

Knowledge, Attitude and Practice of Organ Donation Among Clinical Medicine Students, Mount Kenya University, Kenya: A Cross-Sectional Study

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Abstract

Background: Organ donations can save or prolong life. Clinicians play a key role in promoting organ donation and transplant; hence, their knowledge may have positive effect on organ donation. The aim of this study was to assess the knowledge, attitude and practices about organ donation among students undertaking training in Clinical Medicine and Community health at Mount Kenya University, Kenya.

Methods: A cross-sectional descriptive survey among students undertaking an undergraduate course in Clinical Medicine at Mount Kenya University using a pre-tested questionnaire conducted between January and April 2017. The study used purposive sampling methodology of the students.

Results: Seventy-six participants, mean (sd) age of 22 (2.1) years and thirty-nine (51%) females were recruited. Only 3 (4.0%, 95% CI 0.8 to 11%) students had ever made a donation, all of them blood donation. Although sixty-seven (88%) of the study participants had heard the term organ donation only 15 (20%) of them knew someone who had donated organ. The most common source of information about organ donation was from internet/online according to thirty-three participants (43%). Seventy-one (93%) of the participants reported that organ donation was for saving life and fifty-eight (84%) were aware that organ donation involved risk and that the most important risk was infection. Only 4% were aware of local legislation guiding organ donation and transplantation in Kenya while 53% unaware. Forty-nine of the participants 64% agreed that they would receive organ for transplantation. Of the participants, thirty-nine (51%) considered 'health status of the recipient' as the main factor of the greatest importance when donating organ. Forty-three (57%) and forty-nine (64%) of the participants reported the donor and family member should consent for living donation and after death respectively. Thirty-one (41%) and twenty-six (34%) of the respondents think medical doctors and judges should make decisions about organ donation for unclaimed dead bodies respectively.

Conclusion: Clinical medicine students have significant gaps in knowledge regarding the organ donation and transplantation. There is a low rate of donation even for blood despite the awareness of the need to save lives and therefore need to increase awareness on importance and promote laws to govern organ donation.

Addressing these gaps would provide valuable insights to guide education, policy, and advocacy strategies aimed at improving organ donation practices in Kenya.

Keywords: Organ Donation; Clinical Medicine; Students; Knowledge; Attitude; Practice; Health Belief Model; Kenya

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Background

An organ transplant may save a person's life or significantly improve their health and quality of life. Despite increasing organ for transplantation demands due to lifestyle factors adding to the burden of illness, aging populations, globalization and medical skills transfer, the percentage of organ donation globally is still very low [1]. In the third World Health Organization (WHO) global consultation forum on organ donation and transplantation, there was an emphasis on the need for countries to be self-sufficient by trying to get donations

from within the populations [2, 3]. Organ donation has been defined as giving an organ or part of an organ to be transplanted into another person [3], while transplantation is the transfer (engraftment) of human cells, tissues or organs from a donor to recipient with an aim of restoring function(s) in the body [4, 5].

Organ donation can be from living and deceased donors [3, 4]. A living donor is a person who is alive and decides to donate an organ voluntarily for the purpose of transplantation while a deceased donor is a person confirmed dead through established medical criteria, whose tissues and/or organs are procured for transplantation [3]. Living donors can donate organs such as kidneys and livers. On the other hand, organs such as the heart, pancreas or a cornea tissue for transplantation would need to be procured from a deceased donor [4].

With the increase in non-communicable diseases, more and more patients might be in need of organ transplantation to improve their quality of life or save lives. For instance, the prevalence of end stage renal disease (ESRD) in developing countries is on the increase which could be attributed to the growing incidence of risk factors for Chronic Kidney Disease (CKD) namely diabetes mellitus, hypertension, HIV and chronic glomerulonephritis among others [7, 8].

There is a scarcity of donated organs worldwide. According to the Global Observatory on Donation and Transplantation (GODT) only less than 10% of the actual organ transplantations demand are conducted worldwide each year [9] which is worse in the developing countries. In Africa, which accounts for 16% of the world's population of organ needs, only 0.5% of organ transplants are performed [10]. In Kenya, the scarcity has contributed to long waiting periods for the patients in need of transplantation with some losing life before a donor is found [11]. The same has also been reported for organs that can only be procured from deceased donors like the cornea. An estimated 12.7 million people worldwide are in need of corneal transplantation, but only one cornea is available for every 70 people [12]. Although the country has established an eye bank to cater for those willing to donate their cornea tissue after death, few Kenyans are willing to donate their eyes. The supply-demand imbalance of cornea tissue imbalance in Kenya causes long waiting lists. Of the estimated 200 corneal transplants done in Kenya, almost all of them come from outside the country [13]. There is a dire need to create awareness among the public as well as the health care professionals (HCPs) including the medical students, who are a key element of the organ donation process [14, 15, 16].

The attitude towards organ donation is an important part of the process of decision-making. Studies have shown that poor attitudes and lack of knowledge among health care workers is a major barrier to organ donation [17, 18]. The studies on students' knowledge and attitudes of students taking health related undergraduate courses toward organ donation are virtually absent in Kenya. While some of these studies reported that students do not have positive attitudes [14,18] others have reported very positive results. For instance, in a prospective survey of medical students in Padua, Italy it was found that 91% of the students had a very positive attitude towards organ donation and transplantation [19].

Understanding the attitudes of health care professionals and trainees in health-related courses is of great importance because insufficient knowledge on organ donation has been cited as an important contributing factor responsible for the shortage of donated organs [14, 15, 17, 20]. Lima and colleagues (2010) [16] have argued that it is important for the undergraduate medical and dental curriculum to provide students with basic information on procedures and ethical issues concerning organ transplantation and donation, so that as future practitioners they can become informed advocates of organ donation. In this study, we therefore aimed to assess the knowledge, attitude and practices about organ donation among students undertaking training in Clinical Medicine at Mount Kenya University, Kenya.

Theoretical framework

The study used the Health Belief Model (HBM) which posits that an individual's engagement in a health-related behavior is influenced by personal beliefs or perceptions about a disease or health condition and the perceived benefits and barriers to taking action [21]. The HBM of perceived susceptibility, severity, barriers, and benefits of organ donation need to be effectively to the clinical medicine students and the public to foster organ donation. The HBM framework provided guidance to understand the individual's beliefs, knowledge, attitudes, and behaviours as determinants of willingness to become an organ donor. It thus helped to explain why some health-related students are willing/unwilling to donate organs, and identify the beliefs held by the students that need to be addressed.

Problem statement

The percentage of Kenyans donating organs is low leading to long waiting periods for the patients before an organ is donated and some losing life before a transplant is done. There is a dire need to create awareness among the public as well as the health care professionals (HCPs) including the medical students, who are a key element of the organ donation process.

Clinical medicine students, are future health professionals who will be expected to play a key role in patient education and advocacy. Improving their knowledge and awareness about the organ donation and transplantation ensures that these future clinicians are well-grounded to discuss organ donation with patients, families, and communities.

However, there is limited empirical data assessing the level of knowledge and attitudes of students in health-related courses toward organ donation and transplantation. Secondly, the determinants influencing students' attitudes and willingness to donate organs remain poorly understood, particularly the role of sociodemographic, cultural, religious, and educational factors.

Understanding the attitudes of health care specialists, trainees in health-related courses is of great importance because insufficient knowledge and failure to identify possible donors has been cited as an important contributing factor responsible for the shortage of donated organs.

Methods

Study Setting

This study was conducted at Mount Kenya University, Kiambu County, in Central Kenya region between January and April 2017. Mount Kenya University is a private University offering several degree programmes at both Undergraduate and Post graduate levels among them Clinical Medicine. The Bachelor of Science in Clinical Medicine and Community Health is a 4-year undergraduate course comprising of both preclinical basic science courses and clinical units. The graduates work in the government, private sectors, non- governmental organizations, training institutions as Clinical Officers.

Study Design

This was a descriptive cross-sectional design. The inclusion criteria was all undergraduate students from first year to fourth year undertaking the Bachelor of Science in Clinical Medicine and Community health.

Study population

A cross-sectional descriptive survey was conducted among the 1st to 4th year undergraduate students undertaking Bachelor of Science in Clinical Medicine and Community health in 2017 at Mount Kenya University, in Thika, Kenya. The study conducted using convenient sampling.

Sampling technique

The participants were sampled using convenience sampling method. However, we contacted all the eligible students undertaking the degree in Clinical Medicine and Community health, and 76 students agreed to participate in the study and completed the questionnaire. An informed consent was voluntarily obtained from each participant.

Data collection

The self-administered questionnaires were filled by students who consented from years 1- 4 of study (n=76). The structured questionnaire captured socio-demographic characteristics of the study participants as well as other variables on knowledge and attitudes regarding organ donation such as the process of donating organs, organs that can be donated and the legislation governing organ donation, whether people should be buried with their organs were used to collect quantitative data (**Supplementary appendix**). The tool was pretested before administration and adjustments made where possible. The study involved purposive sampling methodology of

the students undertaking an undergraduate course in Clinical Medicine and Community health at Mount Kenya University.

Study sample size

With a fixed population of 95 students enrolled for bachelor of Science in Clinical Medicine and Community health, a proportion of 36% knowledge [15] of organ donation among Clinical medical students, desired precision of 0.05 and a two-tailed alpha of 0.05, a sample size of 75 students was required [16].

Statistical analysis

Data was entered into Epidata database. All statistical analysis was conducted using Stata version 15.1 (StataCorp, College Station, TX, USA). Participants' age was reported as mean and standard deviation. Since all other variables were categorical, we computed proportions and percentages. The proportion of participants reporting to have donated organ was reported including binomial exact 95% confidence intervals. Distribution of categorical variables between participants who had ever and those who had never donated organs were compared using chi-square and P values < 0.05 were considered significant.

Results

Seventy-six participants were recruited. Their mean age (sd) was twenty-two (2.1) years and thirty-nine (51%) were female. First, second, third and fourth years provided fifteen (20%), eleven (14%), twenty-six (34%) and twenty-four (32%) respectively. Sixty-eight (90%) of the participants were Christian (**Table 1**).

Table 1. Study participants' characteristics.

Variable	Study participants (N=76)
Age in years, mean \pm sd	22 \pm 2.1
Sex	
Male	37 (49)
Female	39 (51)
Year of study	
First year	15 (20)
Second year	11 (14)
Third year	26 (34)
Fourth year	24 (32)
Religion	
Christian	68 (90)
Islam	7 (9.2)
Others	1 (1.3)

Who donated organ?

Of the seventy-six participants, only three (4.0%, 95% CI 0.8 to 11%) had ever donated organ. All these three participants had donated blood. Two had donated to save life while the remaining one had donated for charity. All the three participants reported no side effect attributable to organ donation. Two out of the three donors were males while one was a female with no significance difference between gender (P=0.61). The 3 participants who had ever donated organ had mean (sd) age of 21 (2.0) years which was not different from those who had never donated organ; mean (sd) 22 (2.1), (P=0.44). Among the three participants who donated organ, one was a first year, one a second year and one a third year.

Participants' knowledge of organ donation.

Sixty-seven (88%) of the study participants had ever heard the term organ donation while seventy-two (96%) reported to have heard the term organ transplantation. These results are comparable to other studies done in India [22] and Ethiopia [17]. Despite the high percentage of the participants having heard about transplantation, only 20% of knew someone who had donated organ. Of these fifteen participants, 33% were family members, 40% were friends and 27% were neighbours. Majority of the participants; 68% reported organ donation meant removal of tissues of human body for purpose of transplantation to another person. The most common source of information about organ donation was from internet/online; 43% followed by doctors; 42% while radio; 12% was the least source of information. Majority (93%) of the participants reported that organ donation was done to save someone's life and the respondents were able to list the organs that can be donated. Eighty-four percent of the participants were aware that organ donation involved risk and the most important risk was infection; 41%). More than half of the participants (53%) were not aware of any local or international organ donation legislation and therefore 79% respondents supported the need for effective legislation (**Table 2**).

Table 2. Participants' knowledge of organ donation.

Variable	Study participants (N=76)
Ever heard of the term organ donation-Yes	67 (88)
Heard of the term organ transplantation-Yes	72 (96)
Knows anyone who has donated an organ-Yes	15 (20)
If knows who has donated organ	
Family	5 (33)
Friend	6 (40)
Other (neighbour)	4 (27)
What does the term 'Organ donation' mean?	
Removal of tissues of human body from a cadaver	1 (1.3)
Removal of tissues of human body from living donor	6 (7.9)
Removal of tissues of human body for purpose of transplantation to another person	52 (68)
Can include transfer of cell/ova/foetus/sperm	2 (2.6)
All of the above	6 (7.9)
Source of organ donation information	
From doctor	32 (42)
Internet/online resources	33 (43)
TV	29 (38)
Radio	9 (12)
Newspaper/magazines	23 (30)
Friend or colleague	24 (32)
Why is organ donation done?	
To save someone's life	71 (93)
Out of compassion/sympathy	1 (1.3)
What organs can be donated?	
Kidney	44 (58)
Blood	29 (38)
Heart	24 (32)
Eye	23 (30)
Liver	18 (24)
Skin	8 (11)
Bone marrow	24 (32)
Lungs	3 (4.0)
Organ donation involve any risks	58 (84)
Which risk is the most important in organ donation?	
Infection	24 (41)
Bodily weakness	14 (24)
Anxiety and depression	6 (10)

Pain	5 (8.6)
Bleeding	6 (10)
All of the above	19 (33)
Aware of any local or international organ donation legislation	
Local legislation	3 (4.0)
International legislation	9 (12)
Both of the above	13 (17)
None of the above	40 (53)
Need to have effective organ donation legislation	60 (79)

Attitude and practices regarding organ donation

Thirty-five (46%) and forty-nine (64%) participants agreed or strongly agreed that they would donate organ and receive organ for transplantation respectively. The expression of willingness to donate or receive organ transplant, however, does not necessarily translate into action. In our study, only three (4.0%, 95% CI 0.8 to 11%) had ever donated, in this case blood. This has also been reported by Chung et al. [23] who found a huge discrepancy between attitude and action, with a very small number of participants willing to donate actually going ahead to donate when called to.

Majority of the respondents agreed that a body should be buried with all the organs and feared for their health if they donated organs. However, very few agreed that their family and religion does not agree with organ donation (Table 3).

Table 3. Participants' attitude towards organ donation.

Variable	Disagree	Neutral	Agree
Would you donate an organ for transplantation?	9 (12)	27 (36)	35 (46)
Would you receive an organ for transplantation?	4 (5.3)	17 (22)	49 (64)
Should a body be buried with all the organs intact?	12 (16)	28 (37)	30 (39)
I fear that my if I donate my organs, my health will be affected	27 (36)	15 (20)	29 (38)
My family does not agree with organ donation	25 (33)	30 (40)	15 (20)
My religion does not agree with organ donation	41 (54)	20 (26)	11(14)

The participants were also asked about their willingness to donate and receive organs. Although there were many undecided participants, they were regarded as not willing to donate now. Ethnicity and religion did not influence an individual's decision to donate his/her organs, which suggested that the decision was a personal one. There was no association between age group and willingness to donate a kidney to a relative, although younger respondents were willing to donate kidneys as living donors. Knowledge about organ donation was seen as a strong predictor of the attitudes towards organ donation. . A correlation of the willingness to donate organs with the year of study and religion found a significant association (P= 0.001, P=0.022 respectively). However, there was no significant relationship between the willingness to donate and gender of the participants (P= 0.09). There was also no significant differences between year of study, religion and gender when the question "*Should the body be buried with organs intact*" was asked. The cultural background of the participants probably influenced this.

Forty-four participants (58%) reported that their religion allowed organ donation. A majority of the respondents

also admitted that donated organs could be misused, abused or misappropriated. The main factor considered of the greatest importance when donating organ was 'health status of the recipient' of the participants, thirty-nine (51%). Forty-three (56.6%) and forty-nine (64%) respondents reported that donor and family should be the one to give consent for a living donation and donation after death respectively. Thirty-one (41%) and twenty-six (34%) of the respondents thinks medical doctors and judges should make decisions about organ donation in case of unclaimed dead bodies respectively. Forty-seven (62%) respondents think that parents/guardians can make substitute decision for mentally disabled person regarding organ donation. A total of sixty-six (87%) respondents think organ donation should be promoted (**Table 4**)

Table 4. Respondents' attitudes and practices towards organ donation.

Variable	Study participants (N=76)
My religion allows organ donation	44 (58)
Danger that donated organs could be misused, abused or misappropriated	
Never	10 (13)
Sometimes	48 (63)
Often	9 (12)
Most of the time	6 (7.9)
All the time	1 (1.3)
Factor considered of greatest importance when donating organ	
Relation to the person	9 (12)
Age of recipient	2 (2.6)
Health status of recipient	39 (51)
Substance abuse of the body	1 (1.3)
Assurance of respectful treatment of organ	20 (26)
None of the above	2 (2.6)
Who should give consent for a living donation?	
Donor	43 (57)
Any family member of legal age	12 (16)
Spouse	6 (7.9)
Friends	5 (6.6)
Doctor	4 (5.3)
Others (anyone)	1 (1.3)
For donation after death, who should give consent?	
No one	8 (11)
Family	49 (64)
Spouse	10 (13)
Doctor	3 (4.0)
Who should make decisions about organ donation in case of unclaimed dead bodies?	
Charitable organization	4 (5.3)
Medical doctors	31 (41)
Police	5 (6.6)
A judge	26 (34)
No one	6 (7.9)
Should parents / guardians make substitute decision for mentally disabled persons in regard to organ donation?	
Yes	47 (62)
No	19 (25)
Don't know	7 (9.2)
Should organ donation be promoted?	
Yes	66 (87)

No	1 (1.3)
Don't know	3 (4.0)

Discussion

Knowledge and attitudes towards organ donations have been shown to be determinants of the willingness to donate an organ [24-26]. In this study, knowledge of organ transplant was high but very few (4%) had previously made a donation, all of them blood. Kim *et al.*, 2004 [27], have identified external factors that influence attitudes toward organ donation and transplantation. These include customs and traditions, religious and cultural beliefs [28, 29]. Religion can influence the organ donation process. However, there are conflicting reports on the influence of religious beliefs and traditions on organ donation [25]. Studies have shown that religious beliefs can impede organ donation [17, 21, 22, 30]. However, in this study majority of students reported their religious beliefs could not restrict them from donating organs. While studies reveal that there are no major impediments to organ donation in Christians and Muslims, some religions like Jehovah witness do not accept blood products [31], in others such as the Shinto spiritual beliefs in Japan [32], a dead body is not supposed to be violated. Randhawa outlined that in certain Buddhist groups, they are concerned about 'disturbing the body in the hours after death' and this influence their decisions to participate in organ donations especially those that need to be procured immediately after death [33]. Sque and colleagues (2008) [34], in a study done in the United Kingdom have also noted disfigurement of the body is a predictor of unwillingness to donate cadaveric organs. Followers of Buddhism also believe in a peaceful death and metempsychosis [33], and this could influence cadaver organ donation decision making process. In our study context, all these religious beliefs seem not to apply, probably because majority of students were of the mainstream Christian denominations or Muslim. When the attitude to donate organ was correlated with whether religion allows, it was found to be significant, $X^2(3, N = 72) = 34.718, p < .00001$.

Mwenda and colleagues [7], have reported that deaths from Kidney disease are on the rise in Kenya. Over half of the participants in this study were able to name kidney as one of the organs that can be donated. Other organs that the participants were able to identify as those that can be donated were heart, bone marrow, cornea/eye, and liver. With this heavy burden from kidney diseases, the Kenyan government has supplied dialysis machines to many County hospitals. It is likely that the students have encountered many of these cases in their training and thus their high knowledge of kidney as one of the organs that can be donated.

In a study done among rural and urban residents attending randomly selected primary health care centres in Saudi Arabia, 90% of respondents reported that health care providers were an important source of knowledge on organ donation [14]. The most important sources of information on organ donation for the participants was determined as internet/online resources followed by doctor and television. The result of our research is in parallel with the information in the literature. The internet and the electronic media are an important source of information on health and health related matters. The young people in Kenya are particularly passionate on soccer and soap operas. These sources can be utilized in promoting the issue of organ donation among the youth. The same has been reported by other studies had reported the television/radio as the most important information source [26, 35]. However, it was surprising clinical medicine students could not identify their training as source of information about organ donation and would suggest a need to revise training curriculum to provide more training on role of organ transplant in medicine.

With an ever-increasing gap between demand and supply of donated organs widening worldwide, there is need to promote organ donation and transplantation. However, even when doing this, it is also equally important to take cognizance of the fact that organ trafficking is also a reality. This vice necessitates enactment of a legal framework to control the process of organ donation and transplantation, protect the donors as well as the recipient's fundamental rights. Without proper legal framework donated organs can easily be misused. In a cross-sectional study to analyse knowledge and attitude of people towards organ donation among adult population, in the Madina Teaching Hospital, Faisalabad, in Pakistan, Khan *et al.*, (2011) noted that 50% of potential donors were unwilling to donate for fear that the donated organs could be misused [36]. In another study on knowledge

of organ donation among 311 African Americans, Morgan (2004) has also demonstrated that medical mistrust is a strong indicator of whether people consent to organ donation or not [37]. In this study, majority felt that the donated organs can be misused and therefore they would be unwilling to donate. This demonstrates the mistrust the respondents have on the health system when it comes to organ donation and transplantation.

Article 43 of the Kenyan Constitution (2010) enshrines the right to the highest attainable standard of health for every citizen, implying that access to essential health services, including organ transplantation, is a constitutional entitlement [38]. The inclusion of Part XI in the Health Act, which addresses “human organs, human blood, blood products, other tissues and gametes,” marked a significant legislative milestone by formally recognizing organ and tissue donation as a legal and ethical practice within the Kenyan healthcare system. Yet, the practical implications of this law appear limited, as evidenced by the extremely low public and professional awareness levels.

The data showing that only 4% of respondents were aware of local legislation on organ donation and that over half (53%) were unaware altogether underscores a profound knowledge and information gap among the very individuals expected to operationalize and advocate for organ donation. This finding aligns with similar studies among medical students in Kenya, where awareness of the Health Act was similarly low with only 13.7% of clinical and 4.9% of preclinical students had read it. The results were comparable with a study done on clinical and preclinical students in the bachelor of Medicine and bachelor of Surgery students (MBChB) in the Kenyan Universities that found that only 13.7% clinical and 4.9% preclinical students had read the Health Act [39].

These statistics collectively reveal a concerning disconnection between legislative frameworks and their diffusion into medical education and practice. While the law provides the legal backbone, its effectiveness is dependent upon the awareness, understanding, and engagement of healthcare professionals, who are both potential donors and influencers of public attitudes.

In Kenya, as in many African societies, discussions around body integrity after death are sensitive, often influenced by religious, cultural, and moral considerations. The limited awareness of legal frameworks might therefore also signal low societal discourse on organ donation, reflecting broader taboos or discomfort around the topic. Without deliberate efforts to demystify the legal and ethical safeguards, misconceptions may persist, hindering participation and acceptance.

The findings highlight that the use of legislation alone is not sufficient to drive behavioral and attitudinal change. For the Health Act (2017) to realize its potential, it must be accompanied by awareness creation, organ donation curriculum integration, and advocacy targeting both healthcare professionals and the wider public. As Gridelli and Remuzzi (2000) noted, an effective legal framework can indeed promote organ donation, but only when it is supported by awareness, trust, and institutional commitment [40].

Limitations

The study strength was a high response rate in the entire questionnaire. The main limitation of the study was the small sample size because of the fixed population of students. The students were from Clinical Medicine and Community health only. However, the small sample size may not have introduced any bias because this was a descriptive study with no power required for testing any hypothesis.

Conclusion

To the best of our knowledge, this was the first documented study for evaluating knowledge, attitude and practice of Bachelor of Science in Clinical Medicine and Community Health students about organ transplantation in Kenya. There was lack of knowledge on some pertinent issues pertaining to organ donation such as organ donation after death, legislation, organs that can be donated, and risks of organ donation. There is a low rate of donation, even for blood despite the awareness of the need to save lives and therefore need to increase awareness on importance and promote laws to govern organ donation. Clinicians play a vital role in promoting organ donation; there is urgent need to increase their knowledge awareness. This can be done through a more targeted training curriculum. There is need for subsequent studies, to include including a larger sample of

students, and be carried out in more counties.

Declarations

Ethics Approval and consent to participate

This study was approved by the Mount Kenya University Ethics Research Committee (MKU/ERC/0323). Written informed consent was obtained from each participant before conducting an interview. Identifying details were not included during data collection, data entry or analysis.

Consent for publication

Not applicable.

Availability of data and material

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Author's contributions

PM conceived the study idea and wrote the first draft. PM and JG were involved with study design, data collection and analysis. CN and BK performed data collection. MN carried out data tabulation and statistical analysis. All authors read and approved the manuscript for publication.

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