15. Furthermore, women also die of direct causes that are aggravated by pregnancy. Furthermore, a large number of women suffer from infections and disabilities related to pregnancy and child birth. The maternal mortality rate has become one of the major health problems of Nepal.

Early marriage has numerous adverse effects on the overall health of a girl child who is not mentally, psychologically, emotionally or physically not prepared for a marital life and must be eliminated for its numerous adverse consequences on society. Early marriage deprives her of an opportunity of starting or continuing her education and deprives her possibility to develop her own personality and potentiality. Once married, she is expected to get into the multiple roles of good wife, perfect daughter in-law, diligent housekeeper and

responsible mother. This transition can be psychologically and emotionally stressful for a young girl. Deprive as a child and lacking maturity skill to handle her personal, family, economic and social affairs the young wife develops fears complexes that last her whole life.

The health and well being practice is different from community to community. Well-being status of Nepal community is very poor as in many least developed countries. Nepal has economic problems community consuming health and health services. The present study is based on a community in Jhirubas VDC of Palpa district.

The study area is a remote area where its inhabitants in Jhirubas VDC are furthermore backward regarding health and well-being service and facilities. The majority of the local peoples are Janajati and Dalit in origin, and few of them are found from different communities such as Brahmins or Kshetries. Early marriage is common in Palpa district. 1,195 and 79,973 got marriage on or below 10 years, and between 10-19 years respectively among 207,031 married couples (CBS 2011). In the context of JHIRUBAS VDC, there is the problem of early marriage because of customs and other many reasons such as ignorance, poverty, culture lack of education, discrimination, and so on.

It is known that early pregnancy and early marriage is one of the high risks. Every year at least 585,000 women in the world die from the complications of pregnancy in many developing countries, which leads as a source of maternal and child death. The major health problems of Nepal are high maternal and child mortality, prevalence of communicable disease, high fertility rate, poor health care practice, environmental pollution, rapid population growth, and so on (UNICEF, 2002).

In Nepal, 11.25% of girls are married before their 14th birthday (CBS 2011). Adolescent pregnancy below the age 18 year is 2-3 times more likely to die than the pregnant women between 18 to 25 years. Low birth weight is also more common among babies from adolescence than those women. In Nepal, early marriage system is still accepted though the legal age of marriage is 20 years or above. As a result of child bearing at an early age includes low birth babies that is a complication to both mother and child (Save the Children, Plan International, 2012).

In the hilly region, a 14-18 year old girl is commonly married. The risk of complications during pregnancy period is more because the girls' bodies are not fully developed under 18 years old. There are various determinant factors of early marriage like as lack of education, lack of awareness about early marriage, economic status or poverty, conservative beliefs or culture, social status or backward community who has not got an

opportunity for a good life style. These create many bad consequences like low weight baby, high MMR frequency, morbidity and infant mortality and invites serious problem to the well-being of mother as well as child. It can be minimized to the extent by the relevant knowledge about early marriage and many kinds of opportunity to develop their carrier and further progress. The system of early marriage causes a high risk of pregnancy and affects the health of mother and child. The main cause of their health status due to early marriage is not known. Therefore, this study sought answers to the following questions:

1. What are causes of early marriage in study area?
2. What is the consequent of early marriage on the women and children of study area?
3. How can these underlying reasons for child marriage be combated?

This study was limited to the people in Jhirubas VDC of Palpa district which is the hilly area of Nepal and most of the peoples are Dalit and Janajati in origin with backward and weak health practices. These limits include:

1. Only early married (married before 19 years) women in Jhirubas Palpa district were selected for the study.
2. This study was limited to the women up to 30 years and with a child less than 3 years.
3. The study identified only the causes of early marriage and its consequences on mother and child well being.

Operational Definition of the Terms Used

Adolescence: Life spanning age between 10-19 years (WHO)

Causes: Factor leading to teen-age marriage in the Community

Community: Community of social group within the some degree of social coherence and living in given area.

Consequences: Impact

Household: All the people living together in a house is defined as a group of people related by blood, Marriage, or adoptions that have a common residence

Immunization: It is process of taking medicine for increasing immunity artificially against the infectious disease

Low Birth Weight: An infant's birth weight generally is less than 2500 grams.

Maternal Morality: It is the death of women while pregnant or within 42 days of termination of pregnancy irrespective of its management but accidental or incidental causes.

Morbidity: It means incidence and prevalence of any disease to mother.

Pregnancy: The condition of having a developing embryo or fetus in the body after union of an ovum and sperm. In women, duration of pregnancy is about 280 days or stage of women having a growing baby inside womb.

3. Patriarchy and Cultural Pressures

Feminists use the term patriarchy to describe the power relationship between men and women as well as to find out the root cause of women's subordination. According to Walby (1990:9), patriarchy is indispensable for an analysis of gender inequality. She further argues that there are six patriarchal structures which restrict women and help maintain male domination, and these are paid work relations within the household, patriarchal culture, sexuality, male violence towards women and the state. In terms of their interrelation, Walby argues that each of these structures impacts upon one another but are also relatively autonomous. Their interrelationships constitute the different "forms" of patriarchy present in a particular society (Haralambos and Holborn, 2008:1).

In the patriarchal nature of south Asian culture, value is placed on the boy-child's education than that of the are subordinated and undervalued such that girl-child. Girls do not have equal educational opportunities to boys. Although, the Government of Nepal has endorsed laws and signed many international conventions to overcome this problem, due to weak enforcement of law and low level of people's awareness, still much remains to be done on this issue.

In homes where there is poverty with few financial resources, girls will be forced to drop out of school prematurely in favour of the boys. This is because some parents believe that boys are more intelligent, that they perform better in school and that they are a better educational investment than girls (Odaga and Heneveld, 1995:22). A factor often ignored in discussions of parental preference for boy's education is the prevalence of patrilineal inheritance systems. As the prime beneficiaries of family assets, boys are favoured in human capital investment decisions. In addition, parents worry about wasting money on the education of girls who are likely to get pregnant or married before completing their schooling (Odaga and Heneveld, 1995:23). Also in most African cultures, girls were meant to be housewives, mothers and home-makers doing domestic duties. The boys were to be household heads and the breadwinners or economic providers of their homes and this meant that they were to be educated and acquire wealth to manage these homes (Were, 1991:2). Therefore, gender roles assigned to girls by the family, and society, are geared more towards marriage than attainment of educational success.

Patriarchy hinders women and girls from being involved in development activities in the society. Culture is a product of patriarchy and in patriarchal societies, it is the system which makes men to become rulers over their wives and this means

women do not make decisions in both public and private spheres. A woman cannot decide on the number of children to have and when to have them and also who among girls and boys should go to school, and in most cases girls do not go to school. Therefore, based on the provisions of patriarchy, there are benefits that men acquire from early marriages and these marriages ensure male dominance and female subordination in Nepalese society and even obstruct the children rights to attain a nurturing family environment.

In Nepal, due to religious and cultural pressure, marriage take places early among all ethnic groups, and many Nepalese women marry on their 19th birthday (NCP, 1990). Aryal (1995) mentioned that age at marriage is an especially important variable affecting fertility in a society. Where fertility out of wedlock is strongly disapproved and marital dissolution is insignificant. Therefore it is an especially important variable shaping the fertility level in Nepal wherever few births take place outside of marriage and maternal dissolution is insignificance.

WHO (1996) reported that the life risk of dying of pregnancy or child birth is one in twenty in some developing countries compared to one in ten thousands in some developed countries. The age at which women being is to start child bearing, the interval between each birth, total number of life time pregnancy and socio-cultural and economic circumstances in which women's life influence maternal morbidity and mortality.

First marriage marks the point in women's life at which childbearing becomes socially acceptable. Women who marry early will have, on average, longer exposure to the chance of becoming pregnant and, therefore, early at first marriage often implies early age at child bearing and higher fertility for a society (MOH, 1996:81).

WHO (1997) reported that until recently, adolescent and youth were not considered as an important issue in any kind of policies and programs in many Asian countries. In the late 1980s, the world community formally recognized how seriously the health of young people impacts on the health and development of future generation. The World Health Assembly passed a special resolution in Many 1989 urging member states to given priority to the health needs of adolescent and youth and to develop socially acceptable programs and services to meet these needs

Shakya (1997) found that decreasing age at marriage will have a depressing effect on the number of younger women who are exposed to pregnancy. Delayed marriage is the major contributor to reduce fertility. In Pakistan the educated women had higher age at marriage and lower fertility. It was noticed that there has been an

increase in female age at marriage from 15.4 to 18.1 between 1961 and 1981 in Nepal. This has apparently been achieved mainly due to the tendency of younger persons to postpone marriage. There may be combination factor and contributing to this. Expansion of literacy, education and well-being services, development of other sector. Such as transport and communication, the increasing urbanization and the fixation of the legal minimum age at Marriage may have all contribute to the rising age at marriage.

Gubhaju (2002) mentioned that motherhood at a very young age entails a risk of maternal mortality. The children of young mothers tend to have higher level of morbidity and mortality. Early child bearing continuous to be an implement to improvement in the educational, economic and social status of women all parts of the world

The Fifth Asian and Pacific Population Conference (11-17 December, 2002, Bangkok) stated that Nepal has high fertility rate among adolescents over all, 21% of adolescents girls aged 15-19 are already become mother are pregnant with their first child. The age specific fertility rate in both urban and rural is highest among 20-24 years age groups. The practice of early marriage is a major factor responsible for relatively high proportion of adolescent child bearing in Nepal contributing to high maternal mortality. The adolescent girls have tremendous nutritional deficiencies, which may affect their children resulting infants low weight birth, disabilities or death. With repeated pregnancies they face anemia, continued malnutrition and excessive workload which can result an early death. *"Forcing children, especially girls, into early marriage can be physically and emotionally harmful"*, UNICEF Executive Director Carol Bellamy said in a statement *"it violates their rights to personal freedom and growth"*.

According to Muluki Ain Civil Act (Country Code) new revision Mahal 17 Behabariko 221: The legal age of marriage is 20 for both men and women, Further, the law states that punishment for child marriage is imprisonment for up to three years and a fine of up to 10,000 rupees.

Nepal has made important steps over the past few years to promote gender equality, but according to report of UNICEF published in 2017, the country still has one of the highest rates of child marriage in the world. 37% of Nepalese girls are married before the age of 18. Moreover previously, the 2015 earthquakes devastated the country and left girls and women in an increasingly vulnerable position, leading to fears that child marriage rates may increase over the next year.

NDHS (2016) reported that overall, 17% of women aged 15-19 had begun childbearing: 13% had had a live birth. The proportion of teenagers

who had begun childbearing rose rapidly with age, from 2% at age 15 to 36% at age 19. Moreover, rural teenagers tend to start childbearing earlier than urban teenagers

NDHS (2011) also found that 82% of all deaths among children under age 5 in Nepal take place before a child's first birthday, with 54% occurring during the first month of life. Likewise, same report stated More than half (52%) of women are married by age 18, compared to 1 in 5 men (19%). Which may be the reason as 11% of women begin sexual activity before age 15, while 51% have sex before age of 18 years of age. So the% of women who got married before 18 years is higher. So, adolescent fertility rate (AFR) in Nepal is 81 per 1,000 girls. In 2015, the number of births per thousand women between 15 and 19 years old in Bangladesh amounted to approximately 83 births.

Save the Children (2004) reported a strong association between child marriage and early childbirth, partly because girls are pressured to prove their fertility soon after marrying and they have little access to information on reproductive health or ability to influence decision making on family planning (Mathur et al., 2003; Blesdoe and Cohen, 1993; Mensch, Bruce and Greene, 1998; Malhotra et al., 2003). One third of women in developing countries give birth before 20; and in West Africa, as much as 55% of women give birth before 20.

FCI and the Safe Motherhood Inter-Agency Group (1998) and CDC (2002) reported that women who bear children at a young age may face serious health consequences. Young mothers experience higher rates of maternal mortality and higher risk of obstructed labor and pregnancy-induced hypertension because their bodies are unprepared for childbirth (Save the Children 2004; Mathur, et al., 2003). Girls between 10 and 14 are five times more likely than women ages 20 to 24 to die in pregnancy and childbirth (UNFPA and the University of Aberdeen, 2004). Girls aged 15 to 19 are twice as likely as older women to die from childbirth and pregnancy, making pregnancy the leading cause of death in poor countries for this age group (Save the Children, 2004). In Mali, for example, the maternal mortality ratio is 178 for every 100,000 live births of women ages 15 to 19, compared to only 32 for women ages 20 to 24.

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Girls who have babies also have a high risk of suffering from obstetric fistula, a condition in which the vagina, bladder and/or rectum tear during childbirth and, if left untreated, causes lifelong leakage of urine and feces (UNFPA and Engender Well-being, 2003). Two million women suffer from obstetric fistula worldwide, and an additional 50,000 to 100,000 new cases develop annually among girls (Murray and Lopez, 1998).

Save the Children (2004), and Kurz (1997) reported that the children of teen mothers experience serious health consequences as well. A child born to a teen mother is twice as likely to die before the age of 1 as the child of a woman in her 20s. Currently, 1 million infants of young mothers die every year worldwide as a result of pregnancy and childbirth-related causes. If they survive, these infants tend to have higher rates of low birth weight, premature birth and infant mortality than those born to older mothers (Save the Children 2004). After birth, infants of teen mothers are more likely than infants born to older mothers to have poorer health care and inadequate nutrition as a result of their young mothers' poor feeding behavior.

UNICEF (2005) stated that girls who are married young often lack status and power within their marriages and households, and so are more likely to experience domestic violence, sexual abuse, and isolation from family and community (UNICEF 2005; Jenson and Thornton 2003). A survey in India found that girls who married before 18 reported experiencing physical violence twice as often as girls who married at a later age; younger married girls reported experiencing sexual violence three times more often (ICRW 2005). Girls who marry young are also more likely to believe violence is justified. A useful report is *New Insights on Reversing Child Marriage: A Global Analysis of Factors and Programs* (UNICEF 2005; Ensign and Thornton, 2003). A Kenya study found that 36% of girls who married before 18 believe that men are justified in beating their wives, compared to 20% of those who married at a later age.

Pathfinder International/Ethiopia, (July, 2006) mentioned that in Ethiopia, early marriage is seen as a way to improve the economic status of the family, to strengthen ties between families, to ensure that girls are virgins when they marry, and to avoid the possibility of a girl reaching an age where she is no longer desirable as a wife ("Qoma Qerech").

Acharya (2010), Glasier (2006), Plourde (2012) explained that 'adolescent pregnancy brings lost potential' (UNFPA, 2007a). Furthermore, it may bring many negative health and social effects for

both mother and child. UNFPA (2007a) suggests that when girl aged 15-19 years becomes pregnant, they are twice and adolescent under 15 are five times more likely of dying during pregnancy or childbirth compared to woman over 20 years. School dropout, premature infant deaths, unhealthy children and more children in a shorter period of time can be seen.

Pokherel (1989) found in her study that about one third of women marry early. Dipya (1992) found that majority of the women smoke during pregnancy due to lack of education and most of them undertake heavy works due to poverty.

Chhetry (1993) mentioned that marriage usually takes place at very early ages in Nepal. Tuladhar (1997) conducted a study of 200 early mothers from Tribhuvan University Teaching Hospital (TUTH) and maternity hospital Patan and Thapathali. Results from that study showed that the mean age of delivery is 18 years and minimum age was 15 years. Among all early mothers, 60% were literate and 57% mother's age of marriage was 12 years.

Lloyd and Mensch (1999) showed education is widely credited as the most significant factor for delaying girls' age at marriage (Mathur et al., 2003; United Nations Commission on Population and Development, 2002). Over the last several decades, parents have come to value education for their children, and to be willing to postpone the marriages of their daughters so they can attain a higher education level (Schuler et al., 2006). It is thought that education enhances girls' autonomy, giving them negotiation skills in choosing a partner and influencing the timing of marriage (Lloyd and Mensch, 1999; NRC/IOM, 2005). Education also is believed to increase girls' aspirations and extend the process of finding a suitable marriage partner.

Ghimire (2001) found in her research area that 13% women got married below than 15 years, 50% women get married in the age of 16-19, which are considered as early marriage, 30% and 7% women got marry in the age 20-24 and 25-30 years, respectively. It is found that the causes of early marriage mainly are tradition, 76.67%.

Subedi (2001) revealed that early marriage was found to have high prevalence, more than 50% of the total respondents got married between 10-18 years and 78% got their first pregnancy in this age group. Immunization status of children under 5 years was found very poor, with diarrhea disease, malnutrition and ARI being the most common diseases. Mothers are mostly suffering from swelling, heavy bleeding and lower abdomen pain. Indira (2004) found that early postnatal mothers who delivered the babies of 2500 grams or less than it at birth.

Shah (2004) reported that 95% respondents had got married before 16 years and 5% before 20 years. 72% mothers delivered babies at home. Mahara (2006) mentioned that age at marriage found 50% in 13-15 years and 30% in 10-12 years, more than 70% of women had not known laws about early marriage. 20.69% children died in the 13-15 years age group of mother, 48.55% from 16-18 years ages. Similarly, 48% early married mother had suffered from bleeding after delivery, 22% anemia, 19% weakness and 115 others problems found about early marriage mothers. This topic supports to reflect the severe effects of lack of education discrimination upon them due to forced marriage.

Dhital (2007) mentioned in his report, as cited in United Nations ESCAP(2008) that child marriage is perceived to be an established practice that has occurred for generations in Nepal. Both religious and cultural traditions have favored the marriage of daughters from even less than ten years of age or very early after menarche (first menstrual bleeding), while husbands could be much older. The incident of such marriages varied, with a higher rate in the Terai region in the south. The mean age of marriage is 15 years in the Terai and 18 years in the hill and mountain districts and the Kathmandu valley.

Age specific fertility rate for adolescents aged 15-19 has declined in the last five years (from 2006) by 10%, however the figures are still high compared to other developing countries. This issue is almost twice as common in rural areas than in urban areas (NDHS, 2011). UNICEF and USAIDS (2001) says one in five male and one in ten female early married persons have experienced sex in adolescence. This may lead to early unwanted pregnancy. Being pregnant at young age may have its risk. Apart from that, the culture may consider sex at a young age without marriage as undesirable behavior. This may hinder them to seek health care and family planning (FP) services.

Acharya (2009) carried out research in three districts, and reported 20% adolescents being sexually active and 16% having multiple partners. Similarly, a study among college students in Kathmandu showed nearly 40% adolescents were engaging in premarital sex. The facts mentioned above are the key entry points for this research. Because these are the same determinants of early marriage in that community in Jhirubas of Palpa district (Dahal, 2016).

Coming to intervention and achievement of Nepal, Millennium Development Goals (MDGs) permit unwrapped new paths for the execution of SDGs planned for 2016-2030. The access to the quality reproductive health care services, male dominance

and lack of decisive power among females are also the other causes behind this.

4. Methods

Early married women of Jhiribas were selected for the purpose of this study. The total early marriage women of Jhuribas was 549 (derived from Village Profile). Among them, 126 married women were the population of the study. Participants were selected on the basis of two criteria, such as married women only those who got married before 20 years of age. Another criteria were those selected married women up to 30 years with a child age between less than 3 years. For the convenience 14 respondents from each ward were surveyed.

The interview schedule prepared in Nepali language for the easiness and 10% of total respondent (12 persons) got the trial test in Rampur VDC Ward no 2 and 4. The questionnaire was pre-tested for 12 married women of Rampur VDC ward no 2 & 4 in order to reduce possible minor error and to make practicable, simple and easier schedule.

At first we consulted the Local Municipal Office to obtain the primary data and information about women who married early from every ward in Jhiribas of Palpa district. Ethical permission was taken from the Local Municipal office. Secondary data was derived from the concerned agencies like as rural municipality profiles, sub-health post, related person who take census. In this process, a pilot tested structured interview questionnaire was used.

Prior to the interview, oral consent for survey was taken from all the participants. Almost all agreed to be interviewed. With the assistant of 2 oriented interviewers, necessary information were collected from the participants. In addition, interviewers reached to potential participant's home with a convenience approach and they were asked questioned as per designed for this study. Interviews were carried out in September, 2017. On average, each interview lasted for 35 minutes.

5. Socio-Economic Information of Respondents

126 married women below 20 years of age were selected as respondents. This study was done in the rural peoples living in the Jhiribas of Palpa district.

Education is one of the main factors affecting an individual's knowledge, attitudes and behaviors with regard to various aspect of life, including are at marriage. Literacy means the ability of reading and writing. Literacy is perhaps the most important single means of social economic development. Health statuses of family members also depend on educational status of household head because it

determines to utilize the health care facilities, decisions making of care on health.

The total literacy rate of respondents was 74%, the remaining 26% were illiterate. Among the non-educated, only 20% were literate or can just read and write. Similarly, 20% of the respondents had completed primary level, 13% women had also completed lower secondary level, 12% of the women had completed secondary level, respectively. Only about 9% of the women were found to have completed higher level education. This is lower than the average for Nepal. The 2011 NDHS also shows that about 31% of women didn't have any formal education, as compared to 26% of illiterate (MOPH, New ERA and ICF international Lnc, 2012).

68% of the people interviewed belong to a joint family and 32% of people belong to nuclear family. A small family or nuclear family can provide sufficient facilities including nutrition, education love and care etc so their well-being and physical health will be good and joint family is opposite of theses all facilities they are unable to fulfill all basic needs so there are some differences in the joint and nuclear family in Nepali society.

Cultivated land is important for the people to live. If the land is not sufficient they could not solve their hand to mouth problem. Land belongs to each family of their economic status. If they have sufficient land they can solve their problem and safe from many health hazards, otherwise it may add many difficulties. The responses of respondents are presented in Table 1.

Table 1 shows that more than 71% of respondents do have not sufficient cultivated land to solve their land to solve their hand to mouth problem. And it shows that the maximum expenditure is distributed for food, health and least for education and clothing. But only 4% respondents have sufficient land which could feed their families for a year.

Among all, 71% of people were found under the poverty line in this study, there is a huge problem of lack of sufficient nutritious food supply in their homes, so the mother and children of the family are suffering from malnutrition in the community, which is an indicator for the bad health condition of the mothers and children in this community.

Table 1: Status of Cultivated Land

Area of Cultivated land	N	Percentage
less than one Ropani	90	71
One to five Ropani	20	16
Six to Fifteen Ropani	11	9
More than one Biga	5	4
Total	126	100

The CBS (2011) found that Nepal is largely an agricultural country through different people engage in different types of occupation to earn their livelihoods. There is a strong relationship between occupation and early marriage and health status of women. Most Nepalese do not have choice in their occupation it is determined by their parents of past generation. The study found that almost 71% respondents were involved in agriculture, 20% are engaged in Labor and minimum 9% are engaged in service. More ever the table illustrates that female respondents were more involved in traditional jobs like agriculture and animal husbandry and housekeeping. The majority of the respondents, 71%, were found with engaged in agriculture in the society, but there they do not have sufficient land so it is very difficult to fulfill their basic needs including foods for their family members.

Food security refers to the sufficiency of food produced on one's land or the adequacy, availability and accessibility of food. A household is considered food secure when its dwellers do not live in hunger, fear, or starvation (Hunt, 2009, as cited in MOHP, New ERA and ICF international link, 2012). Food security normally depends on agricultural production in an area.

Table 4 demonstrates that food security by agricultural production in terms of its adequacy for consumption was unsatisfactory. Only 9% of all households had sufficient food production or access to food. In addition, 28% and 63% of all households had enough food for only 7 to 12 months and 0-6 months respectively. These families had to depend on sources other than their own production for survival.

Economic status plays an important role in family life. Such as housing, health related problem, education and so on solved based on their income. The results found that 43% respondents have below 10 thousand rupees per year income, 32% of the respondents have 10-20 thousand yearly income. It shows that 16% have 20 to 30 thousand and only 9% respondents have more than 30 thousand rupees as yearly income. It is concluded in this study that most people are not able to fulfill their fundamental needs. They are suffering from low income and its impact in their lives is very painful.

6. Causes of Early Marriage

Prevalence of early marriage

Age is an important factor which affects mother and children's health. If the age of mother is below 20, she is less likely to give birth to a healthy baby. 68% of respondents said their marriage age was 16-20 years, and 32% were other or below 15 years. There is increased risk of disease and mortality of the mother and child if they got early marriage

because their organs of the body are not mature for reproduction before 20 years of their age.

A total of 126 females were married in the sample households. Arranged marriage 62% was practiced by 62%, though 35% were love marriages and 3% gandharva (winning a girl by impressing her with some performance) marriage. Study shows that the proportion of love marriage is increasing. Most, 93% of respondents thought that modern devices like mobiles and internet encourage early marriage. Among them 27% responded that it applied to them also.

Perhaps mobile phones had caused early marriages where love is a common form of marriage. Love marriage among school-going early marriages seems to be the trend. Study confirmed that persons who got married early committed suicide for various reasons, including that of early marriage, and that, for the reason, parents accepted the demand of their child.

Causes of Early Marriage

Early marriage has several causes, including social, cultural, religious, political, demographic and economic. In many cases, a mixture of these causes traps children in marriage without their consent. The responses about the causes of such marriage are presented in Figure 1.

Figure 1 shows that most (39%) thought that early marriage happened because of family pressure. Another leading cause is the willingness of child or self desire of themselves, 25%. The analysis clearly demonstrated that early marriage in the past occurred due to parental desires rather than the desire of the individuals involved.

Knowledge of Early Marriage

The legal age of marriage in Nepal is 20 years for both male and female. Marriage below 20 years is called early marriage. However, for this study respondents from the age group 10-19 years were most likely to get married before 20 of years of during their teen age.

Many studies have shown young girls get pregnant before age of 18 either after marriage or involving premature sexual intercourse. Legally the earliest marriage age of girl was 18 with consent of parents and 20 without consent of parents currently marriage age of both male and female is 20 as mentioned above, and has been stated in country code (Muluki Ain) of Nepal.

Responses of the respondents about the knowledge of early marriage found 67% respondents replied that early marriage is marriage before 19 years of age. One third of the respondents do not know about teenage marriage and 33% gave

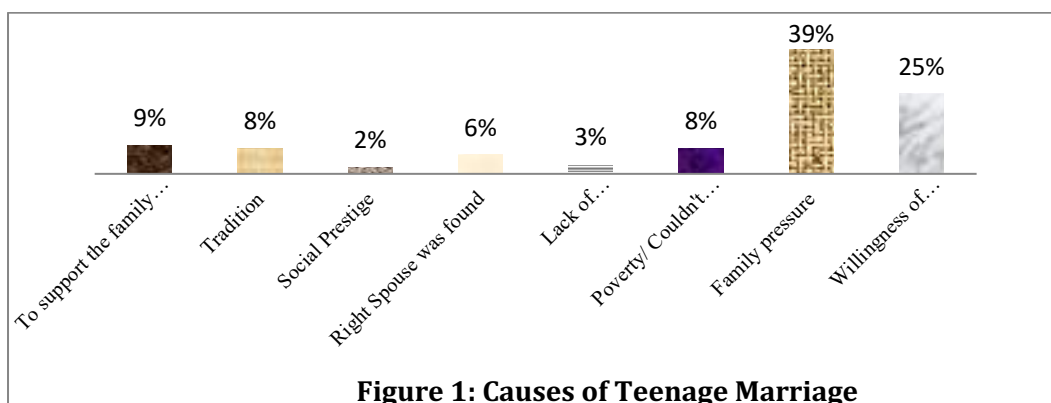


Figure 1: Causes of Teenage Marriage

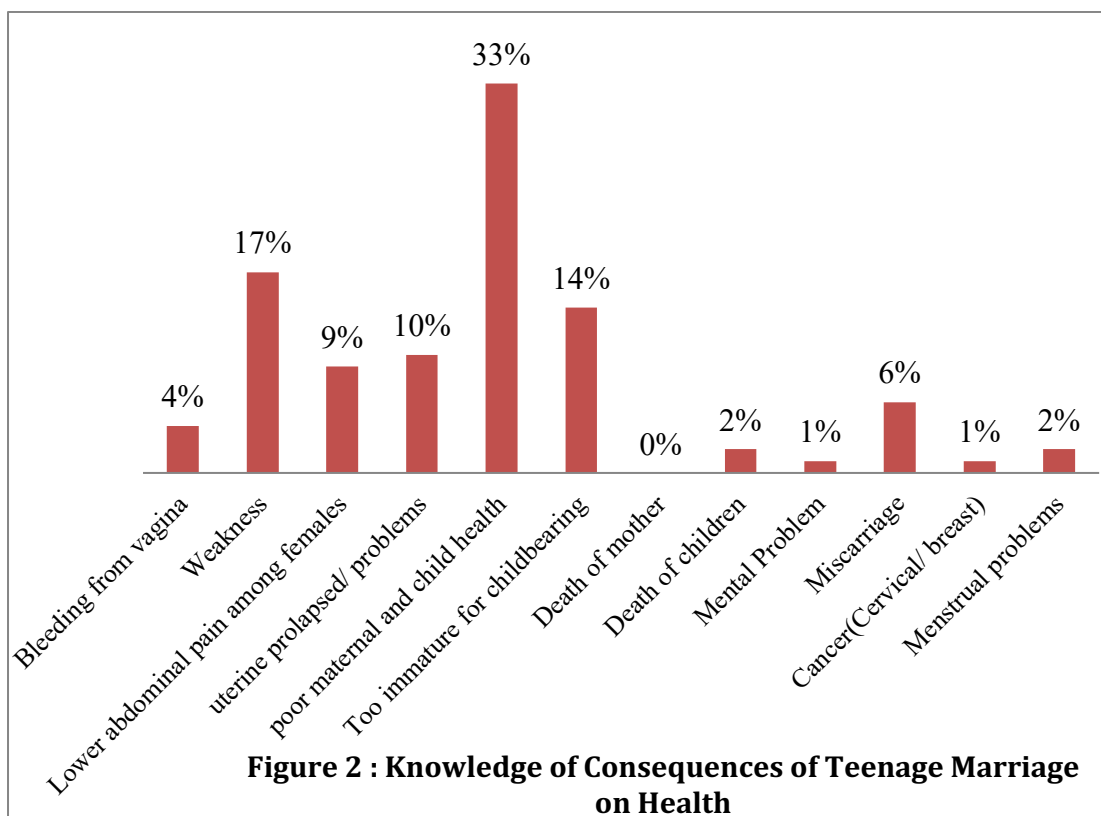


Figure 2 : Knowledge of Consequences of Teenage Marriage on Health

different views about early marriage. Little knowledge is one of the reasons of early marriage practice. Due to the lack of knowledge and illiteracy and the lack of improved social practices majority of the girls on the society were found appealed to get marriage before of the age of their years, which is not the good situation.

Knowledge about Legal Age at Marriage

According to the revised Muluki Ain, the legal age of marriage is 20 years for male and female there is a provision of legal punishment for both couples as well as guardian, if they marry against the law the punishment is imprisonment of 6 months to 3 years, or a cash payment, or both according to the case. In order to assess the knowledge about legal marriageable age among early married women. They were asked about legal age at marriage. 71% of early married respondents don't know about the legal marriage age and only 29% know about the

legal provision. This shows that most of the respondents do not know about the legal marriage age. If they had the knowledge about legal marriage, age and punishment about it, there should be control in early marriage practice is some extent. Thus, there is the lack of knowledge in the respondents about early marriage. If they had the knowledge about it, it would have played a great role in the restriction of early marriage practice.

Decision Making Roles in Marriage

The right to decide whom to marry and when to marry remains with those who are getting married. However, people think that parents (or other members of the family) should make the decision for their children. Respondents who married young were asked who had made the decision about their marriages. As was analyzed above, early marriage is considered a very bad practice by Nepali but it is not yet prevented. An attempt was made to collect

information about who had decided that the respondents would marry young. Table 4 presents the results of the question to identify the decision-makers regarding the respondents early marriage. Table 2 indicates that the father, mother or both took most decisions regarding marriage. Only 21% of respondents reported that they had decided themselves. The findings show that the paradigm shift in decision-making from parents to children, from parental pressure to love was found. It suggests that parental pressure is slightly decreasing regarding marriage case.

Table 2: Major Decision -Maker Regarding Marriage

Decision Makers	Respondents	Percentage
Father	25	20
Mother	7	6
Both Father & Mother	61	48
Self	27	21
Friends	2	2
Others	4	3
Total	126	100

Table 3: Right to make Decision of Marriage

Decision makers	Respondents	Percentage
Father and mother	71	56
Relatives	9	7
Self	42	34
Others	4	3
Total	126	100

Right to make Decision of Marriage

The respondents were asked about who has the right to decide upon the marriages of people in the family. Table 3 shows that about 56% respondents still believed that the right to make decisions about a child's marriage lies with the father and mother and 34% said the right is that of the individual involved. The findings showed that the power of decision taking by parents is declining and the decision by self is increasing.

Consequences on Mother and Child Health

Dahal (2016) found that early marriage has numerous adverse effects on the overall wellbeing of adolescents who are mentally, psychologically, emotionally and physical unfit for married life. Early marriage has led to suicide among adolescent girls and is leading cause of death of women in reproductive age in Nepal.

An attempt was made to find the consequences of early marriage from different perspectives. The respondents were asked some different questions about the consequences of early marriage on mother and child health and their responses were presented under different headings

Perception on Early Marriage

Early marriage is not good; it invites many problems in mother and child health. it leads to

early pregnancy and it made both of them physically, emotionally and intellectually weak. Early married women lose many opportunities including education, independence, and so on. Data shows that 71% of the women married early. They thought that early marriage affects both mother and child; it made both of them physically, emotionally, intellectually and economically weak. There is high probability of death of both (mother and child) and there was loss of many opportunities for women like education independent and other progress. Among them only 29% respondents felt it good. It was good for some of them because parents can be free from their children.

Knowledge of Consequences of Early Marriage

Early marriage forces couples to get involved in sexual activity, which often ends up in early pregnancy of the female. The health consequences of early marriage are reported as poor maternal and child health (33%), weakness of mother (17%), too immature for childbearing (14%), miscarriage (6%), Death of mother/ children (2%) and so on. The analysis clearly indicates that people know that early marriage is harmful for immature girls in many ways.

Reason of Miscarriage or Stillbirth

A miscarriage is the spontaneous loss of a fetus before the 20th week of pregnancy. About 6% of mothers had experienced miscarriage. Though the number of miscarriage or stillbirth is insignificant, the cause of their miscarriage or stillbirth demonstrates the adverse consequences of early marriage on women's health (Table 4).

Table 4: Reason of Miscarriage or Stillbirth

Reason	N=7	%
Hard labor and bleeding	3	43
Dependency on traditional healers	0	0
Dysmenorrheal	0	0
Lack of health institution/ equipment	1	14
Twin born	0	0
Immature mother	2	29
Position of baby	0	0
Improper care of mother	1	14
High blood pressure	0	0
Swollen body	0	0
Fever	0	0
Evil	0	0

According to the American College of Obstetricians and Gynecologists (ACOG). Studies reveal that anywhere from 10-25% of all clinically recognized pregnancies will end in miscarriage. *Chemical pregnancies* may account for 50-75% of all miscarriages. This occurs when a pregnancy is lost shortly after implantation. The woman may not realize that she conceived.

The above findings demonstrated that miscarriage is obtains due to the hard work during

pregnancy and which occurred due to early marriage. So nearly marriage can be taken as a leading factor for miscarriages.

Sexual Problem

Early marriage encourages couples to get involved in sexual activity. Due to their physical immaturity, they have to face many problems. Female respondents were asked whether they were aware of the sexual problems and these included lack of sexual desire 62%, painful intercourse 38%. The result clearly indicates that early marriage is a cause for sexual problems that can directly effects for mother's health.

Age of First Pregnancy

Most of the adolescent women get pregnant before their reproductive and sexual organs become fully developed. As a result, the rate of maternal and child mortality and morbidity become high in Nepal. 71% of respondents had an age of first pregnancy between 15-20 years and only 29% respondents had a first pregnancy below 15 years. The above indicators indicate that the maximum respondents have 1st pregnancy at early age, which enhances the high number of child birth as well as health risk of mother and child. It is caused due to socio-cultural tradition and due to lack of education.

Antenatal Check Up

Antenatal check up means to examine pregnant women's health during pregnancy period. It is essential for health check up for mother and her fetus. At least four antenatal visits are required for normal pregnant women for safe delivery. This study found that 80% of respondents did not get a checkup their health during pregnancy but only 20% respondents were approached to health

center for checkup. Most of the non-checked up women are illiterate and due to lack of knowledge about health checkup during pregnancy. More over there is not availability of health checkup facilities.

Educational Status and Antenatal Check Up

Antenatal check up is an essential health check for mother and her fetus from conception to 28 weeks of pregnancy period, monthly checkups, from 29 weeks up to 36 weeks and weekly check up after 36 weeks is the period of producing baby at least four times antenatal visits are required for normal pregnant women for safe delivery. Therefore, educational status of pregnant mother plays vital role on antenatal check up. So Table 5 presents the relation between educational status of early married mother and antenatal check frequency. It is evidence that 61% of illiterate respondents had not done any antenatal check up. Only 18% illiterate respondents had one time check up, 12% had 2 time check up and 9% had 3 times check up. it shows that no illiterate person had completed the antenatal check up.

Among 25 literate respondents, 12% had not done any antenatal check up, 80% had once, 8% had 2 times check up. From the total of 126 respondents, there was only 20% (25 respondents) who had completed the full package of antenatal check up during their pregnancy and those were only most educated group. Service statistics of the fiscal year 2067/68 (NDHS report 2011) shows that 85% of the mothers received their first antenatal care services and less than three fifths of them made four visits indicating that more than two fifths of the mothers did not complete the recommended four ANC visits.

Table 5: Educational Status and Antenatal Check Up

Educational Status	Frequency of Antenatal Check Up											
	Not at all		1 time		2 time		3 time		4 time		Total	
	No	Per.	No.	Per	No	Per	No	Per	No	Per	No	Per
Illiterate	20	61	6	18	4	12	3	9	-	-	33	100
Literate	3	12	20	80	2	8	-	-	-	-	25	100
Primary	4	16	3	12	16	64	1	4	1	4	25	100
Lower Secondary	-	-	2	13	-	-	11	69	3	19	16	100
Secondary	-	-	-	-	2	13	2	13	11	73	15	100
Higher Secondary	-	-	-	-	-	-	2	17	10	83	12	100
Total	27		31		24		19		25		126	-

Table 6: Economic Status and Place of Delivery

Place of Delivery	Economic Status									
	Lack of Money		Dependency		Unemployment		Difficult livelihood		Total	
	No.	Per.	No.	Per.	No.	Per.	No.	Per.	No.	Per.
Home	9	12	2	3	18	24	46	61	75	100
Cowshed	22	92	1	4	-	-	1	4	24	100
Hospital	-	-	6	37	10	63	-	-	16	100
Others	4	36	-	-	4	36	3	28	11	100
Total	35		9		32		50		126	

So, the status of the study area seems poor in comparison with national reports.

Place of Delivery

A significant proportion of mothers in developing countries still deliver at home unattended by skilled health workers. Traditionally, Nepalese children are delivered at home either without assistance or with the assistance of traditional birth Attendants or relatives and friends. An important component of effort to reduce the health risk of mothers and their children is to increase the proportion of babies delivered under medical supervision, proper medical attention, hygienic conditions during delivery can reduce the health risk, complications and infections that can cause the serious illness leading to death of mother or babies. Respondents in a survey were asked a question about the location of delivering the baby or where did they give birth to their child, and it was found that 60% reported that they have given birth to their child at home, 19% in a cow shed, 13% in hospital and other 9% in other places. At the national level, only 9% of births are delivered in health institutions whereas 89% at home.

Due to the unsafe delivery and healthy practice, many women are suffering from RH related problems like bleeding, infections, injury, and the neo-natal tetanus, during the delivery; so, they should be safe delivered in the maternity hospital.

Condition of First Child

Really, in Nepal, the condition of children is poor. Everyone has four children, which are often born with less than 2.5 kg of weight. A mother's nutritional status during pregnancy is important both for the children's development and for protecting against maternal morbidity and mortality NDHS (2012). Low pregnancy weight is generally associated with pregnancy outcomes e.g. low birth weight and disability. So the question as asked to the respondents "What was baby's condition at birth?". It was found that 71% of the children had low birth weight, 2% abnormal, and 2% over weight. Only 25% reported the weight to be normal. Healthy children represent a healthy nation. Over 85% of the country's population is in rural areas, where many suffer from malnutrition and various disease. Size of the baby of birth and mortality are negatively associated, for example. Children who has regarded as very small or small have an infant mortality rate that is 60% higher than that for average/large children NDHS (2012).

Exclusive Breast Feeding Practice

Responses to the question, "during the breast feeding period, was your breast milk sufficient to your baby or not?" found just more than half (52%) said that they had not sufficient breast milk for exclusive breast feeding practice and only 48% had sufficient milk for exclusive breast-feeding. The

analysis clearly demonstrated that early marriage is the main cause of breast milk sufficiency due to maturity of reproductive organs.

Economic Consequences of early marriage

The respondents' responses with regard to a question about the economic consequences of early marriage made it evidence that the economic consequences of early marriage are difficulty in earning a livelihood 40%, lack of money 28%, jobless 25%, and dependency 7% respectively. Economic status directly impacts livelihood.

Economic Status and Place of Delivery

Economic status of family plays a vital role to define the delivery place. From Table 6 we can see that among the 75 respondents of home delivery, 12% said it was due to lack of money, 3% due to dependency, 24% due to unemployment and 61% due to a difficult livelihood. A total of 24 respondents delivered in a cowshed, 92% due to lack of money, 4% due to dependency and 4% due to difficult livelihood. A total of 16 respondents, 37% of dependent and 63% of employed mothers delivered at safe maternity hospitals. Total 28 respondents delivered in other places, 36% due to lack of money, 36% due to unemployment and 28% due to difficult livelihood.

Comparatively, this study shows that, most of the poor economic status respondents delivered at home or in a cowshed, and few better situations' respondents delivered at hospitals and other places. NDHS 2011 has also shown 36% of deliveries attended by SBA. Service statistics of the fiscal year 2067/68 shows that 37% of the mothers delivered in health facilities, this is close to the findings of NDHS 2011 (35%). In this study, among a total of 126 respondents, only 13% of respondents delivered in hospitals, and this is a poorer situation than the national average.

7. Discussion

The objectives of this study were to examine the causes of early marriage and assess the consequences on Maternal and Child health. Major findings are presented below.

Socio-Economic Information

1. It was found 32% among female respondents married at the age below than 15 years and 68% married at 16-20 years. So early marriage is still prevalent.
2. 26% respondents are still illiterate, only 20% have completed secondary level education.
3. 71% respondents depend on agriculture and 20% depend on Labor, and 9% depend on service.
4. 69% people belong to a joint family and only 32% are in a nuclear family.
5. 71% respondents have not sufficient cultivated land, only 4% have sufficient cultivated land.

Causes of Early Marriage

1. In the age group of 16-20 years, the average prevalence of early marriage among respondents was 68%.
2. Arranged marriage was practiced among 62% and love marriage by 35%.
3. Data from respondents who married early revealed that 39% of early marriage occurred because of family pressure. Another leading cause was self desire. The finding revealed that children themselves like to take part in "love marriages" at an early age due to mobile phones and mass media promoting "love".
4. Their family pressure, self-desire (falling in Love), household activities, poverty, tradition, and lack of education are the main causes of early marriage.
5. 33% of the early married women do not have knowledge about early marriage.
6. More than 71% did not know the legal age of marriage. Their ignorance may be one reason early marriage prevails.
7. Out of total respondents, for 48% of respondents' both father and mother were major decision makers, and 21% of respondents had self decision.
8. 56% respondents still believed that the right to make decisions about a child's marriage lies with father and mother and 34% said the right is that of the individual involved.

Consequences on Child and Mother Well being

1. Out of total respondents, 71% of the women married early.
2. Respondents who had married early were mostly aware of the physical health-related consequences of early marriage. All 3 child deaths occurred among them. One third, 33%, had experience of poor maternal and child well being, 17% experienced weakness, 14% were immature for child bearing, 10% had uterine prolapse problems, 9% experienced lower abdomen pain, 6% mentioned a miscarriage, 4% mentioned bleeding from vagina, 2% mentioned a menstrual problem, and 1% mentioned cancer and mental problems, respectively.
3. Out of 6 persons with miscarriage problem, 43% said that they experienced hard labor and bleeding, 29% said it was being an immature mother, 14% said it was improper care of mother, and 14% said there was a lack of health equipment.
4. Regarding sexual problem, 62% had experienced loss of sexual desire and 38% had experienced painful intercourse.
5. Out of total, 71% got their first pregnancy between the age of 15-20 years.

6. Out of total respondents, 20% were approached to prenatal check up.
7. More than half, 59%, children delivered at home, 19% in a cowshed, 13% were at hospital, and 9% children delivered at other places.
8. Out of total, only 25% found the newborn within the normal range when birth had occurred. 71% of the newborns were of low birth weight, 2% were abnormal and 2% overweight.
9. Out of total, 67% of the respondents were not feeding colostrum and only 33% of the respondents feed colostrum to the newborn baby.
10. Out of total, 48% had practiced exclusive breast-feeding due to sufficiency of milk and 52% practiced inclusive breast-feeding and formula due to insufficiency of milk.
11. The economic consequences of early marriage are found to persist with 40% saying they had a difficult livelihood, 28% a lack of money, 25% were jobless, and 7% dependency. So poor economic status directly affects persons for a difficult livelihood and it results negatively on the mother and child's health.

8. Conclusions

Educational and economic status of early married women is not satisfactory. The majority of the early married women are engaged in household work. Agriculture and labor are the main occupations, so they are suffering from low income and its impact in their lives is very painful. Most people live under the poverty line (Less than 1 Ropani Land = 508m²), which is a huge problem because of lack of sufficient nutritional food supply in their homes which is an indicator for bad well-being condition of the mother and her child.

Early marriage is still prevailing in the Jhirubas VDC where early marriages used to occur because of parental pressure but it is now less significant than falling in love early, and fulfillment of sexual desire. Mobile phones and mass media have contributed to greater early love marriages among recent early married women'. Most of the respondents have no idea about legal marriage age and punishment about it. If they had the knowledge about it, it would have played a great role in the restriction of early marriage practice.

Most of the respondents were aware of the physical health-related consequences of early marriage. They suffered from different physical health-related problems, for example, poor maternal and child well-being, weakness, immaturity, miscarriage, sexual problem, no pre-natal check and so on. Most of the poor economic status respondents delivered at home and in a cowshed with assistance of family members and Female Community Health Volunteers. A few better situated respondents delivered at hospitals and

other places. Most of the respondent's babies did not get exclusive breast-feeding practice. Most of the children are suffering from low birth weight and inclusive breast-feeding practice.

After considering all of the findings and the study indicated that early marriage is mainly affected by traditional system (family pressure) and towards marriage practices, socio-economic status, lack of education, low knowledge about marriage and legal age at marriage are also act as effecting factors for early marriage practice.

9. Recommendations

Early marriage has numerous adverse effects on the overall wellbeing that are mentally, psychologically, emotionally and physically unfit for married life. It is globally accepted as a problem, which deprives especially girls of education and health services, the chance to learn skills and develop their personalities. So based on the above findings and conclusions the following recommendations are made.

Policy level:

1. Forceful legal action can have many harmful results in the lives of couples who marry young. Instead, educational motivations can work. Therefore, programs should be focused to enroll and retain girls in schools.
2. Ending early marriage requires the consolidated efforts of government and other organization. Therefore networks, the coordination and collaboration of different stakeholders, and organizations from community to national level should be strengthened.
3. The massive awareness about increased legal age from 18 to 20 years should be done, and laws should be strictly implemented protecting rights of victims.
4. Ending early marriage should be established as a crosscutting issue and mainstreamed into all development works and mainstream into local policy of federal government and activities and effectiveness of activities focusing reducing early marriage should be done in collaboration with NGOs/INGOs. Therefore, developments organizations' (NGO/INGOs) activities will be implemented through an integrated approach.

Practice level:

1. Early marriage is still widely prevalent in communities. So in order for early marriage livelihood opportunities and income generation support opportunities should be made available in the concerned community.
2. Adolescent boys and girls should be empowered to manage their sexual and reproductive health issues through different approaches such as peer

education, comprehensive sexuality education, and life skill based education in school.

3. Child Club, Youth Club and Local groups should be mobilized and engaged massively to address the issues and combat early marriage hence to discourage to both parents and adolescents to make get married in early age.
4. All educational institutions, government agencies, should focus on creating social pressure and action should be taken with those who are willing to marry their young children below 20 years and educate the young people regarding advantage of getting married after 20 years also informing them on about essentials of delaying pregnancy and adopting safe sexual practices as a way of life.
5. Well-being and health services and linkage to primary health services should be made accessible. So that they can utilize the existing health services as they need to.
6. Non-formal education also would be a better option to eradicate backwardness/ illiteracy of concern community.
7. Existing community and school based complaint hearing structure should be strengthened and though teachers and, community members and local stakeholders/' parents and children should be made aware about legal and health consequences.

Further Research

This study can be used as a reference for further research, especially:

1. A similar study can be conducted on a larger scale so that the generalizations can be made to the wider population.
2. This study is mainly focused on the health related consequences of early marriage women and her child. Therefore, further research on broader aspects including Social, Economic, Educational, Psychological and other consequences that can be generalized for national reference, should be conducted.
3. Similar studies can be conducted to find out about early marriage and maternal/ child health among different communities of the country.

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Prevalence of Oral and Dental Diseases and Oral Hygiene Practices among Illicit Drug Abusers

- Prof. Dr. Md. Anower Hussain Mian, DDS, MPH, PhD, Prof. and Head, Dept. of Community Dentistry, Faculty of Public Health, Bangladesh University of Health Sciences, Mirpur-1, Dhaka, Bangladesh
Email: ayonshafi@hotmail.com
- Dr. Kazi Md. Sakib Hossain, MPH, Lecturer, Dept. of Community Dentistry, Faculty of Public Health, BUHS, Mirpur-1, Dhaka, Bangladesh
Email: kms_doc@buhs.ac.bd
- Dr. Nasrin Akhter, PhD, Senior Lecturer, Dept. of Pharmaceutical Sciences, Faculty of Life Sciences, North South University, Dhaka, Bangladesh
Email: luckyayon@hotmail.com
- Darryl Macer, Ph.D., Hon.D., MPH, President, American University of Sovereign Nations, Arizona, USA
Email: provost@ausn.info

Abstract

There has been increasing incidence of addiction to certain illicit drugs amongst people belonging to various strata of society, particularly among young people in Bangladesh, as well as in western countries. Drug abuse results in several direct consequences including multiple physical and mental problems such as cardiac crisis, respiratory depression, liver cirrhosis, nephropathy, infectious diseases such as hepatitis, AIDS, and tuberculosis, injury-associated disability, mental disorders such as depression, and oral health problems. This is the first published study of illicit drugs abusers' health related data in Bangladesh. The present study was conducted to evaluate the prevalence of oro-dental diseases and explore attitudes towards oral hygiene practices among a group of illicit drug abusers so that required interventions can be planned for the good health of those who are in addicts with illicit drugs in this region. This study was comprised of 120 drug addicts admitted in a drug rehabilitation centre in Dhaka, Bangladesh. Most of the participants were involved in abuse of more than one drug and the most abused drugs were heroin (55%), cannabis (ganja) (43%) and methamphetamine (yaba) (31%). Oral hygiene practices of the drug users were alarming where 78% clean their teeth in wrong way (once/three/more than three times a day) and 23% clean their teeth in right way that is two times daily but 74% of them never used any mouth washes. On the other hand 92% respondents didn't use any dental floss to maintain oral hygiene properly. The schedule of dental check-up was also poor, only

37% respondents visited a dentist once in a year. Ignorance about oral health (48%), money-fear (32%) and money-bad experience (25%) are the obstacles for the respondents to visiting a dentist. Presence of carious teeth was seen in all persons (100%), while bleeding gum, shallow pockets and deep pockets were found in 42%, 44% and 12% of drug users, respectively as in CPI index. Symptoms of xerostomia (mostly in heroin abusers) and meth-mouth (mostly in yaba abusers) were found in 18% and 8%, respectively. Premalignant states of leukoplakia were diagnosed in 8% of drug users. Chi squared test was applied wherever applicable. Significant relationship with oral health condition (at the level of significance at $p < 0.05$) was found with age group, marital status, types (heroin, yaba and cannabis) and duration of drug abuse. Drug abuse is detrimental to oral health, so abusers need to be more aware of the dangerous effects of drugs.

1. Substance Abuse

Substance abuse' is a disorder characterized by repetitive drug use that results in social or economic distress and is often associated with medical problems. 'Drug addiction' is a chronic, relapsing disorder characterized by compulsion to take a drug and loss of self-control in limiting drug intake (Braunwald et al., 2003). The substances or drugs may be natural or synthetic, but is something that has a psychoactive effect and alters or modifies the functions of a living organism. Globally, the number of drug abusers in 2007 was 200 million, i.e. 4.8% of the global population (World Drug Report 2007).

Drugs commonly abused are narcotics (including poppy, opium, morphine, codeine, heroin, opioids, meperidine, pethidine, and methadone), cannabis (marijuana, hashish, and dried parts of cannabis plant), stimulants (amphetamines, cocaine), hallucinogens (LSD, phencyclidine, mescaline, and psilocybin), depressants (barbiturates and benzodiazepines), and miscellaneous (antihistaminics, solvents in aerosols, glue, and whitening fluid) (World Drug Report 1997).

Medical complications of drug use that are relevant to dentistry include abscesses at injection sites, viral hepatitis, Human Immunodeficiency Virus, endocarditis and anaesthesia complications (Meehan, 1999). Studies have shown that the dental health and oral health are affected by drug abuse (Porter et al., 2005, Robinson et al., 2005). Drugs abused adversely affect the oral soft and hard tissues (dental caries, periodontitis) or may lead to potentially malignant states (leukoplakia, oral submucous fibrosis) or may predispose to oral infections (candidiasis, gingivitis) by compromising local immunity (Thavarajah et al., 2006).

The oral health of drugs abusers has received less attention. There are case reports of specific oral changes although epidemiological research shows these changes to be uncommon (Du, 2011). High caries experience is seen in heroin users, perhaps caused by a combination of xerostomia caused by opiates and the high sugar content of oral methadone solutions used to manage withdrawal from the drug (Du et al., 2011, Angelillo et al., 1991). Oral cleanliness may also be reduced in opiate users (Molendijk et al., 1996). Oral effects of cocaine are related to administration of the drug via nasal inhalation, smoking and direct smearing on the oral mucosa, especially the gingivae (Parry, 1996). Cocaine has a vasoconstrictive effect that causes ulceration and atrophy of the tissues. There may also be stimulant effects on the facial and masticatory muscles.

Drug users may also have special needs in relation to receiving dental care. Anecdotally, they may be dentally anxious and have low pain tolerance requiring careful pain relief and a good rapport with the dentist (Sainsbury, 1999). They are unable to assess their dental need and therefore reluctant to go for a dental treatment (Sheridan et al 2001). Similar difficulties have been noted in other areas of healthcare. Drug users experience marginalization and avoidance by service providers and perceive services to be unavailable (Ortiz et al 1997).

2. Drug abuse in the Bangladesh Context

Drug abuse is a direct threat to the economy and social aspects of a country. In Bangladesh, it is a national crisis growing every day. People of different age groups, although especially ranging from 18 to 30 years of age, of different professions and of different social status are abusing drugs. There are millions of drug-addicted people in Bangladesh. The rapid increase rate of drug addicts reported in recent epidemiological surveys carried on the three divisions of Bangladesh reflected that this country would very soon turn to a potential venue of drug abuse. Increased criminal activities like hijacking, extortion etc. to collect money for purchasing drugs destroys social security and peace. Immediate stoppage of illicit drug transportation into and within this country is essential to save our population and country from this deadly game (Shazzad et al. 2013).

Recreational drug abuse eventually limits the normal activities of life through leading to the malfunctioning different vital organs including heart, kidney, brain, liver and bone as well. In a short time of starting abuse, tolerance developed from the most abused drugs and results in increasing dose. Common features associated with drug abuse include lack of patience, sleep

disturbance, confusion, head-ache, feeling dizziness during interval of taking drugs, hallucination, perturbation, lethargy, sexual abnormality, violence, abolished humanity and judgment, and indiscipline in personal life (Leshner 1997).

Bangladesh is situated in the central point between the 'golden triangle' (Myanmar, Thailand and Laos) and the 'golden crescent' (Pakistan, Afghanistan and Iran) in terms of geographical location. Bangladesh with its easy land, sea and air access is becoming a major transit point. Traffickers who supply drugs to the markets of North America, Africa, and Europe are routing their shipments through Dhaka, Chittagong, Comilla, Khulna, and other routes in Bangladesh. It is believed that with the increasing quantity of the wares more and more people are likely to get involved in drug business. In this way it ultimately contributes to increasing the number of drug abusers in the country as well. To procure money for buying drugs, addict makes himself associated with different criminal groups and commit crimes (Simpson et al., 2010). In a statistical study it was shown that among a study of 253 drug abusers in Bangladesh, 31% were addicted to cannabis, 26% to alcohol, 24% to phensidyl, 10% to heroin and 9% to diazepam, antihistamine, etc. The male: female ratio was 20:1. The predominant age groups are: 5% between 10-15 yrs, 58% between 18-35 yrs, 20% between 35-50 yrs and rest were above 50 yrs of age (Shamim et al., 2005).

Despite there being data available in related to the prevalence of oral health of drug abusers worldwide but no study has been performed in Bangladesh on the geographical disparity, types of drugs, pattern of used, duration of used, environment and physiology (race) and so on.

Evaluation of the prevalence of oral health of drug abusers is important on many fronts: Bangladesh is a developing country where disease burden is enormous and availability of curative treatment is quite inadequate compared to what is needed. Prevention is better than cure. But data related to overall oral health status of drug abusers is insufficient in our country, clinician's awareness level about oral health is very low, thus the present study was conducted to (1) examine the prevalence of oral health status; and (2) estimate common oral health practices among drug abusers in selected rehabilitation centers in Bangladesh. It may provide information on the underlying pathological processes, signs and symptoms of oral diseases associated with drug abuse. This may help clinicians to identify such drug abusers from patient reported symptoms and thus facilitate more comprehensive and multidisciplinary prevention approach to the management of addictions.

3. Effects of drug abuse on different vital organs

Over the past decade drug addiction has been considered as a **brain** disease. Structural and functional changes of the brain due to repeated use of addictive drugs can persist after even stopping them. When the brain becomes adapted with different changed chemical and physiological conditions, addiction takes place (Leshner, 1997). Addiction, started with progressive increase of drug intake, manifests as a circuit of malfunctioning of brain with compulsion of taking it which ends with loss of control on taking it (Koob, 1997).

Drugs that are abused for achieving pleasant sensation mostly act on neurotransmitters. Many of those increase dopamine release and cause persistent nerve stimulation which gives energetic and euphoric effects. This chronic and uncontrolled stimulation causes damage to nerve terminals.

Studies with methamphetamine neurotoxicity proposed that this drug causes excitotoxicity to neuron. One mechanism explained that methamphetamine binds with dopamine transporter, enters into presynaptic nerve terminal and force dopamine to be released from vesicles. Thus increases dopamine and serotonin concentration in synaptic cleft. Another mechanism included that methamphetamine decreases dopamine reuptake by reducing activity of dopamine transporter and thus causes persistent nerve stimulation which ends in nerve damage. Free radical mediated apoptosis of nerve cell also suggested as pathway of methamphetamine induced neurotoxicity (Nicole et al., 2011).

Amphetamine and its derivatives, reported as cardiotoxic drugs, manifest their toxic effects by increased **heart** rate, hypertension, cardiac myopathy, cardiac necrosis or myocardial infarction, cardiac arrhythmia or cardiac failure etc. Left ventricular hypertrophy mediated by oxidative stress from methamphetamine abuse was described by a separate study (Jacobs W, 2006). These drugs commonly induce hyperthermia (Kevin et al., 2010).

Stimulant induced cardiotoxicity commences with excessive activity of catecholamines. Persistent release of dopamine by methamphetamine abuse increases heart muscle contraction and heart rate. Additionally, catecholamine toxicity produces fibrous tissue and increases the size of heart muscle cells. Study with acute or chronic administration of methamphetamine suggested its cardiotoxicity induction. Acute cardiotoxicity of methamphetamine marked with acute myocardial infarction and sudden cardiac death whereas chronic cardiotoxicity with development of coronary artery disease and cardiac myopathy (Kaye S, 2010). However, several clinical

consequences resulted in cardiomyopathy with degraded cardiac mitochondria, extreme myofibril contraction and lost myofilament. Methamphetamine treated rats, diagnosed with myocytic degeneration and necrosis in heart, developed myocardial damage with sign of myocytolysis, contraction bands, atrophied myocytes, and spotty fibrosis (He et al., 1996).

Being the major site of excretion, **kidneys** are frequently victimized by drugs or their toxic biotransformed products either directly or indirectly. Amphetamine derivative especially methamphetamine reported to induce rhabdomyolysis with flow of massive toxins through kidney causing it to shut down. Another mechanism of kidney failure by the stimulant drug described as increased heart rate and contraction of blood vessel which cut off blood flow to the kidney (Tokunaga et al., 2006).

Renal damage and peroxidative injury observed in rat kidney after acute and sub-acute administration of methamphetamine in immunohistochemical study in a separate investigation. Blood test revealed significant increase in creatinine and creatinine phosphokinase and decrease in K, Ca & P suggesting renal tubule damage by repeated administration of methamphetamine (Tokunaga et al., 2006).

Bone remodeling is oriented by the co-ordinated activities of osteoblast, osteocyte, osteoclast and bone lining cells continues to maintain good bone quality. The quantity of mineralized bone and bone per unit volume, known as bone mass and bone density respectively, represent bone quality. Inherited factors and environmental influences such as pathology, nutrition and drug use influence bone remodeling. However, exact reason of drug induced disruption of bone remodeling still requires thorough investigation. Some evidence suggested that drug induced bone defect might result from inhibition of growth of trabecular bone by increasing urinary excretion of calcium (in case of caffeine) or direct toxicity to osteoblast cells (alcohol).

Drug induced bone toxicity frequently manifested as: osteomyelitis or bone infection-generated usually from intravenous drug abuse using dirty needles and contaminated drugs; osteoporosis- caused by the malnutrition seen in long-term stimulant users; osteopenia or reduced bone density- created usually from opiate addiction; temporomandibular joint disorder (TMJ), dental damage and decay- associated with stimulant abuse probably due to habitual teeth-grinding during stimulation and stress. Malnutrition among drug abusers causes poor joint health and arthritis. The poor postural habit of

abusers also affects their spinal health causing weakening of spine's supporting muscles and increasing risk of spinal injury (Drug & Alcohol Rehab Florida, 2013).

Several studies suggest methamphetamine abuse exerts negative effects on bone. The strength of the calcaneus bone determined by ultrasound bone densitometer and broadband ultrasound attenuation found significantly lower among methamphetamine abusers as compared to control (Katsuragawa, 1999). In a separate study, methamphetamine decreased bone density in lumbar spine among its abusers (Kim et al., 2009). Mouth dryness of methamphetamine abusers induced tooth decay by reducing the protective action of saliva.

However, methamphetamine toxicity in mice is expressed in different ways as in human abusers. Researchers found increased osteoblast and decreased osteoclast activity in mice after long term treatment with methamphetamine resulted in increased bone formation (Tomita et al., 2015). Low levels of Vitamin K associated with low rates of bone turnover increased risk of osteoporosis.

Drug induced hepatotoxicity comprises about 10% of all types of acute hepatitis (Zimmerman, 2000). The **liver's** position between drug absorption site and systemic passage and moreover its metabolic role favours the drugs or toxic metabolites to attack it very easily as compared to other target organs (Russmann et al., 2009). Four most important highly specialized cells and vessels constitute liver. The majority of liver tissue is composed of parenchymal cells known as hepatocytes which are the main site of metabolic activities such as various biochemical reactions regarding synthesis and breakdown of essential biomolecules, necessary for normal body activities. Hepatocytes work in separate groups to perform multiple functions included repairing of the injured liver by rapid regeneration and biotransformation of the harmful entities. Rest of the cells of liver tissue or non parenchymal cells are kupffer cells, stellate cells and liver sinusoidal cells which function as defender from harmful bacteria and antigens, store vitamin A and control the passage of nutrients and important molecules from blood vessel into liver. Hepatic stellate cells additionally contribute to liver regeneration and formation of fibrosis and tumor as well (Remmer, 1999).

Liver, by itself, produces the necessary enzymes for metabolism or biotransformation of nutrients or xenobiotics making those suitable for used by body, stored or eliminated as whatever needed.

4. Justification of the study

Drug abuse, one of the world's most devastating health problems (Nessa et al., 2008) may also be

considered a prevalent problem, because, for example, in 2009 between 149 and 272 million 15- to 64-year-olds around the world reported using illegal drugs at least once during one year (United Nations Office on Drug and Crime, 2011).

Over the past two decades, it has also been recognized that tobacco and drug abuse is associated with oral diseases. However, for other forms of oral diseases, the prevailing opinion for many years was that if drug users did have more oro-dental diseases, it was probably due to neglected oral hygiene practices. Taking the drug abusers as a study population this study will explain in which extend this section of people is vulnerable to the oral health related diseases. The gathered information by the current study will add to the data bank on issues related to drug abuses in Bangladesh.

Keeping this in mind we conducted an exploratory pilot study to evaluate dental disease prevalence and patterns, and assess the knowledge and attitude towards oral hygiene practice of drug abusers. The results of this present study emphasize a need for special attention from government sector and other health organizations to meet the basic oral health needs of this community according to the prevalence of dental diseases among them. Also oral health care programs should be organized for addicted persons in order to educate them regarding proper oral hygiene practices.

The scanty of information on the drug related oral health problems among the Bangladeshi population has been found in the published literature. Therefore, the present study will also make an effort to assess the adverse effects of drugs abuse on oral health which could be helpful to policy makers to identify the information gaps and formulate guidelines to solve this health problem.

It is expected that the result of this study will influence our national health policy and emphasis will be given on educational program among drug abusers and in future it will ultimately help to reduce the disease of the oral cavity due to drug abused. The result of this study could also be used as a baseline for future study.

5. Methods

Objectives

The key research question is what is the prevalence of Oral-Dental Diseases and attitudes towards the Oral hygiene practices among illicit drug abusers? The general objective is to assess the prevalence of oro-dental diseases among the illicit drug abusers and their attitudes towards oral hygiene practices. Specific objectives include:

- To assess the prevalence of oro-dental diseases among illicit drug abusers.

- To study the oral hygiene related practices and attitudes towards oral health.
- To find out the association between oral health statuses, types of drugs and socio-demographic features among the study population.

The independent variables in this study were: Age, Sex, Education of participant, Occupation of the participant, Marital status of the participant, Types of drugs abused, Duration of abused drugs and Oral Hygiene practices. The dependent variable was Oro-Dental diseases.

Operational Definitions

Oral Hygiene Practice: This is the way of practicing regular oral and dental care which includes-proper teeth cleaning by tooth brush and tooth paste after breakfast and before going to bed at night, regular visit to dental health care personnel at minimum 6 months interval. Regular use of dental floss and mouth wash is also an important part of oral hygiene practice.

Gum disease (periodontal disease): Infection or inflammation of the surround the tooth is known as gum disease. Depending on the severity, gum disease is generally divided into two type- gingivitis and periodontitis. Gingivitis means inflammation of the gum. Periodontitis occurs if gingivitis is left untreated. It becomes worse and progresses to involve the tissue that joint the teeth to the gum (the periodontal membrane) which is characterized by the gum inflammation, with redness and bleeding, deep pocket (greater than 3 mm in depth) formed between the gum and the tooth.

Pocket depth: Increased in the depth of gingival sulcus and forms the dental pocket. Naturally the sulcus depth is 1-2 mm. It is measured from the cemento-enamel junction to the deepest point of the pocket.

DMFT: This is the method of assessing decayed/caries, missing, filling teeth of adult permanent teeth. Mouth mirror and explore or caries probe are used to examine all teeth except 8s.

CPI -INDEX: Severity and degree of periodontal diseases (gingivitis, periodontitis) in an individual (or in a section of a population) are assessed by CPI index.

Scoring: The scoring criteria are:

0: No periodontal disease.

1: Bleeding on probing (mild periodontitis)

2: Calculus with plaque seen or felt by probing (moderate periodontitis).

3: Pathological pocket 4 – 5 mm and more (severe periodontitis)

Mucosal (Oral) lesions:

A. Xerostomia

Xerostomia also termed dry mouth (Scully et al., 2008) as a symptom, which may be associated with a change in the composition of saliva, or reduced salivary flow (hyposalivation).

B. Leukoplakia

Normally refers to a condition where areas of keratosis appear as firmly attached white patches on the mucous membranes of the oral cavity and which have a risk of malignant transformation (Neville BW et al., 2002)

C. Lichen Planus

Lichen planus (LP) is a chronic inflammatory disease of the skin and mucous membranes (Greenberg MS et al., 2008)

D. Meth mouth:

Methamphetamine abusers show bruxism, excessive tooth wear, xerostomia, and rampant caries (so-called meth mouth) (Morio KA et al., 2008): a condition described by patients as "blackened, stained, rotting, crumbling or falling apart" (Saini T et al., 2005).

Study Design

In Bangladesh there are no precise figures of the number of drug dependent people, but it is estimated that around 4.0 million people are dependent on some form of drugs, and the increasing trend among all kinds of people are alarming. Comparing to this situation there are still very few treatment and rehabilitation facilities in the country. However, the study populations of illicit drug abusers were enrolled from drug treatment and rehabilitation center admitted for treatment of drug dependence.

Identifying drug abusers in the population can be difficult with co-operation and compliance being additional problems. This is overcome by recruiting subjects from drug rehabilitation centers purposively.

This study was conducted from December 2016 to May 2017. The population of the study comprised drug abusers who are attending for treatment of drug dependence in rehabilitation centre. The inclusion criteria was persons who are/were using any illicit drugs and are presently undergoing treatment for drug dependence at a rehabilitation center were included in the study. Exclusion criteria were positive for HCV, HBV and HIV (exclude them by their previous record book); and dependent on tobacco and alcohol alone.

For the clinical examination, a modified WHO assessment form (1997) was used. A semi-structured questionnaire translated into Bengali language was administered. The questionnaire consisted of (1) socio-demographic factors (age, education, and occupation/profession); (2) history of drugs abused assessed were types of drug); (3) oral health habits (tooth brushing, other oral hygiene aids, and dental visits); (4) Open question- to assess their attitudes towards oral hygiene, dental treatment and overall health and (5) assessed prevalence of oro-dental diseases by the WHO Oral Health Assessment Form (1997) Modified. Data was collected in two ways using both a semi-structured questionnaire: The participants were interviewed about their age, level of education, occupation, history of drug uses, oral habits etc; and a data capture sheet for a Clinical oral examination using modified WHO Oral Health Assessment 1997 Guidelines. DMFT, periodontal disease and oral mucosal lesions were recorded.

The questionnaire was designed in English language, but translated to Bengali language. After the pilot study on 20 persons, the final questionnaire was used.

Data collection

Two plastic boxes with different colors for instruments were provided. One box was for transporting sterile instruments only and was sterilized if contaminated. A new set of sterile instruments was used for each subject.

Gloves were changed before the examination on every subject and facemasks were changed every hour. Used probes, mirrors, and other instruments were collected in a separate container and, cleaned, washed and autoclaved at the end of the working day. A clinical waste bag was utilized for the disposal of used gloves, facemask, wipes and clinical sheets.

The WHO Oral health survey guidelines and criteria (dmft/DMFT, CPITN) were used. The oral examination was carried out without prior cleaning or drying of the teeth, using a plane mirror and dental curved probe. No radiographic examinations were performed. The oral examinations were carried out in two different places, the referral clinics and ultrasound clinics.

Codes and criteria for Dentition status and treatment need-DMFT/dmft:

0 Sound crowns: A crown was recorded as sound if it showed no evidence of treated or untreated clinical caries. In addition, a crown with the following defects was also coded as sound: white or chalky spots, discolored or rough spots that were not soft to touch with the metal CPI probe, stained pits or fissures in the enamel that did not have visual signs of undermined enamel, or softening of the floor or walls detectable with CPI probe, dark, shiny, hard, pitted areas of enamel in a tooth showing signs of moderate to severe fluorosis, lesions that, on the basis of distribution or history, appeared to be due to abrasion.

1 Decayed crown: Caries was recorded as present when a lesion in a pit or fissure, or on a smooth tooth surface, had an unmistakable cavity, undermined enamel, or a detectable softened floor or wall. A tooth with a temporary filling, or one which is sealed (code 6) but also decayed was also included in this category. The CPI probe was used to confirm visual evidence of caries on the occlusal, buccal and lingual surfaces. Where any doubt existed, caries was not recorded as being present.

2 Filled crown, with decay: A crown was considered filled, with decay, if it had one or more permanent restorations and one or more areas that were decayed.

3 Filled crown, no decay: A crown was considered filled, without decay, when one or more permanent restorations were present and there was no caries anywhere on the crown. A tooth that has been crowned because of previous decay was recorded in this category. A tooth that had been crowned for other reasons (e.g. a bridge abutment), was coded as (7).

4 Missing tooth, as a result of caries: This code was used for teeth that had been extracted because of caries and was recorded under coronal status.

5 Tooth missing, for any other reason: This code was used for teeth judged to be absent congenitally, or extracted for orthodontic reasons, periodontal disease, trauma, etc.

6 Fissure sealant: This code was used for teeth in which a fissure sealant had been placed on the occlusal surface. If a tooth with sealant had decay it was coded as (1).

7 Bridge abutment, crown, and veneer: This code was used under coronal status to indicate that a tooth formed part of a fixed bridge i.e. is a bridge abutment. It was also used for crowns placed for reasons other than for caries and for veneers or laminate covering the labial surface of a tooth on which there was no evidence of caries or a

restoration. Missing teeth replaced by bridge pontics were coded 4 or 5 under coronal status.

8 Unerupted crowns: This code was used for a tooth space with an unerupted permanent tooth. Teeth scored as unerupted were excluded from all calculation concerning dental caries. This category does not include congenitally missing teeth, or teeth lost as a result of trauma, etc

9 Not recorded: This code was used for any tooth that could not be examined for any reason.

Periodontal status

The methods recommended by the World Health Organization (WHO) for recording of periodontal diseases have varied from Russell's periodontal index to the Community Periodontal Index of Treatment Need, CPITN/CPI (Page and Eke, 2007). The WHO introduced the CPI to provide profiles of the periodontal status of populations and to enable countries to plan prevention programs (Benigeri et al., 2000). The surveillance of oral health at country level depends mainly on the CPI data (Petersen and Ogawa, 2005). Periodontal status was assessed using a specially designed lightweight CPITN probe with a 0.5 mm ball tip with periodontal pockets were measured from the edge of the free gingival to the bottom of the pocket. Using the epidemiological part of the CPITN, the community periodontal index (CPI), (W.H.O: Oral Health Surveys, 1997) with the following ten index teeth were examined (17,16,11,26,27,47,46,31,36,37) and six sextant per individual, three indicators (gingival bleeding, calculus and periodontal pockets) of the periodontal status were used. The two molars in each sextant were paired for recording and, if one was missing, no replacement was used. Sextants with fewer than two teeth which were not indicated for extraction were excluded. If no index teeth or tooth was present in the sextant qualifying for the examination, all the remaining teeth in the sextant were examined and the highest score was recorded for the sextant.

Codes and criteria:

0 Healthy

1 Bleeding: observed, directly or by using a mouth mirror, after probing.

2 Calculus: detected during probing, but the entire black band on the probe visible.

3 Pocket 4-5mm: gingival margin within the black band on the probe.

4 Pocket 6mm or more: black band on the probe not visible.

X Excluded sextant: less than two teeth present

Scoring of oral health conditions

For the researcher's convenience the oral health status was classified in 4 categories 0=healthy, 1=mild, 2=moderate and 3 severe oral health conditions. The criteria which were evaluated in the proposed scoring were based on the status of the oral tissues in disease and health. The investigator rated the oral status of the subjects as follows:

Score **0** = If healthy dentition, no decayed, no missing and restored teeth, healthy periodontium and healthy oral mucosa.

Score **1** = If less than 25% decayed, missing and abrasion teeth, mild gingivitis mild periodontitis are present.

Score **2** = If more than 25% and less than 50% decayed, missing and abrasion teeth, moderate gingivitis and moderate periodontitis, xerostomia are present.

Score **3** = if more than 50% decayed, missing and abrasion teeth, severe gingivitis, severe periodontitis and oromucosal lesion are present

Oral mucosa Examination procedure

The oral mucosa and soft tissues in and around the mouth of all subjects were systematically examined. Any abnormalities in the oral mucosa or the gingival or any oral lesion were recorded on the data capture sheet. The examination was thorough and systematic and was performed in the following sequence:

- a) Labial mucosa and labial sulci (upper and lower).
- b) Labial part of the commissures and buccal mucosa (right and left)
- c) Tongue (dorsal and ventral surfaces, margins)
- d) Floor of the mouth
- e) Hard and soft palate
- f) Alveolar ridges/gingival (upper and lower)

Two mouth mirrors were used to retract the tissues. The following procedure was used and the following codes were used to record the absence, presence or suspected presence of the condition: The lips were examined with the mouth closed and open. The colour, texture and any surface abnormalities of the vermilion border were noted. The mandible vestibule was examined visually with the mouth partially opened. The colour and any swelling of the vestibular mucosa were observed. The maxillary vestibule and fraenum with mouth partially opened was examined. Using the plane mouth mirrors as retractors and the mouth wide open, the entire buccal mucosa extending from the commissures and back to the anterior tonsillar pillar was examined. Any changes in pigmentation, colour, texture and mobility of the mucosa were noted. Alveolar ridges were examined from all sides (buccally, palatally, lingually).

With tongue at rest and the mouth partially opened the dorsum of the tongue was inspected for any swelling, ulceration, coating or variation in colour or texture. The patient was then asked to protrude the tongue and the examiner noted any abnormality of mobility. The margins of the tongue were inspected with aid of mouth mirrors and then the ventral surface was observed. While the tongue was elevated, the floor of the mouth was inspected for swellings or any other abnormalities. With the mouth wide open and the subject's head tilted backwards, the base of the tongue was gently depressed. The hard palate was inspected first followed by the soft palate. Any mucosal or facial tissues that seemed to be abnormal, as well as the submandibular and cervical lymph nodes, were palpated.

Reliability

Only one person (Dr. Anower) collected the data and interviews, thereby ensuring standardization in the way the questions were asked and recorded. Descriptive statistics through SPSS were used to describe the demographic factors. Chi-square test used to determine correlation between the scale variables of the sample.

The sampling was only conducted in Dhaka. As oral health practice is related to education, it would be better if could be able to recruit drug abusers from both urban and rural areas. It could also be good to conducted a comparison study between drug abusers with non drug abusers.

Ethical considerations

Ethical clearance was taken from the appropriate authority and ethics were maintained strictly throughout the study. Ethical clearance was obtained from Ethics Review Committee of Bangladesh University of Health Sciences (BUHS). A request letter of cooperation written from the Bangladesh University of Health Sciences (BUHS) to the Drug Rehabilitation Center was taken that was involved in this study prior to the data collection period. All the participants were given an explanation about the objective of the study and their right to participate or not to participate in the study. An Information sheet for participants in Bengali was also given to each participant to read and it was also explained by the investigator. All questionnaires and ethical documents were translated into Bengali before interview. The prospective participants were given free opportunities to receive summary information of the study in writing before giving written consent and taking part in the interviews of the research. Personal information of the participants was keep confidential.

6. Results

6.1 Socio-demographic characteristics

Among the study subjects 13% were below 20 years, 43% were of 20 to 29 years, 18% were of 30 to 39 years and 26% were of above 40 years old. Among the subjects 91% were male and 9% were female. Most were married, 62% respondents were married and unmarried were 35%.

The levels of respondent's highest education was 20% both for higher secondary school and university graduation. This was closely followed by Primary level and high school level at around 19% and 14% respectively. However, nearly 27% of the respondents were illiterate.

Among the drug abusers 42% were unemployed either being students, lost their jobs or doing nothing, while 58.3% of drug abusers were employed, businessmen, service holder and self-employed, etc.

The monthly income of the 120 respondents found that about 42% respondents said that they have no income. 15% respondents earn below 5000 BDT per month, while around 43% of the respondents earn more than 5000 BDT per month.

Table 1: Distribution of the respondents by the types of drugs abused (N=120)

Type of drugs	Responses		% of Cases
	N	%	
Heroin	65	32.3%	55.1%
Injectable opioids	4	2.0%	3.4%
Methamphetamine (yaba)	36	17.9%	30.5%
Cannabis (Ganja)	51	25.4%	43.2%
Phensidyl	24	11.9%	20.3%
Total	201	100%	170%

*Multidrug abusers.

6.2. Pattern of drug abuse

Table 1 shows the distribution of the respondents by abuse of drugs. Almost all were poly-drug abusers, abusing more than one drug. However, the most commonly used category of drugs was heroin were 55% of cases and 32% responses. The second most abused drug was cannabis (ganja) were 43% of cases and 25% responses. Methamphetamines (yaba) were 31% of cases and 18% of responses. Alcohol and phensydil were 10% and 12% responses among the respondents.

The prevalence of opiate drugs heroin users was 54% and injectable opioids was 3.3%. 60% claimed to have taken cannabis or ganja, and also over half, 54%, Methamphetamine (yaba). 34% took Metham and 20% Phensy.

Table 2 shows 24% of the respondents are taking drugs for 10 years or above, around 19% for 5-10 years, around 45% taking drugs for 1-5 years. There were less in this sample who had used less than 6 months and 6months -1 year, 1.7% and 10% respectively.

Table 3: Distribution of respondents in relation with type of drugs regarding respondent's age (n=120)

*According to respondents' verbal statement, **yaba=Methamphetamine, ***ganja=Cannabis

Age group	Heroin	Injectable opioid	Yaba**	Ganja***	Phensydil
<20 years age(n=15, 12.7%)	5(4.2%)	0(0%)	5(4.2%)	8(6.8%)	2(1.7%)
20- 29 (n=49, 41.5%)	21(17.8%)	2(1.7%)	24(20.3)	21(17.8%)	7(5.9%)
30 -39 years (n=22, 18.6%)	15(12.7%)	1(.8%)	4(3.4%)	10(8.5%)	5(4.2%)
>40 years(n=32, 27.1%)	24(20.3%)	1(.8%)	3(2.5%)	12(10.2%)	10(8.5%)
Total	65(55.1%)	4(3.4%)	36(30.0%)	51(43.2%)	24(20.3%)

Table 5: Status of oral mucosa among the respondents

Status of the Oral Mucosa	Heroin	Injectable opioids	Yaba	Ganja	Phensydil
Xerostomia	9(10.7%)	-	13(15.5%)	4(4.8%)	2(2.4%)
Leukoplakia	7(8.3%)	2(2.4%)	-	7(8.3%)	3(3.6%)
Methmouth	7(8.3%)	-	7(8.3%)	-	-
Total	65	4	41	72	24

Table 7: Status of oral health condition according to duration of abuses of drugs

Oral health condition	Duration of abuses of drug				
	<6 month	6 month-1year	1-5 year	5-10 year	>10 year
Healthy	1(.8%)	8(6.7%)	8(6.7%)	3(2.5%)	3(2.5%)
Mild	1(.8%)	4(3.3%)	32(26.7%)	9(7.5%)	3(2.5%)
Moderate	-	-	14(11.7%)	11(9.2%)	14(11.7%)
Severe	-	-	-	-	9(7.5%)
Total	2(.8%)	12(10.0%)	54(45%)	23(19.2%)	29(24.2%)

Table 8: Associated determinants among subjects according to Oral Health Condition

(n=120) Variables	Healthy	Mild/Moderate	Severe	Chi value	p-value
Age					
<25 years (n=51)	10 (19.6%)	41 (80.4%)	0 (0%)	7.26	0.026
≥25 years (n=59)	13 (18.8%)	47 (68.1%)	9 (13%)		
Sex					
Male (n=109)	19 (17.4%)	81 (74.3%)	9 (8.3)	2.93	0.231
Female (n=11)	4 (36.4%)	7 (74.3%)	0 (0%)		
Marital status					
Unmarried (n=74)	14 (18.9%)	58(78.4%)	2(2.7%)	6.6	.037
Married (n=46)	19.6 (9%)	30 (65.2%)	7 (15.2%)		
Educational level					
Illiterate (n=32)	5 (20.8%)	16 (66.7%)	5 (15.6%)	9.25	0.160
Primary to Secondary School (n=40)	7 (17.5%)	32 (80.0%)	1 (2.5%)		
Higher School (n=24)	7 (29.2%)	17 (70.8%)	0 (0%)		
Graduation plus (n=24)	5 (20.8%)	16 (66.7%)	3 (7.5)		
Occupation					
Unemployment (n=50)	12 (24.0%)	32 (64.0%)	6 (12.0%)	4.377	.112
Employment (n=70)	11 (15.7%)	80 (56%)	3 (4.3%)		
Income status (BDT)					
No income (n=50)	12 (24%)	32 (64.0%)	6 (12.0%)	7.010	0.135
Up to 5000 (n=18)	5 (27.8%)	13 (72.2%)	0 (0%)		
More than 5000 (n=52)	6 (11.5%)	43 (82.7%)	3 (5.8%)		
Heroin					
Non-user (n= 55)	10 (18.2%)	45 (81.8%)	0 (0%)	8.66	.013
User (n= 65)	13 (20.0%)	43 (66.2%)	9 (13.8%)		
Methamphetamine (yaba)					
Non-user (n=84)	13 (15.7%)	62 (73.8%)	9 (10.7%)	5.855	.054
User (n=36)	10 (27.8%)	26 (72.2%)	0 (0%)		
Cannabis (Ganja)					
Non-user (n=69)	22 (31.9%)	38 (55.1%)	9 (13.0%)	27.734	.000
User (n=51)	1 (2.0%)	50 (98.0%)	0 (0%)		
Duration of abuses of drugs					
Up to 5 years	17 (25.0%)	51 (75.0%)	0 (0%)	14.6	.001
More than 5 year	6 (11.5%)	37 (71.2%)	9 (17.3%)		
Oral Hygiene Practices (Brushing frequency)					
Two time a day (n=27)	7 (25.9%)	20 (74.1%)	0 (0%)	3.44	.179
Not two times a day (n=93)	16 (17.21%)	68 (73.1%)	9 (9.7%)		

Table 3 shows that 20 to 29 year aged respondents have a high percentage (42%) of drug abuse. Among 55% of heroin abusers, 20% were

above 40 years of age, 18% were aged between 20 to 29 years, 15% respondents were 30 to 39 year old and only 4% respondents were below 20 years.

Table 2: Distribution of the respondents by duration of abused of drugs

Time by years	Frequency	Percent
Less than 6 months	2	1.7
6 months to 1 year	12	10
1 year to 5 year	54	45
5 year to 10 year	23	19.2
More than 10 year	29	24.2
Total	120	100

Among 43% of cannabis (ganja) abusers 18% respondents were 20-29 years old, 10% respondents were above 40 years, 9% respondents were 30-39 year and 7% respondents were below 20 years old. On the other hand among 30% of yaba (methamphetamine) users, 20% were 20-29 years.

Table 4: Oral Health Behavior

Variables	Percentage
Brushing frequency	
Once/three/more than three times a day (Incorrect method)	77.5%
Twice a day (Correct method)	22.5%
Schedule of cleaning teeth	
Before breakfast/After every meal (Incorrect method)	76.7%
After breakfast and before sleep at night (Correct method)	23.3%
Materials used for cleaning teeth	
Tooth powder/charcoal	18.3%
Tooth brush / past	81.7%
Use of mouth washes	
Never	74%
Occasionally	16%
Once a day	10%
Twice a day	-
Use of floss	
Never	92%
Occasionally	8%
Once a day	-
Twice a day	-
Time of last dental visit	
Visited in last six months	4%
Visited previous year	37%
Factor determine the frequency of visiting dentist	
Money and Bad Experience	25%
Money and fear	32%
Ignorance	48%

6.3. Oral hygiene practices among illicit drug abusers

Table 4 describes the pattern of oral hygiene practices among the illicit drug abusers. Regarding brushing frequency, 78% of the respondents didn't brush their teeth regularly i.e. Once/three/more than three times a day and only 22% respondents brushed their teeth in a standardized method that is twice a day. Around 23% of the respondents' schedule of brushing their teeth in the right way (after breakfast and before sleep at night) and 77% of the respondents schedule was wrong (before breakfast/ after every meal). Most of the

participants 74% never used floss to clean their teeth. Only 4% of the participants visited dentist within last six months.

6.4 Attitudes towards oral health related practices

Most of the participants explained that they neglected their oral and personal hygiene because of low self-esteem, for example: "I didn't know so much about Oral hygiene and I didn't care about myself at al." (Jashim, 12/1/2017)

Those who reported brushing their teeth said they would 'do it really quick, in less than a minute'. Sometimes putting the brush in the mouth would cause the drug user to 'start heaving and feeling sick'. Only the few who were quite determined attempted to try again once they 'stop heaving'. Many participants avoided dentists until the pain became impossible to control. Most had self-medicated for pain (especially dental pain). They would take extra drugs for severe toothache including ibuprofen, heroin and cocaine; in some cases injected directly into a tooth or gums. Some participants had even removed teeth themselves in this way.

Because of previous treatment experience, intensity of drug use and inability to keep appointments, many respondents are not visiting Dentist. Several described negative experiences and were 'petrified' of dentists. Some even reported getting up from the dental chair and running away because they could not accept treatment. One particular fear among participants was needle phobia, e.g.: "I didn't like it, especially that big needle they put in your mouth. I hate it" (Yasin, 15/1/17)

Drug-using lifestyle, fear (needle phobia), money, acceptance by dentist, waiting in dental chamber and low self-esteem acts as a barriers and prevent them from visiting Dentist. Most of the respondents expected more care about their oral health as well general health and it will be free of cost.

6.5 Oral conditions due to drug abuse

The 120 persons were examined by a dental specialist. All respondents have carious teeth and 41% had fractured or broken teeth. Periodontal health status was also not good. Calculus was present in 46% of participants, 68% had bleeding on probing, 57% had shallow periodontal pocket and 12% had deep periodontal pockets. 65% respondents (N=78) had healthy oral mucosa. The rest of the respondents have unhealthy oral mucosa. 18% had xerostomia (dry mouth - loss of salivation), 8.3% had leukoplakia (a white patches on oral mucosa called pre cancerous lesion) and 8.3% had a methmouth lesion (bruxism, excessive tooth wear, xerostomia, and rampant caries).

Table 5 shows that Xerostomia was observed in 15.5% abusing yaba, 8.3% alcohol, 10.7% heroin

and only 2.4% phensydil abusers. Leukoplakia lesions 8.3% present in both heroin and ganja abusers. Methmouth lesion were 8.3% present in both heroin and yaba abusers.

Table 6: Dentition status measured by DMFT index

DMFT	Mean \pm SD	Median (Range)
DMFT	5 \pm 2.29	5 (1-10)
Decayed teeth	3.4 \pm 1.8	3 (0-7)
Missing teeth	1.29 \pm 1.7	1 (0-6)
Filled teeth	0.3 \pm 0.7	0.0 (0-4)

DMFT= Decayed, missing and filled teeth, SD = Standard deviation from mean.

Table 6 shows the DMFT (decayed, missing and filled teeth) score of the respondents' dentition. Almost all of the respondents have high DMFT score with mean \pm sd was 5 \pm 2.29. Among drug abusers, all teeth were examined, it was observed that the mean number of decayed teeth was 3.4 with sd 1.8; missing teeth was 1.29 with sd 1.7; and filled teeth was 0.3 with sd 0.7.

For our convenience we have classified the oral health status in 4 categories: healthy, mild, moderate and severe condition of oral health based on the status of the oral tissues in disease and health. 19% had healthy oral condition, 41% mild, 33% moderate and 7.5% had severely bad oral conditions.

Table 7 shows the oral health condition in respect to duration of drug abuse. Severely bad oral health condition (7.5%) observed after above 10 years of drug abuse. Moderate oral health was seen in 12% in 1 to 5 years and observed in 9% after 5-10 years of drug abuse. Mild oral health observed after 6 months of drug abuse.

6.6. Inferential statistics

The relationship between different independent variables (age, sex, marital status, and level of education, occupation, income, type of drugs and duration of abuse of drug) was examined. Chi squared test was applied wherever applicable. Significant relationship was found in case of age group, marital status, type of drugs [in case heroin, yaba and cannabis (ganja)] abuse and duration of abuse of drugs (Table 8). χ^2 -test was used. The level of significance at $p < 0.005$

7. Poor Oral Health

In this study we have noticed that, the oral hygiene practice of drug abusers was not ideal and as a consequence they have poor oral hygiene and worse gingival, periodontal and mucosal health; higher caries experience; and higher prevalence of xerostomia, meth mouth and leukoplakia. It may be

stated that poor oral hygiene and poor dental health status among addicts compared to the general population may be attributed due to the direct effects of drug abuse as well as the indirect effects of addiction such as unhealthy lifestyles and poor oral self care.

The sample size of this study was determined using prevalence of dental diseases in drug users reported in a previous study (Rooban et al., 2008) and consecutive sampling was used. This method of sampling, though a non-probability sampling technique, allows every available subject to be included (Lunsford and Lunsford, 1995). The sample in this study represents a young and predominantly male population which reflects the demography of those in drug rehabilitation programs (Cheung Y Wet et al., 1999). The fact that on average the participants of this study began abusing drugs at 19 years of age confirms that drug abuse is a problem which begins in teenage years (United Nations Office on Drugs and Crime. World Drug Report 2000).

The major drugs used were heroin (opioids), cannabis (ganja) and amphetamine-type stimulants rather than cocaine or other in Bangladesh. The most commonly used category of drugs was heroin were 55% and second most abused drug was cannabis (ganja) were 43% and methamphetamines (yaba) were 31% among the respondents. Ray (2004) found alcohol, cannabis, heroin and opium were the common drugs of abuse for target communities in various parts of India which is almost a similar pattern of drug abuse in our study.

The present study found poor oral health status and negligence for oral hygiene practices among drug addicts. Oral hygiene practices of the drug users were alarming with more than three-quarter of the respondents (78%) cleaning their teeth in a wrong way. Poor oral hygiene practices may be due to the lack of concern for overall personal hygiene, resulting from drug dependents, consumption and withdrawal (DSM-IV criteria: Jaffe, 2000). 74% of the respondents had never used moth washes and 92% had no idea about dental floss.

Consciousness about oral and general health was poor and only 4% respondents said that they had visited a dentist in the past 6 months. Schedule of dental check-up was also poor, only 37% respondents visiting to a dentist once in a year. Ignorance (48%), money-fear (32%) and money-bad experience (25%) are the main obstacle for the respondents to visit a dentist. Use of dental services was inhibited by low priority for oral health, low self esteem, addiction state, needle phobia, ability to self-medicate and organizational factors in their lifestyles. Most of the participants told, reason for dental visit was their broken tooth. Similarly,

(Robbinson) reported that a number of participants said that they frequently ended up in hospital casualty departments because of accidents.

Analysis of the individual components of mean DMFT value showed that the mean number of decayed teeth (3.98, sd 2.5 and range 0-10) constituted the major part of the index, indicating high caries prevalence among the drug users. Significantly lower numbers of filled teeth (mean 0.5) was recorded amongst drug users, suggesting that drug abusers rarely received comprehensive dental care.

This indicates that in addition to poor oral health and corresponding needs, they have difficulty in accessing dental services. Concerned administration of rehabilitation center and NGOs should be given more importance on accessing more dental services of drug users. Also, symptoms of caries may be masked by pharmacological effects of drugs and in case of severe pain these subjects may self-medicate (Robinson et al., 2005).

The periodontal status of the drug users was found to be poor and only 11% found healthy periodontium. Previous studies (Du et al., 2001; Scheutz, 1984) have also reported poor periodontal health among drug users. Analysis of community periodontal index (CPI) of treatment needs indicates that majority of the drug users have bleeding pocket (68%) and 57% of the respondents had shallow pocket (4-5mm) and they need professional plaque control (scaling and polishing). 12% drug users need deep scaling, root planning and surgical procedure. This may be attributed to their poor oral hygiene and concomitant heavy use of tobacco. Further, addictive drugs, particularly opiates have been found to impair cell division, thereby tilting the balance towards breakdown of tissue and failure to achieve repair and regeneration (Reece, 2007).

The results also showed that 49% had mild oral health condition, 33% moderate oral health condition and 8% had severely bad oral health condition. 35% respondents had unhealthy oral mucosa. Around 18% have xerostomia, 8% have leukoplakia (pre cancerous lesion) and 8% have methmouth lesion. Chi squared test was applied wherever applicable. Significant relationship (at the level of significance at $p < 0.005$) was found in case of age group, marital status, type of drugs [in case heroin, yaba and cannabis (ganja)] abuse and duration of abuse of drugs.

The findings of this study reflect the oral health status of disadvantaged group of drug abusers in selected center. Bangladesh is a nation with diverse socio-cultural and regional variations. Therefore, further comprehensive study comprising a big population is recommended to get a clearer picture of drug abuser. The possibility of social desirability

bias while answering the questions on drug use and oral health practices cannot be ruled out due to interview based administration of the questionnaire; however, measures were taken to reduce the bias.

Like other epidemiologic field studies, this study did not include radiographs as part of the clinical dental examination because of common ethical and logistical constraints. This approach may underestimate the prevalence and severity of dental caries and periodontal disease.

In conclusion, the findings suggest that illicit drug use is independently associated with poor periodontal health. It can be inferred that it is not only the direct effect of the illicit drugs, but also the indirect influence of factors such as associated low socioeconomic status and lifestyle pattern that contributes to poor oral health in this disadvantaged group.

8. Drivers of Drug Abuse

Family problems could be a very critical factor for abusing drugs. An absent father or mother is most likely to produce an addict child. It is very difficult to maintain discipline in a family without parents. Moreover, lack of bonding between parent & child drive someone for drugs. Participants also described lack of self-esteem and peer pressure also drove them to a drugs addict. They feel something is wrong with them. They feel guilty and responsible for their parents' problems. Some of the participants described they addicts due to curiosity and experiment with their friends. Parents of few participants have a history of drug addict. Parental drug use could be a risk factor of drug addicts. Cultural influence like TV ads also influenced them to a drug.

9. Steps to Addiction

Participants reported that firstly they took drugs as an experiment. The most common drug used was cigarettes and alcohol. They trust the drug will make them feel better. Then they started use occasionally, just on the weekends. Next they took regularly, almost every day of the week. All activities revolve around drugs and friends who use drugs. Harmful dependence developed to use the drug to get high. Finally they took daily and usually all day long. The user has to take the drug to feel normal. The brain chemistry has changed to the drug is part of the normal function of the brain. If the drug is stopped, withdrawal sets in.

10. Socio-demographic features of the respondents

The sample in this study represents a few young teenagers, with 43% of 20 to 29 years, 18% of 30 to 39 years old, and predominantly a male population which reflects the demographics of those in drug

rehabilitation programmes (Cheung et al; 1999). The fact that on average the participants began abusing drugs at 21 years of age confirms that drug abuse is a problem which begins in teenage years (United Nations Office on Drugs and Crime (World Drug Report 2000).

The socioeconomic status was found poor among the drug abusers. Almost half of the respondents (42%) have no income, depended on family and 15% of respondent's income was below 5000 Taka. Frequent unemployment and economic difficulties are well recognized consequences of drug dependence (Hanson *et al.*, 2005; Ray, 2004), this may could moral deterioration of the drug abusers. To obtain money for the drug the addict often turns to crime and increased many social problems in our country like crime in the form of drug trafficking, theft and prostitution.

Drug abuse has a major medical problem with extensive legal, social and even political problems. A person made tolerant to a large dose of one narcotic is also cross-tolerant to many of the effects of another narcotic. Indiscriminate use of any of these drugs becomes dangerous and produces a gradual mental, physical and moral deterioration of the individual and sometimes also sexual perversions or crime. To get money for drugs the addict often turns to prostitution or crime. The majority of drug victims are neurotic individuals who are mentally unbalanced.

11. Responsibilities of the government

Government and NGOs can play a great role in this regard. They need to invest in education, research and prevention programs for those at high risk of substance abuse and the public in general. They should also encourage the use of treatment facilities that really work. By effectively treating those with addictions and working harder to prevent new people from abusing drugs or alcohol, we will be really dealing with the problem of substance abuse.

12. Conclusions

Drug abuse is a major cause of multiple physical and mental problems such as cardiac crisis, respiratory depression, liver cirrhosis, nephropathy, infectious diseases such as hepatitis, AIDS, and tuberculosis, injury-associated disability, mental disorders such as depression, and oral health problems. The number of drug abusers in Asia is sharply rising. The incidence of addiction to certain drugs in Bangladesh is alarming particularly amongst young people in our country.

In this study most of the participants could not complete their education. Most of the participants were in the low income group. Study showed that majority of the respondents were addicted to heroin, cannabis (ganja) and/or yaba for a long

time. We have also noticed that the majority of the respondents did not maintain their oral health practice properly. Teeth cleaning practice showed that all respondents cleaned their teeth once in a day, which is not a healthy practice. For getting maximum benefit by oral hygiene practice one should brush his teeth twice daily with a tooth brush and tooth paste. Regular use of mouth wash and dental floss will give extra protection for oral health. However, this study described that drug abusers oral condition was not healthy.

Based on findings from this study we can conclude that drug abusers had inferior oral hygiene practices and as a consequence poorer oral hygiene and worse gingival, periodontal and mucosal health; higher caries experience; and higher prevalence of xerostomia, meth mouth and leukoplakia. A large proportion of oral diseases may be preventable among drug abusers through proper prevention and rehabilitation of oral health and also cessation of drugs among them. The changing attitude can be occurred by giving adequate information and motivation to the respondents. So dental health and public health education is needed focusing on special needs of population to improve their quality of life expectancy

12. Recommendations

If we really want people to stop abusing drugs, we need to know why people are taking drugs and how it happens. Considering the causes discussed above and findings of this study, the following recommendation are made for prevention of drug abuse.

- Research should be continued on the factors which influence drug abuse and further exploration is needed with a large scale community based study to find out the prevalence, knowledge and attitudes regarding drugs abused related oral health problem.
- Oral health service should be introduced in every rehabilitation center to the oral self care practice, rapid diagnosis and treatment of oral disease among the drug abusers.
- Rules and regulation should be strict to prevent the transport and sales of drugs in our country.
- Proper educational programmed should be arranged among the workers of rehabilitation center to educate the drug abusers about oral health.
- We should train parents, teacher, imams (religious leaders) and community leaders about the harmful effects of drugs and also proper oral hygiene so that they can build awareness to the community people through dissemination information and motivate the people to give up drugs addiction.

- These findings should be used as a baseline to increase focus on oral health promotion strategies for drug addiction populations by formulating public health programs stressing on primary and secondary care for prevention and early treatment of oral disease.
- Every dental professional should be aware of oral problems associated with drug abused and strongly motivate their patients by drugs cessation counseling to quit drugs using and the dentist may take an active role in drugs prevention counseling.

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