DETERMINANTS OF INTRAUTERINE CONTRACEPTIVE DEVICE UTILIZATION AT PRIMARY HEALTH CARE FACILITIES IN MEKELLE CITY, NORTHERN ETHIOPIA

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ABSTRACT

BACKGROUND: Each year, the current level of modern contraceptive use averts 188 million unintended pregnancies, which in turn results in 112 million fewer abortions. Of the 867 million women in the developing world who are sexually active and want to avoid becoming pregnant, about 222 million of them have an unmet need for modern contraception.

OBJECTIVES: To identify the determinant factors for utilization of intrauterine contraceptive devices among women visiting primary health care facilities in Mekelle city.

METHOD: Facility based unmatched case-control study design was conducted among 234 women (78 cases and 156 controls). Data was collected by questionnaire. Data entry and cleaning was done using EPI- Info version 5.3.1 and analysis done using SPSS version 20. The study used a logistic regression model to identify the association between independent variables with Intrauterine Contraceptive Device.

RESULT: Marital status ([AOR (95%CI) =8.59(2.60 - 28.43)], number of pregnancies (AOR (95%) CI=5.69(1.020-31.802), and number of alive children [AOR (95%CI) =3.5 (1.03-11.9) had a significant association with the use of Intrauterine Contraceptive Device (IUCD). Other determinants found to have significant association included awareness about Intrauterine Contraceptive Device, visual exposure to Intrauterine Contraceptive Device during counseling about contraception, and participants told about the availability of health care provider able to insert Intrauterine Contraceptive Device.

CONCLUSION: The study identified marital status, gravidity, number of alive children, information on availability of IUCD provider and visual exposure to IUCD and awareness to Intrauterine Contraceptive Device as major determinants for use of Intrauterine Contraceptive Device. Thus, stake holders like Tigray Regional Health Bureau, health care facilities and providers should work to increase the utilization of this effective and safe modern contraceptive method IUCD.

KEY WORDS: Case control, Determinant factors, Intrautterine Contraceptive Device, Logistic regression

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INTRODUCTION

Family planning is defined as the use of contraceptive methods which enable couples to have the desired number of children and to control the timing and spacing of pregnancy [1]. The use of modern contraception is of great importance in public health, as its advent has resulted in the decline of fertility and the improvement of economic productivity, as well as the health of mother and child [2]. Modern contraceptive methods are categorized into three: long acting reversible contraceptive methods which consist of development and introduction of modern intrauterine devices (IUCDs) and implants, permanent contraceptive methods which include tubal ligation and vasectomy, and short term contraceptive methods, which constitute the predominant method in developing countries, and include injectables, , oral pill, male and female condoms, foam tablet and cervical cap [3].

The development and introduction of modern intrauterine devices (IUDs) in 1960, shortly after the advent of oral contraceptives, marked the beginning of the modern era of long-acting reversible contraception. These rapidly became the method of choice in pioneering programs in Taiwan, Korea, and United States of America [4].

It is estimated about 500 million women in the developing world are using some form of family planning. Of the 113 million married women of reproductive age in sub-Saharan Africa, 21 million (one in five) married women use family planning. 14.7 million (less than one of seven) women currently use modern contraception, and only 2.7 million women use long-acting or permanent contraception [5].

Copper IUCD are the most reliable and effective form of long acting reversible contraceptives (LARCs) and have several advantages over other forms including Implanon. IUCD serves us both long and short acting as fertility returns immediately after removal, has fewer side effects than hormonal methods, has a lower discontinuation than other forms of contraception. It can be inserted immediately after delivery and abortion, has no adverse effect with other medications like anti-retroviral therapy, and can be inserted by trained health providers at all levels. In spite of these advantages and cost-effective potential of IUCD, utilization is still low at only 8% in Sub Saharan countries, 9% in South Central Asia, and 22% in South East Asia [6].

The world-wide fertility rate is 2.5 children per woman (WFP 2015). According to WHO estimates about global maternal mortality rates 800 maternal deaths every day occur with preventable causes related to pregnancy and childbirth. Ninety-nine percent of these deaths are in developing countries; Sub-Saharan Africa contributes 66% of maternal mortality [6]. Each year, the current level of modern contraceptive use averts 188 million unintended pregnancies, which in turn results in 112 million fewer abortions, 1.1 million fewer newborn deaths, and 150,000 fewer maternal deaths [7].

Africa remains the region with the highest fertility rate at 4.7 children per woman, and projected to account for 21% of the global population by 2050 [9]. The Federal Democratic Republic of Ethiopia is the second most populous country in Sub Saharan Africa with an estimated population of approximately 92.08 million people and total fertility rate (TFR) of 4.6 and the tenth largest by area at 1.1 million square kilometers [9].

Globally, 163 million (15% of reproductive aged women) use IUCD [10]. Countries with the higher number of IUCD users include Cuba (43.5%), Vietnam (37.7%), Egypt (36.5%) and China (44.9%) The lowest use of the IUCD is observed in Africa, where few countries show more than one or two percent use of the method [11].

The progress of contraceptive prevalence rate (CPR) in Ethiopia has increased from 6% in 2000 to 35% by 2016. However, The CPR is highly dependent on short-term family planning methods (e.g. Nearly 23% receive injectables, followed by implants at 8%, and IUCD constituting 2%), Unmet need for family planning is still high for spacing births (13%) and limiting (9%) [12]. The CPR in Tigray is similar to the national average (35%) in EDHS 2016, and dependent on injectables (19%) followed by

implants (11%) and pills (4%), but the prevalence of IUCD (1%),is below the national level [12].

Recent evidence related to intrauterine contraception provides various assumptions as to the reasons for low and declining use of the IUCD. Among various reasons, incorrect perceptions and knowledge of IUCDs, as well as skills of providers and facility readiness for IUCD service have been considered as major limitations [13].

Although the IUCD is available free of charge in the public sector services, it is not being utilized adequately. Various studies suggest that lack of clients' knowledge and/or misunderstanding about IUCD method, reluctance of service providers in providing information about IUCD in adequately trained health care providers, and absence of continuing education and awareness of clients have been suggested to be major limiting factors to improve acceptability of this safe and effective contraceptive method of IUCD [14].

Recognizing this situation, the Federal Ministry of Health (FMOH), under Health service development program IV, set a target CPR of 66 percent by 2015., The FMOH has considered the important role of long-acting nonpermanent and permanent methods and aims to provide 20 percent of all family planning clients with these long-acting methods [12]. But this remained un-attainable as CPR in the country is 35% which relies on injectables [13].

In general, it is possible to conclude from the above discussions that modern contraceptive use in Ethiopia is dependent on short acting contraceptive methods and IUCD use remains underutilized in most women in Ethiopia [13]. Thus, understanding the factors that limit the use of IUCD in women in Mekelle city can help to inform interventions that can strengthen women's empowerment in ways to plan their pregnancies to achieve desired family size.

METHOD AND MATERIALS
Study setting, design and population
This study was done in Mekelle town, which is the capital of Tigray region, from October 25-November 25, 2017 where the overall prevalence IUCD in the city is 1.5% [15]. Facility-based unmatched case-control study design was used. The study population was those who were IUCD users, as well as short acting hormonal contraceptive users,including oral contraceptives (OCPs) and injectables, during the time of the study. The number of participants was determined by using formula for comparison of two population proportions with unequal proportion and Epi Info Version 3.5.3 statistical software. Based on the assumption of level of significance, α = 0.05, power = 90 % and control to case ratio is 2:1. Based on the study done in Debremarkos, partner discussion about modern contraceptive was a determinant factor for the utilization of IUCD Women who had discussions with their partner were 2.5 times more likely to use IUCD than their counterparts. 62.5% of users and 40% of non-users had partner discussion about contraceptives [3]. Finally, the calculated sample size is 234 (78 IUCD users and 156 non users).

Case definition:
Cases: Women who were users of IUCD.
Controls: Women who took OCPs and injectables.
Exclusion Criteria: Women who took other forms of contraception such as implants, condoms, or permanent methods

Sampling procedures
In the town there are 13 health facilities, from which more than 7 (50%) of the facilities were randomly selected by using a lottery method. Then, cases were allocated based on their last two months provision (August and September 2017). In each facility, all women who were using IUCD during the study period were selected as cases. If the individual did not fulfill case inclusion criteria, the individual was excluded before control selection. For each case, two controls that used OCPs/implant/ injectable/ condom during the study were included.

Data collection procedures and tools
A structured questionnaire was used to interview the study participants. It was prepared in English and translated to Tigrigna language. Training was

given for seven nurse data collectors to assure the quality of data. A pretest was done at Mekele General Hospital, which was not the actual study setting. The written consent was taken before starting the interview. Quality and completeness of collected information was checked by the investigators.

Operational definition

Unmarried: includes those who are single, divorced, or widowed according to reproductive health classification of marital status.

Data Analysis

The data entry was done using Epi- Info version 3.5.3 and analysis was done using SPSS version 20.0 statistical software. The logistic regression model was used to identify the association between independent variables and outcome of IUCD utilization. The independent variables that were associated to the outcome at bivariate analyses up to 25% significance level were used in the multivariable logistic model to examine the magnitude and associations between the outcome of IUCD utilization and independent variables. The statistical significance level was set at P-value <0.05.

Ethical Approval

The study was conducted after getting approval from Mekelle University institutional review board (IRB) to conduct the study. Following the approval, official letter of co-operation was written to concerned bodies by the department of Midwifery of Mekelle University. Permission was granted from all selected primary health care administration. Informed written consent was obtained from the study participants after explaining the purpose of the study. Participants were assured that their namewould not be stated, data would be kept confidential and anonymous, and would be used only for research purposes.

RESULT

Socio-demographic Characteristics

A total of 234 women of reproductive age attending the selected primary health care facilities were interviewed. The age of respondents was normally distributed at the mean (+SD) is 32±6.22 (range 20-43) and 26.28±5.83 (range 17-40) for the case and control respectively. Around 20 percent of cases and controls ha primary level of education. (See **Table 1**)

Table 1. Socio-demographic characteristics of clients visiting family planning clinic at Primary Health Care Facilities in Mekelle city. Northern Ethiopia, Tigray region, 2017

Variables		Cases (78)	Controls (156)	Total (234)
Age (years)	15-24	9(11.5)	69(44.3)	78(33)
	25-29	23(29.5)	42(26.8)	65(27)
	30-34	17(21.8)	26(16.7)	43(18)
	35-39	16(20.5)	13(8.3)	29(12)
	≥40	13(16.7)	6(3.8)	19 (8)
Religion	Orthodox Christian	69 (88.5)	134 (85.9)	171(73.1)
	Muslim	9 (11.5)	22(14.1)	31(13.5)
Ethnicity	Tigray	64(82.2)	130(83.3)	194(82.9)
	Amhara	10(10.6)	19(12.2)	29(12.4)
	Others	6(7.7)	12(7.7)	18(7.7)
Educational status	Primary school	10(12.8)	37(23.7)	47(19.3)
	Secondary school	41(52.6)	82(52.6)	123(52.6)
	Above secondary	27(34.6)	37(23.7)	64(27.4)
Marital status	Married	73(93.6)	101(64.7)	174(74.4)
	Unmarried	5(6.4)	55(35.3)	60(25.6)

Reproductive health characteristics of the women
About ninety seven percent of cases and around seventy five percent of controls had previously experienced pregnancy. More than half (56.6%) of cases experienced pregnancy 3 to 4 times, and less than 10% of controls were pregnant 5 or more times. Among those who had a history of pregnancy, the majority of cases 72 (98.6%) and controls 105 (93.8%) had a history of normal birth. The majority of cases 58 (80.6%) and controls 82 (78.1%) were planning to space their pregnancies . All of the cases have no history of STI, but 15 (9.6%) of controls had STIs treatment history. (See **Table 2**)

Table 2.Reproductive health characteristics of clients visiting family planning clinic at Primary Health Care Facilities in Mekelle city. Northern Ethiopia, Tigray region, 2017

Variables		Cases(78)	Controls(156)	Total (234)
History of pregnancy (N=234)	Have experienced pregnancy	76(97.4)	118(75.6)	194(82.9)
	No Experience of Pregnancy	2(2.6)	38(24.4)	40(17.1)
Number of pregnancy(N=194)	≤2 times	19(25)	67(57.35)	86(44.6)
	3 to 4 times	43(56.6)	40(34.2)	83(43)
	≥5 times	14(18.4)	10(8.5)	24(12.4)
History of abortion (N=194)	Experienced abortion	37(48.7)	56(47.9)	93(48.2)
	No experience of abortion	39(51.3)	61(52.1)	100(51.8)
Number of Abortion (N=93)	Experienced Abortion Once	32(86.5)	51(91.2)	83(89.4)
	Experienced Abortion≥ Twice	5(13.5)	5(8.8)	10(10.6)
History of birth (N=194)	experienced birth	72(98.6)	105(93.8)	177(95.7)
	No experience of birth	1(1.45)	7(6.2)	8(4.3)
Number of Birth (N=177)	Once	6(8.2)	33(31.4)	38(21.9)
	Twice	22(30.1)	30(28.6)	52(29.2)
	>Twice	45(61.6)	42(40)	87(48.9)
Number of alive children (N=177)	1 child	6 (8.2)	33 (31.4)	39(21.9)
	2 children	25(34.2)	30(28.6)	55(30.9)
	>2 children	42(57.5)	42(40)	4(47.2)
Plan of fertility (234)	Spacing Birth	58(80.6)	82(78.1)	140(79.1)
	Limiting Birth	14(19.4)	23(21.9)	37(20.9)
History of STI	No history of STI	78(100)	141(90.4)	219(93.6)
	History of STI	0(0%)	15(9.6)	15(6.4)
Screening for HIV	Ever screened for HIV	76(33.5)	151(66.55)	227(97)
	Not screened for HIV	2(2.6)	5(3.2)	7(3)
Test result	Reactive	2(2.6)	5(3.2)	7(3)
	Non-reactive	76(97.4)	149(96.8)	225(97)

Awareness and Practice

The majority of cases 76 (97.4%) and two-thirds (66%) of controls had heard about IUD.. Regarding partner discussion about modern contraception, 79.2% of cases and 69% of controls had discussion with their partner.
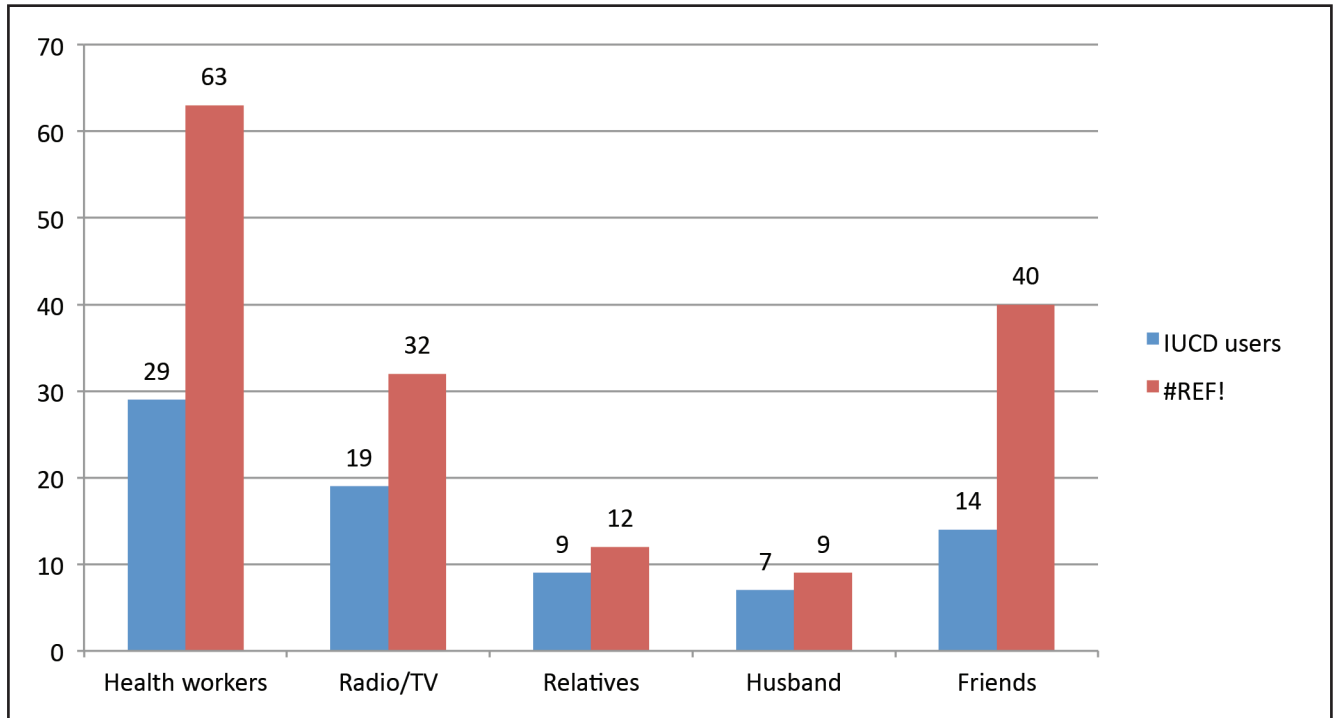

Figure 1: Source of information to modern contraception for women visiting family planning clinic at primary health care facilities in Mekelle city, Northern Ethiopia, Tigray region, 2017

The above graph showed that the health workers were a source of information for 29 (37.2%) of cases and 63 (40.4%) of controls followed by mass media for nearly a quarter (24.4%) of cases and friends for 40 (25.6%) of controls.

Factors associated with IUCD utilization

In this study, the variables- age, occupation, marital status, ever heard about IUCD, visual experience of IUCD, the information given about availability of IUCD, and availability of health care providers able to insert IUCD at facilities protect pregnancy to 12 years IUCD require minimal follow up were included in the multivariable logistic regression model at P value <0.25. Accordingly, marital status, number of pregnancies, number of living children, awareness about IUCD, visual exposure of IUCD during FP counseling and information given about the availability of health care provider able to insert IUCD were identified as independent predictors of IUCD utilization. **(See Table 3)**

Table 3. Determinants of IUCD utilization in Primary health care facilities in Mekelle city, Northern Ethiopia, Tigray region, 2017

Variables		Cases (78)(%)	Controls 156(%)	COR (95% CI)	AOR (95% CI)
Age (years)	15-24	9(11.5)	69(44.3)	1 1	
	25-29	23(29.5)	42(26.8)	4.19(1.78, 9.93)*	1.14(.28, 4.65)
	30-34	17(21.8)	26(16.7)	5.01(1.99,12.65)*	1.34(.26, 6.81)
	35-39	16(20.5)	13(8.3)	9.43(3.44, 25.88)*	2.75(.46, 16.35)
	40-44	13(16.7)	6(3.8)	16.61(5.05,54.65)*	7.23(.74, 70.79)
Occupation	House wife	10(12.80)	47(30.10)	1.97(0.57-6.78) *	0.1(0.01-1.26)
	Merchant	26(33.30)	24(15.40)	10.02(3.11-32.33)*	0.62(0.05-7.29)
	Govt. Employee	23(29.50)	29(18.60)	7.34(2.28-23.58)*	0.43(0.04-4.89)
	Private Employee	15(19.20)	19(12.20)	7.30(2.13-25.08)*	0.65(0.06-7.76)
	Student	4(5.10)	37(23.70)	1 1	
Marital status	Married	73(93.60)	101(64.70)	7.95(3.03-20.84)	8.59(2.6 - 28.40)**
	Unmarried	5(6.4)	55(35.3)	1 1	
Number of pregnancy (N=194)	≥5 times	14(18.40)	10(8.50)	4.94(1.89-12.87)	5.7(1.02-31.80) **
	3 - 4 times	43(56.60)	40(34.20)	3.79(1.95-7.39) *	2.04(0.67-6.23)
	1 - 2 times	19(25)	67(57.35)	1 1	
Number of alive children (N=177)	>2 children	42(57.50)	42(40)	5.50(2.08-14.45)	3.5(1.03-11.91) **
	2 children	25(34.20)	30(28.60)	4.58(1.65-12.70)	3.94(1.14-13.55) **
	1child	6 (8.20)	33(31.4)	1	1
Ever heard about IUCD (234)	Yes	76(97.40)	103(66)	19.55(4.62-82.74)	14.15(2.82-71.18)**
	No	2(2.60)	53(22.60)	1	1
Have you ever seen IUCD (234)	Yes	70(89.70)	54(34.60)	16.53(7.41-36.87)	10.40(4.0 -27.17) **
	No	8(10.30)	102(65.4)	1	1
Information on availability of IUCD provider	Yes	73(93.60)	120(76.90)	4.38(1.65-11.67)*	6.11(0.55-68.02)
	No	5(6.40)	36(23.10)	1	1
Information told on the availability of HCP that insert IUCD	Yes	67(85.90)	84(53.80)	5.22(2.56-10.63)	3.90(1.50-9.70) **
	No	11(14.10)	72(46.20)	1	1
Information on IUCD protect pregnancy for about 12 years	Yes	60(76.90)	66(42.60)	4.49(2.43-8.32) *	1.42(0.33-6.15)
	No	18(23.10)	89(57.40)	1	1
Information on IUCD requires less follow up	Yes	35(44.90)	105(68.20)	2.63(1.53-4.61) *	1.26(0.36-4.39)
	No	43(55.10)	49(31.80)	1	1

*Significant p<0.25, and ** Significant p<0.05

DISCUSSION

In the current study marital status was a significant determinant of IUCD utilization. Those women who are married were 8.6 times more likely to use IUCD than those unmarried ([AOR (95%CI) =8.59 2.598 - 28.42. It could be because of women who are married and in long-term relationship are more likely to choose IUCD for its ability to act as long-term contraceptive methods. On the other hand, those who are unmarried might not think IUCD is necessary for their infrequent sexual activity or they may perceive their short-term relations not mandate IUCD. It also may be the professional counseling bias and misleading to choose nulliparouse for short actind and other methods. It also may be due to joint decision with their husband or partner to prefer IUCD. However, this finding is contrasted with a study done in Ethiopia based on evidence from EDHS 2011, in which women who were temporarily living with their partners were about two times more likely to use LARC ([AOR (95%CI) =1.9(1.2,3.0) [16]. This might be a result of the social and cultural unacceptability of giving birth before formal marriage in most parts of Ethiopia.

Another strong predictor of IUCD utilization was awareness. The women receiving an IUCD were 14 times more likely to utilize the method than their counterparts ([AOR (95%CI) =14.2 (2.814-71.184). This finding is higher than the results of other studies done in Ethiopia [15, 16, 17]. This might be a result of continuous promotion and advertisement through media and the observed difference is due to the educational background of clients.

In the current study, the number of living children was an important factor for IUCD utilization; it implies that those having >2 children are more than three times more likely to use IUCD compared with women having one child [AOR (95%CI) =3.5 (1.03-11.9). This finding was similar to studies done in Nepal in which women having more than 2 children were two times more likely to utilize IUD compared with those having ≤ 2 children [AOR (95%CI) = 2.20 (1.12-4.32)] [18].

Information on the availability of IUCD providers had a statisticaly significant effect on IUCD utilization. The women who had awareness on the availability of IUCD provider information were four times more likely to use IUCD [AOR (95%CI) =3.89 (1.55, 9.74) compared to their counterparts. This finding is relatively low compared with a case control study conducted in Addis Ababa , which indicated that those who were provided with this information were around six times more likely to utilize the method [AOR (95%CI) =5.765(1.646, 51.486) [16]. It could be evidenced by health care providers in counseling aspects of IUCD and sociodemographic differences of the study population. It also might be a result of providers not possessing adequate knowledge about the IUD as a LARC methods and providing incomplete information to potential clients.

One of the critical factors for women to use IUCD is visualizing the method. Women who had ever seen IUCD were more than ten times more likely to use IUCD than those with no visual exposure [AOR (95%CI) =10.4(4.0 -27.17). Effective communication and counseling can avert the variation on utilization. This can be due to counselors' bias to show IUCD during counseling and lack of demonstration skills can affect the decision to use a method [16, 17].

We, the authors of this study made effort to address all important variables through primary source of data and close supervision to attain quality; therefore, we believe there are no lost variables which determine IUCD use and no possible recall bias.

CONCLUSION AND RECOMMENDATION

The results of this study showed that being married, number of pregnancies, number of living children, having awareness about IUCD, information on availability of IUCD providers, and visual exposure to IUCD was positively affected IUCD utilization. Thus, stakeholders like Tigray Regional Health Bureau, health care facilities, and providers should work to increase the utilization of this effective and safe modern contraceptive method IUCD.

AUTHORS' CONTRIBUTIONS: GT conceived and designed the study, developed data collection instruments and supervised data collection. GT, HG, BH, GA, NB, MS, SH and KT participated in the testing and finalization of the data collection instruments and coordinated the study progress. GT and SH performed the statistical analysis and wrote all versions of the manuscript. All authors read and approved the final manuscript.

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