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Prevalence and determinants of self-reported anxiety and stress among women with abortion-related complications admitted to health facilities in Eastern and Southern Africa: A cross-sectional survey

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Abstract

Objective: To estimate the prevalence of women who were admitted to health facilities with abortion-related complications who reported feeling anxious/stressed during their stay, and to identify sociodemographic, facility, and abortion-related characteristics associated with self-reported experience of anxiety/stress.

Methods: We used data from four countries in Eastern and Southern Africa (Kenya, Malawi, Mozambique, and Uganda) collected from 2017–2018 as part of the World Health Organization (WHO) Multi-Country Survey on Abortion-related morbidity (MCS-A). Information was extracted from women's medical records and their participation in audio computer-assisted self-interviews (ACASI). Based on a question in the ACASI, "Did you encounter any anxiety or stress during your hospital stay?", the percentage of women who self-reported feeling anxious/stressed during their facility stay

was calculated. Generalized estimating equations were used to identify the determinants of anxiety/stress following a hierarchical approach whereby potential determinants were grouped from most distal to most proximal and analyzed accordingly.

Results: There were 1254 women with abortion-related complications included in the analysis, of which 56.5% self-reported that they felt anxious/stressed during their facility stay. We found evidence that lower socioeconomic status, lower levels of education, no previous childbirth, no previous abortion, higher gestational age at abortion, and use of unsafe methods of abortion were independent determinants of self-reporting anxiety/stress.

Conclusions: Action should be taken to reduce experience of anxiety/stress among women attending facilities for postabortion complications, including reducing the number of women experiencing abortion-related complications by improving access to safe abortion. This issue warrants further study using more comprehensive and validated tools to understand the levels and drivers of anxiety/stress self-reported by women attending facilities with abortion-related complications.

KEYWORDS

abortion-related complications, cross-sectional study, postabortion care, self-reported anxiety, self-reported stress, Sub-Saharan Africa

1 | INTRODUCTION

Unsafe abortion is a major health challenge across many settings in Africa due to a range of factors including legally restrictive policies, social stigma surrounding abortion, and weak health systems.[1] Modelled estimates suggested that around 75.6% of abortions between 2010 and 2014 were unsafe in this region,[2] leading to high levels of abortion-related maternal morbidity and mortality. Based on a systematic analysis, Say et al.[3] reported that 9.6% of maternal deaths between 2008 and 2013 were due to abortion in Africa, higher than any other world region.

While there have been global and national level commitments to ensuring that comprehensive and safe postabortion care (PAC) is available to all women, there has been insufficient research focus on women's experience of care, which is an essential component of high-quality PAC.[4,5] Studies utilizing data from the World Health Organization (WHO) Multi-Country-Survey on Abortion (MCS-A) found that only 53% of women attending facilities for abortion-related complications in 2017–2018 across 11 countries in Sub-Saharan Africa reported being satisfied or very satisfied with care,[6] and almost two-thirds reported negative experience of care.[7] To the best of our knowledge, there is very little published data available on levels and determinants of self-reported anxiety/stress among women attending facilities for abortion-related complications in low- and middle-income settings. This highlights an inadequate focus on understanding women's emotional experience as they access and receive treatment for abortion complications.

The evidence around levels of psychological distress experienced by women in abortion care is largely from studies in high-income countries where termination of pregnancy is legal and therefore abortion-related complications very rare. This body of literature is largely focused on levels of psychological distress before and after an induced abortion or comparing levels of anxiety and/or stress between women who had an induced abortion and those who did not have an abortion. These studies have used comprehensive and validated tools to establish that women have symptoms of these psychological outcomes.[8-11]

There are many potential sources of anxiety/stress among women experiencing abortion-related complications. Firstly, the pain from the complication; furthermore, fear of mortality or long-term complications is likely to be a source of anxiety/stress for some women. There are also potential sources of anxiety/stress stemming from the circumstances around the abortion—for women who have had an induced abortion, this may include anxiety/stress over any legal ramifications in areas where abortion is restricted[12]; for women who had a spontaneous abortion, this may include anxiety over future occurrence of pregnancy loss.[13] The quality and the experience of care for abortion-related complications are also likely to play a role in how anxious or stressed a woman feels, with factors such as lack of emotional support, fear or experience of stigma, concerns over any out-of-pocket healthcare costs, and quality of care potentially increasing levels of anxiety/stress.[5,14-16] These are likely to be heavily influenced by broader structural factors such as the country's abortion laws and women's understanding of the law.

Using data from the WHO MCS-A,[17,18] the aim of the present study was to estimate the self-reported levels of anxiety/stress among women attending facilities for spontaneous and induced abortion-related complications, and identify the sociodemographic, obstetric, facility, and abortion-related determinants of experiencing anxiety/stress within four countries in Eastern and Southern Africa (Kenya, Malawi, Mozambique, and Uganda). Focusing on these four countries allowed us to compare levels of anxiety across a range of legal contexts, ranging from very legally restrictive abortion laws in Malawi,

where abortion is only permitted to save a woman's life, to abortion being permitted on a woman's request up to 12 weeks in Mozambique.

2 | MATERIALS AND METHODS

This study draws on data from the WHO MCS-A, conducted between February 2017 and April 2018, with the aim to capture the burden and severity of abortion-related complications, management of complications, and experience of care among women presenting to health facilities.[17,19] Multistage sampling was used to identify countries, provinces, and health facilities for inclusion in the survey (Appendix S1). Ultimately, the survey was conducted in 11 countries across the WHO Africa region, of which four were in Eastern and Southern Africa and included in this analysis: Kenya, Malawi, Mozambique, and Uganda. Details of the legal context for abortion in each of these countries is provided in Table S1.

After selection of facilities (eligible for inclusion in the sampling frame if they had at least 1000 deliveries per year and were capable of providing emergency obstetric care), data collection was conducted at the facility level (health facility assessment) and individual level (review of medical records and exit surveys using audio computer-assisted self-interviews [ACASI] for women with abortion-related complications). There were 27 facilities included across the four countries in this study, with the number of participants per facility ranging from 4–179. While the medical record review was conducted for all women with abortion-related complications, only a subset of women were included in the ACASI. For the ACASI, eligibility criteria included women with abortion-related complications who were admitted for a minimum of 24 h, were not referred, and were able and willing to consent to participate in the survey. A sample of women fulfilling the eligibility criteria were selected for inclusion into the ACASI, which was completed after women were discharged from the facility.

During the ACASI, women were asked questions encompassing abortion safety characteristics prior to facility attendance and women's experience of abortion care during their time in the facility. These questions were asked in the local language, after a translation and pretesting phase. As part of the ACASI, a single question was asked on women's feelings of anxiety/stress, which was utilized as the self-reported outcome for this analysis. Specifically, women were asked "Did you encounter any anxiety or stress during your hospital stay?", with the response options of yes or no.

Potential determinants of self-reported anxiety/stress were divided into three levels: (1) the most distal potential determinants incorporating sociodemographic and obstetric characteristics of women; (2) the midlevel capturing facility characteristics; and (3) the most proximate potential determinants encompassing abortion-related characteristics. Specific potential distal determinants under the sociodemographic and obstetric characteristics were age, education, marital status, socioeconomic status (SES), individual income, gainful occupation, parity, number of previous abortions and contraceptive use prior to pregnancy termination. SES was categorized into

three groups (low, middle, and high) on the basis of four questions from the ACASI as described by Eboigbe et al.[6] Individual income and contraceptive use prior to pregnancy were reported in the ACASI, with other determinants extracted from medical records. Midlevel facility characteristics included facility location, facility level, and facility capability to provide PAC. These data were all extracted from the health facility assessment. Facility capability categorization was created using eight signal functions for comprehensive PAC capability that were adapted from Campbell et al.[20] (removal of retained products available; parenteral antibiotics available; uterotonics available; intravenous antibiotics available; blood transfusion available; three or more contraceptive methods offered; at least one long-acting reversible contraceptive offered; and one or more obstetricians on duty 24/7). Facilities were categorized as highly capable of providing PAC if they met all eight signal functions, as medium capability with seven signal functions, and low capability with six or fewer signal functions. The abortion-related characteristics included gestational age, severity of complication, self-report of induced abortion, the method used for ending pregnancy, and whether the woman reported disrespectful care. Gestational age and severity of complication were extracted from the medical records, while the other potential determinants were self-reported in the ACASI. Abortion-related complications were classified into five categories based on severity: deaths, near miss, potentially life-threatening complications, moderate complications, and mild complications as described by Qureshi et al.[18] For the present study, severe maternal outcomes (deaths and near miss) and potentially life-threatening complications were combined into one category for severity of complication. Women were categorized as reporting disrespectful care if they responded negatively to at least one of eight questions in the ACASI, which were selected from existing tools for measuring respectful care.[7]

All analyses were conducted using Stata version 16.1 (StataCorp LLC). We initially conducted descriptive analyses, looking at the distribution of the sample by key characteristics, and calculating the prevalence of women with abortion-related complications who reported feeling anxious/stressed.

Generalized estimating equations (GEE) models, accounting for clustering of women attending the same facility and adjusting for country, were used to assess the crude association between each potential determinant and self-reported anxiety/stress. To identify the independent determinants of anxiety/stress, we built three multivariate models—one for each level of determinants as described above. We started with the most distal determinants (sociodemographic and obstetric characteristics). We added the potential sociodemographic and obstetric determinants to the GEE model with country included a priori, starting with the determinants that showed the strongest evidence of an association in the crude analysis; determinants that were associated with self-reported anxiety/stress at $P < 0.10$ were retained in the model and considered the independent sociodemographic and obstetric determinants of self-reported anxiety/stress. These independent sociodemographic and obstetric determinants of self-reported anxiety/stress were included as a priori confounders for the facility level characteristics; as

at the first level, these facility characteristics were added to the GEE model one at a time, starting with the one showing the strongest evidence of an association in the crude analysis, and were retained if there was evidence of an association. The same analytical process was followed for the abortion-related characteristics, with the independent sociodemographic, obstetric, and facility characteristics included as a priori confounders.

The study was approved by the WHO Ethical Review Committee (protocol: 0002699) and the WHO Human Reproduction Programme (HRP) Review Panel on Research Projects. It was also approved by in-country ethical committees in Kenya (University of Nairobi Ethics and Research Committee); Malawi (College of Medicine Research Ethics Committee); Mozambique (Comité Nacional de Bioetica para e saude, Ministerio de Saude); and Uganda (Mulago Hospital Research Committee; Uganda National Council for Science and Technology). Ethical approval for the analysis was obtained from the London School of Hygiene and Tropical Medicine Research Ethics Committee (Reference 21926).

3 | RESULTS

Study data were available for 1254 women (Figure 1) to explore determinants for experiencing feelings of anxiety/stress during their stay at a facility for abortion-related complications across Kenya, Malawi, Mozambique, and Uganda. The key demographic, obstetric, and clinical characteristics of these women are shown in Table 1, with a further breakdown by country in Table S2. The majority of the study population was aged 20–29 years ($n = 616$, 50.2%). Most women completed primary level of education ($n = 396$, 31.6%), while 26.6% ($n = 334$) completed secondary education. Overall, 73% ($n = 862$) of women were married, 51.1% ($n = 641$) were not gainfully employed, and over half (57.6%, $n = 718$) were of high socioeconomic status.

Over half (56.5%, $n = 708$) of the women with abortion-related complications self-reported experiencing feelings of anxiety/stress during their stay at the facility. This varied between countries (Table S2), with the lowest and highest levels of self-reported feelings of anxiety/stress in Mozambique (46.9%) and Malawi (63.7%), respectively.

As shown in Table 2, sociodemographic and obstetric characteristics associated with self-reported anxiety/stress when adjusting for only country include education, parity, and number of previous abortions. In adjusted analyses, there was strong evidence of an association between parity ($P = 0.004$) and self-reported anxiety/stress. Women who previously gave birth to two children had about 40% lower odds of self-reporting anxiety/stress compared with women who had no previous childbirth (aOR 0.62; 95% CI, 0.42–0.90). There was also evidence of an association between number of previous abortions ($P = 0.02$) and self-reported anxiety/stress. Women who experienced one previous abortion had over 20% lower odds of self-reporting feelings of anxiety/stress compared with women who had no previous abortion (aOR 0.77, 95% CI, 0.58–1.01). Finally, there was some
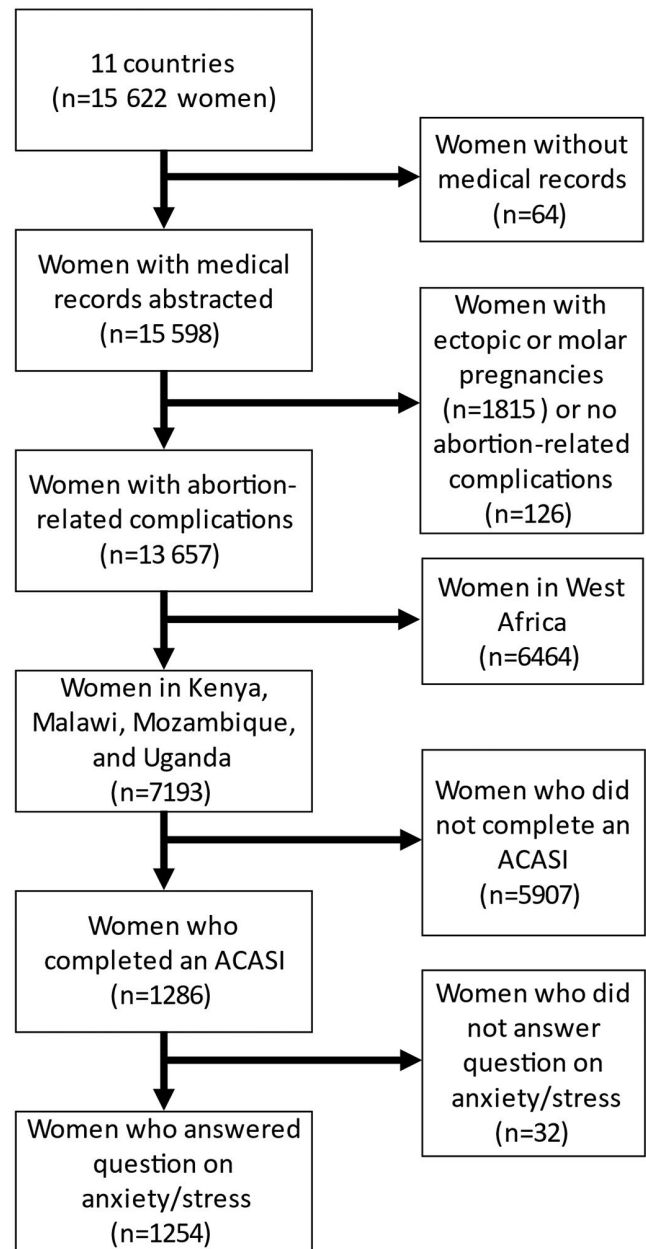
FIGURE 1 Study flow diagram for inclusion of women with abortion-related complications who self-reported information on experience of anxiety/stress

evidence for an association between both education ($P = 0.06$) and SES ($P = 0.06$) and self-reported anxiety/stress. Women who had completed secondary education had about 40% lower odds of self-reporting anxiety/stress compared with women who had no/some primary education (aOR 0.62, 95% CI, 0.42–0.90). Women with high SES had approximately 30% lower odds of self-reporting anxiety/stress compared with women with low SES (aOR 0.69, 95% CI, 0.50–0.94). There was no evidence of an association between age ($P = 0.30$), marital status ($P = 0.62$), individual income ($P = 0.25$), gainful occupation ($P = 0.65$), or contraceptive use prior to pregnancy termination ($P = 0.46$) and self-reported anxiety/stress after adjusting for education, SES, prior abortion, and parity.

TABLE 1 Characteristics of women in the study sample (*n* = 1254)

Characteristics	No. (%)
Country	
Kenya	527 (42.0)
Mozambique	98 (7.8)
Malawi	512 (40.8)
Uganda	117 (9.3)
Age, years (26 missing)	
≤19	241 (19.6)
20–29	616 (50.2)
30+	371 (30.2)
Education	
None/some primary	320 (25.5)
Complete primary	396 (31.6)
Secondary and above	334 (26.6)
Unknown	204 (16.3)
Marital status (73 missing)	
Single	293 (24.8)
Separated/divorced/widowed	26 (2.2)
Married	862 (73.0)
Self-reported individual income	
No	595 (47.5)
Yes	659 (52.6)
Gainful occupation	
No	641 (51.1)
Yes	440 (35.1)
Unknown	173 (13.8)
Self-reported socioeconomic status (7 missing)	
Low	241 (19.3)
Middle	288 (23.1)
High	718 (57.6)
Parity (56 missing)	
0	428 (35.7)
1	275 (23.0)
2	198 (16.5)
3+	297 (24.8)
Number of previous abortions (72 missing)	
0	960 (81.2)
1	156 (13.2)
2+	66 (5.6)
Self-reported contraceptive use prior to pregnancy termination	
No	263 (21.0)
Yes	182 (14.5)
Unknown	809 (64.5)
Facility location	
Urban	837 (66.8)

(Continues)

TABLE 1 (Continued)

Characteristics	No. (%)
Peri-urban	262 (20.9)
Rural	155 (12.4)
Facility level	
Primary/secondary	754 (60.1)
Tertiary	372 (29.7)
Other	128 (10.2)
Facility capability to provide postabortion care (78 missing)	
Low	91 (7.7)
Medium	435 (37.0)
High	650 (55.3)
Gestational age, weeks	
<12	403 (32.1)
≥12	709 (56.5)
Unknown/missing	142 (11.3)
Severity of complication	
Moderate	691 (55.1)
Mild	419 (33.4)
SMO/PLTC	144 (11.5)
Self-reported induced abortion (4 missing)	
No	1054 (84.3)
Yes	196 (15.7)
Self-reported methods used to end pregnancy (4 missing)	
Medical	58 (4.6)
Invasive	13 (1.1)
Medical + invasive	94 (7.5)
Other	31 (2.5)
No induced abortion	1054 (84.3)
Self-reported experience of disrespectful care (12 missing)	
None	578 (46.5)
At least one	664 (53.5)
Self-reported anxiety or stress	
No	546 (43.5)
Yes	708 (56.5)

Abbreviations: PLTC, potentially life-threatening condition; SMO, severe maternal outcome.

Table 3 shows that there was no evidence of association between facility-level factors and self-reported anxiety/stress in crude analyses. After adjusting for the independent sociodemographic and obstetric characteristics of self-reported anxiety/stress, there was no evidence for an association between facility location (*P* = 0.29), facility level (*P* = 0.66), or facility capability (*P* = 0.63) and self-reported anxiety/stress.

In Table 4, the crude analyses of abortion-related characteristics showed evidence only for an association between gestational age and self-reported anxiety/stress. After adjusting for the independent sociodemographic and obstetric characteristics, there was weak evidence for an association between gestational

TABLE 2 Association of sociodemographic and obstetric characteristics and women's report of anxiety or stress

Characteristics	Report of anxiety/stress No. (%)	Crude OR[a] (95% CI)	P value	Adjusted OR[b] (95% CI)	P value
Age, years (26 missing)					
<20	147 (61.0)	1	0.83	1	0.30
20–29	338 (54.9)	0.90 (0.64–1.27)		1.12 (0.79–1.59)	
≥30	205 (55.3)	0.92 (0.63–1.35)		1.41 (0.85–2.33)	
Education					
No/some primary	207 (64.7)	1	0.03	1	0.06
Complete primary	214 (54.0)	0.72 (0.55–0.94)		0.71 (0.54–0.95)	
Secondary and above	163 (48.8)	0.61 (0.44–0.86)		0.62 (0.42–0.90)	
Unknown	124 (60.8)	0.82 (0.55–1.22)		0.78 (0.49–1.24)	
Marital status (73 missing)					
Single	172 (58.7)	1	0.10	1	0.62
Separated/divorced/widowed	14 (53.9)	0.77 (0.39–1.56)		0.82 (0.36–1.88)	
Married	478 (55.5)	0.76 (0.59–0.99)		0.84 (0.59–1.19)	
Self-reported individual income					
No	329 (55.3)	1	0.43	1	0.25
Yes	379 (57.5)	1.11 (0.86–1.43)		1.17 (0.90–1.53)	
Gainful occupation					
No	361 (56.3)	1	0.89	1	0.65
Yes	239 (54.3)	1.03 (0.84–1.27)		1.11 (0.85–1.44)	
Unknown	108 (62.4)	1.10 (0.73–1.65)		1.24 (0.72–2.01)	
Self-reported socioeconomic status (7 missing)					
Low	146 (60.6)	1	0.15	1	0.06
Middle	159 (55.2)	0.79 (0.55–1.14)		0.77 (0.52–1.14)	
High	398 (55.4)	0.73 (0.52–1.00)		0.69 (0.50–0.94)	
Parity (56 missing)					
0	247 (57.7)	1	0.01	1	0.004
1	170 (61.8)	1.22 (0.88–1.70)		1.18 (0.86–1.62)	
2	93 (47.0)	0.70 (0.49–0.99)		0.62 (0.42–0.90)	
3+	165 (55.6)	0.95 (0.73–1.23)		0.81 (0.62–1.07)	
Number of previous abortions (72 missing)					
0	546 (56.9)	1	0.02	1	0.02
1	75 (48.1)	0.76 (0.58–0.99)		0.77 (0.58–1.01)	
2+	41 (62.1)	1.31 (0.91–1.90)		1.34 (0.91–1.97)	
Self-reported contraceptive use prior to pregnancy termination					
No	158 (60.1)	1	0.17	1	0.46
Yes	91 (50.0)	0.72 (0.51–1.02)		0.78 (0.53–1.15)	
Unknown	459 (56.7)	0.89 (0.67–1.18)		0.91 (0.67–1.24)	

[a]Adjusting for country as an a priori confounder and accounting for clustering of facilities.

[b]Adjusting for parity, number of previous abortions, education, and socioeconomic status.

age ($P = 0.07$) and self-reported methods used to end pregnancy ($P = 0.07$) with self-reported anxiety/stress. We found that women who were attending the facility due to an abortion at 12 weeks or more had over 30% higher odds of self-reporting anxiety/stress compared with women with an abortion at less than 12 weeks (aOR 1.34, 95% CI, 1.01–1.79). Women who self-reported using "other" methods to end the pregnancy had over double the odds of self-reporting anxiety/stress compared with women who self-reported not inducing an abortion (aOR 2.37, 95% CI, 1.05–5.33). There was no evidence of an association between severity of complications ($P = 0.97$), self-reported induced abortion ($P = 0.40$), or experience of disrespectful care ($P = 0.94$) and self-reported anxiety/stress after adjusting for sociodemographic, obstetric, and abortion-related characteristics.

TABLE 3 Association of facility characteristics and women's report of anxiety or stress

Characteristics	Report of anxiety/stress No. (%)	Crude OR[a] (95%CI)	P value	Adjusted OR[b] (95% CI)	P value
Facility location					
Urban	452 (54.0)	1	0.12	1	0.29
Peri-urban	156 (59.5)	0.98 (0.68–1.41)		0.96 (0.66–1.40)	
Rural	100 (64.5)	1.55 (1.01–2.37)		1.45 (0.90–2.33)	
Facility level					
Primary/secondary	433 (57.4)	1	0.52	1	0.66
Tertiary	202 (54.3)	1.11 (0.88–1.39)		1.06 (0.84–1.32)	
Other	73 (57.0)	1.20 (0.84–1.73)		1.19 (0.80–1.77)	
Facility capability to provide postabortion care (79 missing)					
Low	47 (51.6)	1	0.55	1	0.63
Middle	268 (61.6)	1.35 (0.75–2.42)		1.27 (0.62–2.57)	
High	348 (53.5)	1.15 (0.66–1.99)		1.06 (0.54–2.12)	

[a]Adjusting for country as an a priori confounder and accounting for clustering of facilities.
[b]Adjusting for parity, number of previous abortions, education, and socioeconomic status.

TABLE 4 Association of abortion-related characteristics and women's report of anxiety or stress

Characteristics	Report of anxiety/stress No. (%)	Crude OR[a] (95%CI)	P value	Adjusted OR[b] (95% CI)	P value
Gestational age, weeks					
<12	205 (50.9)	1	0.09	1	0.07
≥12	415 (58.5)	1.34 (1.01–1.79)		1.34 (1.01–1.79)	
Unknown/missing	88 (62.0)	1.50 (1.00–2.25)		1.70 (1.04–2.77)	
Severity of complication					
Mild	249 (59.4)	1	0.82	1	0.97
Moderate	379 (54.9)	0.94 (0.75–1.18)		1.01 (0.81–1.28)	
SMO/PLTC	80 (55.6)	1.02 (0.72–1.47)		1.05 (0.69–1.60)	
Self-reported induced abortion (4 missing)					
No	587 (55.7)	1	0.20	1	0.40
Yes	120 (61.2)	1.24 (0.89–1.73)		1.17 (0.81–1.70)	
Self-reported methods used to end pregnancy (4 missing)					
No induced abortion	587 (55.7)	1	0.16	1	0.07
Medical	32 (55.2)	0.94 (0.52–1.68)		0.82 (0.44–1.52)	
Invasive	9 (69.2)	2.05 (0.61–6.91)		1.63 (0.45–5.94)	
Medical + invasive	57 (60.6)	1.24 (0.77–2.00)		1.14 (0.68–1.93)	
Other	22 (71.0)	1.77 (0.95–3.32)		2.37 (1.05–5.33)	
Self-reported experience of disrespectful care (12 missing)					
None	330 (57.1)	1	0.93	1	0.94
At least one	372 (56.0)	1.01 (0.77–1.34)		0.99 (0.74–1.32)	

Abbreviations: PLTC, potentially life-threatening condition; SMO, severe maternal outcome.
[a]Adjusting for country as an a priori confounder and accounting for clustering of facilities.
[b]Adjusting for parity, number of previous abortions, socioeconomic status, education, gestational age, and self-reported methods used to end pregnancy; self-reported induced abortion adjusted for all independent determinants except self-reported methods used to end pregnancy due to co-linearity.

4 | DISCUSSION

Over half of women attending facilities with abortion-related complications reported feeling anxious or stressed during their facility stay (56.5%); however, in the absence of similar published data, it is impossible to draw conclusions on whether this is high compared with women with abortion-related complications in other settings. There was some variation of levels of self-reported anxiety/stress

across the four countries included in the study. The lowest level of anxiety/stress was in Mozambique (46.9%) and the highest level was in Malawi (60.7%), noting that these are the countries in this study with the most liberal and most restrictive abortion laws, respectively.

We found evidence that SES and education were associated with levels of self-reported anxiety/stress for women attending facilities with abortion-related complications. Women with high SES had lower levels of self-reported anxiety/stress compared with women with low SES. This is partly explained by feelings of anxiety/stress over the costs of care; as reported elsewhere, there were relatively high levels of dissatisfaction reported in the MCS-A with out-of-pocket expenses paid.[6] It is plausible the women with lower levels of education have higher underlying feelings of anxiety/stress, driven by a range of factors which might include, for example, lower social capital.[21,22]

It has been hypothesized that women undergoing multiple induced abortions might be more likely to report feeling anxiety/stress due to higher levels of violence or instability leading to the need to have multiple abortions,[23] but we did not observe this. In the present study, women with complications who previously had one abortion were less likely to self-report experiencing anxiety/stress compared with women with complications having an abortion for the first time. Our result is likely to reflect less anxiety/stress among women who have prior experience with abortion procedures. Our results also indicate that women who previously gave birth to two or more children had lower odds of self-reported anxiety/stress compared with women who had never previously given birth. It is possible that women who have not previously had a child and are experiencing complications of an abortion might be anxious about their fertility.[13] It is also plausible that women who have previously had a child are more experienced with being treated by obstetricians, leading to lower levels of self-reported anxiety/stress.

There was also evidence that the circumstances in which the abortion took place was associated with self-reported feelings of anxiety/stress during the hospital stay. Women who self-reported using "other" methods (such as ingestion of herbs, bleach, gasoline, or using traditional abdominal massage) to end the pregnancy had increased self-reported anxiety/stress compared with women who reported not having an induced abortion. There are many different potential explanations for this association, stemming from feelings of anxiety/stress about complications from these invasive methods to feelings of anxiety/stress around stigma from healthcare workers or their social network from undergoing an induced abortion. There are several studies from East Africa showing that stigma plays a role in delayed health seeking after harmful abortion practices[15,24,25] and it is likely to be linked with feelings of anxiety/stress. We also found that women attending the facility for abortion-related complications in the second trimester had higher levels of self-reported anxiety/stress compared with women with first-trimester abortion. Second-trimester abortions are riskier than first-trimester abortions and can result from delays in seeking an induced abortion, potentially explaining the increased self-report of experiencing anxiety/stress.[1] Surprisingly, there was no evidence for an association between facility capability and self-reported anxiety/stress, but this is likely to

be driven by the inclusion criteria for the MCS-A. This study only included high-level facilities with surgical capability, and therefore there was certainly less variability in facility capability than would be observed if all facilities that provided postabortion care were included, potentially leading to a lack of association.

The strength of the study is the use of a standardized approach to collect data across different countries to quantify the severity and treatment of abortion-related complications, as well as women's experience of care. Comprehensive data collection was undertaken as part of this study, with data collected at the facility level, from medical records and using ACASI surveys to understand women's direct experience. This enabled us to look at a wide range of different potential determinants of self-reported anxiety/stress among women during their facility stay. The ACASI surveys were conducted in a private location and promoted confidentiality. ACASI surveys have been shown to provide more accurate self-reporting data, specifically for sensitive topics such as abortion.[26,27] For this study in particular, women may have felt more comfortable to self-report feelings of anxiety/stress without concerns of being judged by an interviewer. As reported in detail elsewhere, there was a relatively high percentage of women eligible to complete the ACASI who did not participate; however, analysis indicated there was no difference in key sociodemographic characteristics between women who completed the ACASI and those who did not complete the ACASI.[18]

One of the major limitations of this study is that measurement of self-reported anxiety/stress is based on a single question that was included as part of a wider survey on experience of care for abortion-related complications. As such, it is not possible for us to draw conclusions on the levels and determinants of symptoms or clinical diagnoses of anxiety or stress, which would require more rigorous assessment processes, using validated tools and/or clinical assessments. By not using validated tools for measuring anxiety and stress, we were also unable to examine differences in the severity of anxiety and/or stress, and unable to differentiate between these two outcomes. We were also unable to disentangle women who were feeling anxiety or stress before attending the facility from women who started feeling anxious or stressed because of their facility stay. Since women participated in the ACASI as they exited the facility, it is possible that the self-reported levels of anxiety may be different than what was actually experienced during the facility stay, although the potential for recall error is low. This analysis did not include women who died, were only admitted to the facility for less than 24 h, were referred, or were unable to access a facility for postabortion care, and therefore the results cannot be generalized to such groups. Due to the sensitive nature and legality of abortion, participants may have been hesitant to provide accurate responses during medical history collection, for example on previous abortions and marital status. This may have affected the quality of data available from the medical records. Finally, this study only included data from East and Southern Africa for regional coherence.

In conclusion, we found that over half of women attending facilities with abortion-related complications, whether because of a spontaneous or induced abortion, self-reported experiencing feelings of

anxiety/stress during their facility stay. Action should be taken to reduce these levels. Removal of legal restrictions on abortion should reduce the levels of abortion-related complications due to unsafe abortions, and the number of women with abortion-related complications self-reporting anxiety/stress may also decrease. Providers should be made aware of high levels of women reporting anxiety/stress, particularly among women of lower SES, lower levels of education, and those with abortion-related complications at a later gestational age. Our findings warrant further studies using validated diagnostic tools to understand levels and drivers of clinical anxiety and stress in women attending facilities with abortion-related complications in low- and middle-income countries.

CONFLICTS OF INTEREST

CC reports consultancy fees paid to her institute from WHO. VF reports WHO funding to support data analysis and writing in this study. Other authors report no conflicts of interest.

AUTHOR CONTRIBUTIONS

JP, KM, VF, CC, HM, and OT conceptualized the study. JP conducted the analysis under the supervision of CC. JP and CC wrote the first draft of the paper. KM, VF, HM, and OT reviewed multiple drafts of the manuscript and gave input. JP and CC incorporated and edited all comments. KA, FB, RC, LG, PG, and ZQ reviewed and provided critical input on the near-final draft.

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