Estimating Utility value for Female Genital Mutilation

Cyrus Alinia

Urmia University of Medical Sciences

Bakhtiar Piroozi (✉ bpiroozi@gmail.com)

Kurdistan University of Medical Sciences

Fariba Jahanbin

Urmia University of Medical Sciences

Hossein Safari

Tehran University of Medical Sciences

Amjad Mohamadi-Bolbanabad

Kurdistan University of Medical Sciences

Ali Kazemi-Karyani

Kermanshah University of Medical Sciences

Ghobad Moradi

Kurdistan University of Medical Sciences

Fariba Farhadifar

Kurdistan University of Medical Sciences

Mohammad Ebrahimi

Kermanshah University of Medical Sciences

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Abstract

Background: Female genital mutilation/cutting (FGM/C) is a clear violation of women's rights and can have adverse and irreversible health effects as well. Worldwide, more than 200 million women and girls have undergone FGM/C. Utility value of FGM/C has not been estimated yet, so we designed this study to extract the health utility value of FGM/C for the first time in the world.

Methods: In a cross-sectional study in Iran, 125 girls and women who underwent FGM/C procedure were examined by the trained midwives in order to determine its type. In addition, a questionnaire was completed for identifying the socio-demographic factors and extracting the health utility of these individuals. Health utility was measured using Time Trade-off method and also to determine the effects of the socio-demographic factors on the health utility a two-limit censored regression model was applied.

Findings : The mean and median of the health utility of women with FGM/C were 0.971 (SE: 0.003) and 0.968 (IQR: 1-0.95), respectively. Number of non-traders was 58 (46.4%) who reported perfect health utility. However, the mean of health utility among traders was 0.946 (SE: 0.002). Only type 1 (Clitoridectomy) and type 2 (Excision) FGM/C were seen in this study. Women with Type 1 FGM/C had significantly lower health utility value (Mean: 0.968, Median: 0.957) than their type 2 counterparts (Mean: 0.987, Median: 1.00). Moreover, women in the age group of 31-45 years (Mean: 0.962, Median: 0.956), single (Mean: 0.950, Median: 0.954), divorced (Mean: 0.951, Median: 0.950), employed (Mean: 0.959, Median: 0.956), and with supplementary insurance (Mean: 0.962, Median: 0.950) had significantly lower health utility than their counterparts.

Conclusion: FGM/C affects physical and psychological well-being of these individuals, resulting in a lack of personal and marital satisfaction, which ultimately leads to a 3% reduction in their health related quality of life. Therefore, preventing from this practice is very important and should be considered by health system policy makers more than before.

Background

Female Genital Mutilation/Cutting (FGM/C), which is considered as a global concern, is defined by World Health Organization (WHO) as "all procedures that involve the partial or total removal of external genitalia or other injury to the female genital organs for non-medical reasons".[1] The practice, which is also considered as violence against women, is prevalent in 30 African and some Middle Eastern and Asian countries, and threatens the life of about 3.6 million girls and women annually.[2] Estimates have shown that more than 200 million girls and women have experienced this counter-human rights procedure.[3]

The highest prevalence of FGM/C is seen in African countries such as Somalia (98%), Guinea (96%), Djibouti (93%), and Egypt (91%).[4] It may also be seen among some ethnic groups and immigrants living in developed European and North American countries and Australia.[5] We also have had some cases of FGM/C performed secretly and mysteriously in a number of families in some cities of Iran, including

Hormozgan, Khuzestan, Bushehr, Kurdistan, and Kermanshah. Nonetheless, we do not have official and reliable statistics regarding its prevalence in Iran.[6–8]

Researchers have divided the causes behind practicing FGM/C into five groups: Psychosexual, Sociological and Cultural, Hygienic and Aesthetic, Religious, and Socio-economic.[9] These factors have turned FGM/C, as an element for inequality and violence against women, into a social norm or conviction. [10] However, so far, not only no hygienic or unsanitary benefits have been reported for this procedure, but also numerous studies have shown its increasing and long-term negative effects. Its immediate effects include shock, severe pain, extensive bleeding, swelling, damage or infection of the genital area, fever, and, in some cases, even death. Long-term effects of FGM/C include urinary problems, vaginal problems (such as discharge, infection and itching), menstrual problems, scar tissue and keloid, sexual dissatisfaction, high risk pregnancy, psychological problems (depression, anxiety, post-traumatic stress disorder, low self-esteem and self-confidence), social isolation, and sanitation problems.[2, 11–14] However, health-related quality of life of women living with FGM/C has not been quantitatively measured in the world. Therefore, in this study, we aimed to measure its utility value among different socio-demographic groups in order to objectively determine the total effects of FGM/C on health-related quality of life of women and girls.

Methods

Study population

This cross sectional and multicenter study was conducted in 2018 in Kermanshah province, west of Iran. 125 females aged over 15 who had experienced the FGM/C participated in the study after giving their written consent. The samples were selected by non-random consecutive sampling method from the girls or women referred to the midwifery offices for examination. Next, they were examined by trained midwives and a questionnaire was completed for them. An obstetrician examined these women for having FGM/C and identified its type.

Type 1 FGM/C (Clitoridectomy) means removing part or all of the clitoris; type 2 (Excision) is defined as removing part or all of the clitoris and the labia minora, with or without removal of the labia majora; type 3 (infibulation) is narrowing of the vaginal opening by creating a seal, formed by cutting and repositioning the labia; and type 4 (other harmful procedures) means any injury to the female genitals, including pricking, piercing, cutting, scraping or burning the area. The females who did not have any illness, disorder, and psychological disability except FGM/C entered the study.

Measurement of utility value

Time trade off (TTO) approach has been used to measure the health-related utility of FGM/C. In this approach, the researcher asked the participants: how many years in the current health state (X) you would be willing to lose in order to regain full health. Number of these years changes to a degree that the individual has to subjectively stay indifferent between their health state in remaining future years (Y) and

perfect health state in shorter period of time and sees their value both the same. The amount (x/y) is presented as disutility and the result of formula $1 - (x/y)$ indicates the health utility of each individual. In all cases, in the first question, the value of x was considered 4 years. If the interviewees agree/disagree, this amount could be increased/decreased and it continued until reaching the indifference point. Life expectancy at birth for Iranian women was considered 79 years.

The best and the worst health state of the individual measured by TTO method equals zero and one, respectively. It gets zero if the individual is not willing to lose any years of their life, and it gets one if the individual is willing to lose all their remaining years of life to fix the FGM/C problem.

Measurement of socio-demographic characteristics

After determining the type of FGM/C, questions about socio-demographic factors were asked from the participants by the midwife. These questions included determining the age (grouped in three classes: 19–30, 31–45, and over 46), marital status (single, married and widowed/divorced), employment status (unemployed, employed, and housewife), standardized monthly household expenses (monthly household expenditure is divided by its household dimension), and having basic and supplementary health insurance.

Two-limit Tobit linear regression model was used in order to determine the effects of socio-demographic factors on the level of health utility among women with FG/CM. In this model, given that the dependent variable is assumed to have a normal distribution; therefore, we considered the logarithmic value of health utility as a dependent variable and factors of age (years of life); type of FGM/C (1: type 2 and 0: type 1); marital status (1: married and 0: non-married); occupation (1: employed and 0: non-employed); standardized monthly household expenditure (average monthly expenditure per person); and supplementary insurance (1: having supplementary health insurance and 0: having no supplementary health insurance) as independent variables.

Statistical analysis

The distribution of studied women among socio-demographic groups is represented by number and percentage. For each of these socio-demographic sub-groups, the amount of measured utility has been reported with mean, standard error, median, and interquartile range. Considering the non-normal distribution of the utility values, to measure the significant difference between the mean values for subgroups of each socio-demographic group, Kruskal Wallis (for groups with more than 2 subgroups) and Mann-Whitney (for groups with 2 subgroups) were used. In order to convert Rial into US Dollar, each Dollar was considered equal to 120000 Iranian Rial. The significance level was set at $p\text{-value} < 0.05$. All statistical analyzes were performed using STATA version 13 (Stata Crop LP, College Station, TX, USA).

Ethical considerations

This study was approved by Research Deputy of Kurdistan University of Medical Sciences. Prior to the study, all participants gave written informed consent to participate in the study. Also, the researchers adhered to the tenets of the Declaration of Helsinki in the implementation of all stages of the study.

Results

A total of 125 women and girls who had a history of FGM/C participated in this study. The mean age of these participants was 35.74 years (ranged 19-55). The participants included 10 (8%) single women, 17 (13.6%) divorced / widowed, and the rest were married. The distribution of first and second type of FGM/C among the participants was 104 (83.2%) and 21 (16.8%), respectively (Table 1).

Table 1 Utility values of Female Genital Mutilation among different socio-economic groups

Socio-Demographic Factors & FGM/C types	Number (%)	Utility value		P-value
		Mean (SE)	Median (IQR)	
Total	125 (100)	0.971 (0.003)	0.968 (1-0.950)	0.001
Age				
Young (19-30 years)	42 (16.0)	0.978 (0.004)	1.000 (1 -0.968)	
Not Young (31-45 years)	63 (50.4)	0.962 (0.003)	0.956 (1 - 0.936)	
Middle age (46-55 years)	20 (33.6)	0.985 (0.005)	1.000 (1-0.950)	0.003
Marital Status				
Single	10 (8,0)	0.950 (0.006)	0.954 (0.957-0.936)	
Married	98 (78,4)	0.977 (0.003)	1.000 (1 -0.956)	
Divorced	17 (13.6)	0.951 (0.001)	0.950 (0.950-0.950)	0.051
FGM/C types				
Clitoridectomy	104 (83.2)	0.968 (0.003)	0.957 (1-0.943)	
Excision	21 (16.8)	0.987 (0.004)	1.000 (1-0.968)	0.023
Job				
Employed	16 (12.8)	0.959 (0.027)	0.956 (0.979-0.941)	
Unemployed	33 (26.4)	0.963(0.004)	0.950 (1-0.950)	
Housewife	76 (60.8)	0.978 (0.030)	1.000 (1-0.956)	0.203
Having basic insurance				
Yes	105 (84,0)	0.970 (0.029)	0.958 (1-0.950)	
No	20 (16,0)	0.979 (0.06)	0.992 (1-0.968)	0.024
Having Supplementary insurance				
Yes	34 (27.2)	0.962 (0.028)	0.950 (1-0.950)	
No	91 (72.8)	0.975 90.028)	1.000 (1-0.952)	0.077
Standardized household's monthly cost				
Lowest (< 50 USD)	111 (88.8)	0.970 (0.029)	0.968 (1-0.950)	
Highest (> 50 USD)	14 (11.2)	0.984 (0.026)	1.000 (1-0.956)	

SE: Standard error, IQR: Interquartile range

The results of the Tobit regression analysis are presented in Table 2. As shown here, health utility of women with FGM/C decreases significantly with having job and having type 1 FGM/C than type 2.

Table 2 Estimation results of the two-limit Tobit model of utility value for Female Genital Mutilation

P-value	t statistics	Coefficient	Variables
0.108	1.62	0.001	Age
0.010	2.66	0.038	FGM types
0.472	-0.72	-0.007	Marital status
0.017	2.43	0.007	Job
0.459	0.74	0.008	Supplementary insurance
0.101	1.65	0.028	Standardized monthly expenditure

Discussion

The FGM/C procedure, which acts as a violation of women's rights and is considered as violence against women, imposes much physical, psychosocial and social harm on women and girls, and reduces their health-related quality of life. For the first time, the current study measured the utility value of FGM/C for different socio-demographic groups. The results indicated that women/girls living with FGM/C had an average health utility of 0.971 (SE: 0.003) with median of 0.968 (IQR: 1-0.95). In other words, they lost about 3% of their Health-Related Quality of Life (HRQoL) due to FGM/C, on average.

The utility value, which subjectively represents the sum of the effects of FGM/C on women's health, was significantly lower for single (Mean: 0.950, 95% CI: 0.935–0.964) and divorced women (Mean: 0.951, 95% CI: 0.943–0.958) compared to married women. In other words, single women experienced more reduction in their HRQoL than married women. This may be due to delay in their marriage. Because the mean age of the single subjects participated in the study was significantly higher than that of the married women (38.2 vs. 33.8 years), which it may be attributed to FGM/C.

This negative effect may vary in different countries and cultures, as in countries such as Nigeria, Somalia, and Sudan, girls who have performed FGM/C have a higher chance of finding a partner and having a timely marriage.[15, 16] While in Guinea, having or not having FGM/C, did not have any effect on the chance of getting married.[17] In Iran, however, because FGM/C is performed only in certain ethnic and religious groups; therefore, it is generally considered unacceptable in society and may decrease the chance of marriageability. Nonetheless, a definitive answer to this requires more in-depth studies.[18]

Another reason can be related to the perception of single women of marital restrictions of FGM/C, such as intercourse pain, less sexual pleasure and related bleeding. Since women from less developed societies may not experience these restrictions before marriage, they may over-estimate them.[15] The divorced women may also attribute their separation and failure in life to FGM/C.

Another interesting result of this study was that women in the 31–45 age group (Mean: 0.962, 95% CI: 0.956–0.969) reported a lower HRQoL than others, which appears to be due to more divorce rate of this group in comparison with other age groups. It accounts for 65% of all divorces. This group of women may attribute their divorce to FGM/C, which may be resulted from their sexual dissatisfaction or disability. This finding is in line with the results of other studies.[19–22]

Surprisingly, employed women reported less health utility than unemployed women and housewives (Mean: 0.959, Median: 0.956). This can be due to the different expectations of this group from marital life and their greater understanding of the negative effects of FGM/C on their physical and psychological health, as all 16 employed females participated in the study were university graduates. Also, employed women had a mean age above the average of the study population (Mean: 38.75, 95% CI: 37.53–39.97); therefore, they may have perceived the long-term effects of this procedure better and more than others.

In this study, only types 1 and 2 of FGM/C were considered. The findings indicated that type 1 had more severe effects on HRQoL reduction than type 2. A strong reason for this lies in the difference between the mean ages of two groups. The mean age of participants with type 1 and 2 FGM was 37.47 (95% CI: 35.86–39.9) and 27.14 (95.1% CI: 29.99–24.99), respectively. Therefore, women with type 1 FGM had experienced long-term effects of this procedure more than their counterparts. Moreover, findings showed that women who were never married or got divorced had type 1 FGM/C. There was not any divorced or single women among women with type 2 FGM/C.

Therefore, the obtained health utility value cannot be directly attributed to type of FGM itself, because women with type 2 FGM/C have not experienced its long-term effects yet. Therefore, in order to more accurately compare the effects of type of FGM/C on HRQoL of individuals, a larger sample size with the same age strata are required for all types of FGM/C.

The results of the Tobit regression model were fully consistent with the preceding findings. This shows that the effects of FGM/C become more tangible with increasing age and emergence of personal and marital dissatisfactions, which may result in divorce or in never getting married and passing the marriage age, and leads to a gradual reduction in HRQoL. The findings of the model suggest that women affected by the negative outcomes of this practice are forced to work outside the home leading to their dissatisfaction as they mainly come from households with lower income levels and larger household size than the average of the society.

58 participants of the study (46.4%) were not willing to lose any time to regain their usual genital condition, and they reported a full health utility. These are referred to as non-traders. All of them were married and more than 81% of them were housewives. These people, on average, had a larger household

size with a monthly household expenditure below the average. Therefore, it can be concluded that non-traders were less influenced by the effects of FGM/C, and were able to live their lives in accordance with the community conditions and their expectations, so they did not complain about it. The mean health utility for traders was 0.946 (95% CI: 0.943–0.950). In other words, women, who have been hurt in their personal and family life due to FGM/C, lose 5.4% of their HRQoL.

The effect of FGM/C on HRQoL in individuals can be compared with diseases such as non-severe hypoglycemic, mild primary dysmenorrhea, skin neoplasm, myopia, and otitis media associated with pain. On average, these all result in a 3% loss of HRQoL in individuals. Subgroups such as single or middle-aged women with FGM/C, who are affected by this procedure more than others, have disutility almost equal to mild gastroenteritis. Of course, since the FGM/C procedure is mainly performed during the childbirth or childhood, it has life-time effects and imposes more disease burden than the above-mentioned diseases (Table 3). If we assume that a girl performs FGM/C in her first year of life, with a discount rate of 3% and a life expectancy of 75 years, its burden of disease is equal to 0.87 year.

Table 3 Comparison of FGM's utility value with other diseases		
Diseases	Mean of utility value	Reference
Hypoglycemic- Non-severe daytime event	0.972	[23]
Hypoglycemic- Non-severe nocturnal event	0.977	[23]
Stable schizophrenia	0.919	[24]
Mild Primary Dysmenorrhea	0.970	[25]
Skin neoplasm of uncertain behavior	0.970	[26]
Epilepsy	0.920	[27]
Myopia	0.970	[28]
Otitis media with pain	0.970	[29]
Moderate gastroenteritis	0.940	[29]

The burden of FGM/C is totally unnecessary and avoidable, provided that governments take indigenous and effective initiatives and measures to prevent from the FGM/C procedure. In order to develop domestic protocols, the main reasons for performing FGM/C should be extracted in each community, and should be considered as a basis for identifying prevention strategies. The main reasons for performing this procedure include controlling the sexual desire and behavior of girls and women; preserving a cultural and traditional practice; parents' low level of education, especially mothers and girls themselves; the pressure of families and relatives; lack of awareness of the psychical and psychological consequences of FGM/C in the long run; and linking FGM/C to religious beliefs and commands.[12, 30–32]

Of course, all prevention programs require intersectoral collaboration and should include activities such as health education to parents, passing national laws, standing against some meaningless social norms and traditional beliefs, encouragement of mothers and girls to educate, and getting help from religious missionaries.[33, 34] Nowadays, one of the new barriers to eliminate FGM/C in some countries, especially African countries, is medicalization. Doctors, nurses and some other health workers claim that they can perform this procedure in sanitary conditions, so they give FGM/C legitimacy. It not only does not help to the prevention of FGM/C, but it also encourages people to do it. Therefore, announcing that performing FGM/C is against the law can also be an effective step to reduce the incidence of this procedure.[35, 36]

The strength of the current study was to examine FGM/C victims by trained midwives in order to determine the degree of FGM/C. However, the results of the present study should be interpreted in light of its limitations. First, we did not include types 3 and 4 of FGM/C; therefore, our results can only be generalized to women with types 1 and 2. Given the fact that the more severe types of this disorder impose more long-term negative effects on the individuals and create more family and personal problems for them, it may also create greater health disutility. Therefore, it is highly recommended that the disutility of types 3 and 4 of FGM/C should be extracted in other studies. Second, the amount of health disutility of FGM/C seems to be very much influenced by the culture of the community, so if the restrictions imposed by FGM/C prevent women from meeting their personal and social expectations, it can raise women's dissatisfaction and create more disutility. Therefore, the results of this study are not necessarily the same in different societies and communities.

Conclusion

Women undergoing FGM/C lose an average of 3% of their HRQoL due to their health and marital problems. Of course, these people are classified into two groups. Therefore, the epidemiological burden of FGM/C is very considerable, and it is recommended that the countries involved in this social and health challenge develop prevention protocols for FGM/C and stick at them seriously.

Abbreviations

FGM/C: Female Genital Mutilation/ Cutting; WHO: World Health Organization; TTO: Time trade off; HRQoL: Health-Related Quality of Life

Declarations

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Not applicable.

Author's Contributions

CA, BP, and FJ conceived the idea of the study, CA and FJ contributed to the study design, CA and AMB performed the statistical analysis, CA, GhM, FF, and ME took part in the interpretation of the results and HS, AKK, GhM, and CA critically revised manuscript drafts. All authors read and approved the final version of the manuscript.

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Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available for confidentiality reasons since individual privacy could be compromised but are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

This study protocol was reviewed by Research Ethics Committee at the Deputy of research and technology, Kurdistan University of Medical Sciences (No. IR.MUK.REC.1396/377) and was found to comply with ethical standards. Besides, participants had given written informed consent to participate in the study.

This research is a retrospective analysis of pre-collected data and has received approval from the University of Toronto Ethics Board (Protocol No. 30943).

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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- [STROBEchecklistcrosssectional.doc](#)