Original Research Paper

Impact of war on psychological status and quality of life of Sudanese pregnant women

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Abstract

Background: In war, pregnant women are a particularly vulnerable group requiring extra protection. Traumatic experiences can jeopardize the mental and reproductive health of mothers and harm the development of their unborn children. **Aims:** This study aimed to evaluate the mental health and quality of life of Sudanese pregnant women who are affected by war, and to identify factors associated with the mental health and quality of life of Sudanese pregnant women who are affected by war. **Methods:** A cross-sectional study was conducted involving 400 women attending Al Qadarif Hospital. Participants completed a survey including GAD-7 and Quality of Life Questionnaire. Data were analyzed to identify the associations between the psychological status, quality of life and the war. **Results:** Overall, 66.5% reported a poor quality of life and (62%) revealed that they were dissatisfied with their health. The participants who reported poor quality of life had the following characteristics: aged between 23 and 30 years, the majority (97.8%) were married and less than half (39.6%) were in their first or second trimester of pregnancy Additionally, the majority (88.8%) had no chronic illnesses there were no significant differences in age groups, marital status trimester, and chronic illnesses with quality of life. **Conclusion:** Pregnant women's psychological health and quality of life are significantly impacted by the ongoing conflict in Sudan. Significantly more participants, especially those with chronic illnesses, reported having moderate-to-severe anxiety. Factors like age, marital status, and trimester phase did not significantly correlate with quality-of-life outcomes, except in the presence of chronic illness, despite the high incidence of reported low quality of life. To lessen the detrimental psychological impacts of conflict on pregnant women in Sudan, these findings emphasize the critical need for accessible mental health support and focused health education initiatives. Meeting these needs can enhance the well-being of this vulnerable population.

Keywords:
Pregnancy, Maternal Health, Mental Health, War, Psychological Trauma, Anxiety Disorders, Depression, Health Services Accessibility, Quality of Life, Stress, Psychological

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Background

The process of national development is seriously threatened by wars and other armed conflicts. It is estimated that over 47.2 million of the 120 million people who are currently displaced by war are children. Children can suffer crippling effects from living in unstable, conflict-affected areas. Children exposed to conflicts are twice as likely to be undernourished as children in low- and middle-income countries due to food shortages, disruptions in access to sanitation and health care, and other factors.[1]

Contemporary warfare, having progressed from massive military confrontations to low-level, localized, proxy, terrorist, and information warfare, is linked to a lower rate of direct fatalities but a rising and enduring toll on mental health. These effects can be seen in veterans, other military personnel, and fighters.[2.]

A crucial component of human capital, mental health has a big influence on a lot of different parts of life, like happiness, work, income, status, and stigma.[3]

There are numerous effects of being exposed to armed conflict on both civilian and military populations. Stress during pregnancy has a negative impact on fetal development, postpartum outcomes, and an individual's later development.[4]

As a physiological process, pregnancy can occasionally result in several events that could endanger the mother's life as well as the life of the fetus.

Of course, one of the conditions that could put the mother and the fetus at risk for morbidity or death .

Medical issues during the prenatal and post-natal phases of pregnancy have the potential to cause major complications, including psychiatric disorders. However, this could also have an impact on how women feel about getting pregnant and whether they want to try again.[5]

In times of war, women and their babies require extra protection because traumatic experiences can jeopardize the mental and reproductive health of mothers and harm the development of their unborn children.[6]

The study aims to evaluate the impact of war on the psychological status of Sudanese pregnant women and to evaluate the factors associated with mental health and quality of life of Sudanese pregnant women who are affected by war.[7]

One of the most crucial prerequisites for enhancing perinatal care is comprehending how war affects women's perinatal health. The two primary goals of this narrative synthesis are to: (1) compile the most recent data on perinatal health outcomes and care among women who are giving birth; and (2) pinpoint the remaining research gaps regarding perinatal care.[8]

Stress, anxiety, and depression during pregnancy are risk factors for unfavorable outcomes for both mothers and their unborn children. Pregnancy anxiety has a negative impact on fetal neurodevelopment and child outcomes, and it is linked to shorter gestation. Pregnancy-related anxiety is very strong. Pregnancy-related depression symptoms, chronic stress, and racism exposure are linked to lower birth weight babies, which can have an impact on the development of the unborn child. More research should be done on these unique risk factors and the processes that lead to different birth outcomes.[9]

There is an ethical dilemma that needs to be addressed by medical professionals when the arms trade is considered, and the data is analyzed. The rates of maternal and infant mortality for the nations that export most of these killing machines are significantly lower than those of the nations where they are used.[10]

Methodology:

1. Study Design:

This study is an observational, cross-sectional study. It aims to assess the anxiety levels and quality of life among pregnant women in Sudan, using a combination of demographic data, the General Anxiety Disorder (GAD-7) scale, and the WHOQOL-BREF instrument.

2. Study Area:

Al Qadrif Hospital Sudan, Obstetrics and Gynecology Clinics.

3.Study Population:

The target population consists of Sudanese pregnant women aged 15–40 years who are currently living in Sudan. This population group was chosen for the study based on their potential exposure to the stressors associated with pregnancy and their relevance to understanding anxiety and quality of life in this demographic.

4. Inclusion criteria:

All female who are in the reproductive age between 15-40 years, who are currently living in Sudan, pregnant and willing to participate.

5. Exclusion Criteria.

Those who were not pregnant, did not give their consent, had a history of severe trauma, such as PTSD from a war, sexual violence, or domestic abuse, or had a prior diagnosis of a mental illness (such as major depression, anxiety disorders, schizophrenia, or bipolar disorder) were not allowed to participate. Women who had major medical illnesses, high-risk pregnancies, or cognitive impairments that would have affected their participation or the interpretation of mental health outcomes were also not included.

6. Sample Size:
The equation we used for calculation of sample size: $n = (Z^2 * p * (1 - p)) / E^2$

Where:
- n = required sample size
- Z = Z-value (e.g., 1.96 for 95% confidence level)
- p = estimated proportion (0.5 if unknown)
- E = margin of error (expressed as a decimal, e.g., 0.05 for 5%)

In this study, applying the formula:
$n = (1.96^2 * 0.5 * (1 - 0.5)) / (0.05)^2 \approx 384$

7. Sampling Technique:
A total of 400 Sudanese pregnant women were involved in our study, selected using convenience sampling while they were attending Al Qadrif hospital from the total population.

Tool:
A modified questionnaire from two standardized questionnaires which are GAD-7 and Quality of Life Questionnaire.

An interview method was used to collect data for this study to ensure clear communication and understanding. By using this method, we were able to thoroughly clarify the questions, clear up any misunderstandings, and offer the required explanations.

The data collecting tool consists of three sections. The first section was Demographic Information.
The second section was a General Anxiety Disorder (GAD-7) questionnaire, a validated seven-item assessment(11).

The final part is Health Organization Quality of Life-BREF (WHQOL-BREF). It is a self-administered 23-item instrument categorized into four domains (physical, psychological, social, and environmental).

The Questionnaire contains four domains, but we analyzed a 3 domains, cause the social domain contains 3 questions, drop one of the questions so the whole domain wasn't calculated according to the tool guidelines.

from 1 to 5 on a response scale. Higher total scores indicate higher QOL

The instruments are available for scientific purposes without commercial use.

GAD-7 Questionnaire: -.
GAD-7 is a seven-item survey that asks respondents to rate the frequency of anxiety symptoms over the previous two weeks on a scale ranging from "not at all" to "nearly every day." The GAD-7 is widely used to diagnose GAD and track treatment results in clinical and research context.

It is prized for its ease of use, validity, and dependability in identifying anxiety symptoms in a variety of demographics.

Quality Of Life Questionnaire: -
Quality of Life Questionnaire is a comprehensive questionnaire that covers various attributes of an individual's life.

It covers a variety of demographic questions to get better quality data and information before analyzing the quality of life of an individual.

It covers different domains that can assess the quality of individual life from different aspects.
To ensure the validity of the questionnaire a pilot study was done using Scale Reliability Statistics

Cronbach's α: scale 0.92

We ran an expert review regarding the questionnaire and received the participants´ feedback, to ensure validity that it accurately measures mothers' knowledge and first-aid practices regarding household chemical poisoning. The experts evaluated the relevance, clarity, and comprehensiveness of the questions, and adjustments were made based on their feedback to improve the tool's accuracy.

GAD-7 was used for anxiety measurement, while WHO-QOL assessed psychological well-being as part of quality of life.
Statistical Analysis:

Data analysis was conducted via IBM SPSS Statistics for Windows, Version 26.0. We used descriptive statistics based on simple tabulation, frequencies, and percentages. The normality of continuous variables was evaluated using the Shapiro-Wilk test, median and interquartile range (IQ) were calculated to describe the total scores of three domains of QOL, and the score of GAD-7.

To assess the association of demographic characteristics between QOL levels and level of anxiety we used Chi-Square test, p value less than 0.05 considered statistically significant.

A multiple linear regression model was used to assess the predictors of the overall score of quality of life among the pregnant women.

The regression model was used to assess the relationship between pregnant women´s quality of life total score as the dependent variable, and many independent variables including age, marital status, trimester of the pregnancy and presence of chronic disease, The model was also evaluated for Goodness of Fit using an F test and the coefficient of multiple determination (R2), P value less than 0.05 was statistically significant.

Ethical considerations:
This study was conducted according to the ethical standards of Sudan and the Helsinki Declaration.

All the participants read, understood, and signed the study consent. The IRB committee approved the study protocol.

The data was stored under a high confidentiality level without names to protect participants' privacy. All participants had the right to withdraw at any stage.

In this study, psychological support was a crucial factor. Participants who experienced distress during data collection were given referrals for mental health support to safeguard their well-being. However there were a few cases of women who experienced re-traumatization by the data collecting process.

Results: -
Among the 400 participants, most (271 ,67.8%) were aged 23–30 years, (77,19.2%) were aged 15–23 years and (52,13.0%) were aged 31–40, the majority of participants were married (391, 97.8%)

(7, 1.8%) were widows and only (2, 0.5%) were divorced.

Regarding the trimester of pregnancy, most participants (165, 41. 2%) were in the second trimester, (131, 32.8%) were in the first trimester and (104, 26.0%) were in the third trimester. In terms of chronic illness, most participants (355, 88.8%) did not have any chronic illness, while (45, 11.2%) had a history of chronic illness, as displayed in Table 1.

The quality of life domains (physical, psychological social and environmental) and anxiety disorder scores differed among pregnant women based on age group, marital status, pregnancy trimester, and presence of chronic illness.

Women aged (15–22 years) and those in their first trimester reported higher physical domain scores, whereas those aged (31–40 years) had higher psychological and environmental domain scores and higher anxiety levels.

Married women had better quality of life scores, compared to divorced and widowed women, whereas widows had lower anxiety scores.

Women in the second and third trimesters had higher scores in the psychological and environmental domains, whereas those in the first trimester showed relatively higher physical domain scores. However, women in the second trimester had higher anxiety scores.

Women with chronic illnesses showed slightly lower quality of life scores throughout all domains and higher anxiety scores than women without chronic illnesses, as displayed in Table 2.

The association between quality of life levels and demographic characteristics showed no statistical significance with age group, marital status, trimester of pregnancy, or presence of chronic illness (p value (0.144), (0.469), (0.173) and (0.558, respectively), as displayed in Table 3.

Cross-tabulation between the level of anxiety and demographic characteristics was statistically significant in the presence of chronic illness (p=0.043), while there was no statistically significant relationship with age group (p=0.228), marital status(p=0.384), or trimester of pregnancy (p=0.653), as listed in Table 4.

Regarding the overall quality of life rate among the participants, the majority of the participants (66.5%) reported that they had poor quality of life; (28%) of the participants had neither good nor poor quality of life; (3%) reported that they had a good quality of life; (2%) had a very poor quality of life; and only (0.5%) had a very good quality of life, as shown in Figure 1.

The majority of participants (62.3%) were dissatisfied with their health; 23.8% were neither satisfied nor dissatisfied; 9.8% reported they were very dissatisfied; 3.8% were satisfied with their health; and 0.5% were very satisfied with their health, as shown in Figure 2.

Multiple linear regression was conducted to evaluate the relationship between overall quality of life scores and the following predictors: age, marital status, trimester of pregnancy, presence of chronic disease, and anxiety scores. The model was statistically significant ($F=8.889$, $p < 0.001$) with ($R^2 = 0.101$) of the variance in quality-of-life overall scores.

Marital status showed a significant negative association (B = -2.709, 95% CI =-4.723 to -0.695, p = 0.009), anxiety scores were also significantly associated (B = -0.383, 95% CI 0.507 to 0.260, $p < 0.001$), and other variables, such as age (B=0.198, 95% CI: -1.174 to 0.779, p = 0.691), trimester of pregnancy (B=0.406, 95% CI = -0.312 to 1.123, p= 0.267), and chronic disease (B=1.104, 95 % CI : -0.635 to 2.842, p=0.213) not statistically significant, as displayed in Table 5.

Discussion:

66.5% of pregnant women in Sudanese war zones reported poor quality of life, and 62% were not satisfied with their health. Among 400 participants, 67.8% were aged 23 to 30 years, and 97.8% were married. Although 88.8% had no chronic diseases, those who had them had worse quality of life and higher anxiety. Moderate to severe anxiety was felt by 57% of the subjects, although demographic characteristics (age, marital status, trimester of pregnancy) did not impact these significantly—except for chronic illness, which was consistently linked with elevated anxiety.

The implications of these results are the critical necessity of providing mental health care to pregnant women in areas of conflict. In contrast to other work that also included midwives and other medical professionals, this research exclusively targeted pregnant women. The implementation of European models of obstetric and midwifery care (**12**).

Chronic illness was strongly associated with increased levels of anxiety (p = 0.043), with 14.5% of individuals with chronic illnesses having increased anxiety, versus 8.4% of those who did not.

A broader review of the literature demonstrates that interest in quality of life has intensified, with a 195% increase in scientific publications concerning this subject in the past decade. Obstetrics has followed this trend, with most studies focusing on pregnant women with medical conditions. Our research agrees with reports that only 21 studies actually focus on quality of life in normal pregnancies, indicating a severe deficiency in understanding maternal well-being (13).

While our study concentrated on maternal mental health, war also impacts infant development and maternal-fetal attachment (MFA). A research study on MFA in Gaza during pregnancy and after birth was found to have no direct correlation between war trauma and MFA but highlighted the role of social support, mental health, and maternal health on infant development (14).Moreover, studies point towards the postpartum period and indicate that the stressed pregnant women had 4.67 times more chance to develop postpartum symptoms of anxiety, which impact mother and child.

Implosive rage is yet another distress response that is combat-related but underemphasized. 12% of pregnant and postpartum women in Timor-Leste qualified for intermittent explosive disorder; two in every five experienced one or more attacks of anger within the previous month. While actions such as these pose a danger of stigmatization, they throw into relief the social and historical contexts surrounding women's emotional lives in situations of post-conflict (15).

Food variety is another condition that dictates mothers' mental wellbeing but is not explored in our research. Previous research has revealed that increased scores of food variety were observed in individuals with greater symptoms of depression, anxiety, or PTSD due to possibly social support, occupational demands, or finances. However, when under food insecurity, food choice becomes restricted too, thus amplifying the association of nutrition with mental health status further (16).

Apart from personal stressors, even partner deployment influences pregnant women's health. It was found that 49.1% of the women had deployed partners and reported higher levels of stress, dietary changes, and increased war-related anxiety due to media coverage. Moreover, sexual violence-related pregnancies (SVRPs) are a daily consequence of war, leading to social rejection, stigma, and long-term psychological distress. Our study did not

Table 1: shows demographic Characteristics of the participants (n=400)

Characteristics	N (%)
Age group:	
15-22 years	77 (19.2)
23-30 years	271 (67.8)
31-40 years	52 (13.0)
Marital status	
Married	391 (97.8)
Divorced	2 (0.5)
Widow	7 (1.8)
Which trimester	
1st trimester	131 (32.8)
2nd trimester	165 (41.2)
3rd trimester	104 (26.0)
Do you suffer from any chronic illness	
Yes	45 (11.2)
No	355 (88.8)

Table 2: shows the median and interquartile range (IQ) Of quality-of-life domains and anxiety disorder According to pregnant women during conflict (n=400)

Quality of life domains								
	Physical		Psychologic		Environmental		Anxiety score	
	Median	IQ	Median	IQ	Median	IQ	Median	IQ
Age groups:								
15-22	17.0	16.0 - 18.0	16.0	16.0-18.0	16.0	15.0-17.0	16.0	16.0-18.0
23-30	16.0	16.0-18.0	16.0	14.0-18.0	16.0	14.0-17.0	15.5	14.0-17.0
31-40	16.0	15.0-17.0	19.0	17.0-20.0	19.0	17.0-20.0	18.0	17.0-20.0
Marital status:								
married	16.0	16.0-18.0	16.0	14.0-17.0	18.0	17.0-20.0	11.0	7.0-14.0
divorced	15.5	15.2-15.8	15.0	15.0-15.0	16.5	14.2-18.8	12.0	12.0-12.0
widow	15.0	15.0-16.5	16.0	14.5-16.5	17.0	15.5-17.0	5.0	4.0-10.0
Trimester:								
1st	17.0	16.0-18.0	15.0	14.0-18.0	18.0	17.0-20.0	11.0	6.5-14.0
2nd	16.0	16.0-17.0	16.0	14.0-17.0	19.0	17.0-20.0	12.0	7.0-14.0
3rd	16.0	16.0-18.0	15.0	14.0-16.2	19.0	17.0-21.0	11.5	6.0-15.0
Do you suffer from any chronic illness								
yes	16.0	15.0-17.0	15.0	14.0-17.0	19.0	17.0-20.0	12.0	09 - 14.0
No	17.0	16.0-18.0	16.0	14.0-17.0	18.0	17.0-20.0	11.0	06-04

Table 3: Shows association Between quality-of-life level and demographic Characteristics of the Pregnant women(n=400)

variable	Quality of life level			P value
	Good quality of life (N=83)	Average quality of life (N=221)	poor quality of life (N=96)	
Age group:				
15-22	15.0 (18.1%)	38.0 (17.2%)	24.0 (25.0%)	0.144
23-30	61.0 (73.5%)	147.0 (66.5%)	63.0 (65.6%)	
31-40	7.0 (8.4%)	36.0 (16.3%)	9.0 (9.4%)	
Marital status:				
married	83.0 (100.0%)	216.0 (97.7%)	92.0 (95.8%)	0.469
divorced	0.0 (0.0%)	1.0 (0.5%)	1.0 (1.0%)	
widow	0.0 (0.0%)	4.0 (1.8%)	3.0 (3.1%)	
which trimester:				
1st trimester	28.0 (33.7%)	65.0 (29.4%)	38.0 (39.6%)	0.173
2nd trimester	28.0 (33.7%)	99.0 (44.8%)	38.0 (39.6%)	
3rd trimester	27.0 (32.5%)	57.0 (25.8%)	20.0 (20.8%)	
Do you suffer from any chronic illness:				
yes	7.0 (8.4%)	25.0 (11.3%)	13.0 (13.5%)	0.558
no	76.0 (91.6%)	196.0 (88.7%)	83.0 (86.5%)	

Table 4: Shows association between anxiety levels and demographic characteristics of the Pregnant women (n=400)

Variable	Level of anxiety			P value
	minimum (N=53)	mild (N=119)	moderate to severe (N=228)	
Age group:				
15-22	5.0 (9.4%)	22.0 (18.5%)	50.0 (21.9%)	
23-30	41.0 (77.4%)	78.0 (65.5%)	152.0 (66.7%)	0.228
31-40	7.0 (13.2%)	19.0 (16.0%)	26.0 (11.4%)	
Marital status:				
married	51.0 (96.2%)	116.0 (97.5%)	224.0 (98.2%)	
divorced	0.0 (0.0%)	0.0 (0.0%)	2.0 (0.9%)	0.384
widow	2.0 (3.8%)	3.0 (2.5%)	2.0 (0.9%)	
which trimester:				
1st trimester	20.0 (37.7%)	41.0 (34.5%)	70.0 (30.7%)	
2nd trimester	22.0 (41.5%)	44.0 (37.0%)	99.0 (43.4%)	0.653
3rd trimester	11.0 (20.8%)	34.0 (28.6%)	59.0 (25.9%)	
Do you suffer from any chronic illness?				
yes	2.0 (3.8%)	10.0 (8.4%)	33.0 (14.5%)	
no	51.0 (96.2%)	109.0 (91.6%)	195.0 (85.5%)	0.043

Table 5: Shows multiple linear regression model for the factors that are associated with quality-of-life overall scores as dependent variables (n=400)

Predictor	B	SE	Standardized B	t	P value	95% Confidence Interval		Model summary
						Lower level	Upper level	
(Constant)	55.744	2.574		21.654	.000	50.683	60.806	F=8.889,pvalue=0.000
Age	-.198	.497	-.019	-.398	.691	-1.174	.779	
Married	-2.709	1.024	-.127	-2.645	.009	-4.723	-.695	
Trimester	.406	.365	.054	1.112	.267	-.312	1.123	R^2=0.101
Chronic disease	1.104	.884	.060	1.248	.213	-.635	2.842	
Anxiety score	-.383	.063	-.295	-6.099	.000	-.507	-.260	

Figure 1: Quality of life rate among the participants (n=400)

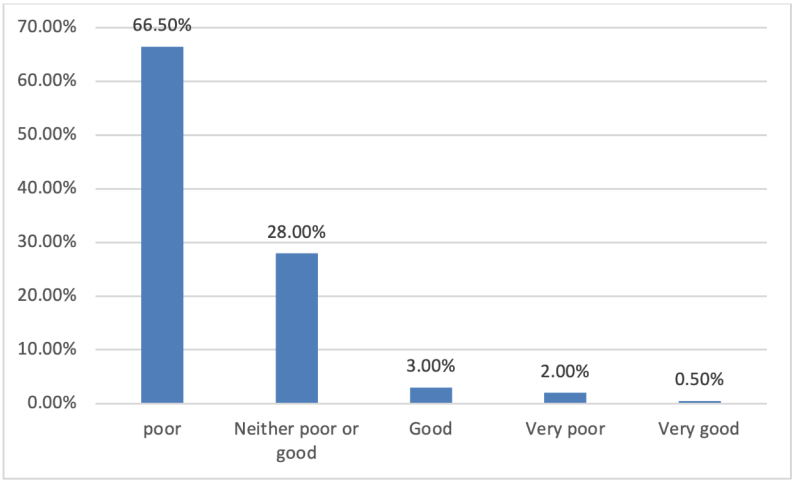
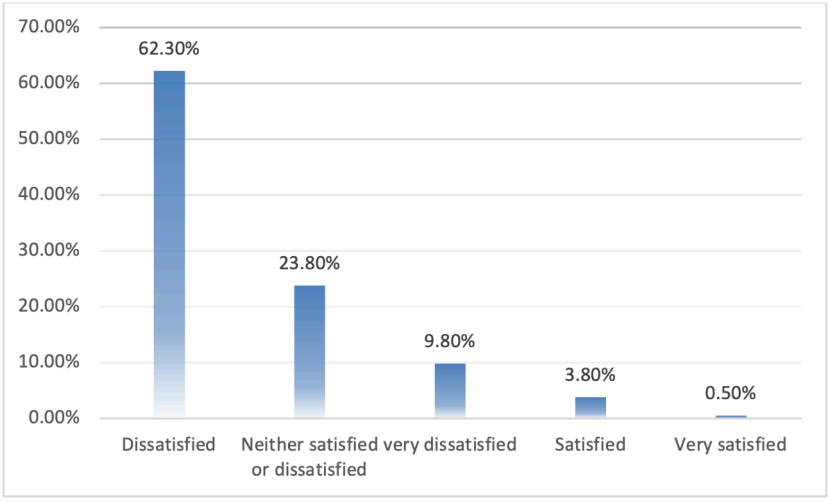


Figure 2: Satisfaction of the participants with their health (n=400)



measure SVRPs, although studies indicate that most affected women are resilient and capable of agency in the face of social adversity (17).

Finally, post-traumatic stress disorder (PTSD) is prevalent in pregnant women and war-affected children. Studies in Palestine and Israel have shown that PTSD symptoms occurred in 41% of Gaza children and 37.8% of Israeli children who lived near areas of conflict (18).

Our study indicates the urgent requirement for mental health treatment in pregnant women in war-affected areas, but subsequent research needs to reach postpartum psychological effects, infant development, nutrition, deployment of the spouse, and SVRPs. A multi-dimensional approach is necessary to the war-induced long-term impact on maternal and child health (19).

Some studies at the regional level revealed that postpartum depression was present in 18.6% of cases. Logistic regression revealed that the following factors independently predicted postnatal depression: younger age (OR, 5.42; 95% CI, 2.61–10.32; P<.05), primigravida status (OR, 2.73; 95% CI, 1.44–4.24; P<.05), not having the desired gender for their children (OR, 2.86; 95% CI, 1.62–5.93; P<.05), and issues with in-law relationships (OR, 3.64; 95% CI, 1.84–7.22; P<.05) (20).

A further cross-sectional study in rural China demonstrated that the domains of physical health, psychological health, social interactions, and environmental circumstances had mean scores of 14.08 ± 2.27, 11.78 ± 2.28, and 13.07 ± 2.69, respectively, for quality of life. While a higher monthly income was linked to higher quality of life scores, older age, chronic illness, being left behind, feeling insecure in one's marriage, and stress were all adversely correlated with these scores. The association between stress and quality of life may be moderated by coping mechanisms (21)

Limitations:-

1.The possibility of a response bias is one of the study's main limitations. The accuracy of the results may have been impacted by some participants underreporting their experiences due to the cultural stigma associated with disclosing distress.

2. Health system access: The disparity in access to medical treatments is a major drawback of selection bias in hospital-based research. People having better access to healthcare, such as those with health insurance, those who live in cities, or those who have more money to seek care, may be over-represented among study participants. This leaves out people from poor or rural areas, who can encounter obstacles to receiving healthcare due to a lack of services in their area, or financial limitations.

3. We didn't use a separate tool to measure anxiety related to war, than anxiety related to pregnancy, but from our statistical analysis we differentiated anxiety influenced by pregnancy-related factors and anxiety caused by war-related factors.

Conclusion: -

The current study recognizes the extreme psychological impact of war on pregnant women and the need for assessing this population alone, besides health workers and midwives. Identification of mental disorders using the EPDS and the GAD-7 is useful for diagnosis and treatment of issues in pregnant women who are war-affected. The prevalence of anxiety is significant and in line with the literature relating exposure to conflict to PTSD, depression, and anxiety, and emphasizing the need for focused mental health interventions during pregnancy as well as postpartum.

In addition, 60% of the women had compromised quality of life and over 63% were dissatisfied with their health, suggesting the importance of quality-of-life assessments during pregnancy, even in regions affected by war. Mental well-being of the mother is directly associated with fetal growth, and further research is required regarding long-term effects on the child and mother.

Our findings also point towards the effect of socio-economic stressors such as deployment of partner, sexual violence, and food insecurity that augment psychological distress. Impulsive anger and emotional instability are poorly studied but may be extremely relevant in poverty-stricken and war-torn societies.

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