Association between Family Functionality, Sociodemographic Factors, and Severity of Depression in Women with Infertility Attending a Gynecology Clinic in Northwest Nigeria

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J Neurosci Rural Pract 2022;13:246–253.

Abstract

Background Depression is a common psychological disorder in women with infertility, which causes significant morbidity and mortality. Little attention is currently given to depression by health care providers who manage infertility, and there is a scarcity of studies on depression among women with infertility in northern Nigeria.

Objective This study aimed at assessing the association between family functionality, sociodemographic factors, and depression severity in women with infertility attending a gynecology clinic in northwest Nigeria.

Methods This was a cross-sectional study involving 415 females systematically selected from women with infertility attending a gynecology clinic in a Nigerian hospital. They were interviewed using Beck's Depression Inventory and Family APGAR (Adaptability, Partnership, Growth, Affection, Resolve) questionnaires over 12 weeks. Data regarding participants' sociodemographic and infertility characteristics were also collected. The association between categorical variables was assessed using the chi-square or Fisher's exact test. The determinants of depression severity were assessed using logistic regression analysis. A p-value of < 0.05 was considered significant.

Results The mean age of respondents was 30.9 ± 6.6 years; the prevalence of depression was 44.6% (32.5% were of mild severity). Most families (73.5%) were highly functional. Association between family functionality and depression severity was not statistically significant (chi-square $=5.143$, $p = 0.259$). Respondents' religion (chi-square $= 10.813$, $p = 0.029$), education (chi-square $= 36.835$, $p = 0.001$), and monthly income (chi-square $= 9.261$, $p = 0.010$) were associated with depression severity. Being a Muslim (odds ratio [OR] $= 2.9$, 95% confidence interval [CI] $= 1.8–5.6$, $p = 0.001$) and having formal education (OR $= 10.2$, 95% CI $= 4.7–16.5$, $p = 0.001$) were determinants of depression severity.

Keywords
- depression
- family functionality
- gynecology clinic
- infertility
- severity
- women

published online
March 10, 2022

DOI https://doi.org/10.1055/s-0042-1743456.
ISSN 0976-3147.

Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India

Conclusion The prevalence of depression was high among the respondents. Although no association was found between family functionality and depression severity, respondents who are Muslims or had formal education were at increased risk of depression. Therefore, a high index of suspicion for depression and holistic care is required to manage women with infertility.

Introduction

Infertility is a common gynecological condition seen in the gynecology clinic. The World Health Organization estimates suggest that up to 15% of reproductive-aged couples are infertile globally.[1] In sub-Saharan Africa, the prevalence of infertility ranges from 9 to 30%; similarly, the prevalence is between 10.5 and 14.6% in Nigeria, with 50% attendance reported at some gynecology clinics.[2–4] The demand for care at such clinics underscores the desire of many young women to become parents, which stems from the value society places on children. Moreover, in Africa, motherhood is seen as a stabilizing factor for marital relationships and brings happiness to the family.[5] Interestingly, the burden of infertility is often placed on women as they are generally blamed for infertility rather than men.[6,7] Hence, women with infertility suffer consequences such as discrimination, stigma, economic hardship, neglect, social isolation, violence/abuse by the husband, her in-laws, and community, and denial of proper death rites in some countries and cultures.[1,5]

Therefore, infertility can be a distressing experience for the couple, often resulting in major psychological disorders such as depression.[5] Depression has been reported as a major problem associated with infertility that can result in significant morbidity and mortality, especially in Africa, where children are highly valued for various sociocultural and economic reasons.[5,8] The prevalence of depression in the general population in some African countries like Uganda is between 21 and 24.4%[9]; although, lower prevalence of 3.1 and 1.1% for lifetime and 12-month estimates of major depression, respectively, have been reported in Nigeria.[10] However, among women with infertility, the prevalence of depression varies with countries and cultures. Prevalence of 5.2 and 62.0% have been reported in Kuwait and Ghana, respectively[5,11]; with infertile females the greatest sufferers.[12] In Nigeria, the prevalence of depression among women with infertility ranges from 39.5 to 52.7%.[13–16] Unfortunately, the impact of infertility on women's mental health often goes unnoticed. Similarly, despite the high prevalence of infertility, fertility rather than infertility has received more attention in developing countries like Nigeria, probably because of overpopulation.[1]

In addition, it is known that the family functionality (which involves how the family structure functions effectively and positively nurture individual family members) plays an important role in disease transmission, child development, morbidity, mortality of adults, and recovery from illnesses.[17] However, there is a paucity of studies that have assessed the association between family functionality and depression severity in women with infertility in Nigeria. This is especially important in the northwest region, where the culture is different. Therefore, this study examined the prevalence and severity pattern of depression, the family functionality, and the association between sociodemographic factors, family functioning, and depression severity among women with infertility at the gynecology clinic of a tertiary hospital in northwest Nigeria.

Materials and Methods

Study Design and Settings

This descriptive cross-sectional study was conducted at the gynecology clinic of the obstetrics and gynecology (O&G) department of Aminu Kano Teaching Hospital (AKTH), Kano, Northwest, Nigeria from February 6 to May 1, 2017. According to the 2006 population census, Kano is Nigeria's most populous and second most industrialized state. It is a commercial center and northern Nigeria's economic nerve center. AKTH is located within the Kano metropolis and serves as a referral center to Kano and neighboring states. It is a 600-bed capacity hospital. The infertility (gynecology) clinic is run in the evenings (2:00 p.m. to 6:00 p.m.) every Monday. An average of 65 to 75 patients is seen weekly. The clinic is run by consultants and residents of the O&G department and family medicine residents during their O&G posting.

Study Population

The study population comprises women of reproductive age (15–49 years)[18] with a diagnosis of infertility at the clinic during the 12-week study period.

Inclusion and Exclusion Criteria

Women of the age group 15 to 49 years presenting with infertility and attending the gynecology clinic of AKTH within the study period were included. However, critically ill patients, those with depressive disorder preceding infertility, or those who declined consent to participate were excluded from the study.

Sample Size Determination

The minimum sample size of 377 was calculated using the Fisher's formula ($n = z^2pq/d^2$),[19] where n is the minimum sample size, z is the standard normal deviation corresponding to the 95% confidence interval (1.96), p is the prevalence rate of depression in infertility (42.9% = 0.429) based on a study by Upkong and Orji,[13] q is 1–p (1–0.429 = 0.571), and d

is the level of precision set at 5% (0.05). However, to adjust for nonresponse and missing data, 10% (38) was added to the minimum sample size to give a final sample size of 415 ($377 + 38$).

Sampling Method

A systematic sampling technique was used to select all women who satisfied the inclusion criteria, using a list of registered patients on each clinic day. The clinic records revealed that an average of 65 to 75 patients was seen weekly. Therefore, with a 12-week study duration, a sampling frame of 840 (i.e., $[65 + 75]/2 \times [12]$) potential participants was obtained. The sampling interval was derived from dividing the sampling frame by the sample size ($840/415 \approx 2$). Hence, every second patient was recruited after the first participant was chosen by balloting until the sample size was reached.

Data Collection Methods

Three research assistants were recruited for this study. They were female clinical assistants and qualified community health extension workers fluent in the local language (Hausa); they were also conversant with the study area's culture and customs. They were trained on how to administer and fill questionnaires appropriately.

A pretested questionnaire was administered to participants in English or Hausa language by the researcher and three trained research assistants. The questionnaire consisted of four sections: (1) sociodemographic data, (2) infertility characteristics, (3) Beck's Depression Inventory for Primary Care (BDI-PC), and (4) Family APGAR. The BDI-PC, Family APGAR tools, and the consent form, initially in English, were translated into Hausa (the dominant local language) by a Hausa-speaking family physician and a Hausa linguistic professional experienced in health surveys. Thereafter, it was back-translated independently by another family physician and a linguist. A comparison with the original translation was done and confirmed to be satisfactory before the pretest.

The administration of the BDI-PC questionnaire followed a two-stage process.[13–15] The first stage was a screening, in which only patients with positive responses for two or more items proceeded to the second stage. Only respondents who qualified for the second stage were recruited for the study. This questionnaire consisted of 7-item questions. The items reflected the cognitive, affective, somatic, and vegetative symptoms of depression. Scores on each item ranged from 0 to 3. Respondents were categorized based on the range of index scores. Scores of 0 to 3, 4 to 6, 7 to 9, and 10 to 21 denoted as no (or minimal), mild, moderate, and severe symptoms of depression, respectively.

The Family APGAR questionnaire was used to assess the presence and severity of family dysfunction.[20] It had five components: Adaptation, Partnership, Growth, Affection, and Resolve. Each component had a score range of 0 to 2: hardly ever (0), some of the time (1), and almost always (2). Total scores of 0 to 3, 4 to 6, and 7 to 10 denoted severely dysfunctional, moderately dysfunctional, and highly functional families, respectively.

Data Analysis

The data were entered, stored in a passworded computer to ensure confidentiality, and analyzed using Statistical Package for Social Science (SPSS) version 20 statistical software. Qualitative variables such as sex and marital status were described using percentages and proportions, while quantitative variables such as age were described using measures of central tendency (mean, median) and measures of dispersion (range, standard deviation) as appropriate. The chi-square or Fisher's exact test (as appropriate) was used in assessing the significance of association between categorical variables. A p-value of < 0.05 was considered significant. Factors significantly associated with depression at the bivariate level were entered into a logistic regression model.

Ethical Considerations

Ethical approval was sought and obtained from the Research Ethics Committee of the hospital. Written informed consent was obtained from all respondents before study questionnaires were administered. All provisions of the Helsinki Declaration[21] were respected during the study. Participants identified with mild to moderate depression were managed accordingly using the biopsychosocial approach, while those with severe depression were appropriately referred to the hospital's psychiatry clinic.

Results

Four hundred and fifteen of the 453 screened patients were recruited and analyzed. All 415 respondents were married.

Sociodemographic Characteristics of Respondents

►**Table 1** shows the sociodemographic characteristics of the respondents. Their ages ranged from 18 to 49 years, with a mean age of 30.9 ± 6.6 years. The most frequent age group was the 25 to 34 years (53.0%; ►**Table 1**). Muslims were the majority (398, 95.9%), 388 (93.5%) resided in urban areas, and 300 (72.3%) respondents were Hausas. Most respondents were from a monogamous family setting (313, 75.4%). A majority (338, 81.4%) was in their first marriage, had a least secondary-level education (324, 78.1%), unemployed (210, 50.6%), and had a monthly income of $>$ 1,800 naira (≈US$50) (347, 83.6%).

Prevalence and Severity Pattern of Depression among Respondents

Most respondents (230, 55.4%) had no (minimal) depression, while 185 (44.6%) had depression (►**Fig. 1**); 135 (32.5%) respondents had mild depression while 50 (12.1%) had moderate depression. None had severe depression.

Association between Family Functionality and Depression Severity

The proportion of respondents with depression (irrespective of severity) increased as respondents' families became more

Table 1 Sociodemographic characteristics of the study respondents ($n = 415$)

Characteristics	*n*	Percentage
Age (y)		
15–24	67	16.1
25–34	220	53.0
35–44	114	27.5
45–54	14	3.4
Total	415	100
Religion		
Islam	398	95.9
Christianity	17	4.1
Total	415	100
Residence		
Urban	388	93.5
Rural	27	6.5
Total	415	100
Tribe		
Hausa	300	72.3
Fulani	71	17.1
Yoruba	7	1.7
Igbo	11	2.6
Others[a]	26	6.3
Total	415	100
Type of marriage		
Monogamy	313	75.4
Polygamy	102	24.6
Total	415	100
Chronology of marriage		
1st marriage	338	81.4
2nd marriage	65	15.7
3rd marriage and above	12	2.9
Total	415	100
Education		
None	0	0
Quranic	39	9.4
Primary	52	12.5
Secondary	183	44.1
Tertiary	141	34.0
Total	415	100
Occupation		
Civil servant	76	18.3
Business	93	22.4
Artisan	35	8.5
Private company employee	1	0.2
Unemployed	210	50.6
Total	415	100
Monthly income		
$\leq$ 18,000 naira ($50)	68	16.4
$>$ 18,000 naira ($50)	347	83.6
Total	415	100

[a]Nupe, Kanuri, Ebira, Igala, Babur, Shuwa, Tiv, Idoma, Bachama, Margi.

functional (►**Table 2**). This relationship was, however, not statistically significant (Fisher's exact, $p = 0.259$).

Association between Sociodemographic Characteristics and Depression Severity

►**Table 3** shows the relationship between respondents' sociodemographic characteristics and the severity of depression. There was a statistically significant association between religion and the severity of depression (Fisher's exact, $p = 0.029$). However, the associations between respondents' age, area of residence, tribe, type of marriage, the chronology of marriage, occupation, and severity of depression were not statistically significant.

Association between Socioeconomic Characteristics, Type and Duration of Infertility, and Depression Severity

►**Table 4** shows the relationship between socioeconomic characteristics and the severity of depression. A significant association was observed between respondents' educational level and severity of depression (Fisher's exact test, $p = 0.001$) and monthly income (chi-square $= 9.261$, $p = 0.010$). Although the proportion of respondents with employment increased with the severity of depression, this relationship was not statistically significant (chi-square $= 5.607$, $p = 0.061$). Similarly, there were no statistically significant associations between marriage type, the chronology of marriage, type and duration of infertility, and depression severity.

Determinants of Depression Severity among Respondents

The variables that were significantly associated with depression severity on bivariate analysis (i.e., income, religion, and education) were further analyzed to adjust for the effect of confounders (►**Table 5**). We found that belonging to the Islamic faith and having formal education were the independent determinants of depression severity.

Discussion

This cross-sectional, hospital-based study examined the prevalence of depression, the association between family function, sociodemographic factors, and depression severity

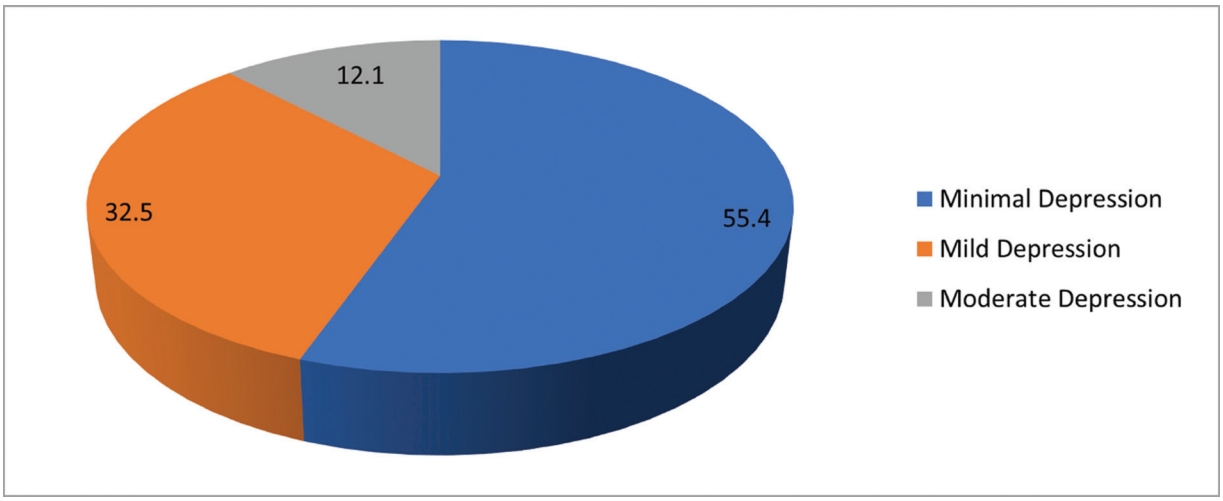

Fig. 1 Prevalence and severity pattern of depression among respondents.

Table 2 Relationship between family functionality and depression

Variable	Severity of depression			Fisher's exact test	*p*-Value
Family functioning	No (minimal)	Mild	Moderate		
Severe dysfunction	14 (6.1%)	3 (2.2%)	0 (0.0%)	5.143	0.259
Moderate dysfunction	52 (22.6%)	30 (22.2%)	11 (22.0%)		
Highly functional	164 (71.3%)	102 (75.6%)	39 (78.0%)		

Table 3 Relationship between sociodemographic characteristics and severity of depression

Variable	Severity of depression			Chi-square	*p*-Value
	No (minimal)	Mild	Moderate		
Age group (y)					
15–24	35 (15.2%)	24 (17.8%)	8 (16.0%)	FET	0.988
25–34	121 (52.6%)	72 (53.3%)	27 (54.0%)		
35–44	66 (28.7%)	34 (25.2%)	14 (28.0%)		
45–54	8 (3.5%)	5 (3.7%)	1 (2.0%)		
Religion					
Islam	224 (97.4%)	129 (95.6%)	45 (90.0%)	FET	0.029[a]
Christianity	6 (2.6%)	6 (4.4%)	4 (8.0%)		
Traditional	0	0	1 (2.0%)		
Residence					
Urban	165 (71.7%)	109 (80.7%)	33 (66.0%)	5.459	0.065
Rural	65 (28.3%)	26 (19.3%)	17 (34.0%)		
Tribe					
Hausa	167 (72.6%)	99 (73.30%)	34 (68.0%)	FET	0.452
Fulani	35 (15.2%)	27 (20.0%)	9 (18.0%)		
Yoruba	3 (1.3%)	3 (2.3%)	1 (2.0%)		
Igbo	7 (3.1%)	2 (1.5%)	2 (4.0%)		
Others	18 (7.8%)	4 (2.9%)	4 (8.0%)		

Abbreviation: FET, Fisher's exact test.
[a]Significant.

Table 4 Relationship between socioeconomic characteristics, type and duration of infertility, and severity of depression

Variable	Severity of depression, *n* (%)			Chi-square	*p*-Value
	No (minimal)	Mild	Moderate		
Type of marriage					
Monogamous	172 (74.8)	99 (73.3)	42 (84.0)	2.353	0.308
Polygamous	58 (25.2)	36 (26.7)	8 (16.0)		
Chronology of marriage					
1st marriage	190 (82.6)	107 (79.3)	40 (80.0)	FET	0.725
2nd marriage	35 (15.2)	20 (16.3)	9 (18.0)		
3rd marriage and above	5 (2.2)	6 (4.4)	1 (2.0)		
Education					
Nonformal	39 (17.0)	1 (0.7)	0 (0.0)	FET	0.001[a]
Formal	191 (83.0)	134 (99.3)	50 (100.0)		
Occupation					
Unemployment	125 (54.3)	67 (49.6)	18 (36.0)	5.607	0.061
Employed	105 (45.7)	68 (50.4)	32 (64.0)		
Monthly income					
$\leq$ 1,800 ($50)	49 (21.3)	13 (9.6)	6 (12.0)	9.261	0.010[a]
$>$ 1,800 ($50)	181 (78.7)	122 (90.4)	44 (88.0)		
Type of infertility					
Primary	156 (67.8)	88 (65.2)	37 (74.0)	1.300	0.522
Secondary	74 (32.2)	47 (34.8)	13 (26.0)		
Duration of infertility (y)					
1–5	108 (47.0)	59 (43.7)	22 (44.0)	4.039	0.401
6–10	84 (36.5)	60 (44.4)	23 (46.0)		
$>$ 10	38 (16.5)	16 (11.9)	5 (10.0)		

Abbreviation: FET, Fisher's exact test.
[a]Significant.

among women with infertility attending the gynecology clinic of a tertiary hospital in Kano, Northwest Nigeria.

The prevalence of depression among our study respondents was 44.6%. This finding is higher than the prevalence reported in other countries such as Sweden (10.9% among women and men with infertility undergoing in vitro fertilization treatment),[12] Italy (17.9%, among couples undergoing assisted reproductive treatment),[22] and China (14.8%, also among infertile women seeking in vitro fertilization treatment).[23] Lower levels of stigma associated with infertility and higher nonresponse rate or lack of participation in depression-infertility studies (probably from the psychological distress associated with infertility) have been associated with lower prevalence of depression in women with infertility.[23] Other reasons for differences in depression prevalence include variations in the screening tools for depression (e.g., Primary Care Evaluation of Mental Disorders, Zung Depression Scale vs. BDI), variations in the endpoints studied (e.g., depression vs. psychiatric disorders), and variations in the study population (in vitro fertilization client vs. general infertility patients). However, our finding is similar to the 42.9% reported among women with infertility at a tertiary hospital in Ile-Ife, Southwest, Nigeria,[17] and 39.5% reported in Awka, Southeast, Nigeria.[14] In contrast, higher prevalence of 52.7 and 68.9% were reported in Ogbomoso, Southwest Nigeria, and Basrah, Iraq.[16,24] This could be attributed to the different tools used in the two studies (Patient Health Questionnaire and International Classification of Diseases, Tenth Revision criteria) and the study populations (general infertility vs. in vitro fertilization patients).

The majority of respondents (73.7%) in our study had a Family APGAR score of $\geq$ 7, suggesting that they had highly functional families. However, we found no significant association between respondents' family functionality and depression severity. This finding indicates that the type of respondents' family structure interactions, nurturing, and support systems did not influence the severity of depression in our study population. Unfortunately, there is a paucity of published studies on family functionality and depression among women with infertility to compare with. However, some studies have shown an association between family functionality and depression among the elderly[25,26] and adolescents.[27] They have suggested that though the functional family provides a comfortable environment that

Table 5 Determinants of depression severity among respondents

Variable	Odds ratio	95% CI	*p*-Value
Income ($\leq$ \$50/$>$ \$50)	3.1	0.9–6.3	0.08
Religion (Islam/Others)	2.9	1.8–5.6	0.001[a]
Education (formal education/no formal)	10.2	4.7–16.5	0.001[a]

Abbreviation: CI, confident interval.
[a]Significant.

ensures the well-being of its members, the elderly tend to have comorbid conditions which predispose them to depression.[25] The institutionalized elderly patients, on the other hand, because of distance, lose their family support system, are lonely, and hence, are predisposed to depression.[26] Similarly, families of depressed adolescents have been shown to have difficulties demonstrating affection, communicating with each other, defining roles, solving conflicts, and showing integration and cohesion as a group.[27] However, we suspect that our finding may be due to the unwillingness of some respondents to express issues related to their families freely; this is often because of concerns about exposing family secrets to the community. In addition, it could also be due to the use of a self-reported inventory in this study.

Formal education was significantly associated with the severity of depression; respondents who had formal education were 10 times more likely to be depressed than those without formal education. This finding could be due to the influence of education on the likelihood of seeking educational materials to improve their knowledge on infertility and its consequences. This agrees with findings reported by Alhassan et al and Awoyinka and Ohaeri.[5,15] In contrast, reports by Upkong and Orji, Ikeako et al, Oladeji and OlaOlorun, Al-Asadi and Hussein, and Al-Homaidan suggest that highly educated people may have other engaging pursuits other than infertility to focus on and, as such, are less prone to depression.[13,14,16,24,28]

Furthermore, high income was found to be significantly associated with severity of depression. This finding could be due to men's increased tendency of taking another wife when the family income is high in the traditional Hausa society. This may, in turn, worsen her psychological stress and result in depression. However, our finding contrasts with results reported by Ikeako et al, where they suggested that income should be interpreted with caution owing to the difficulty in verifying the authenticity of the reported income.[14]

We also observed a significant association between being Muslims and the severity of depression in this study. Respondents who were Muslims were nearly three times more likely to be depressed than non-Muslims. This may be because approximately 96% of the respondents were Muslims. In addition, Muslims practice polygamy, divorce is acceptable, and family beliefs on childbearing are considered highly important. Infertility could therefore predispose women to increased psychological stress because of the above factors. Our finding is in accord with a report by Al-Homaidan in Riyadh, Kingdom of Saudi Arabia, which suggested that family status, especially childbearing, is very important and valuable. It opined that a child stabilizes the family and increases marital satisfaction and that the absence of children may cause marital problems such as divorce or even a second marriage.[28]

Study Limitations

This study had some limitations, including our inability to exclude all the respondents' potential risk factors for depression. Second, given that this study is hospital-based, a community-based study is necessary to decipher the complete prevalence and determinants of depression severity among women with infertility in the study area. Finally, the paucity of similar studies made the comparison of findings difficult.

Recommendations

The high prevalence of depression among the respondents suggests that health care professionals (e.g., family physicians, gynecologists) who manage women with infertility should heighten their index of suspicion for depression. They may also require appropriate training to provide holistic care (biopsychosocial model of care), requiring the use of simple screening tools to identify psychological stress such as depression, commence therapeutic counseling (before, during, and after infertility treatments), and coordinate care where necessary.

Conclusion

There was a high prevalence of depression among respondents. A majority had functional families. Although the proportion of respondents with depression of varying severity increased with family function, the association was not significant. Respondents who were Muslims or had formal education were at increased risk of depression. These findings suggest that health care professionals who manage women with infertility should have a high index of suspicion for depression and should provide holistic care (biopsychosocial model of care).

Conflict of Interest
None declared.

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