scientific reports

Check for updates

OPEN

Mental health outcomes and post-traumatic stress disorder associated with female genital mutilation

Esra Keles[1,2], Yıldız Bilge[3], Mustafa Öztürk[1], Guven Bektemur[1], Hasan Huseyin Eker[1,4], Umut Erkok[5]✉, Samira Hassan Mohamed[5] & Khadija Yusuf Ali[5]

The aim of this study was to examine mental health outcomes associated with FGM and identify possible predictors for the development of post-traumatic stress disorder (PTSD) in women affected by Female Genital Mutilation (FGM). A cross-sectional study was conducted among women who attended to Somalia Mogadishu Research and Training Hospital. Brief Resilience Scale, National Stressful Events Questionnaire for PTSD-Short Scale, Brief Symptom Inventory (BSI), Childhood Trauma Questionnaire—Short Form, Satisfaction with Life Scale, were used to collect data. Assessments of 180 women who underwent FGM revealed significant positive correlations between post-traumatic stress disorder (PTSD) symptoms and Brief Symptom Inventory (BSI) subscales ($r = 0.32–0.52$, $p < 0.01$). Key predictors of PTSD severity included trauma history, sexual dysfunction, unanticipated FGM procedures, and maternal or grandmother decision-making ($\beta = 0.45$, $p < 0.001$; $\beta = 0.32$, $p < 0.01$; $\beta = 0.28$, $p < 0.05$; $\beta = 0.34$, $p < 0.01$). Psychological resilience served as a protective factor against PTSD ($\beta = -0.22$, $p < 0.05$). Childhood trauma, especially physical and sexual abuse, showed strong positive correlations with PTSD and other psychological symptoms ($r = 0.32–0.52$, $p < 0.01$). Key predictors of psychological distress included emotional neglect ($\beta = -0.28$, $p < 0.01$), fear of violence ($\beta = 0.22$, $p < 0.05$), and low psychological resilience ($\beta = -0.22$, $p < 0.05$). The study showed that women with FGM presents with substantially higher levels of PTSD. The primary decision-makers in the practice of FGM are predominantly mothers and grandmothers.

Keywords Childhood trauma, Female genital mutilation, Mental health, Post traumatic stress disorder, Resilience, Somalia

Female Genital Mutilation (FGM) involves procedures that partially or totally remove female genitalia for non-medical reasons. An estimated 200 million women and girls globally have undergone FGM, with 3 million at risk annually[1]. While prevalent in over 30 African nations, as well as parts of Asia and the Middle East, Somalia reports the highest rates globally, with over 98% of women aged 15–49 having undergone the procedure[2]. Despite being widely recognized as a violation of human rights, FGM persists as a significant socio-cultural norm, often carried out by traditional practitioners[3]. The urgency to eliminate such harmful practices is underscored by the 2030 Sustainable Development Goals (SDGs), specifically Target 5.3, which calls for global action to achieve gender equality[1].

Although the physical health consequences of FGM, including severe pain, hemorrhage, infections, urinary tract issues, and complications during childbirth, have been extensively documented[1], the psychosocial and relational outcomes, particularly in endemic regions, remain understudied[3].

Studies have increasingly linked FGM to adverse mental health outcomes, including depression, anxiety, somatization, and post-traumatic stress disorder (PTSD), with Type III (infibulation) associated with particularly

[1]Department of Public Health, Hamidiye Faculty of Medicine, University of Health Sciences, Istanbul 34668, Turkey. [2]Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, Kartal City Hospital, University of Health Sciences, Istanbul 34865, Turkey. [3]Department of Psychology, Hamidiye Faculty of Life Sciences, University of Health Sciences, Istanbul 34668, Turkey. [4]Department of Public Health, Mogadishu Somalia-Turkey Recep Tayyip Erdoğan Training and Research Hospital, University of Health Sciences, Mogadishu, Somalia. [5]Department of Obstetrics and Gynecology, Mogadishu Somalia-Turkey Recep Tayyip Erdoğan Training and Research Hospital, University of Health Sciences, Mogadishu, Somalia. ✉email: drumuterkok@gmail.com

severe outcomes[4]. Psychological responses are influenced by factors such as age at the time of cutting, memory of the event, cultural attitudes, and trauma-related emotions like shame and guilt[4].

Existing studies have explored the relationship between FGM and PTSD. Knipscheer et al.[5] identified infibulation (WHO Type III), a clear recollection of the event, and maladaptive coping mechanisms such as substance misuse as significant predictors of heightened PTSD symptoms. In contrast, Vloeberghs et al.[6] found that factors like informed consent, prior discussion about the procedure, and older age at the time of FGM were associated with higher PTSD scores, a finding that contrasts with Köbach et al.[7], who reported elevated cortisol levels in women who underwent Type I FGM before the age of one year. These diverse findings highlight the complex and multifactorial nature of trauma responses following FGM, although systematic research in this area remains limited[8]. Qualitative studies conducted with women who have undergone FGM consistently describe the practice as traumatic, characterized by intense fear, helplessness, and pain[9].

From a diagnostic perspective, FGM aligns with the criteria for PTSD as outlined in the DSM-5, encompassing symptom clusters such as intrusive re-experiencing, avoidance behaviors, negative alterations in cognition and mood, and hyperarousal[7,10]. Furthermore, comorbid psychiatric conditions, including depression, affective disorders, anxiety disorders, somatization disorder and PTSD, are frequently observed in individuals who have experienced trauma, including FGM[2]. Despite this alignment, empirical research specifically investigating the association between FGM and PTSD within practicing communities remains limited[11]. A review by Mulongo et al.[12] found that only a small fraction of the extensive literature on FGM addressed psychological outcomes, with very few studies meeting rigorous methodological standards. In a study conducted in Senegal, Behrendt and Moritz[9] reported a significantly higher prevalence of PTSD among women who had undergone FGM compared to those who had not. Similarly, Knipscheer et al.[5] found clinically significant PTSD symptoms, as well as anxiety and depression, in over a third of their sample of immigrant women in the Netherlands with a history of FGM.

A significant gap exists in the literature, as most studies examining the psychological impact of FGM have focused on immigrant populations residing in Western contexts[13]. This overlooks the experiences of women within practicing communities, who often face unique sociocultural pressures and have limited access to mental health services[13]. This study addresses this gap by assessing the psychological consequences of FGM among Somali women living in Somalia. Therefore, the objectives of this study were to examine the associations between PTSD symptoms and other mental health outcomes, specifically obsessive–compulsive symptoms, depression, and anxiety, in Somali women who have undergone FGM, while also assessing the mediating roles of childhood emotional neglect and psychological resilience.

Methods

Study design and setting

This cross-sectional study was performed between January and March 2023 at the Obstetrics and Gynecology Department of the Mogadishu Somali-Turkey Recep Tayyip Erdoğan Training and Research Hospital, a 250-bed tertiary referral center in Mogadishu, Somalia.

Participants and recruitment

The study population consisted of Somali women aged ≥ 18 years with a history of FGM attending the obstetrics and gynecology outpatient clinics of the hospital. Women were excluded if they had an active psychiatric disorder requiring pharmacotherapy, were unable to understand or communicate in English, or declined participation.

Ethical considerations

The study protocol received approval from the Ethics Committee of the Mogadishu Somali-Turkey Recep Tayyip Erdoğan Training and Research Hospital (Approval No. 798; Ref. No. MSTH/14,542). All procedures complied with the ethical standards of the Declaration of Helsinki. Written informed consent was obtained from all participants prior to data collection. Participant confidentiality and anonymity were ensured throughout the study.

Sample size calculation

Sample size was calculated using G*Power (v. 3.1). For a multiple linear regression model, detecting a medium effect size ($f2 = 0.15$) with 95% statistical power ($1 - \beta = 0.95$) at a two-tailed significance level of $\alpha = 0.05$ required a minimum of 153 participants. Our final sample size ($N = 180$) exceeded this requirement.

Data collection and measures

Data were collected via face-to-face administration of a structured questionnaire. FGM type was ascertained by a clinical examination performed by a local obstetrician-gynecologist, utilizing the WHO classification system[1]. Participant anonymity was strictly maintained.

The questionnaire gathered information on: (1) sociodemographic characteristics (age, marital duration, parity, educational level, occupation, income); (2) FGM history (age at procedure, type, practitioner, decision-maker); (3) health outcomes including sexual dysfunction, obstetric complications, dysmenorrhea, and chronic pelvic pain; and (4) psychosocial factors such as perceived justification for FGM and attitudes regarding its cessation.

National stressful events survey PTSD short scale (NSESSS-PTSD)

The NSESSS-PTSD is a validated 9-item self-report instrument designed to assess PTSD symptom severity in adults (≥ 18 years) using a 5-point Likert scale (0–4 per item; total score range: 0–36). Elevated scores denote increased symptom severity, with robust internal consistency (Cronbach's $\alpha = 0.91$) reported in prior validation studies[14].

Brief symptom inventory (BSI)

It is a 53-item self-report tool by Derogatis (1992) that evaluates psychological symptoms across nine subscales (Somatization, Obsession-Compulsion, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism) via 5-point Likert scale (0–4). Subscale scores reflect symptom intensity, with established reliability (Cronbach's $\alpha = 0.71–0.85$) and discriminant validity in clinical populations[15].

Childhood trauma questionnaire—short form (CTQ)

Bernstein et al.'s 28-item CTQ evaluates five childhood trauma subtypes (emotional/physical/sexual abuse, emotional/physical neglect) and total trauma exposure. Items are scored on a 5-point Likert scale (1–5), with subtype-specific thresholds for severity classification. The tool demonstrates strong internal consistency ($\alpha = 0.79–0.94$) and convergent validity[16].

Brief resilience scale (BRS)

Smith et al.'s 6-item BRS assesses psychological resilience via a 5-point Likert scale (1–5), incorporating balanced wording (three positive/three negative items). Total scores range from 1–5, with higher values indicating greater resilience ($\alpha = 0.80–0.91$)[17].

Statistical analysis

Descriptive statistics were computed as frequencies and percentages for categorical variables, and means, standard deviations, minimum, and maximum values for numerical variables. The normality of continuous variables was assessed via skewness and kurtosis values, with parametric or non-parametric methods applied as appropriate. Group differences for nominal data were evaluated using the Chi-square (χ^2) test. For comparisons of continuous variables between two independent groups violating normality assumptions, the Mann–Whitney U test was employed. Correlations between continuous variables were analyzed via Pearson's Product-Moment Correlation. To determine the extent to which PTSD symptoms and psychological symptoms were predicted by childhood trauma and psychological resilience, multiple linear regression analysis was conducted.

Three primary regression models were constructed, aligned with the study's objectives. In all models, PTSD was designated as the independent variable. Model 1 examined the effect of PTSD on obsessive–compulsive symptoms, with resilience (assessed via the Childhood Psychological Resilience Scale, CPRS) and childhood emotional neglect (assessed via the Childhood Trauma Questionnaire-Emotional Neglect subscale, CTQ-EN) as mediators. Model 2 evaluated PTSD's effect on depression, using the same mediators (CPRS and CTQ-EN). Model 3 assessed PTSD's influence on anxiety, again incorporating CPRS and CTQ-EN as mediators.

Multicollinearity was tested using the Variance Inflation Factor (VIF). VIF quantifies the correlation between independent variables; values exceeding 10 indicate significant multicollinearity. In this study, VIF values ranged between 1 and 3, confirming minimal multicollinearity and robust model reliability.

Regression analyses were performed using Hayes' (2013) Process Macro, with direct and indirect effects examined across all models[18]. Bootstrap resampling (5000 iterations) tested the significance of indirect effects. All analyses were conducted at a significance level of $\alpha = 0.05$ using SPSS v.25.

Results

Sociodemographic characteristics of participants

The study included 180 women with FGM aged 18–53 years (mean age: 30.7 ± 7.2). The majority underwent FGM between ages 7–11 (57.8%, n = 104), while 30.6% ($n = 55$) and 11.7% ($n = 21$) experienced it during early childhood (6 months–6 years) or adolescence (12–22 years), respectively. Marital duration varied, with 33.9% (n = 61) married for 0–5 years. Nearly half (44.9%, n = 81) had four or more children. The educational attainment of participants varied, with 26.1% (n = 47) completing primary school, 18.3% (n = 33) middle school, and 22.8% (n = 41) higher education. The majority (77.2%, n = 139) resided in urban areas, and 72.8% (n = 131) identified as housewives (Table 1).

Perspectives on female genital mutilation

Participants cited various socio-cultural and religious justifications for undergoing FGM, with the most common being religious obligation (31.1%, n = 56), followed by tradition and customs (20.0%, n = 36), social pressure (13.8%, n = 25), preservation of virginity (11.1%, n = 20), and control over sexual desire (10.0%, n = 18), and 4.4% (n = 8) associated the practice with social acceptance (Table 2).

Emotional responses to female genital mutilation

On the day of the procedure, 58.9% (n = 106) of respondents reported feelings of "extreme fear and trauma," while 17.8% (n = 32) reported feelings of "happiness and joy." During the procedure itself, 60.6% (n = 109) described experiencing "fear, panic, and severe pain" (Table 2).

Physical consequences of female genital mutilation

The data demonstrate that long-term physical complications are prevalent, with 43.9% (n = 79) of participants reporting persistent health sequelae. Childbirth-related complications were the most frequently cited (47.8%, n = 86), followed by dysmenorrhea (47.8%, n = 86) and menorrhagia (33.3%, n = 60). Furthermore, 41.7% (n = 75) of the participants reported sexual dysfunction, including dyspareunia and reduced sexual desire, while 31.7% (n = 57) experienced chronic pelvic pain. The analysis also revealed additional morbidities, including vulvar pruritus (21.1%, n = 38), recurrent genitourinary infections (43.3%, n = 78), dysuria (37.8%, n = 68), impaired fertility (22.8%, n = 41), and structural genital abnormalities (18.9%, n = 34).

	n	%
Age of FGM/C		
6 month-6 age	55	30.6
7–11 age	104	57.8
12–22 age	21	11.7
Duration of marriage		
0–5 years	61	33.9
6–10 years	45	25.0
11–20 years	54	30.0
21–33 years	20	11.1
Number of children		
0	34	18.9
1 child	28	15.6
2–3 children	37	20.6
4-above	81	44.9
Marital status		
Single	20	11.1
Married	133	73.9
Divorced/widowed/ seperated	27	15.0
Educational level (n = 176)		
Primary school	47	26.1
Secondary school	33	18.3
Tertiary (College/University)	41	22.8
No formal school	55	30.6
Reside/stay (n = 177)		
Urban	139	77.2
Rural	33	18.3
Internally displaced persons (IDPs)	5	2.8
Occupation (n = 177)		
House wife	131	72.8
Merchant	2	1.1
Governmental employee	7	3.9
Private employee	24	13.3
Daily laborer	3	1.7
Pastoralist/other	10	5.6
Income (n = 178)		
Income is less than expenses	62	34.4
Income is equal to expenses	108	60.0
Income is more than expenses	7	3.9
Husband Education (n = 176)		
Primary school	15	8.3
Secondary school	42	23.3
Tertiary (college/university)	67	37.2
No formal school	52	38.9
Husband occupation		
Farmer /pastoralist	10	5.6
Merchant	11	6.1
Governmental employee	32	17.8
Private employee	59	32.8
Daily laborer	35	19.4
No job	33	18.3

Table 1. Baseline sociodemographic characteristics (n = 180). Data are presented as number (n) and percentages (%).

	n	%
Type of FGM (n = 180)		
Type I FGM	41	22.8
Type II FGM	37	20.6
Type III FGM	76	42.2
Type IV FGM	24	13.3
Person performed the circumcision (n = 176)		
Traditional cumciser	145	80.6
Trained midwife/nurse	26	14.4
Doctor/other healthcare personnel/a traditional birth attendant/One of the relatives	5	2.8
Decision-maker for FGM (n = 177)		
Mother	129	71.7
Grandmother	31	17.2
Father/Grandfather/Aunt	17	9.4
Your think about FGM (n = 179)		
Religious requirement	56	31.1
Custom and tradition	36	20.0
Public pressure	25	13.8
Protection of virginity	20	11.1
Control sexual desire	18	10.0
For social acceptance	8	4.4
For beauty and cleanliness/ teaching about life and marriage/ family honour	16	9.2
Your satisfied being FGM (n = 178)		
Yes	78	43.8
No	100	55.9
Which preferred word related to FGM? (n = 178)		
Positive	76	42.2
Negative	102	56.7
Should female circumcision be? (n = 178)		
Continued	69	38.3
Stopped	101	56.1
No comment	8	4.4
About the day of your circumcision (n = 178)		
Happy, cheerfull (1)	32	17.8
2	1	0.6
3	37	20.6
4	2	1.1
Extremely appalling and traumatizing (5)	106	58.9
Your feel during the procedure (n = 179)		
Happy, painless (1)	37	20.6
2	2	1.1
3	29	16.1
4	2	1.1
Horror, fear and severe pain (5)	109	60.6
Does continued the negative effects of FGM? (n = 175)		
Yes	68	37.8
No	83	46.1
No comment	24	13.3
How the FGM event was performed? (n = 179)		
Unexpectedly and without any preliminary explanation	102	56.7
Unexpectedly and with preliminary explanation	27	15.0
Expectedly and with preliminary explanation	31	17.2
Expectedly and without any preliminary explanation	19	10.6

Table 2. FGM-related characteristics of the study participants. Data are presented as number (n) and percentages (%).

Views on the continuation of FGM

The findings of the study indicated that 43.8% of the participants reported satisfaction with undergoing FGM, while 55.9% expressed dissatisfaction. In terms of terminology preference, 42.2% of the participants favored positive descriptors for FGM, whereas 56.7% preferred negative words. Regarding the continuation of the practice, 38.3% of the participants supported its perpetuation, while 56.1% advocated for its cessation. An additional 4.4% of participants did not offer a opinion on the subject (Table 2).

FGM implementation and decision-making

Mothers were the primary decision-makers for FGM (71.7%, $n=129$), followed by grandmothers (17.2%, $n=31$); fathers, grandfathers, or aunts constituted 9.4% ($n=17$). Most participants (56.7%, $n=102$) underwent FGM unanticipatedly without prior explanation, while 15.0% ($n=27$) experienced unanticipated procedures with explanation. Anticipated procedures occurred with explanation (17.2%, $n=31$) or without (10.6%, $n=19$). (Table 2).

PTSD symptoms exhibited significant positive correlations with all Brief Symptom Inventory (BSI) dimensions ($r=0.23$–0.37, $p<0.01$) and a negative association with resilience ($r=-0.27$, $p<0.01$). BSI subscales demonstrated strong intercorrelations, including somatization with obsessive–compulsive symptoms ($r=0.67$, $p<0.01$) and depression with anxiety ($r=0.69$–0.70, $p<0.01$).

Bidirectional relationships between PTSD and psychological symptoms were assessed via multiple linear regression. Predictors (sociodemographics, childhood trauma subtypes, resilience) were modeled bidirectionally: PTSD symptoms as the dependent variable with psychological symptoms as predictors, and vice versa. All predictors (nominal, ordinal, continuous) were entered simultaneously using stepwise selection, following confirmation of regression assumptions (VIF < 10, tolerance > 0.20). The PTSD symptom model explained 23.6% of variance ($R^2=0.236$, $F(4,122)=10.74$, $p<0.001$), with dysmenorrhea ($\beta=0.22$, $t=2.57$, $p<0.05$) and traumatic life experiences ($\beta=0.26$, $t=3.20$, $p<0.001$) identified as significant positive predictors of PTSD symptoms. Resilience inversely predicted PTSD severity ($\beta=-0.19$, $p<0.05$). Interpersonal sensitivity (BSI-IS; $\beta=0.17$, $t=2.11$, $p<0.05$) also contributed positively to PTSD severity.

In the first model, it was significant the direct effect of PTSD, which is the independent variable, on BRS (a_1) (B = −0.24, SE = 0.06, t = −3.68, $p<0.001$ and 95% CI [−0.39 to −0.11]) and of direct effect on CTQ-EN (a_2) (B = −0.06, SE = 0.03, t = −2.13, $p<0.001$ and 95% CI [−0.12 to −0.01]). In addition, obsessive compulsive symptoms, which is the dependent variable of the model, has a direct effect on BRS (b_1) (B = −0.08, SE = 0.04, t = −2.18, $p<0.001$ and 95% CI [−0.15 to −0.01]), and of direct effect on CTQ-EN (b_2) (B = −0.23, SH = 0.08, t = −2.72, $p<0.001$ and 95% CI [−0.39 to −0.06]). They were found to be significant the total effect on depression of PTSD (c) (B = 0.17, SE = 0.03, t = 5.29, $p<0.001$ and 95% CI [0.11–0.23]) and direct effect (c') (B = 0.14, SE = 0.03, t = 4.19, $p<0.001$ and 95% CI [0.07–0.20]). The bootstrap method was used to test whether the effect of the mediator variable was significant, and since the confidence intervals did not include zero, the total indirect effect on obsessive compulsive symptoms was found to be significant (B = 0.03, SE = 0.01 and 95% CI [0.01–0.06]) (Fig. 1). Additionally, the model was found to be significant, explaining 14% of the variance ($F(1,178)=27.98$, $p<0.05$).

In the second model, it was significant the direct effect of PTSD, which is the independent variable, on BRS (a_1) (B = −0.24, SE = 0.06, t = −3.68, $p<0.001$ and 95% CI [−0.39 to −0.11]) and of direct effect on CTQ-EN (a_2) (B = −0.06, SE = 0.03, t = −2.13, $p<0.001$ and 95% CI [−0.12 to −0.01]). In addition, depression, which is the dependent variable of the model, has a direct effect on BRS (b_1) (B = −0.04, SE = 0.03, t = −1.29, $p<0.001$ and

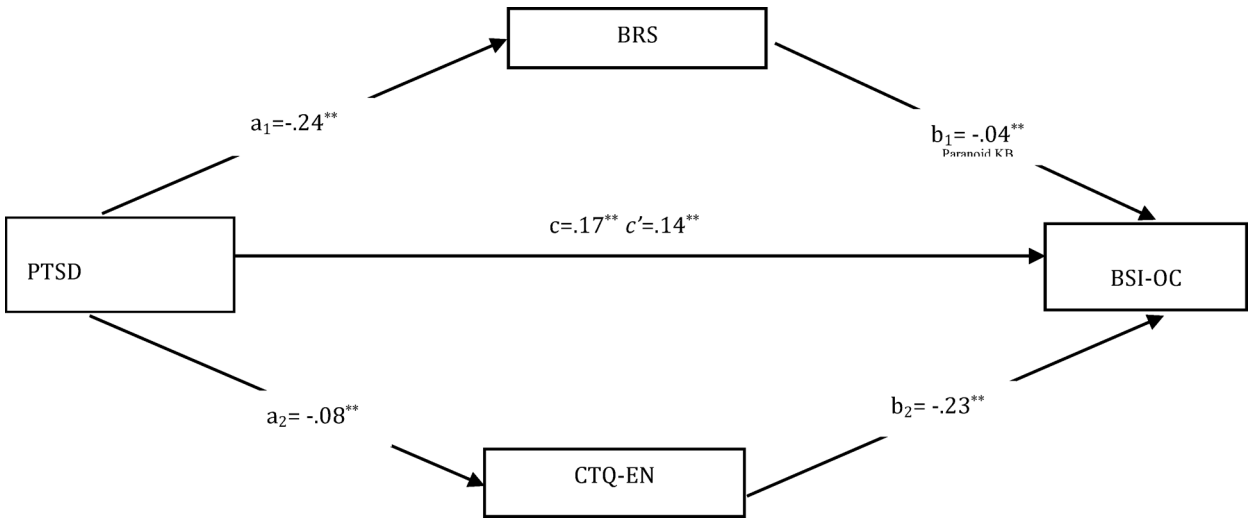


Fig. 1. Parallel mediation effect of resilience and CTQ-EN in the relationship between PTSD and obsessive–compulsive symptoms PTSD: National Stressful Events Survey for post-traumatic stress disorder, CTQ-EN: Childhood Trauma Questionnaire- Emotional Neglect, BRS: Brief Resilience Scale, BSI-O-C: BSI (Brief Symptom Inventory)- Obsession–Compulsion.

95% CI [−0.10 to −0.00]), and of direct effect on CTQ-EN (b_2) (B = −0.31, SH = 0.07, t = −4.51, $p < 0.001$ and 95% CI [−0.45 to −0.17]). They were found to be significant the total effect on depression of PTSD (c) (B = 0.09, SE = 0.03, t = 3.40, $p < 0.001$ and 95% CI [0.04–0.15]) and direct effect (c') (B = 0.06, SE = 0.03, t = 2.39, $p < 0.001$ and 95% CI [0.01–0.12]). The bootstrap method was used to test whether the effect of the mediator variable was significant, and since the confidence intervals did not include zero, the total indirect effect on depression was found to be significant (B = 0.03, SE = 0.01 and 95% CI [0.01–0.05]) (Fig. 2). Additionally, the model was found to be significant, explaining 6% of the variance (F(1,178) = 11.54, $p < 0.05$).

In the third model, it was significant the direct effect of PTSD, which is the independent variable, on BRS (a_1) (B = −0.24, SE = 0.06, t = −3.68, $p < 0.001$ and 95% CI [−0.39 to −0.11]) and of direct effect on CTQ-EN (a_2) (B = −0.06, SE = 0.03, t = −2.13, $p < 0.001$ and 95% CI [−0.12 to −0.01]). In addition, anxiety, which is the dependent variable of the model, has a direct effect on BRS (b_1) (B = −0.04, SE = 0.03, t = −1.23, $p < 0.001$ and 95% CI [−0.10 to −0.00]), and of direct effect on CTQ-EN (b_2) (B = −0.18, SH = 0.07, t = −2.55, $p < 0.001$ and 95% CI [−0.33 to −0.04]). They were found to be significant the total effect on anxiety of PTSD (c) (B = 0.10, SE = 0.03, t = 3.53, $p < 0.001$ and 95% CI [0.04–0.15]) and direct effect (c') (B = 0.08, SE = 0.03, t = 2.69, $p < 0.001$ and 95% CI [0.02–0.13]). The bootstrap method was used to test whether the effect of the mediator variable was significant, and since the confidence intervals did not include zero, the total indirect effect on aggression was found to be significant (B = 0.02, SE = 0.01 and 95% CI [0.00–0.04]) (Fig. 3). Additionally, the model was found to be significant, explaining 7% of the variance (F(1,178) = 12.47, $p < 0.05$).

Discussion

The study showed that women with FGM presents with substantially higher levels of PTSD. The primary decision-makers in the practice of FGM are predominantly mothers and grandmothers. Key predictors of PTSD include sexual dysfunction, trauma history, unanticipated FGM procedures, and maternal or grandmaternal decision-making. Psychological resilience serves as a protective factor. Additionally, childhood trauma—such as physical and sexual abuse and emotional neglect—correlates with heightened psychological symptoms in women with FGM, exacerbating their mental health challenges.

This study showed that elevated PTSD symptom severity among women with FGM, corroborating prior evidence of FGM as a risk factor for long-term trauma-related disorders[19,20]. Specifically, the study's findings indicate a significant correlation between childhood trauma, including physical, sexual abuse, and heightened psychological symptoms in women with FGM, thereby exacerbating their mental health challenges. Notably, childhood emotional neglect demonstrated a synergistic effect on psychological distress when it co-occurred with other forms of childhood adversities[5]. This interaction between different subtypes of childhood trauma and FGM-related PTSD underscores the concept of a cumulative trauma burden, where pre-existing adversities can amplify the psychological sequelae of subsequent traumatic events like FGM[7,21]. The identification of specific predictors of PTSD severity offers valuable targets for intervention and prevention efforts. Understanding that factors such as trauma history, sexual dysfunction, the unexpected nature of the procedure, and the involvement of mothers and grandmothers in the decision-making process are linked to increased PTSD severity allows for the development of more focused and effective interventions[10]. For instance, mental health services could prioritize addressing pre-existing trauma history through trauma-informed care approaches, acknowledge and provide support for sexual dysfunction, and develop culturally sensitive educational programs targeting mothers and grandmothers to raise awareness about the potential psychological consequences of FGM.

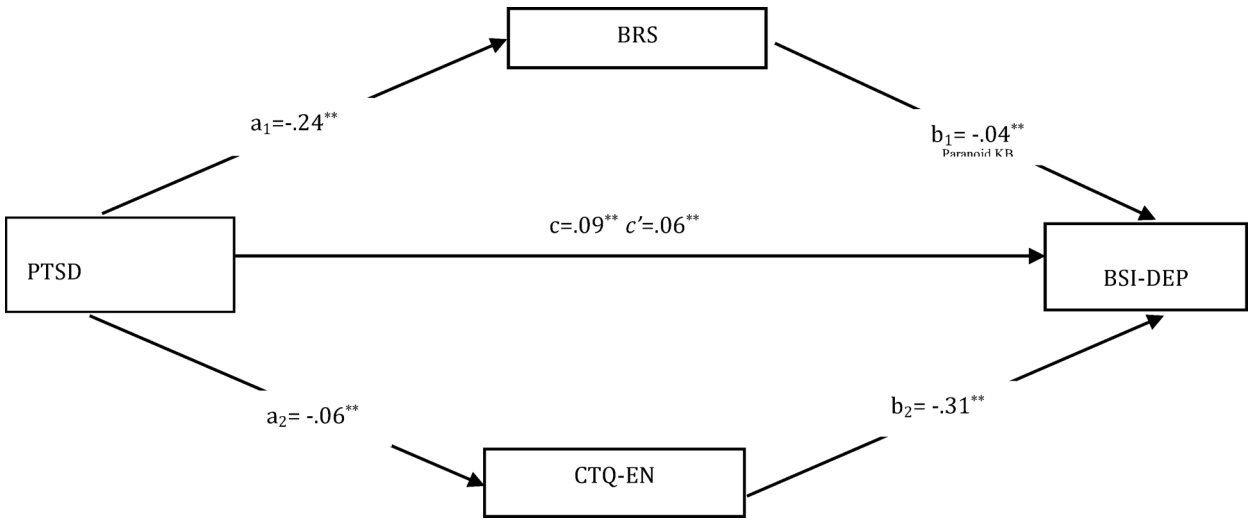


Fig. 2. Parallel mediation effect of resilience and CTQ-EN in the relationship between PTSD and depression. PTSD: National Stressful Events Survey for post-traumatic stress disorder, CTQ-EN: Childhood Trauma Questionnaire- Emotional Neglect, BRS: Brief Resilience Scale, BSI-DEP: BSI (Brief Symptom Inventory)-Depression.

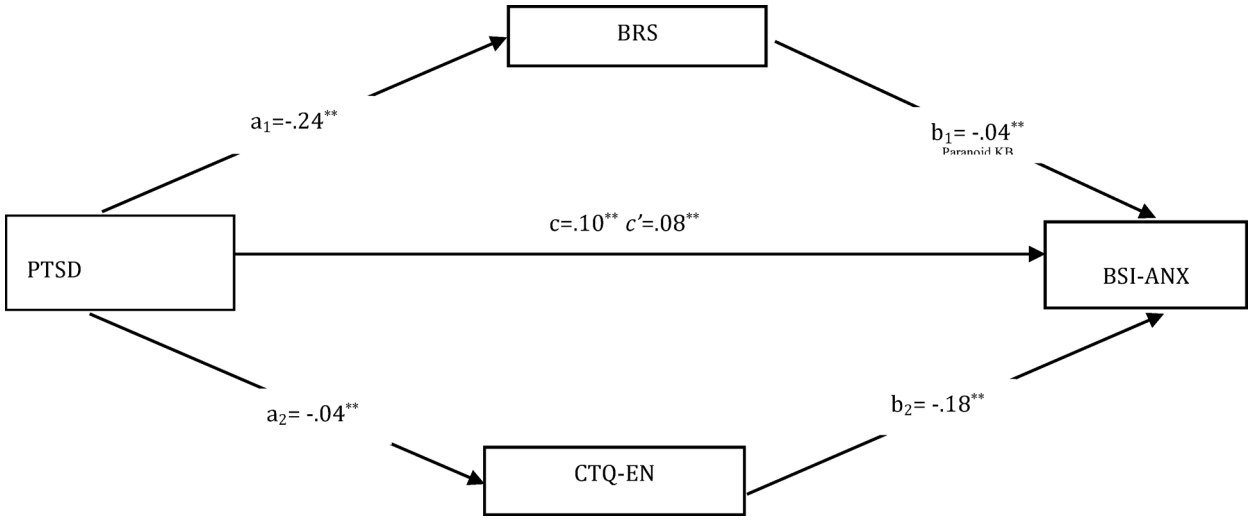


Fig. 3. Parallel mediation effect of resilience and CTQ-EN in the relationship between PTSD and anxiety. PTSD: National Stressful Events Survey for post-traumatic stress disorder, CTQ-EN: Childhood Trauma Questionnaire- Emotional Neglect, BRS: Brief Resilience Scale, BSI-ANX: BSI (Brief Symptom Inventory)-Anxiety.

The prevalence of PTSD and other psychological symptoms in the current study's Somali sample can be compared with rates reported in existing literature on FGM, both within African countries and among dispersed ethnic populations. Behrendt and Moritz (2005) found significant levels of probable PTSD in Senegalese women affected by FGM, with 30% of the FGM group meeting criteria for PTSD compared to none in the control group[9]. Similarly, Kizilhan et al. (2011) reported a significantly higher prevalence of PTSD (44.3%), depression (33.6%), and anxiety disorders (45.6%) in circumcised Kurdish girls in Northern Iraq compared to their uncircumcised counterparts[22]. Mulongo et al.'s (2014) systematic review of over 1000 articles on FGM highlighted negative psychosocial consequences, including PTSD, anxiety disorders, and depression, further supporting the link between FGM and psychological distress[23].

Studies focusing on migrant and refugee populations who have undergone FGM also report elevated rates of psychological symptoms. Abdalla and Galea's (2019) systematic review of asylum seekers found that 30% were diagnosed with PTSD, 20% with major depressive disorder, and 6% with generalized anxiety disorder[24]. Knipscheer et al. (2015) investigated immigrant women in the Netherlands and found that over a third of their sample with a history of FGM presented clinically significant PTSD symptoms, as well as anxiety and depression[5]. Reman et al.'s (2023) mixed-method systematic review also indicated a significantly higher prevalence of PTSD, depression, anxiety, and somatization in women who had experienced FGM compared to non-mutilated women[25]. The findings of the current study, indicating substantially higher levels of PTSD among Somali women with FGM, align with this general trend observed across various populations and geographical locations. The potentially higher rates observed in the Somali sample might be attributed to the high prevalence and often severe forms of FGM, particularly infibulation (Type III), prevalent in Somalia[26].

However, it is important to note a contrasting finding from a study by Heir T. et al. (2023) on Gambian girls, which suggested that other serious life events might be more influential than FGM in explaining high rates of PTSD in that specific population[27]. This discrepancy could be due to several factors, including the specific cultural context of the Gambia, the age of the participants (adolescent girls), and the potential for different patterns and frequencies of exposure to other traumatic events compared to the adult Somali women in the current study. It highlights the importance of considering the broader context of adversity when examining the psychological impact of FGM.

The predictors of PTSD identified in this study, including trauma history, sexual dysfunction, unanticipated procedure, and maternal/grandmother decision-making, show both consistency and variability when compared to existing research. Pechmann et al. (2016) and Knipscheer et al. (2015) identified older age at the time of FGM, feelings of guilt, and the centrality of the event in a woman's life as significant predictors of PTSD[5,28]. While the current study did not explicitly measure guilt or centrality, the predictor "trauma history" might encompass related experiences of past adversity. Knipscheer et al. (2015) also found that infibulation (Type III), a clear recollection of the event, and maladaptive coping mechanisms such as substance misuse were associated with heightened PTSD symptoms[5]. The significance of sexual dysfunction as a predictor in the current study could be linked to the high prevalence of infibulation in Somalia, which is known to cause long-term physical and emotional consequences affecting sexual health[29].

Interestingly, Vloeberghs et al. (2012) found that factors like informed consent, prior discussion about the procedure, and older age at the time of FGM were associated with higher PTSD scores, a finding that contrasts with the current study's finding that unanticipated procedures predicted greater PTSD severity[6]. This suggests that in the Somali context, the lack of preparation and agency associated with an unanticipated procedure might be more traumatic than undergoing the procedure at an older age. Mulongo et al.'s (2014) review also indicated

that the extent of cutting and the circumstances surrounding the procedure can influence psychological outcomes[23], which aligns with the current study's findings regarding unanticipated procedures and the role of maternal/grandmother decision-making, potentially reflecting a stronger cultural endorsement and less individual autonomy. The World Health Organization (2025) also highlights that the pain, shock, and sense of betrayal experienced during FGM can contribute to trauma[30], which could be exacerbated when the procedure is unexpected. The variability in predictors across studies underscores the complex and context-dependent nature of trauma responses following FGM.

The current study's finding that psychological resilience serves as a protective factor against PTSD is consistent with broader literature on trauma. Giraud et al.'s (2024) study on sexual and gender minority youth also found that resilience can attenuate the positive associations of microaggressions with both depression and anxiety[31]. Glover et al.'s (2017) qualitative research with FGM survivors highlighted that the fear resulting from FGM could negatively impact women's ability to enhance their resilience[32]. The current study provides quantitative support for the protective role of resilience, suggesting that a greater capacity to recover from stress can indeed mitigate the development of PTSD symptoms following FGM. This ability to bounce back from adversity, potentially involving effective coping mechanisms and a positive self-appraisal, might help women with FGM to manage the traumatic memories, physical discomfort, and social stigma associated with the practice, thus reducing their vulnerability to PTSD. Thus, interventions aimed at enhancing resilience may be a valuable component of support programs for affected women.

The findings of the study showed that approximately two-thirds of women reported experiencing pain during intercourse and a decrease in sexual desire. The pathophysiology is often attributed to genital scarring and anatomical distortion consequent to FGM, which compromise sexual function. Similarly, Berg et al. (2010) indicated that circumcised women were significantly more likely to experience painful intercourse (RR = 1.52; 95% CI 1.15–2.00) and a lack of sexual desire (RR = 2.15; 95% CI 1.37–3.36)[19]. Adverse outcomes such as low sexual satisfaction, impaired arousal, and anorgasmia were recurrent themes across studies, particularly among women subjected to FGM Types I and II, where scarring and infections were prevalent, and Type III, which is often associated with severe mechanical obstruction and chronic pain[33,34]. Despite these findings, the heterogeneity and methodological limitations of the included studies restricted the strength of the conclusions drawn. Several studies reported specific dysfunctions among circumcised women, including coital pain (31.5%), reduced sexual desire (49.6%), arousal difficulties (36%), and anorgasmia (16.9%). Other frequently cited concerns included vaginal dryness during intercourse (48.5%), infrequent sexual desire (28%), reduced sexual pleasure (49%), and difficulty achieving orgasm (60.5%)[35]. Collectively, these findings reinforce the urgent need for further high-quality research exploring the biopsychosocial consequences of FGM and informing targeted interventions.

Many women with FGM also experience other traumas, such as forced marriages and domestic violence, leading to polyvictimization[36,37]. This accumulation of trauma intensifies the psychological effects of FGM. Therefore, interventions to enhance sexual health must address both physical and psychological dimensions of care.

A key finding of the study is the significant role of cultural beliefs and family dynamics in perpetuating FGM practices. Many participants viewed FGM as an religious obligation, a deeply ingrained tradition, significant social pressure to conform, the perceived necessity of preserving virginity until marriage, and the belief that FGM helps control female sexual desire. A particularly salient finding was the decisions about FGM are primarily made by mothers or grandmothers, indicating the practice's deep-rooted and intergenerational nature[7,26,38,39]. The emotional responses reported by the women on the day of and during the FGM procedure further illuminate the subjective experience of this practice. A substantial majority of respondents described feelings of extreme fear and trauma, which contrasts with the small minority who reported feelings of happiness or joy. This discrepancy underscores the predominantly negative emotional valence associated with FGM, despite the socio-cultural rationalizations often provided to justify it. The high prevalence of unanticipated FGM procedures reported by the participants suggests a lack of agency and control experienced by these women, which likely contributes to the increased psychological trauma associated with the event. The feeling of being unprepared and uninformed about such a significant and invasive procedure can heighten feelings of helplessness, a key factor in the development of PTSD[40].

While this study provides valuable insights into the psychological examination of FGM on Somali women, it is important to acknowledge its strengths and limitations. A key strength lies in its focus on an understudied population within Somalia, providing compelling evidence from a high-prevalence setting. The use of validated measures enhances the reliability and comparability of the findings. However, the cross-sectional design limits the ability to establish causal relationships between FGM and mental health outcomes. The reliance on self-report measures introduces the potential for recall bias and social desirability bias, which could influence the accuracy of the reported experiences and symptoms. Additionally, the recruitment of English-speaking participants from a hospital setting may have introduced selection bias, potentially limiting the generalizability of the findings to all Somali women who have undergone FGM.

This study is crucial for understanding the psychological and cultural factors that sustain FGM in Somalia. Future research should prioritize longitudinal studies to examine the long-term psychological consequences of FGM and the trajectory of mental health outcomes over time. Investigating the effectiveness of various intervention strategies, such as resilience-based training and trauma-focused therapies, within the specific cultural context of Somalia is also crucial[15]. Qualitative research approaches would be valuable in gaining a deeper understanding of the lived experiences of Somali women who have undergone FGM, their unique coping mechanisms, and their perspectives on mental health and overall well-being[7]. Further research should also explore the mediating role of cultural factors and social support systems in the relationship between FGM and psychological distress, as well as in fostering resilience within this population. Finally, exploring the

perspectives of men and community leaders on FGM and its psychological consequences for women is essential for developing comprehensive and effective prevention strategies.

In conclusion, this study demonstrates that women with FGM exhibit significantly elevated PTSD symptom severity. Key predictors of PTSD included sexual dysfunction, childhood trauma exposure, unanticipated FGM procedures, and the decision-making of maternal or grandmaternal figures, reflecting entrenched intergenerational and sociocultural norms. Psychological resilience moderated PTSD severity, underscoring its role as a protective buffer against trauma sequelae. These findings advocate for multilevel interventions that integrate clinical care for FGM-related morbidity with community-based strategies to disrupt intergenerational trauma cycles and empower resilience-building.

Data availability

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

Received: 23 December 2024; Accepted: 22 May 2025
Published online: 03 June 2025

References

1. World Health Organization. Female genital mutilation [Internet]. Geneva: World Health Organization. [cited 2025 03 22]. (2024). Available from: https://www.who.int/news-room/fact-sheets/detail/female-genital-mutilation.
2. United Nations Children's Fund (UNICEF). A decade of action to achieve gender equality: The UNICEF approach to the elimination of female genital mutilation. (UNICEF, 2020). Available from: https://www.unicef.org/media/88751/file/FGM-Factsheet-2020.pdf
3. Sarayloo, K., Latifnejad Roudsari, R. & Elhadi, A. Health consequences of the female genital mutilation: A systematic review. *Galen Med. J.* **8**, e1336. https://doi.org/10.22086/gmj.v8i0.1336 (2019).
4. Alidost, F., Abbasi, M., Ghamsari, S. R. & Pakzad, M. Mental health disorders in circumcised Reproductive-age women, legal dimensions and prevention strategies: A narrative review. *Rev. Bras. Ginecol. Obstet.* **45** (5), 281–288. https://doi.org/10.1055/s-0043-1770130 (2023).
5. Knipscheer, J., Vloeberghs, E., van der Kwaak, A. & van den Muijsenbergh, M. Mental health problems associated with female genital mutilation. *BJPsych Bull.* **39** (6), 273–277. https://doi.org/10.1192/pb.bp.114.047944 (2015).
6. Vloeberghs, E., van der Kwaak, A., Knipscheer, J. & van den Muijsenbergh, M. Coping and chronic psychosocial consequences of female genital mutilation in the Netherlands. *Ethn. Health*. **17** (6), 677–695. https://doi.org/10.1080/13557858.2013.771148 (2012).
7. Köbach, A., Ruf-Leuschner, M. & Elbert, T. Psychopathological sequelae of female genital mutilation and their neuroendocrinological associations. *BMC Psychiatry*. **18** (1), 187. https://doi.org/10.1186/s12888-018-1757-0 (2018).
8. Atkinson, H. G., Ottenheimer, D. & Mishori, R. Public health research priorities to address female genital mutilation or cutting in the united States. *Am. J. Public. Health*. **109** (11), 1523–1527. https://doi.org/10.2105/AJPH.2019.305259 (2019).
9. Behrendt, A. & Moritz, S. Posttraumatic stress disorder and memory problems after female genital mutilation. *Am. J. Psychiatry*. **162** (5), 1000–1002. https://doi.org/10.1176/appi.ajp.162.5.1000 (2005).
10. Wulfes, N. et al. Cognitive-emotional aspects of post-traumatic stress disorder in the context of female genital mutilation. *Int. J. Environ. Res. Public. Health*. **19** (9), 4993. https://doi.org/10.3390/ijerph19094993 (2022).
11. Manuel, C., Fortunato, M. & Cativo, C. Psychological consequences of female genital Mutilation - A review. *Int. J. Psychol. Psychoanal.* **9**, 070. https://doi.org/10.23937/2572-4037.1510070 (2023).
12. Pa, M. The psychological impact of female genital mutilation/cutting (FGM/C) on Girls/women's mental health: A narrative literature review. *J. Reprod. Infant Psychol.* **32** (5), 469–485 (2014).
13. Johnson-Agbakwu, C. E., Fox, K. A., Banke-Thomas, A. & Michlig, G. J. Influence of female genital mutilation/cutting on health morbidity, health service utilization and satisfaction with care among Somali women and teenage girls in the united States. *J. Racial Ethn. Health Disparities*. **10** (2), 788–796. https://doi.org/10.1007/s40615-022-01266-x (2023).
14. LeBeau, R. et al. Dimensional assessment of posttraumatic stress disorder in DSM-5. *Psychiatry Res.* **218** (1–2), 143–147. https://doi.org/10.1016/j.psychres.2014.03.032 (2014).
15. Derogatis, L. R. & Melisaratos, N. The brief symptom inventory: an introductory report. *Psychol. Med.* **13** (3), 595–605 (1983).
16. Bernstein, D. P. et al. Development and validation of a brief screening version of the childhood trauma questionnaire. *Child. Abuse Negl.* **27** (2), 169–190. https://doi.org/10.1016/s0145-2134(02)00541-0 (2003).
17. Smith, B. W. et al. The brief resilience scale: Assessing the ability to bounce back. *Int. J. Behav. Med.* **15** (3), 194–200. https://doi.org/10.1080/10705500802222972 (2008).
18. Hayes, A. F. *Introduction to Mediation, Moderation, and Conditional Process Analysis* (Guilford, 2013).
19. Berg, R. C., Denison, E. & Fretheim, A., Psychological & Social and Sexual Consequences of Female Genital Mutilation/Cutting (FGM/C): A Systematic Review of Quantitative Studies. (Knowledge Centre for the Health Services at The Norwegian Institute of Public Health (NIPH); 2010 Jun. Report from Norwegian Knowledge Centre for the Health Services (NOKC) No. 13-2010.
20. Ahmed, M. R. et al. Psychological impact of female genital mutilation among adolescent Egyptian girls: A cross-sectional study. *Eur. J. Contracept. Reprod. Health Care*. **22** (4), 280–285. https://doi.org/10.1080/13625187.2017.1355454 (2017).
21. Tammary, E. & Manasi, K. Mental and sexual health outcomes associated with FGM/C in Africa: A systematic narrative synthesis. *EClinicalMedicine* **56**, 101813. https://doi.org/10.1016/j.eclinm.2022.101813 (2023).
22. Kizilhan, J. Impact of psychological disorders after female genital mutilation among Kurdish girls in Northern Iraq. *Eur. J. Psychiatry*. **25** (2), 92–100 (2011).
23. Mulongo, P., Hollins Martin, C. & McAndrew, S. The psychological impact of female genital mutilation/cutting (FGM/C) on Girls/women's mental health: A narrative literature review'. *J. Reprod. Infant Psychol.* **32** (5), 469–485. https://doi.org/10.1080/02646838.2014.949641 (2014).
24. Abdalla, S. M. & Galea, S. Is female genital mutilation/cutting associated with adverse mental health consequences? A systematic review of the evidence. *BMJ Glob. Health*. **4** (4), e001553. https://doi.org/10.1136/bmjgh-2019-001553 (2019).
25. Reman, T., Balligand, V., Schoefs, B., Feipel, V. & Bertuit, J. Psychological consequences of female genital mutilation: A mixed-method systematic review. *S Afr. J. Physiother.* **79** (1), 1877. https://doi.org/10.4102/sajp.v79i1.1877 (2023).
26. Keles, E. et al. Determinants of disagreement with female genital mutilation among mothers. *Int. J. Womens Health*. **14**, 1863–1870. https://doi.org/10.2147/IJWH.S391043 (2022).
27. Heir, T., Bendiksen, B., Minteh, F., Kuye, R. A. & Lien, I. L. Serious life events and associated PTSD in Gambian girls exposed to female genital cutting. *Front. Public. Health*. **11**, 1242270. https://doi.org/10.3389/fpubh.2023.1242270 (2023).
28. Pechmann, C. et al. Belastungsbewältigung Bei Frauen Mit FGM Aus Äthiopien – Zur Rolle der einstellung [Coping Process in Women with FGM from Ethiopia - The Contribution of Attitude]. *Psychother. Psychosom. Med. Psychol.* **66** (11), 421–428. https://doi.org/10.1055/s-0042-107803 (2016). German.

29. Esho, T. & Kumar, M. Mental and sexual health outcomes associated with FGM/C in Africa: A systematic narrative synthesis. *EClinicalMedicine* **56**, 101813. https://doi.org/10.1016/j.eclinm.2022.101813 (2023).
30. World Health Organization. Sexual and reproductive health and research (SRH). (World Health Organization, 2025). Available from: https://www.who.int/teams/sexual-and-reproductive-health-and-research-(srh)/areas-of-work/female-genital-mutilation/health-risks-of-female-genital-mutilation
31. Giraud, C., Newcomb, M. E. & Whitton, S. W. An evaluation of resilience as a protective factor for mental health among sexual and gender minority young people. *LGBT Health* https://doi.org/10.1089/lgbt.2024.0135 (2024).
32. Glover, J., Liebling, H., Barrett, H. & Goodman, S. The psychological and social impact of female genital mutilation: A holistic conceptual framework. *J. Int. Stud.* **10** (2), 219–238. https://doi.org/10.14254/2071-8330.2017/10-2/16 (2017).
33. Buggio, L. et al. Psychosexual consequences of female genital mutilation and the impact of reconstructive surgery: A narrative review. *Health Equity*. **3** (1), 36–46. https://doi.org/10.1089/heq.2018.0036 (2019).
34. Rouzi, A. A. et al. Effects of female genital mutilation/cutting on the sexual function of Sudanese women: A cross-sectional study. *Am. J. Obstet. Gynecol.* **217** (1), 62. https://doi.org/10.1016/j.ajog.2017.02.044 (2017).
35. Mpinga, E. K. et al. Female genital mutilation: A systematic review of research on its economic and social impacts across four decades. *Glob Health Action*. **9**, 31489. https://doi.org/10.3402/gha.v9.31489 (2016).
36. Chen, V. H., Caron, J., Goddard, B., Eng, S. M. & Ades, V. Polyvictimization and psychiatric sequelae associated with female genital mutilation/cutting (FGM/C). *J. Immigr. Minor. Health*. **24** (4), 1020–1028. https://doi.org/10.1007/s10903-022-01343-7 (2022).
37. Im, H., Swan, L. E. T. & Heaton, L. Polyvictimization and mental health consequences of female genital mutilation/circumcision (FGM/C) among Somali refugees in Kenya. *Women Health*. **60** (6), 636–651. https://doi.org/10.1080/03630242.2019.1689543 (2020).
38. Boyle, E. H. & Svec, J. Intergenerational transmission of female genital cutting: Community and marriage dynamics. *J. Marriage Fam.* **81** (3), 631–647. https://doi.org/10.1111/jomf.12560 (2019).
39. Suluhan, D. et al. Do attitude, awareness and intention to perform female genital mutilation or cutting for their daughters of women healthcare providers differ from mothers in Somalia? *Int. J. Womens Health*. **15**, 1333–1343. https://doi.org/10.2147/IJWH.S411217 (2023).
40. Evans, C. et al. Seeking culturally safe care: A qualitative systematic review of the healthcare experiences of women and girls who have undergone female genital mutilation/cutting. *BMJ Open* **9** (5), e027452. https://doi.org/10.1136/bmjopen-2018-027452 (2019).

Acknowledgements

The authors would like to thank the study participants for their contribution. This study is derived from Esra Keles's PhD dissertation entitled "The Impact of Female Genital Mutilation on Mental Health", conducted under the supervision of Prof Mustafa Ozturk.

Author contributions

EK contributed substantially to the conception, design, analysis, interpretation of the results, and the drafting of this article. EK, YB, HHE, MO contributed substantially to the design, supervised data collection, and interpretation of the results. UE, SHM and KYA contributed substantially to the design, data collection, and interpretation of the results presented in this article. EK, YB, GB contributed to the analysis and interpretation of the results. All authors, EK, YB, MO, HHE, GB, UE, SHM and KYA participated in the revision of the manuscript, and input to various drafts. All of the authors have read and approved the final version of this manuscript.

Funding

No funding.

Declarations

Competing interests

The authors declare no competing interests.

Additional information

Correspondence and requests for materials should be addressed to U.E.

Reprints and permissions information is available at www.nature.com/reprints.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Open Access This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by-nc-nd/4.0/.

© The Author(s) 2025