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Women's reproductive health and depression

A community survey in the Gambia, West Africa

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Abstract *Background:* Depression is the commonest mental illness in developing countries and impoverished women are most at risk. Formal mental health services in these situations are rare. Depression commonly co-presents with physical symptoms or else is unspectacular, so the condition often goes unrecognised. To strengthen the prevention and management of depression, information is required on easily recognisable correlates of depression. This study explored associations between depression and reproductive health conditions in rural African women of reproductive age. *Methods:* A community-based reproductive health survey among rural women aged

15–54 years in The Gambia, West Africa, included screening with a modified Edinburgh Depression Scale (EDS), a reproductive health questionnaire and a gynaecological examination. Depression was then assessed clinically and data for 565 women were used to estimate the prevalence of depression and examine associations with reproductive health conditions and demographic factors. *Results:* The weighted prevalence of depression was 10.3% (95% CI 8.3–12.7). Being depressed was most significantly associated with widowhood or divorce (adjusted Odds Ratio (aOR) 8.42, 2.77–25.57), infertility (3.69, 1.42–9.65) and severe menstrual pain (3.94, 1.52–10.27). There were significant differences between ethnic groups. Being in the postpartum period was not associated with an increased likelihood of depression. *Conclusion:* This study points to the importance of reproductive potential and reproductive health in maintaining women's mental well-being across different strata of a rural and resource-poor society. It could provide an initial focus for the management of women with depression as well as directing future research in reproductive health and psychiatry.

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Introduction

Depression is the most common mental illness in developing countries [1], with risk of onset associated with female gender and poor socio-economic situation [2–4]. Mental health services are usually unavailable where these vulnerable women live; consequently, any therapy they receive will be reactive or informal from members of their close community or traditional healers. Among formal health services, it is general primary care and maternal and child health clinics that are the most accessible, but depression is not often

Table 1 Categories of reproductive morbidity

Infertility	Less than 45 years of age, trying to get pregnant for at least 1 year and not succeeding in spite of having regular (1/week or more) sexual intercourse and not using contraceptive methods. Neither pre-menarchal nor post-menopausal	
Poor obstetric outcome	Miscarriage, still birth, early or late neonatal death	
Menstrual pain	Pain with menstrual periods that kept the woman from normal activities in the last 3 months	
Other menstrual problems	Irregular menstruation, spotting or prolonged bleeding	
Anaemia	Pregnant	Non-pregnant
Mild	Hb < 11 g/dl	Hb < 12 g/dl
Moderate	Hb 7.0–8.9 g/dl	Hb 8.0–9.9 g/dl
Severe	Hb < 7 g/dl	Hb < 8 g/dl
Reproductive-organ masses	Masses of the vulva, cervix, uterus and adnexae	
Reproductive tract infection	Bacterial vaginosis, <i>Trichomonas vaginalis</i> , candida albicans, <i>Gonorrhoea</i> or <i>Chlamydia Trachomatis</i> diagnosed from vaginal or cervical swabs	
Pelvic tenderness	Uterine tenderness and/or adnexal tenderness in combination with cervical excitation pain	
Female genital cutting, Type II	Partial or total removal of the clitoris with partial or total excision of the labia minora	
Genital Prolapse	Mild, moderate or severe genital prolapse	
Body mass index wt(kg)/height(m) ²	Undernutrition BMI <18 Obesity BMI ≥30	
Cervical Dysplasia	Either (a) histological evidence of human papillomavirus infection or cervical pre-cancer in those women who underwent a biopsy or excision or (b) cytological evidence of squamous intraepithelial lesions or abnormal squamous cells of uncertain significance for women not undergoing further biopsy or excision	

recognised there [5]. Clarifying easily identifiable factors associated with depression may therefore help to improve the recognition and treatment of depression in women.

For a resource-poor woman the greatest life stressors are maintaining food supplies and a place to live for her and her family [6]. Being physically healthy is obviously important, whilst her reproductive health has particular psychological relevance. Since bearing and raising a man's children helps a woman to obtain social status and resource security from him and his relatives [7], her reproductive capability can have a direct effect on her exposure to stress, and consequently on her emotional well-being.

In a homogeneously poor and deeply rural community of the type common in sub-Saharan Africa, the prevalence of clinical depression in women of reproductive age was assessed and its associations with different reproductive health indicators were investigated. It was hypothesised that indicators that undermined a woman's ability to gain and maintain security would have the strongest associations with depression, whilst factors that reduced the likelihood of her exposure to such stress would not be associated. Appropriate use of the results in identifying and treating similar depressed women was also considered.

Methods

The data on which this study is based were part of a woman's reproductive morbidity survey (RMS) in the Farafenni area on the north bank of the river Gambia, West Africa. Here the Medical Research Council (MRC) has operated a continuous demographic surveillance system in 40 villages and hamlets since 1981. The area has been described previously [8]. The population numbered

16,203 at the end of March 1999, with 3,934 women aged between 15 and 54 years. Most people lived by subsistence farming and 45% had an income below US\$150/year. Women were married for the first time at a mean age of 15 and averaged 6.8 births subsequently [9]. Few women (3.1%) had any formal education; maternal mortality was estimated at 424/100,000 live births [10].

The RMS was a community-based study that took place between January and July 1999 among women between the ages of 15 and 54 in half (20/40) of the villages in the demographic surveillance area. The methodology of the study has been described extensively elsewhere [11]. A cluster-sampling scheme was used based on entire villages and 20 villages were selected randomly for inclusion in the study. Three villages had to be replaced with others of comparable ethnicity, size and rurality because they were reluctant to participate. The study was approved by the ethics committee of the Gambia Government/MRC (SCC proposal 755). Explanatory meetings were conducted with village leaders and subsequently with the whole village, where permission was sought to invite women aged between 15 and 54 years to participate. There were no specific exclusion criteria. After further individual explanation by a fieldworker in the appropriate local language, signed consent (or a thumbprint where the woman could not sign) was obtained from each woman asked to participate. A reproductive health questionnaire was administered to each consenting participant, who also underwent a gynaecological examination. Physical assessment was made visually of the external reproductive tract and internally by bimanual and speculum examination. Specimens were tested for common endogenous and sexually transmitted reproductive tract infections and anaemia. Standard definitions of reproductive morbidities were used (see Table 1).

A modified version of the Edinburgh Depression Scale (EDS), often referred to as the Edinburgh Postnatal Depression Scale (EDPS) (see Table 2), was administered orally by a field worker to all women who participated in the RMS. The EDS is a depression-rating questionnaire, validated in postnatal and non-postnatal women in resource-rich and poor settings [13]. It consists of ten items where a woman can rate her symptoms of depression on a scale of 0 (none) to 3 (most severe). The total score ranges from 0 to 30; previous studies have found a score of ≥12 to be a useful indicator of depression [13]. The scale is not intended to diagnose clinical depression but to select those women among whom the substantial probability of depression necessitates further clinical evaluation [14]. An experienced anthropologist (KP) oversaw the adaptation and translation of the EDS. The field workers who administered the

Table 2 Modified^a Edinburgh Depression Scale [from 12]

Questions and filters	Coding categories
We would like to know something about how you feel in your day-to-day life. Please answer each question for how you have felt in the last 7 days, not only today	
Have you been able to laugh and see the funny side of things	<input type="checkbox"/> 0 As much as you always could <input type="checkbox"/> 1 Not quite so much as you used to <input type="checkbox"/> 2 Definitely not so much as you used to <input type="checkbox"/> 3 Not at all
Have you looked forward with enjoyment to things	<input type="checkbox"/> 0 As much as you used to <input type="checkbox"/> 1 A bit less than you used to <input type="checkbox"/> 2 Definitely less than you used to <input type="checkbox"/> 3 Hardly at all
Have you blamed yourself unnecessarily when things went wrong	<input type="checkbox"/> 3 Yes, most of the time <input type="checkbox"/> 2 Yes, some of the time <input type="checkbox"/> 1 Not very often <input type="checkbox"/> 0 Not at all
Have you been anxious or worried for no good reason	<input type="checkbox"/> 0 No, not at all <input type="checkbox"/> 1 Hardly ever <input type="checkbox"/> 2 Yes, sometimes <input type="checkbox"/> 3 Yes, very often
Have you felt scared or panicked for no good reason	<input type="checkbox"/> 3 Yes, quite a lot <input type="checkbox"/> 2 Yes, sometimes <input type="checkbox"/> 1 No, not much <input type="checkbox"/> 0 No, not at all
Have you been coping with your daily routine	<input type="checkbox"/> 0 Yes, I have been coping as well as ever <input type="checkbox"/> 1 Yes, most of the times I have coped quite well <input type="checkbox"/> 2 No, sometimes I have not coped as well as usual <input type="checkbox"/> 3 No, most of the time I have not been able to cope at all
Have you had difficulty sleeping	<input type="checkbox"/> 3 Yes, most of the time <input type="checkbox"/> 2 Yes, sometimes <input type="checkbox"/> 1 Not very often <input type="checkbox"/> 0 No, not at all
Have you felt sad	<input type="checkbox"/> 3 Yes, most of the time <input type="checkbox"/> 2 Yes, quite often <input type="checkbox"/> 1 Not very often <input type="checkbox"/> 0 No, not at all
Have you been so unhappy that you have been crying	<input type="checkbox"/> 3 Yes, most of the time <input type="checkbox"/> 2 Yes, quite often <input type="checkbox"/> 1 Not very often <input type="checkbox"/> 0 No, never
Do you like to be by yourself	<input type="checkbox"/> 3 Yes, most of the time <input type="checkbox"/> 2 Yes, some of the time <input type="checkbox"/> 1 Not very often <input type="checkbox"/> 0 Not at all

^a The final item in the EDS ("Thoughts of harming yourself") was modified, as it was felt inappropriate to ask during a general questionnaire. This item was replaced with "Do you like to be by yourself?" since isolation was thought to be a strong indicator of depression in this community (AM Mendy, Gambian Community Mental Health Team, personal communication). Ideas or experience of self-harm were explored later in the clinical interview.

EDS were involved first in extensive discussion about the purpose and meaning of the signs and symptoms in the EDS and the corresponding phrases and idioms in the three most common local languages, Mandinka, Wolof and Fula. Using a World Health Organisation (WHO) translation protocol, forward and back translation was performed so that the relevant and equivalent cultural concepts were determined and used in a standardised manner.

The diagnosis of depression used in this study was clinical, derived from an interview using a semi-structured format based on the Present State Examination (PSE) [15]. The PSE is a guide to structuring a clinical interview that covers the broad range of affective

disorders and functional psychoses. The clinical interview was held with a sub-sample of study participants: we aimed to interview all women with a moderate to high EDS score ($\geq 10/30$) as well as a random sample of one-third of those with a score of < 10 . Depression was defined according to the 10th International Classification of Diseases (ICD-10) [16], to include persistent low mood, loss of interest and enjoyment and reduced energy for most of the day almost every day for the previous 2 weeks. Other symptoms probed for when determining the severity of any depression included poor concentration or decision making, feelings of worthlessness or hopelessness, isolation, unreasonable guilt or self-reproach, think-

Table 3 Crude and adjusted odds ratios for the association between depression and socio-demographic and anthropometric variables

Variables	r/n ^a	% ^b	Crude OR ^c (95% CI)	p ^d	Adjusted OR (95% CI)	p ^e
Socio-demographic						
<i>Age (Years)</i>						
15–24	10/118	3.1	1	<0.001	1	
25–34	25/146	9.2	3.15 (1.30–7.62)		2.38 (0.69–8.16)	0.169
35–44	45/193	15.8	6.10 (2.55–13.44)		2.71 (0.70–10.60)	0.150
45–54	27/108	18.9	7.50 (2.99–17.62)		1.88 (0.44–8.01)	0.394
<i>Marital status</i>						
Monogamous	27/174	6.8	1	<0.001	1	
Polygamous	63/343	11.4	1.77 (1.04–3.01)		1.11 (0.57–2.19)	0.755
Widow or divorced	16/29	52.7	15.3 (6.23–37.64)		8.42 (2.77–25.57)	<0.001
Never married	1/19	1.0	0.15 (0.01–1.16)		0.50 (0.04–6.01)	0.587
<i>Ethnicity and circumcision status</i>						
Wolof (95% uncut)	24/193	6.8	1	0.032	1	
Uncut Fula	12/53	14.2	2.26 (0.94–5.46)		2.39 (0.89–6.35)	0.081
Cut Fula	2/22	3.7	0.52 (0.11–2.49)		0.93 (0.15–5.84)	0.943
Mandinka (98% cut)	69/297	12.7	2.00 (1.14–3.52)		2.23 (1.07–4.66)	0.032
Anthropometric						
<i>Body Mass Index</i>						
Normal	77/463	8.9	1	0.003	1	
Underweight	23/84	14.9	1.80 (0.97–3.35)		1.47 (0.75–2.88)	0.266
Obese	6/16	36.0	5.77 (1.64–20.35)		4.66 (1.29–16.81)	0.019

^a Number depressed/total in category

^b Weighted prevalence of depression

^c Adjusted for weighting

^d P-value for unadjusted association from Pearson chi-squared test corrected for weighting

^e P-value from Wald test comparing with baseline value, adjusting for weighting and other variables for which there are adjusted OR

ing too much, poor sleep, crying, change in appetite with corresponding weight change and thoughts of self-harm. Mild depression was diagnosed when 2–3 symptoms were present, but the woman was able to continue with most activities. Moderate depression was diagnosed when 4 or more symptoms were present and the woman had great difficulty with everyday activities. Severe depression was diagnosed when several of the above symptoms were marked and distressing and a number of 'somatic' symptoms were present.

This clinical interview took place on the same day, or the day after, the RMS and EDS questionnaires. It was conducted in the woman's first language in a calm and private location chosen by the woman. All the interviews were conducted by the same senior fieldworker who had received teaching on common mental illness and the PSE from the Principal Investigator (PI) (RC) and the Gambian registered psychiatric nurse in charge of primary mental health services in The Gambia. This same nurse mentored the field worker during interviews and discussion for the first weeks of the study. The field worker was blinded to the woman's EDS score to avoid bias in the style of interview. The woman's depression status was determined through discussion of the interviews by the field worker with the PI, a physician who was also blinded to the EDS score. The PI visited any woman who was severely depressed or whose status was unclear from the interview. In line with WHO guidelines [17], women identified as mildly or moderately depressed were given counselling by the same senior field worker. This focussed on immediate coping strategies, recognising and resisting habitual negative attitudes and garnering social support. Women identified as severely depressed were also given medication (Amitryptilline, starting dose 25 mg or 50 mg nocte) by the PI. Follow-up was offered to all depressed women at the local government clinic where one of the study doctors was available weekly.

Analysis and statistical methods

Double data entry, checking and cleaning were done using Epi Info version 6.04. Final analysis was restricted to the women who had had the clinical interview to assess their depression status. Since all

women with a moderate to high EDS score ($\geq 10/30$) (who were more likely to be depressed) were intentionally selected for this clinical assessment, depressed women were over-represented in the sample analysed. To ensure that the end results were representative of the whole study population, all analysis was weighted using the svy commands in Stata 6.0 (Stata Corporation, Texas, USA). The weights used were the reciprocal of the percentage of women with each EDS score who were assessed clinically. Due to low numbers, pre-menarchal women and those in the uncategorised ethnic group were excluded from the analysis.

It was not possible to examine the effects of ethnic group separate from genital cutting status since genital cutting is so closely associated with ethnic group in this population. Nearly all Mandinkas are cut, one-third of Fulas are cut and virtually all Wolof are uncut [18]. To account for this, a new variable was created with four categories—Mandinka, cut Fula, uncut Fula and Wolof. Comparison across these four categories should give some understanding of the effects of both ethnic group and genital cutting.

The final model of associations was built up stepwise. The potential correlates with depression were grouped under five headings: socio-demographic, anthropometric, fertility, menstrual problems and other reproductive morbidity. Each factor was cross-tabulated with clinical depression diagnosis (using svytab) to give the prevalence of depression at different levels of each factor and crude odds ratios (ORs) were calculated. ORs adjusted for the possible confounding effect of other factors were obtained by fitting a logistic regression model in several stages. First the socio-demographic variables were entered into the model. The anthropometric variable was then entered and removed if it did not significantly improve the model. The same process was repeated for the remaining fertility variables, the menstrual problem variables and finally other reproductive morbidity variables to achieve the final model.

Results

A total of 1,348 (72%) of 1,871 eligible women participated in the survey. Ten women declined to an-

swer some of the questions needed to calculate the EDS score. Clinical interview for assessment of depression was made for 205/218 (94%) of those women with an EDS score $\geq 10/30$ and 368/1120 (33%) of those with an EDS score of < 10 . After excluding three pre-menarchal women and five women in the uncategory ethnic group category, 565 women were included in the analysis. Around half the sample (53%) were from the Mandinka ethnic group, 34% were Wolof and the remaining 13% Fula. The majority (61%) were in polygamous marriages with 31% in monogamous marriages, 5% being widowed or divorced and 3% never married. A total of 97% of women worked as housewives and farmers and 92% had had at least one live-birth.

Only 259/565 women (46%) had menstrual cycling at the time of the survey; the majority of the others were either breast-feeding (22% of women), post-menopausal (16%) or pregnant (12%). Modern contraceptive use was rare, with only 33 women (6%) either sterilised or using oral or injectable hormonal contraceptives. The types of education available for women in the study area were Qu'ranic instruction or

primary school. Qu'ranic education is highly variable in intensity and duration and since only 2% (12/565) of the women had attended primary school, it was not possible to make a meaningful analysis of the role of education in depression in this population.

The weighted prevalence of clinical depression was 10.3% (95% CI 8.3–12.7). (Crude prevalence of depression was 19% (107/565)). Among the 107 depressed women, 79 (74%) were diagnosed with mild depression, 25 (23%) with moderate and 3 (3%) with severe depression. In those women with an EDS score of ≥ 10 , crude depression prevalence was 41.2% (84/204) and in those with score < 10 prevalence was 6.4% (23/361). This indicates that using this division of EDS scores had enriched the data with depressed women as intended. If the EDS was used as a screening tool with a score of ≥ 10 considered as the cut-off point to identify those at risk of depression, then 84/107 of clinically depressed women would have been detected, giving a sensitivity of 78.5%; the specificity would be 338/458 (73.8%).

Tables 3, 4 and 5 shows crude and adjusted ORs for associations between depression and the different

Table 4 Crude and adjusted odds ratios for the association between depression and fertility and menstrual problem variables

Variables	<i>r/n</i> ^a	% ^b	Crude OR (95% CI) ^c	<i>P</i> ^d	Adjusted OR (95% CI)	<i>P</i> ^e
Fertility						
<i>Parity</i>						
Nulliparous	9/46	5.5	1	0.041	1	
Para. 1–3	23/149	8.3	1.56 (0.62–3.93)		0.85 (0.23–3.15)	0.813
Para. 4–7	47/246	11.2	2.16 (0.92–5.07)		0.79 (0.19–3.37)	0.754
Para. 8+	28/124	16.0	3.25 (1.32–8.03)		0.70 (0.14–3.39)	0.654
<i>Obstetric history</i>						
No poor outcome	22/183	4.8	1	< 0.001	1	
1–3 poor outcomes	64/299	13.5	3.11 (1.73–4.47)		1.72 (0.79–3.75)	0.173
4+ poor outcomes	21/83	18.1	4.40 (2.11–9.20)		2.66 (1.00–7.09)	0.051
<i>Reproductive Category</i>						
Menstruating ^f	50/259	9.3	1	< 0.001	1	
Post-menopause	24/90	20.8	2.55 (1.37–4.75)		1.12 (0.43–2.94)	0.821
Pregnant	7/66	6.2	0.64 (0.24–1.70)		0.49 (0.14–1.79)	0.283
Delivered < 6 months	7/52	6.9	0.72 (0.27–1.94)		0.83 (0.28–2.46)	0.733
Delivered 6–18 months	4/60	3.2	0.33 (0.11–0.99)		0.35 (0.10–1.23)	0.101
Infertile	15/38	28.8	3.93 (1.70–9.05)		3.69 (1.42–9.65)	0.008
Menstrual Problems^g						
<i>Menstrual pain</i>						
No problem	38/210	9.0	1	< 0.001	1	
Problem	14/33	37.3	6.0 (2.51–14.3)		3.94 (1.52–10.27)	0.005
<i>Heavy Prolonged bleeding</i>						
No problem	46/228	10.9	1	0.051	Not in final model	
Problem	6/15	29.3	3.37 (1.06–10.67)			
<i>Irregular Menses</i>						
No problem	37/195	9.9	1	0.025	Not in final model	
Problem	15/49	20.8	2.40 (1.10–5.25)			
<i>Spotting</i>						
No problem	45/218	11.2	1	0.376	Not in final model	
Problem	7/25	16.8	1.60 (0.59–4.37)			

^a Number depressed/total in category

^b Weighted prevalence of depression

^c Adjusted for weighting

^d *P*-value for unadjusted association from Pearson chi-squared test corrected for weighting

^e *P*-value from Wald test comparing with baseline value, adjusting for weighting and other variables for which there are adjusted OR

^f Menstruating women not reporting a fertility problem and (*n* = 37) breastfeeding women who delivered more than 18 months ago

^g A total of 306 women did not have menstrual cycling at the time of the survey

Table 5 Crude and adjusted odds ratios for the association between depression and other reproductive morbidity variables

Variables	<i>r/n</i> ^a	% ^b	Crude OR (95% CI) ^c	<i>P</i> ^d	Adjusted OR (95% CI)	<i>P</i> ^e
Other reproductive morbidity						
<i>Reproductive-organ masses</i>						
No	68/413	8.8	1	<0.001	1	
Yes	31/93	23.4	3.18 (1.82, 5.58)		1.84 (1.00–3.37)	0.049
<i>Genital prolapse</i>						
No	50/254	9.54	1	0.239	Not in final model	
Yes	49/251	12.44	1.35 (0.82–2.21)			
<i>Painful intercourse</i>						
No	48/311	9.0	1	0.002	Not in final model	
Yes	19/54	23.4	3.07 (1.45–6.48)			
<i>Reproductive tract infection</i>						
No	51/249	11.0	1	0.892	Not in final model	
Yes	48/247	11.37	1.04 (0.63–1.71)			
<i>Pelvic tenderness</i>						
No	80/426	10.7	1	0.034	Not in final model	
Yes	15/51	20.3	2.13 (1.05–4.33)			
<i>Cervical dysplasia</i>						
No	91/457	11.6	1	0.848	Not in final model	
Yes	6/29	10.5	0.90 (0.31–2.62)			
<i>Anaemia</i>						
Mild or no anaemia	85/481	9.1	1	0.066	Not in final model	
Moderate or severe	19/76	15.5	1.84 (0.95–3.0)			

^a Number depressed/total in category

^b Weighted prevalence of depression

^c Adjusted for weighting

^d *P*-value for unadjusted association from Pearson chi-squared test corrected for weighting

^e *P*-value from Wald test comparing with baseline value, adjusting for weighting and other variables for which there are adjusted OR

potential correlates. Disparity between the total number in any category of variable and the 565 women who were interviewed is usually due to women who declined to answer a particular question or undergo a particular investigation (for example, blood taking or bimanual pelvic examination).

The final, weighted, logistic regression model showed that being infertile, widowed or divorced, having a poor obstetric history, experiencing severe menstrual pain, having reproductive-organ masses and being obese were significantly associated with depression (Tables 3–5). Being of Mandinka ethnicity (which is inseparable from being subject to female genital cutting (FGC)) was also associated. Older age, increased parity, being post-menopausal, irregular menstruation, heavy and prolonged bleeding during menstruation, painful sexual intercourse, pelvic tenderness and anaemia showed some association with depression in the crude analysis but the association disappeared when adjusted. Genital prolapse, reproductive tract infection, spotting and cervical dysplasia were not associated with depression in either the unadjusted or adjusted analysis.

Women who were in the postnatal period were divided according to whether they had delivered up to 6 months prior to the survey ($n = 52$) or during the 6–18 months previous to that ($n = 60$). Women in these two groups were less likely to be depressed than menstruating women although the small number of women in the postnatal periods meant confidence intervals were wide.

There were signs of FGC in 58% (668/1157) of the women whose external genitalia were examined [18]. The majority (98% (655/668)) of the FGC was of type II (Table 1), and most circumcised women (79%) reported their age at circumcision as between 4 and 7 years. Mandinka women (98% cut) had significantly higher odds of depression than Wolofs (95% uncut). The wide confidence intervals for the ORs comparing cut and uncut Fula women do not help to clarify whether this likely to be due to FGC or other differences between ethnic groups.

Of the women identified as depressed, 83% (89/107) had attended primary health care facilities and been treated for somatic complaints. Neither the women nor the health care workers had identified a psychological health problem for attention.

Discussion

The 10% prevalence of depression found in this study is consistent with the WHO multi-centre primary care study [19] but lower than the 23% reported from a community study of 93 women in two villages in Uganda [20]. This is the first comprehensive community survey linking overall reproductive health status and depression in women of reproductive age in rural sub-Saharan Africa. Most other surveys have been clinic or urban based, or focused only on pregnant or postnatal women. The participation rate (72%) was high for such a survey.

We found the strongest associations for women in this community between depression and experiencing infertility, widowhood or divorce, or severe menstrual pain. No association was demonstrated with being postpartum. It was not clear whether significant differences between ethnic groups indicate an association with FGC or are explained by other unmeasured aspects of ethnicity. The low numbers of subjects in some categories for analysis and the wide confidence intervals derived do limit the power of this study to test many associations but the overall impression is that achieving reproductive potential is independently involved in maintaining women's mental well-being in this rural and resource-poor society.

Our results show some consistency with a study conducted in India [21], which found being widowed or separated and in severe poverty to be independently associated with Common Mental Disorder (CMD) with the most common type of CMD being mixed anxiety-depressive disorder. Additionally, the Indian study also found sexual violence by the husband and low levels of autonomy and support from the family to be associated with CMD. They also found associations with gynaecological problems, such as dysmenorrhoea and complaints of a vaginal discharge.

Unfortunately, although domestic and sexual abuse are known to be associated with depression, it was not possible to investigate these in the context of this study. Workers in these fields are increasingly urging caution, especially when adding investigation of abuse to a more general survey with another focus, in order to avoid endangering and/or alienating the affected women [22]. Given the lack of formative research on abuse in this community as well as the already sensitive nature of the RMS, it was felt inappropriate to add such investigation.

The causative links between reproductive health and depression are obviously complex, and even the direction of association is not always clear. For example, does menstrual pain potentiate depression or vice versa? The three factors found to be most strongly associated with depression in this study (experiencing infertility, widowhood or divorce, or severe menstrual pain) could all potentiate depression by threatening the woman's status and resource-security; either through preventing her from contributing to continuation of a family line, by isolating her or by limiting her physical activity.

In contrast, we found that being postpartum, if anything was protective against depression in this community. Being postpartum is a recognised risk factor for depression in many societies, but the lack of association found here could be partly due to the enhancement of a woman's status and security. The stress of the new baby on the mother appears tempered by customary social norms and associations that do not make demands on her [23, 24] but instead affirm the birth, acceptance of the baby and the

support that will consequently be routine. In this rural area 99% of childbirth takes place within marriage, which enhances the status of the mother in the eyes of her husband, family and community, and bestows on her secure right of residence and care from the husband and his family [7, 9]. In this way, other risk factors for PND that have been identified in sub-Saharan Africa, such as physical or social insecurity [25–28], can also be ameliorated through childbirth. Although the number of postpartum women is small, these findings are still valuable since there is comparison with groups of non-postnatal women, which is rare in other studies of Postnatal Depression (PND) from sub-Saharan Africa.

The increased prevalence of depression among Mandinka women (who practice female circumcision) relative to Wolofs (who do not) is difficult to interpret. Within the Mandinka ethnic group, circumcision confers high status [29] and an uncircumcised woman would be ostracised, which might be a risk factor for depression. Taking into account the social status accorded to circumcision within practicing groups and untangling the effects of FGC from other ethnicity-related factors will be extremely complex to research.

The risk factors identified do not explain all the variance in depression prevalence, and are clearly not sufficiently sensitive, or specific, to identify women with depression. The majority of depressed women in this survey had attended a primary health clinic and it is known that primary care staff can be trained to recognise depression [30]. In a busy clinic there needs to be some way of directing staff to select women for interview who are more likely to have depression and this is where these identified risk factors could have a role.

Information is incomplete on therapies effective in this type of setting, but there is some evidence that cognitive therapy and medication can both have a role [25]. Pharmacological treatment of depression with simple supportive explanations is the practical option for primary care facilities [30], while community members and traditional healers will be able to assist with support and counselling. The challenge is to raise community and clinic awareness of depression, train primary care workers in relevant and feasible screening or diagnostic tools and establish a system of communication between the woman's community, traditional healers and primary health facilities.

Conclusion

Depression in women of reproductive age is clearly correlated with factors related to reproductive health and potential. The recognition of depression in women could be improved by the inclusion of these factors in training and raising awareness. There was no evidence of a higher risk of depression in postnatal women in this community and a significant difference between

circumcising and non-circumcising ethnic groups was difficult to interpret. These results emphasise the importance of poverty and resource-security in the genesis of depression in this community, and the need for research on how to bring better together reproductive health, public health and mental health to address depression.

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