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Abstract

Background: The practice of female genital mutilation (FGM) is widespread in Sudan. Over the years, the government, civil society and the international community implemented multiple interventions to address the issue. However, due to a number of cultural and educational factors, this harmful practice continues.

Aims: This study aimed to assess the effects of a secondary school-based health education intervention on the knowledge and attitude of female students towards FGM in Sudan.

Methods: We conducted a quasi-experimental study in Karary Locality, Khartoum State, Sudan. A multistage sampling technique was used to determine targeted schools. Within the schools, students of two randomly selected classes received the intervention. The study included three phases; in the pre-intervention phase, data were collected from the totality of students (154 students) using a pre-tested questionnaire, after which students received health education sessions. The same questionnaire was used to re-collect the data in a post-intervention phase 6 weeks later.

Results: The participants were between 14 to 17 years old, 30.3% of which were subjected to FGM. The main source of information about FGM was family and friends (41.1%). The majority of participants had a negative attitude towards FGM. The means of knowledge and attitude scores increased from 8.63 (SD=2.562) and 5.76 pre-intervention (SD=1.937) to 11.99 (SD=2.264) and 6.53 post-intervention (SD=1.164), respectively.

Conclusions: School-based health education has a positive impact on both knowledge and attitude of female students towards FGM in Sudan. As such, introducing health education about the complications of FGM in curricula of secondary schools in Sudan has the potential to improve students' knowledge and attitude. Ultimately, such interventions can help reduce the prevalence of the practice when students become responsible for future families.

Keywords: adolescent, female genital mutilation, FGM, female genital cutting, school-based interventions.

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Introduction

At least 200 million girls and women have undergone female genital mutilation (FGM) in 30 countries around the world (1). According to the World Health Organization (WHO) the estimated prevalence of FGM among girls and women in northern Sudan in 2000 was 90% (2). The first Sudan National Household Survey in 2006 showed a reduction in the FGM prevalence rate to 69% (3). However, according to a Sudan multiple indicator cluster survey, by 2014 the percentage of girls and women aged 15 to 49 years who had undergone FGM increased to 86.6% (4). This increase is a concern since the government, civil society and the international community have all implemented multiple interventions to address the issue. However, due to a number of cultural and educational factors this harmful practice continues in Sudan.

Education to change communities' attitudes, values and behaviours towards FGM, coupled with governmental support and appropriate legislation, is an effective combination to reduce the prevalence of the practice (5). FGM differs from most other forms of gender-based violence in that women are not the victims but often the perpetrators and promoters of the practice. It is a common occurrence that female relatives of the girl advocate for the practice and make arrangements for a traditional female excisor to conduct the procedure (6). In light of this fact, changing females' knowledge and attitude towards the practice should be a priority in any strategy to eliminate the practice of FGM in Sudan.

Adolescence is an important formative phase in the lives of young people. Moreover, secondary school is important for shaping and changing attitudes and behaviours of teenagers because it provides a neutral and suitable medium for discussions of sensitive issues like FGM in isolation from the influence of society. Information delivered to students in schools tends to be age-specific and tailored to the students' needs. In addition, communities consider schools to be a safe and reliable source of information (7). Prior health education interventions in a number of countries targeting sexuality and reproductive health awareness have shown significant improvement of girls' reproductive health knowledge and attitudes following the intervention (8–10).

With the deficiency of published research on the impact of interventions to reduce the prevalence of FGM in Sudan, the question of the effectiveness of health education in changing the attitude of the individuals remains unanswered. Our study aims to add to the literature and assess the impact of a school-based intervention on the knowledge and attitude of female teenagers regarding FGM.

Methods

Study settings and sampling

We conducted this quasi-experimental, school-based study in Karary locality, Khartoum State, Sudan. Karary locality is one of the seven localities in Khartoum state, occupying the north-western area and covering 4646 km2 (11). There are 12 secondary schools for girls in the locality. Among the schools, four were excluded because they were the target of a previous study (12). Of the remaining eight schools, we randomly selected two schools and then selected two second grade classes (out of four classes) in each school randomly. We collected data from the totality of students in these two classes who fulfilled our selections criteria.

The total number of participants in the pre-intervention phase was 154 students (none of the students refused to participate in the study), and in the post-intervention phase was 150 students (four students were absent from school at the time of data collection). The inclusion

criteria for participation in our study were: 1) any female student in the targeted schools; 2) who is currently studying in the randomly selected second grade; and 3) agreed to be part of the study. The only exclusion criterion was refusal to participate or withdrawal from the study at any stage. The study had three phases: pre-intervention, intervention and post-intervention phases. The pre- and post-intervention phases included a questionnaire on students' knowledge and attitude towards FGM. In the intervention phase, each class received a health education session on FGM and its complications.

Design of the health education intervention

The intervention consisted of an 80-minute health education session that focused on FGM and the complications of the practice. The session included:

1. A lecture on the origin of FGM, its definition, types, health complications and the factors reinforcing the practice in Sudan. The lecture also included visual aids to show the normal anatomy of female external genitalia and the damage caused by each FGM type.

2. Group work to encourage brainstorming and help the students talk about this issue with each other. The participants answered basic questions based on information presented in the lecture. Students were also asked to discuss FGM in Sudan, causes of this practice and their suggested solutions to this problem.

3. The session also included the display of a video that tells a story of a girl who suffered from FGM complication throughout her life.

4. Each section of the session was followed by a questions-and-answers break to give participants the opportunity to digest information from the previous section as well as clarify any confusion.

Data collection

We conducted two data collection sessions; one prior to the intervention (pre-intervention) and another six weeks later (post-intervention). We collected data through a structured, closed-ended, self-administered questionnaire. The questionnaire is composed of 26 questions divided into three sections: personal and demographic information (five questions), knowledge about FGM (14 questions) and attitudes towards FGM (seven questions). The validity of the

questionnaire was checked in a previous study by the lead author, which involved a total number of 292 students. The internal consistency of the questionnaire was checked by Cronbach's alpha (0.818). Factor analysis was carried out to ascertain the questionnaire validity, Kaiser-Meyer-Olkin measure of sampling adequacy was 0.850 and Bartlett's test of sphericity was significant ($\chi 2$ (210) = 1.774E3, P **Data analysis**

The data was analyzed using SPSS Version 24. To assess the change in knowledge and attitude, two scores (knowledge score and attitude score) were created. Each correct answer was given a score of 1 and incorrect answers were given a score of 0. Overall scores for a respondent's knowledge about FGM could range from 0 to 14 and between 0 to 7 to attitude towards FGM reflecting the number of questions in each of these sections. Because the data was not normally distributed, we used a Wilcoxon signed-rank test to assess the difference between pre- and post- intervention scores in intervention group. To examine the effects of tribe, family acceptability and baseline knowledge score on the FGM status of the respondents, we constructed a multinomial regression model. Tribe, the respondent's family's acceptances of FGM as well as the baseline knowledge score were used as independent variables in this model.

Results

Sample description

Participants were aged between 14 to 17 years, with a majority (66.9%) aged 15 years old. Most of them were from the Jaalia tribe (31.2%). One third of participants had undergone FGM (30.3%), and from families that practice FGM (32.9%).

Knowledge and attitude towards FGM

Figure 1 and Figure 2 show students' knowledge about FGM both pre- and post- intervention. As illustrated in Figure 1 , in the pre-intervention questionnaire, only 29.2%, 17.5%, 8.4% and 27.3% of students knew FGM type 1, 2, 3 and 4, respectively. The students' knowledge increased in the post-intervention questionnaire, where 81.3%, 75.8%, 49.3% and 67.8% of participants recognized type 1, 2, 3 and 4 of FGM, respectively. Additionally, students' knowledge about FGM complications increased in the post-intervention questionnaire (Figure 2). The percentage of the students who knew that FGM can result in psychological problems, infertility and sexual problems increased by 23.7%, 16% and 18.3% post-intervention, respectively. We created a score scale to measure the overall change in knowledge.

It should be noted that knowledge about bleeding as a complication alone, for example, as an indicator for knowledge about complications can be misleading. In this study, knowledge about the possibility of bleeding did not change significantly, which shows the importance of using a

score of different assessments for knowledge.

The percentage of students who believe that a girl having undergone FGM is more chaste than a girl who has not, decreased from 18% pre-intervention to 2.7% post-intervention. Similarly, our study documented a decline in the percentage of participants who considered FGM as a religious practice (from 20.8% to 5.3%) and those who think FGM increases personal hygiene (from 20.8% to 5.4%). Additionally, 59.5% of participants labeled FGM as an illegal practice in Sudan pre-intervention. The percentage went up to 72.2% post-intervention. Figure 3 illustrates differences in the s of participants pre- and post-intervention.

Students showed more negative attitudes towards FGM post-intervention. This is evident by the increase in percentage of students who consider FGM as a violation of human rights; who will join activities aim to discontinue FGM; and who support legislation against FGM by 14.7%, 12.7% and 13.5%, respectively. Moreover, the percentage of students who support the discontinuation of the FGM practice increased by 11.6% and those who will object if someone in their family wanted to practice FGM went up by 10.7%.

The means of knowledge and attitude scores increased from 8.63 and 5.76 pre-intervention (Knowledge score SD=2.562, Attitude score SD=1.937) to 11.99 and 6.53 post-intervention (Knowledge score SD=2.264, Attitude score SD = 1.164), respectively. Wilcoxon signed-rank test showed that there is a statistically significant post-intervention increase in the total knowledge score (P **Multinomial logistic regression model for circumcision status**

Using the personal data section of the questionnaire, we conducted a secondary analysis to measure links between demographics and whether participants had undergone FGM or not. We constructed a multinomial logistic regression model using the FGM status as the dependent variable, and tribe, acceptability of the practice and baseline knowledge score as the independent variables. Without the addition of tribe, acceptability or baseline knowledge score, the odds of not having undergone FGM is 0.988 (P = 0.913). The addition of tribe, acceptability of the practice and baseline knowledge score improved the fit of the model, and the predicted P-values for these variables were P = 0.003, P

Moreover, the relationship between the variables and the FGM status of the respondent was statistically significant (P

Moreover, we found that a respondent from the Jaalia tribe had odds of identifying of not have undergone FGM of 1.45 (P = 0.39). This means that members of the Jaalia tribe were more likely to have undergone FGM in comparison to other tribes. lastly, we found that with every point increase in the baseline knowledge score, odds of not have undergone FGM are multiplied

by 1.35. This means that as the knowledge score increases, the odds of not identifying of having undergone FGM also rise.

Discussion

This is a school-based quasi-experimental study in Karari locality, Sudan. The participants of the study received a health education intervention regarding the types and complications of FGM. Study participants self-reported lower rates of FGM. Moreover, we found statistically significant improvements in the levels of knowledge and attitudes of the study participants surrounding FGM.

The study revealed a FGM prevalence of 30.3% among female students of selected primary and secondary schools in Karari locality of Khartoum state, which was lower when compared to the prevalence documented by Sudan multiple indicator cluster survey (86.6%) (4). This result was also lower than the FGM prevalence reported by other studies, for example in rural areas of Nigeria (49.6%) (13), nationwide in Sierra Leone (94%) (14), in selected areas of eastern Ethiopia (90%) where Muslims make up 84% of the study participants (15), and in Hormozgan in the southern region of Iran (68.5%) where Muslims form all study participants (16). However, this lower result might be due to reticence by females at this age to give such information, even with assurances of anonymity. Moreover, this result should be interpreted carefully as the study participants lived in an urban area, in contrast to the general Sudanese population which mostly lives in rural areas.

Our study showed that the main source of information about FGM was family and friends for 41.2% of students. Similar results were documented by two studies conducted in Nigeria and Oman, which reported that major sources of information on reproductive health issues were friends (9) and family (17), respectively. This demonstrates the impact that society has on an individual’s perception and knowledge of their surroundings. Furthermore, this result shows the need to design and implement educational material about FGM for students, and introduce such topics in the school curriculum to ensure adolescents receive science-based information about this topic. The incorporation of reproductive health education in the school curriculum will improve the quality and accuracy of such information available and help address some of the reproductive health problems to which adolescents are exposed due to ignorance (9).

In the pre-intervention phase, students showed poor knowledge about FGM types. However, most of students showed good knowledge about certain FGM complications (bleeding, delivery problems and recurrent infections). This result is similar to those reported by Herieka et al. and Ibekwe Perpetus et al. (18,13). In contrast, nearly one third of students did not recognize psychological problems, infertility and sexual problems as FGM complications. Unlike the

Herieka et al. study, which reported 94.2% of female university students were aware of the sexual and fertility complications caused by FGM (18). The better knowledge about sexual and fertility complications may be attributed to the age difference between participants in each study; the mean age in Herieka et al. study was 20.2 (18), yet 15.04 years old in our study, and it is noteworthy that it is socially unacceptable in Sudan to discuss sexual issues with teenagers. Moreover, our study reported that 3.9% of students did not know any of the complications, unlike the Ibekwe Perpetus C. et al. study conducted in Nigeria, which revealed 36.2% of participants did not know of any of FGM complications (13).

Pre-intervention analysis

In the pre-intervention phase, nearly 20% of students thought that a girl who had undergone FGM is more chaste than a girl who did not, and 20.8% thought that FGM is related to personal hygiene. Similarly, a study in Sierra Leone revealed that 21.7% of female respondents thought that FGM enhances a women's cleanliness (14). In contrast, only 14.06% of respondents in the Ibekwe Perpetus C et al. study believed that FGM increased female hygiene (13).

We found that 76% of students thought that FGM is not a religious practice. Similar results were documented by Herieka et. al and Hussein et. al in Sudan and Ethiopia (15,18). Conversely, in Sierra Leone 43% of female respondents believed that FGM is a religious requirement (14). Furthermore, 59.5% of respondents in our study considered FGM an illegal practice. In comparison, the Herieka et al. study in 2003 documented a lower awareness, since only 46.9% of respondents knew FGM was an illegal practice in Sudan (18).

All discrepancies in knowledge of FGM within our study participants could be attributed to the lack of educational material regarding this topic in school curricula and the relative reliance of students on other sources of information to acquire knowledge about FGM.

Overall attitude regarding FGM

Our study revealed that the majority of respondents had negative attitudes toward FGM. Most of the students (89%) indicated that they will not subject their daughters to FGM; 81.2% of them would disagree if one of the family want to practice FGM; 83% would advise their family members not to practice FGM; 80.5% would encourage legislation that prohibits FGM; 76.6% of the participants would agree to join activities that aim to stop FGM; and 86.4% percent of students support FGM discontinuation.

Similar results were reported in Sudan, Ethiopia and Nigeria (13,15,19). In contrast, 80% of

Omani adolescents support continuation of FGM, and only one quarter of women in Sierra Leone supported discontinuation of FGM (14,17). The attitude among Sudanese students might be due to efforts made by governmental and non-governmental organizations to educate the public about FGM and are encouraging further efforts to be made. For example, one of the most famous campaigns that aims to discontinue FGM in Sudan is the national “Saleema” campaign, which was launched by the National Council for Child Welfare (NCCW) and The United Nations Children’s Fund (UNICEF) in 2008 (20). The campaign focuses on positive messages and elevates the value of not practicing FGM. The campaign uses traditional language and local arts; hence, the message is easy to understand by the whole community regardless of their age or educational level. Additionally, the use of national TV and local radio enabled the message to be delivered to a large segment of the population. Awareness, beliefs and sociocultural factors directly affect personal attitudes, which in turn shape the individual’s behaviour. Concerning FGM practice, the literature reported that the more educated the parents, the less likely they are to have their daughters suffer FGM (21), which will affect FGM practice in the future.

Post-intervention analysis

Our study also revealed that health education interventions may have a positive effect on both the knowledge and attitude of students. The mean score for students’ knowledge about FGM increased from 8.6 (pre-intervention) to 11.9 (post-intervention), and their mean scores on attitudes increased from 5.7 before the educational session to 6.5 after. The difference between pre-and post-intervention scores of both knowledge and attitude were statistically significant (P

However, this positive attitude change towards FGM might not be translated into a decrease in the level of FGM practice in the future. Many studies have shown that a health education intervention programme alone usually is not sufficient to achieve the kind of behavioural change that will lead to discontinuation of a complex practice such as FGM. In behaviour change communication, health communication goes beyond developing the right messages for any particular audience; it recognizes that behavioural change may also require skill-building. Studies have shown that the practice still persists despite an increased awareness and increased general negative attitude towards it (24). This can be attributed to the fact that FGM is usually advocated for by older women in the family despite the younger parents’ disagreement. However, other studies have shown that placing FGM elimination efforts within a comprehensive development strategy and a larger context of reproductive health and gender education is the most effective approach to eliciting behavioural change (21).

Study limitations

Generalizability of the study results to the whole country, even for Khartoum state, would be difficult since the study spanned only one locality. Additionally, the intervention was tailored to the specific age group and may not result in similar effect in other age groups. We originally had planned a second re-evaluation of the knowledge and attitude of the students (after three months and after six months), however, time constraints on schools prevented this from

happening due to midterm examinations. Different forms of health education may give different results; also the knowledge, character and personality of the health educator may affect the results.

Conclusion

Notwithstanding these limitations, school-based health education has a positive impact on both the knowledge and attitude of female students towards FGM in Sudan. As such, introducing health education about the complications of FGM in curricula of secondary schools in Sudan has the potential to improve students' knowledge and attitudes. Ultimately, such intervention can help reduce the prevalence of the practice.

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Competing interests: None declared.

Effets de l'éducation sanitaire en milieu scolaire sur les attitudes des élèves filles à l'égard des mutilations sexuelles féminines au Soudan

Résumé

Contexte : La pratique des mutilations sexuelles féminines est très répandue au Soudan. Au fil des ans, le gouvernement, la société civile et la communauté internationale ont mis en œuvre de multiples interventions pour s'attaquer à ce problème. Toutefois, en raison d'un certain nombre de facteurs culturels et éducatifs, cette pratique néfaste perdure.

Objectifs : La présente étude visait à évaluer les effets d'une intervention d'éducation sanitaire dans des écoles secondaires sur les connaissances et l'attitude des élèves filles face aux mutilations sexuelles féminines au Soudan.

Méthodes : Nous avons mené une étude quasi-expérimentale dans la localité de Karary, dans l'État de Khartoum au Soudan. Une technique d'échantillonnage à plusieurs degrés a été utilisée pour déterminer les écoles ciblées. Dans les écoles, les élèves de deux classes choisies de manière aléatoire ont bénéficié de l'intervention. L'étude comportait trois phases ; dans la phase pré-intervention, les données ont été recueillies auprès de l'ensemble des élèves (154 élèves) à l'aide d'un questionnaire prétesté, à la suite de quoi les élèves ont bénéficié de

séances d'éducation sanitaire. Le même questionnaire a été utilisé pour collecter à nouveau des données dans une phase post-intervention six semaines plus tard.

Résultats : Les participantes étaient âgées de 14 à 17 ans, dont 30,3 % avaient subi une mutilation sexuelle. La principale source d'information sur ces mutilations était la famille et les amis (41,1 %). La majorité des participantes avaient une attitude négative à l'égard des mutilations sexuelles féminines. Les moyennes des notes relatives aux connaissances et aux attitudes sont passées de 8,63 (écart-type = 2,562) et 5,76 avant l'intervention (écart-type = 1,937) à 11,99 (écart-type = 2,264) et 6,53 après l'intervention (écart-type = 1,164), respectivement.

Conclusions : L'éducation sanitaire en milieu scolaire a un impact positif sur les connaissances et l'attitude des élèves filles face aux mutilations sexuelles au Soudan. Ainsi, l'introduction de l'éducation sanitaire concernant les complications des mutilations sexuelles féminines dans les programmes des écoles secondaires au Soudan permet potentiellement d'améliorer les connaissances et l'attitude des élèves. En fin de compte, de telles interventions peuvent aider à réduire la prévalence de la pratique lorsque les élèves deviennent responsables de futures familles.

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أسلوب أخذ عينات متعدد المراحل لتحديد المدارس المستهدفة . وطُبِّق التدخل على طالبات
فصلين مختارين بشكل عشوائي داخل مدارسهن . وشملت الدراسة ثلاث مراحل؛ في مرحلة ما قبل
التدخل، تم جمع البيانات من جميع الطالبات (154 طالبة) باستخدام استبيان مُختبر
مسبقًا، وبعدها حصلت الطالبات على جلسات التثقيف الصحي . كما استُخدم نفس الاستبيان في
إعادة جمع البيانات في مرحلة ما بعد التدخل بعد مرور 6 أسابيع .

: تراوحت أعمار المشاركات بين 14 و17 عامًا، وخضعت 30.3% منهن إلى تشويهالنتائ ج
الأعضاء التناسلية الأنثوية وكان المصدر الرئيسي للمعلومات حول الختان هو العائلة
والأصدقاء (41.1%). واتخذ أغلب المشاركات موقفًا سلبيًا تجاه الختان . وازدادت درجات
وسائل المعرفة والموقف من 8.63 (SD =2.562) و5.76 قبل التدخل (SD=1.937) إلى 11.99
(SD=2.264) 6.53 التدخل بعد (SD=1.164) ، على التوالي .

: يتسم التثقيف الصحي المدرسي بتأثيره الإيجابي على معرفة الطالباتالاستنتاجات
وموقفهن تجاه تشويه الأعضاء التناسلية الأنثوية في السودان . وعليه، يمكن أن يؤدي
إدخال التثقيف الصحي حول مضاعفات الختان في المناهج الدراسية للمدارس الثانوية في
السودان إلى تحسين معلومات واتجاهات الطالبات تجاه هذه المشكلة . وفي النهاية، ستساعد
التدخلات على تخفيض معدل انتشار هذه الممارسة عندما تصبح الطالبات مسؤولات عن
عائلاتهن في المستقبل .

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