Cross-sectional study to assess the psychological morbidity of women facing possible miscarriage

Patricia NP Ip *, Karen Ng, Osanna YK Wan, Janice WK Kwok, Jacqueline PW Chung, Symphorosa SC Chan

ABSTRACT

Introduction: Threatened miscarriage is a common complication of pregnancy. This study aimed to assess psychological morbidity in women with threatened miscarriage, with the goal of identifying early interventions for women at risk of anxiety or depression.

Methods: Women in their first trimester attending an Early Pregnancy Assessment Clinic were recruited between July 2013 and June 2015. They were asked to complete the 12-item General Health Questionnaire (GHQ-12), the Beck Depression Inventory (BDI), Spielberger's State Anxiety Inventory State form (STAI-S), the Fatigue Scale–14 (FS-14), and the Profile of Mood States (POMS) before consultation. They were also asked to rate anxiety levels before and after consultation using a visual analogue scale (VAS).

Results: In total, 1390 women completed the study. The mean ± standard deviation of GHQ-12 (bi-modal) and GHQ-12 (Likert) scores were 4.04 ± 3.17 and 15.19 ± 5.30, respectively. Among these women, 48.4% had a GHQ-12 (bi-modal) score ≥4 and 76.7% had a GHQ-12 (Likert) score >12, indicating distress. The mean ± standard deviation of BDI, STAI-S, and FS-14 scores were 9.35 ± 7.19, 53.81 ± 10.95, and 2.40 ± 0.51, respectively. The VAS score significantly decreased after consultation

(P<0.001). Compared with women without a history of miscarriage, women with a previous miscarriage had higher GHQ-12, BDI, and POMS scores (except for fatigue-inertia and vigour-activity subscales). A higher bleeding score was strongly positively correlated with GHQ-12 (Likert) score. There were weak correlations between pain score and the GHQ-12 (bi-modal) ≥4, BDI >12, and POMS scores (except for confusion-bewilderment subscale which showed a strong positive correlation).

Conclusion: Women with threatened miscarriage experience a considerable psychological burden, emphasising the importance of early recognition for timely management.

PNP Ip *, FHKCOG, FHKAM (Obstetrics & Gynaecology)
K Ng, FHKCOG, FHKAM (Obstetrics & Gynaecology)
OYK Wan, FHKCOG, FHKAM (Obstetrics & Gynaecology)
JWK Kwok, BSc
JPW Chung, FHKCOG, FHKAM (Obstetrics & Gynaecology)
SSC Chan, MD, FHKCOG

Department of Obstetrics and Gynaecology, The Chinese University of Hong Kong, Hong Kong SAR, China

* Corresponding author: patricia.ip@cuhk.edu.hk

New knowledge added by this study
- A substantial proportion of women with threatened miscarriage had symptoms of anxiety or depression.
- Women with a previous miscarriage had a higher level of distress and would benefit from additional attention and psychological support.

Implications for clinical practice or policy
- Women with problems in early pregnancy should receive both clinical and psychological care to alleviate their anxiety.
- Further studies of maternal psychological outcomes and fetal outcomes are needed to determine the long-term effects of anxiety and depression among women with threatened miscarriage in the first trimester.

Introduction

Miscarriage occurs in 10% to 15% of pregnancies, mainly in the first trimester.[1] Spontaneous miscarriage is associated with psychological problems such as anxiety and depression.[2-4] Post-traumatic stress disorder may also occur after a miscarriage.[3] Threatened miscarriage affects 15% to 20% of pregnant women.[5] Management of threatened miscarriage involves reassurance and counselling. Women with threatened miscarriage

and/or pregnancy-related uncertainty may experience frustration and anxiety. Although there are extensive data regarding the association between miscarriage and psychological morbidity, higher incidences of anxiety and depression among women with threatened miscarriage have only been detected in small studies.[6,7]

Antenatal depression and anxiety disorders are associated with increased fetal risks, such as low birth weight; antenatal symptoms of depression have been

positively associated with postnatal depression.[8,9] Furthermore, antenatal maternal stress and anxiety appear to predict long-term behavioural and emotional problems in children.[10,11] Therefore, early detection and intervention are needed in women with antenatal psychological symptoms to minimise the impacts of those symptoms.

This study assessed psychological morbidity in women with threatened miscarriage, with the goal of identifying early interventions for women at risk of anxiety or depression.

Methods

Study design

This cross-sectional study, conducted at a university hospital in Hong Kong between July 2013 and June 2015, was part of a study that examined the ability of an early pregnancy viability scoring system to support counselling for women.[12] In this hospital, an outpatient Early Pregnancy Assessment Clinic (EPAC) provides medical care for women experiencing abdominal pain, vaginal bleeding, or other problems in early pregnancy (gestational age ≤12 weeks). Referrals are usually made by medical officers from the Accident and Emergency Departments across Hong Kong, as well as general practitioners. All gynaecologists at the EPAC have ≥3 years of experience performing ultrasound scans. All Chinese women attending the EPAC were invited to participate; written informed consent was obtained from women who agreed to take part in the study.

Exclusion criteria were age <18 years, ectopic pregnancy, multiple pregnancies, gestational age >84 days (>12 weeks), requested termination of pregnancy, and loss to follow-up. Demographic data, obstetric history, smoking status, alcohol consumption, and body mass index were recorded. Details of early pregnancy complaints were assessed, including abdominal pain (graded by a pain score of 0 to 3, where a higher score represents greater pain) and vaginal bleeding (determined by a pictorial blood loss chart according to the number of pads used, where 0 corresponds to no bleeding and 4 corresponds to clots or flooding).

Psychometric instruments

Chinese validated versions of five questionnaires were used to assess psychological well-being among the participants: the 12-item General Health Questionnaire (GHQ-12), the Beck Depression Inventory (BDI), Spielberger's State Anxiety Inventory State form (STAI-S), the Fatigue Scale–14 (FS-14), and the Profile of Mood States (POMS). All questionnaires have demonstrated reliability and validity in previous studies.[13-15] The GHQ-12 and BDI scores were reported as both continuous and categorical variables, while the scores of other questionnaires were reported as continuous variables.

The GHQ-12 is a self-reporting rating scale intended to identify individuals with reduced psychological well-being or diminished quality of life. It is sensitive to short-term psychiatric disorders. A total score of ≥4 using the bi-modal scoring method (0-0-1-1) is considered 'high distress'. When using the Likert scoring method (0-1-2-3), scores ≤12 are considered normal, while scores >12 are considered evidence of psychological distress.[16,17] The questionnaire has been used as a tool to evaluate women with miscarriage.[18-20]

The BDI is a 21-item self-reporting rating scale intended to measure symptoms of depression in both general and psychiatric populations.[21] It is used to measure depression severity, and psychological morbidity is defined as a score of >12, indicating probable depressive disorder. The STAI-S is a 20-item self-reporting inventory that measures state anxiety, including transitory and situational feelings of worry.[22] Its use has been validated in pregnant women.[23] A higher score indicates a higher level of anxiety. The FS-14 is a 14-item self-rating questionnaire that measures fatigue severity. A lower score indicates a higher level of fatigue.

The POMS is a self-reporting tool for the assessment of mood alterations in clinical and psychiatric populations.[24] This 65-item questionnaire

面臨可能流產的女性心理狀態評估橫斷面研究

葉雅平、吳嘉詠、温綺琪、郭蘊琪、鍾佩樺、陳丞智

簡介：先兆流產是妊娠常見的併發症。本研究評估先兆流產婦女的心理狀態，旨在為可能患有焦慮或抑鬱症的婦女提供早期干預措施。

方法：我們於2013年7月至2015年6月期間招募了到一間早期妊娠評估診所就診的懷孕早期女性參與本研究。她們須在接受諮詢前填寫12項常規健康問卷（GHQ-12）、貝克抑鬱量表（BDI）、斯皮爾伯格狀態焦慮量表（STAI-S）、疲勞量表-14（FS-14）和情緒狀態量表（POMS），並須使用視覺模擬量表（VAS）評估諮詢前後的焦慮水平。

結果：共有1390名婦女完成了本研究。平均 ± 標準差GHQ-12（雙峰）和GHQ-12（李克特評分）分數分別為4.04 ± 3.17和15.19 ± 5.30。在這些婦女中，48.4%的GHQ-12（雙峰）分數≥4，76.7%的GHQ-12（李克特評分）分數>12，表示存在困擾。平均 ± 標準差BDI、STAI-S和FS-14分數分別為9.35 ± 7.19、53.81 ± 10.95和2.40 ± 0.51。諮詢後的VAS分數顯著降低（P<0.001）。與無流產史的婦女相比，有先前流產史的婦女的GHQ-12、BDI和POMS（除疲勞—慣性和活力—活動亞量表）分數較高。出血評分與GHQ-12（李克特評分）分數呈強正相關。疼痛評分與GHQ-12（雙峰）≥4、BDI >12和POMS（除困惑—迷茫亞量表，與之呈強正相關）分數之間的相關性較弱。

結論：先兆流產的婦女承受相當大的心理負擔；及早識別對於及時管理至關重要。

contains seven components: tension-anxiety, depression-dejection, anger-hostility, fatigue-inertia, confusion-bewilderment, vigour-activity, and total mood disturbance. Scores range from 0 (not at all) to 4 (extremely). Higher positive mood scores indicate an ideal mood, whereas higher negative mood scores indicate severe mood disturbance.

In addition to the above questionnaires, each woman's level of anxiety and worry before consultation was assessed using a 0 to 10 cm visual analogue scale (VAS). A higher value represents a higher level of anxiety and worry about their pregnancies. The VAS has previously been validated with respect to its correlations with other measures of anxiety.[25,26]

During the consultation, women were counselled based on their ultrasound findings and clinical diagnosis. These women used the VAS to indicate their level of pregnancy-related anxiety after consultation. Follow-up scans (1-2 weeks later) were offered for women with a pregnancy of uncertain viability. Actual pregnancy outcomes were reassessed at 13 to 16 weeks, either by phone or by retrieval of information from the hospital's centralised computer antenatal records system.

Statistical analysis

The sample size was calculated based on the number of participants required for the primary study to validate the scoring system.[12] SPSS software (Windows version 26.0; IBM Corp, Armonk [NY], United States) was used for data entry and analysis. A 95% confidence interval (95% CI) was calculated to determine the estimated errors and prevalence. Descriptive analyses were used for demographic data. The Chi squared test was used to explore associations between categorical variables. The Mann-Whitney U test was used to compare median values when data were not normally distributed, while the t test was used to compare means when data were normally distributed. Univariate analyses were performed to identify factors associated with psychological distress or morbidity. Factors with P values <0.1 in univariate analysis were entered into multivariate analysis, which was conducted via binary logistic regression. P values <0.05 were considered statistically significant.

Results

Among the 1508 women who attended the EPAC during the study period, 64 were excluded and 54 declined to participate; thus, 1390 women completed the study (Fig). The demographic data are shown in Table 1. At the first clinic visit, most women (n=1048, 75.4%) had a viable pregnancy, 223 women (16.0%) had a pregnancy of uncertain viability, and 119 (8.6%) women had a miscarriage. At 13 to 16 weeks of gestation, 1111 women (79.9%) had a viable pregnancy, and an additional 160 (11.5%) women had a miscarriage.

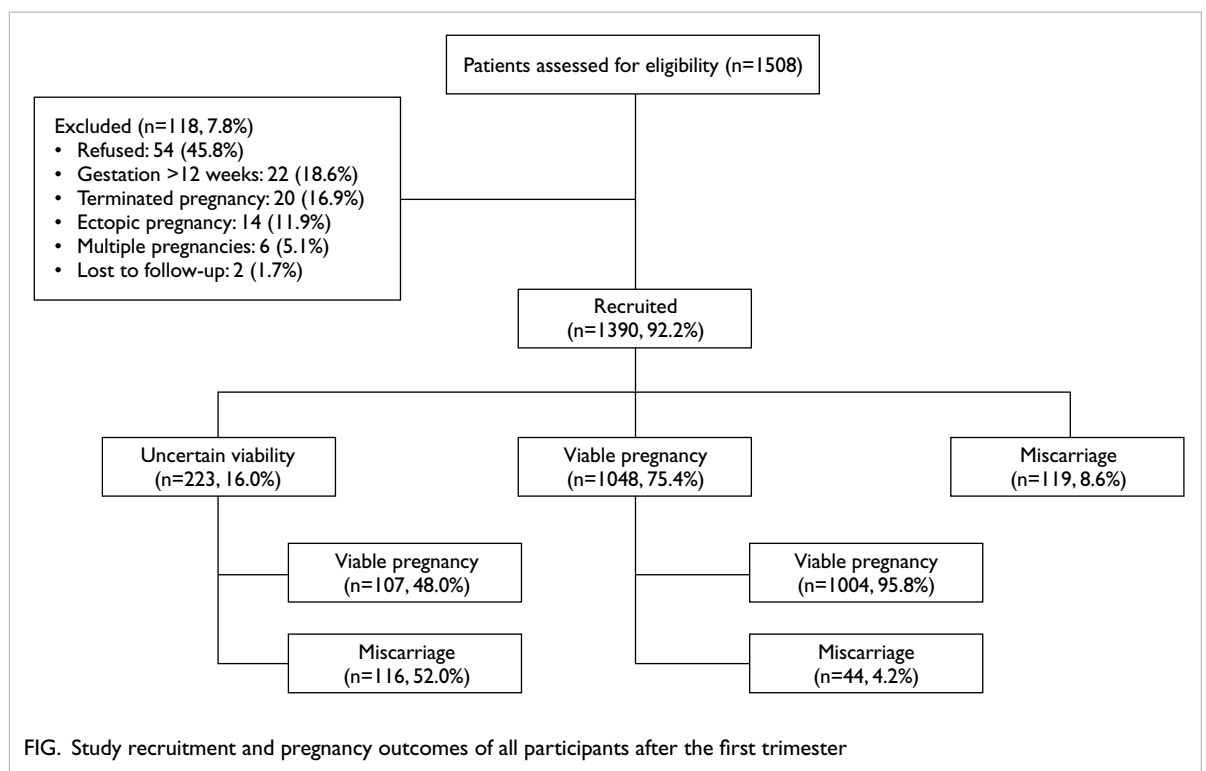The GHQ-12 (both bi-modal and Likert), BDI, STAI-S, FS-14, POMS, and VAS results are presented

FIG. Study recruitment and pregnancy outcomes of all participants after the first trimester

TABLE 1. Demographic characteristics, pain severity, and bleeding scores among all participants (n=1390)*

Age, y	31.2 ± 4.8 (18-47)
Weight, kg	55.1 ± 9.7 (33.6-104.8)
Height, m	1.6 ± 0.1 (1.36-1.76)
Body mass index, kg/m^2	22.0 ± 3.6 (14.0-41.3)
Current smoker	179 (12.9%)
Alcohol consumption (>2 units/day or >4 units on any single occasion)	31 (2.2%)
Gravidity	
1	532 (38.3%)
2	423 (30.4%)
≥3	435 (31.3%)
Parity	
0	805 (57.9%)
1	482 (34.7%)
≥2	103 (7.4%)
History of miscarriage	246 (17.7%)
Gestational age at first consultation, d	58.1 ± 12.6 (31-116)
Bleeding score	
0	310 (22.3%)
1	863 (62.1%)
2	195 (14.0%)
≥3	22 (1.6%)
Abdominal pain	
None	457 (32.9%)
Mild	787 (56.6%)
Moderate to severe	146 (10.5%)

* Data are shown as mean ± standard deviation (range) or No. (%)

in Table 2. Overall, 48.4% and 76.7% of women had a GHQ-12 (bi-modal) score ≥4 and a GHQ-12 (Likert) score >12, respectively, indicating distress. Among the viable pregnancy, uncertain viability, and miscarriage groups, the percentages of women with a GHQ-12 (bi-modal) score ≥4 (43-52%) and a GHQ-12 (Likert) score >12 (73-83%) were similar. Women with miscarriage had the highest GHQ-12 score and the highest percentages of a GHQ-12 (bi-modal) score ≥4 and a GHQ-12 (Likert) score >12. The miscarriage group also had relatively higher POMS subscale scores for tension-anxiety, depression-dejection, anger-hostility, confusion-bewilderment, and total mood disturbance compared with women who had other diagnoses.

The VAS scores for anxiety are also presented in Table 2. The score before consultation was the highest among women with a miscarriage (mean ± standard deviation=7.02 ± 2.50). Although the scores for the viable pregnancy and uncertain viability groups were significantly lower after consultation, the score was substantially higher in the uncertain viability group than in the viable pregnancy group.

Subgroup analysis showed that GHQ-12, BDI, and POMS (except fatigue-inertia and vigour-activity subscales) scores were significantly higher among women with previous miscarriage than among those without (Table 3). The bleeding score was strongly positively correlated with the GHQ-12 (Likert) score (correlation coefficient=0.56; P=0.032). Univariate analysis revealed that compared with women who had a lower bleeding score (<2), women with a higher bleeding score (≥2) had a significantly higher risk of having a GHQ-12 (bi-modal) score ≥4 (P=0.041), a GHQ-12 (Likert) score >12 (P=0.025), and a BDI score >12 (P=0.022) [Table 4]. There were statistically significant but weak positive correlations between the pain score and a GHQ-12 (bi-modal) score ≥4 (P=0.001), a BDI score >12 (P<0.001), and a POMS total mood disturbance score (P<0.001), as well as various subscales. Notably, the POMS confusion-bewilderment subscale (correlation coefficient=0.93; P<0.001) demonstrated a strong positive correlation with the pain score.

Statistically significant factors associated with the various psychometric instrument scores were subjected to multivariate analysis (Table 4). Previous miscarriage was an independent risk factor for a GHQ-12 (bi-modal) score ≥4 (odds ratio [OR]=1.570, 95% CI=1.19-2.07) and a GHQ-12 (Likert) score >12 (OR=1.459, 95% CI=1.04-2.06), indicating distress; it was also a risk factor for a BDI score >12 (OR=1.717, 95% CI=1.28-2.30), suggesting probable depression. A bleeding score ≥2 was an independent risk factor for a GHQ-12 (Likert) score >12 (OR=1.506, 95% CI=1.05-2.17) and a BDI score >12 (OR=1.423, 95% CI=1.04-1.95).

Discussion

In this cohort study, nearly 50% and approximately 77% of women had a GHQ-12 (bi-modal) score ≥4 and a GHQ-12 (Likert) score >12, indicating distress. Around one-fourth (24.5%) of women had a BDI score >12, suggesting probable depression.

Regardless of diagnosis, the VAS score decreased after consultation. However, the decrease in VAS score was smaller for the uncertain viability group, which may be attributed to the enhanced anxiety resulting from uncertainty among these women. This anxiety would be alleviated after an ultrasound examination and consultation with an accurate diagnosis. These findings emphasise the need to implement an early pregnancy assessment service that provides both clinical and psychological guidance to alleviate anxiety among women with problems in early pregnancy.

Emotional disturbances can have long-term

TABLE 2. Scores of various psychometric tests among women based on their pregnancy outcome[*]

	Overall (n=1390)	Viable pregnancy group (n=1048)	Uncertain viability group (n=223)	Miscarriage group (n=119)
GHQ-12				
Bi-modal score	4.04 ± 3.17	4.07 ± 3.09	3.89 ± 3.43	4.38 ± 3.29
Indication of distress [GHQ-12 (bi-modal) score ≥4]	673 (48.4%)	515 (49.1%)	96 (43.0%)	62 (52.1%)
Likert score	15.19 ± 5.30	15.19 ± 5.18	15.08 ± 5.885	15.85 ± 5.27
Indication of distress [GHQ-12 (Likert) score >12]	1066 (76.7%)	805 (76.8%)	162 (72.6%)	99 (83.2%)
BDI	9.35 ± 7.19	9.53 ± 7.02	8.88 ± 7.96	9.29 ± 7.10
Probable depression (BDI score >12)	341 (24.5%)	260 (24.8%)	51 (22.9%)	30 (25.2%)
Spielberger's State Anxiety Inventory State form	53.81 ± 10.95	54.43 ± 10.57	52.98 ± 11.9	49.95 ± 11.88
Fatigue Scale–14	2.40 ± 0.51	2.45 ± 0.51	2.30 ± 0.497	2.28 ± 0.51
Profile of Mood States subscale scores				
Tension-anxiety (range, 0-36)	12.55 ± 7.71	12.32 ± 7.56	12.35 ± 7.96	14.93 ± 8.52
Depression-dejection (range, 0-60)	12.52 ± 11.59	11.93 ± 11.20	12.80 ± 12.12	17.53 ± 13.27
Anger-hostility (range, 0-48)	9.96 ± 8.63	9.75 ± 8.47	10.08 ± 8.66	11.58 ± 9.73
Fatigue-inertia (range, 0-28)	12.28 ± 6.50	12.58 ± 6.55	11.41 ± 6.30	12.02 ± 6.74
Confusion-bewilderment (range, 0-28)	9.83 ± 5.31	9.72 ± 5.20	9.68 ± 5.66	11.15 ± 5.76
Vigour-activity (range, 0-32)	10.79 ± 5.52	10.70 ± 5.46	11.44 ± 5.48	10.46 ± 6.10
Total mood disturbance (range, -32 to 200)	46.37 ± 37.35	45.61 ± 36.50	44.90 ± 38.79	56.80 ± 42.42
VAS score				
Before consultation	6.06 ± 2.41	6.01 ± 2.32	5.94 ± 2.48	7.02 ± 2.50
After consultation	4.07 ± 2.53	3.69 ± 2.30	5.55 ± 2.74	N/A
P value comparing VAS scores before and after consultation	<0.001	<0.001	0.02	-

Abbreviations: BDI = Beck Depression Inventory; GHQ-12 = 12-item General Health Questionnaire; N/A = not applicable; VAS = visual analogue scale
[*] Data are shown as mean ± standard deviation or No. (%), unless otherwise specified

effects on women with a previous miscarriage. Lok et al[19] reported consistently higher scores on the GHQ-12 and BDI among women with a previous miscarriage, although these scores could decrease over time. In the present study, we observed a higher level of distress among women with a previous miscarriage, as demonstrated by the significantly greater proportion of women with GHQ-12 (bi-modal) score ≥4, GHQ-12 (Likert) score >12, and BDI score >12. Profile of Mood States scores were also significantly higher on all subscales, except for the fatigue-inertia and vigour-activity subscales. Similarly, the baseline VAS score before consultation was significantly higher among women with a previous miscarriage than among those without. In multivariate analysis, previous miscarriage was an independent risk factor for GHQ-12 (bi-modal) score >4, GHQ-12 (Likert) score >12, and BDI score >12. Baseline psychological morbidity may be greater among women with a previous miscarriage than among those without, consistent with findings in other studies.[3,27] Therefore, additional attention and psychological support would be beneficial for women with greater distress and worse mood status.

A higher pain score was positively correlated with higher levels of distress and anxiety, as indicated by the positive relationships with various scales used in the present study. Pain is associated with anxiety and depression in pregnant women.[28] Nevertheless, we observed weak relationships between pain and anxiety or distress, which might be related to the subjective nature of pain assessment.

Women with moderate to heavy bleeding (bleeding score ≥2) had significantly higher GHQ-12 (bi-modal), GHQ-12 (Likert), and BDI scores. Additionally, multivariate analysis showed that moderate to heavy bleeding (bleeding score ≥2) was an independent risk factor for a GHQ-12 (bi-modal) score ≥4, a GHQ-12 (Likert) score >12, and a BDI score >12. Heavy bleeding is often regarded as a common sign of threatened miscarriage. These findings highlight the importance of addressing pain and bleeding symptoms among women who attend early pregnancy services. The underlying complications of pregnancy, as well as anxiety and low mood in affected women, should be promptly managed.

TABLE 3. Scores of various psychometric tests among women based on their history of miscarriage (n=1390)[*]

	No previous miscarriage (n=1144)	Previous miscarriage (n=246)	P value	95% Confidence interval
GHQ-12				
Bi-modal score	3.89 ± 3.12	4.71 ± 3.31	<0.001	-1.24 to 0.39
Indication of distress [GHQ-12 (bi-modal) score ≥4]	531 (46.4%)	142 (57.7%)	0.001	-
Likert score	14.94 ± 5.23	16.3 ± 5.48	<0.001	-2.07 to 0.65
Indication of distress [GHQ-12 (Likert) score >12]	864 (75.5%)	202 (82.1%)	0.027	-
BDI	9.02 ± 6.93	10.89 ± 8.12	<0.001	-2.94 to 0.80
Probable depression (BDI score >12)	255 (22.3%)	82 (33.3%)	<0.001	-
Spielberger's State Anxiety Inventory State form	54.49 ± 10.76	50.71 ± 11.33	<0.001	2.32 to 5.24
Fatigue Scale–14	2.40 ± 0.51	2.43 ± 0.52	0.317	-0.10 to 0.03
Profile of Mood States subscale scores				
Tension-anxiety (range, 0-36)	12.19 ± 7.55	14.25 ± 8.25	<0.001	-3.09 to 1.03
Depression-dejection (range, 0-60)	11.90 ± 11.28	15.39 ± 12.59	<0.001	-5.04 to -1.94
Anger-hostility (range, 0-48)	9.67 ± 8.42	11.29 ± 9.41	0.006	-2.77 to -0.46
Fatigue-inertia (range, 0-28)	12.30 ± 6.49	12.27 ± 6.59	0.972	-0.86 to -0.89
Confusion-bewilderment (range, 0-28)	9.61 ± 5.18	10.88 ± 5.77	<0.001	-1.98 to -0.56
Vigour-activity (range, 0-32)	10.98 ± 5.58	9.88 ± 5.12	0.002	0.40 to 1.80
Total mood disturbance (range, -32 to 200)	44.67 ± 36.58	54.20 ± 39.85	<0.001	-14.82 to -4.23
VAS score				
Before consultation	5.91 ± 2.41	6.75 ± 2.33	<0.001	-1.02 to 0.28
After consultation	3.95 ± 2.47	4.61 ± 2.77	0.001	-1.05 to -0.25
P value comparing VAS scores before and after consultation	<0.001	<0.001	-	-

Abbreviations: BDI = Beck Depression Inventory; GHQ-12 = 12-item General Health Questionnaire; VAS = visual analogue scale
[*] Data are shown as mean ± standard deviation or No. (%), unless otherwise specified

TABLE 4. Univariate and multivariate analyses of factors associated with 12-item General Health Questionnaire [GHQ-12] (bi-modal), GHQ-12 (Likert), and Beck Depression Inventory (BDI) scores

	Univariate analysis			Multivariate analysis		
	Odds ratio	95% Confidence interval	P value	Odds ratio	95% Confidence internal	P value
Indication of distress [GHQ-12 (bi-modal) score ≥4]						
Previous miscarriage	1.630	1.24-2.14	<0.001	1.570	1.19-2.07	0.001
Bleeding score ≥2	1.345	1.01-1.79	0.041	1.307	0.98-1.74	0.067
Age ≥35 y	1.339	1.05-1.71	0.019	1.253	0.98-1.61	0.073
Indication of distress [GHQ-12 (Likert) score >12]						
Previous miscarriage	1.472	1.05-2.07	0.027	1.459	1.04-2.06	0.031
Bleeding score ≥2	1.520	1.06-2.19	0.025	1.506	1.05-2.17	0.028
Age ≥35 y	1.240	0.92-1.67	0.155	-	-	-
Probable depression (BDI score >12)						
Previous miscarriage	1.731	1.29-2.32	<0.001	1.717	1.28-2.30	<0.001
Bleeding score ≥2	1.442	1.06-1.97	0.022	1.423	1.04-1.95	0.028
Age ≥35 y	1.442	1.06-1.97	0.022	-	-	-

Pregnancy loss is associated with negative mood status, including depression and anxiety.[3,18,19,27,29] Whereas many studies have investigated the effects of miscarriage or pregnancy loss on depression, the effects of threatened miscarriage or early pregnancy-related complaints on women have not been extensively explored, despite the burdensome experience of a threatened miscarriage that appropriately causing anxiety in affected women. Our results are consistent with findings by Zhu et al,[6] who reported that a substantial proportion of women with threatened miscarriage had symptoms of depression or anxiety.

The present study had a large sample size and a high rate of participation. Additionally, multiple psychometric instruments were used to assess the participants. The findings emphasise the importance of assessing and managing depression and anxiety symptoms in women with threatened miscarriage. Mental health assessments should be performed when women with threatened miscarriage attend clinics and hospitals. Early recognition of relevant mood problems will facilitate timely management. Non-pharmacological interventions, such as antenatal group therapy, constitute effective treatment for pregnant women with anxiety and depression.[6] Pharmacological therapies (eg, most selective serotonin reuptake inhibitors and benzodiazepines) can be administered after considering the side-effects of medications relative to the risk of untreated antenatal depression and anxiety.[30]

Limitations

Nevertheless, this study had some limitations. First, it used a cross-sectional design without longitudinal follow-up, and the subgroup analysis might have been underpowered. Second, information was unavailable regarding social factors (eg, education level or marital status) and the presence of an underlying psychiatric disorder, which might contribute to differences in baseline mood status. Third, the study did not include a comparison group of women without symptoms of threatened miscarriage.

Conclusion

There is a considerable psychological burden among women with early pregnancy problems and concerns about future pregnancy viability. These women experience emotional disturbances, as indicated by a significant proportion of women in this study who had high scores on psychometric tests. A gynaecologist consultation, in combination with an ultrasound assessment, is reassuring and can alleviate anxiety among women with early pregnancy problems. This study on maternal psychological outcomes provides insights concerning psychological morbidity among women with threatened miscarriage in the first trimester, while also demonstrating the usefulness and feasibility of various psychometric instruments in identifying women who require additional psychological support. Further studies exploring maternal psychological well-being later in pregnancy, as well as fetal outcomes, are needed to determine the long-term effects of anxiety and depression among women with threatened miscarriage in the first trimester.

References

1. Tong S, Kaur A, Walker SP, Bryant V, Onwude JL, Permezel M. Miscarriage risk for asymptomatic women after a normal first-trimester prenatal visit. Obstet Gynecol 2008;111:710-4.
2. Broen AN, Moum T, Bödtker AS, Ekeberg O. Predictors of anxiety and depression following pregnancy termination: a longitudinal five-year follow-up study. Acta Obstet Gynecol Scand 2006;85:317-23.
3. Farren J, Jalmbrant M, Ameye L, et al. Post-traumatic stress, anxiety and depression following miscarriage or ectopic pregnancy: a prospective cohort study. BMJ Open 2016;6:e011864.
4. Jensen KL, Temple-Smith MJ, Bilardi JE. Health professionals' roles and practices in supporting women experiencing miscarriage: a qualitative study. Aust N Z J Obstet Gynaecol 2019;59:508-13.
5. Park C, Kang MY, Kim D, Park J, Eom H, Kim EA. Prevalence of abortion and adverse pregnancy outcomes among working women in Korea: a cross-sectional study.

PLoS One 2017;12:e0182341.

6. Zhu CS, Tan TC, Chen HY, Malhotra R, Allen JC, Østbye T. Threatened miscarriage and depressive and anxiety symptoms among women and partners in early pregnancy. J Affect Disord 2018;237:1-9.

7. Aksoy H, Aksoy Ü, İdem Karadağ Ö, et al. Effect of threatened miscarriage on maternal mood: a prospective controlled cohort study. J Clin Obstet Gynecol 2015;25:92-8.

8. Gelaye B, Sanchez SE, Andrade A, et al. Association of antepartum depression, generalized anxiety, and posttraumatic stress disorder with infant birth weight and gestational age at delivery. J Affect Disord 2020;262:310-6.

9. Siu BW, Leung SS, Ip P, Hung SF, O'Hara MW. Antenatal risk factors for postnatal depression: a prospective study of Chinese women at maternal and child health centres. BMC Psychiatry 2012;12:22.

10. Ibanez G, Bernard JY, Rondet C, et al. Effects of antenatal maternal depression and anxiety on children's early cognitive development: a prospective cohort study. PLoS One 2015;10:e0135849.

11. O'Connor TG, Heron J, Golding J, Glover V; ALSPAC Study Team. Maternal antenatal anxiety and behavioural/emotional problems in children: a test of a programming hypothesis. J Child Psychol Psychiatry 2003;44:1025-36.

12. Wan OY, Chan SS, Chung JP, Kwok JW, Lao TT, Sahota DS. External validation of a simple scoring system to predict pregnancy viability in women presenting to an early pregnancy assessment clinic. Hong Kong Med J 2020;26:102-10.

13. Chan DW, Chan TS. Reliability, validity and the structure of the General Health Questionnaire in a Chinese context. Psychol Med 1983;13:363-71.

14. Shek DT. Reliability and factorial structure of the Chinese version of the Beck Depression Inventory. J Clin Psychol 1990;46:35-43.

15. Shek DT. Reliability and factorial structure of the Chinese version of the State-Trait Anxiety Inventory. J Psychopathol Behav Assess 1988;10:303-17.

16. Liang Y, Wang L, Yin X. The factor structure of the 12-item General Health Questionnaire (GHQ-12) in young Chinese civil servants. Health Qual Life Outcomes 2016;14:136.

17. Rao WW, Yang MJ, Cao BN, et al. Psychological distress in cancer patients in a large Chinese cross-sectional study. J Affect Disord 2019;245:950-6.

18. Lok IH, Lee DT, Yip SK, Shek D, Tam WH, Chung TK. Screening for post-miscarriage psychiatric morbidity. Am J Obstet Gynecol 2004;191:546-50.

19. Lok IH, Yip AS, Lee DT, Sahota D, Chung TK. A 1-year longitudinal study of psychological morbidity after miscarriage. Fertil Steril 2010;93:1966-75.

20. Kong GW, Lok IH, Yiu AK, Hui AS, Lai BP, Chung TK. Clinical and psychological impact after surgical, medical or expectant management of first-trimester miscarriage—a randomised controlled trial. Aust N Z J Obstet Gynaecol 2013;53:170-7.

21. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. Arch Gen Psychiatry 1961;4:561-71.

22. Hedberg AG. Review of State–Trait Anxiety Inventory. [Review of the Book State–Trait Anxiety Inventory, by C. D. Spielberger, R. L. Gorsuch & R. E. Lushere]. Prof Psychol 1972;3:389-90.

23. Bann CM, Parker CB, Grobman WA, et al. Psychometric properties of stress and anxiety measures among nulliparous women. J Psychosom Obstet Gynaecol 2017;38:53-62.

24. McNair DM, Heuchert P. Profile of mood states: technical update. North Tonawanda (NY): Multi-Health Systems; 2013.

25. Williams VS, Morlock RJ, Feltner D. Psychometric evaluation of a visual analog scale for the assessment of anxiety. Health Qual Life Outcomes 2010;8:57.

26. Facco E, Stellini E, Bacci C, et al. Validation of visual analogue scale for anxiety (VAS-A) in preanesthesia evaluation. Minerva Anestesiol 2013;79:1389-95.

27. Cumming GP, Klein S, Bolsover D, et al. The emotional burden of miscarriage for women and their partners: trajectories of anxiety and depression over 13 months. BJOG 2007;114:1138-45.

28. Virgara R, Maher C, Van Kessel G. The comorbidity of low back pelvic pain and risk of depression and anxiety in pregnancy in primiparous women. BMC Pregnancy Childbirth 2018;18:288.

29. Kong GW, Lok IH, Lam PM, Yip AS, Chung TK. Conflicting perceptions between health care professionals and patients on the psychological morbidity following miscarriage. Aust N Z J Obstet Gynaecol 2010;50:562-7.

30. Vitale SG, Laganà AS, Muscatello MR, et al. Psychopharmacotherapy in pregnancy and breastfeeding. Obstet Gynecol Surv 2016;71:721-33.