

## ORIGINAL RESEARCH ARTICLE

# Menstrual pain self-medication relates to poor mental health outcomes from Al-Zaatari refugees' camp

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## Abstract

Dysmenorrhea, the most common gynecological pain syndrome reported in women, is understudied in refugee communities. In addition, the association between dysmenorrhea self-medication and mental health symptoms in this population is poorly understood. We aimed to examine whether the use of dysmenorrhea analgesic self-medications and other clinical factors are associated with post-traumatic stress disorder (PTSD), depression, anxiety and insomnia severity in female war refugees residing in Zaatari Camp. This study followed a cross-sectional design and was performed on a cohort of women with predefined inclusion criteria. The severity of PTSD, depression, anxiety and insomnia were assessed using Davidson Trauma Scale, the Patient Health Questionnaire-9, the General Anxiety Disorder-7, and the Arabic version of the Insomnia Severity Index, respectively. Data were analysed from 386 participants. Using OTC paracetamol was significantly associated with higher PTSD severity ( $B=4.16$ ,  $t=2.43$ ,  $p=0.01$ ), and severe depression ( $OR=1.88$ , 95%  $CI=1.07-3.28$ ,  $p=0.03$ ), while OTC non-steroidal anti-inflammatory drugs (NSAIDs) was significantly associated with severe insomnia ( $OR=1.62$ , 95%  $CI=1.05-2.49$ ,  $p=0.02$ ). In conclusion, self-medication with analgesics was correlated with poor mental health; close medical and psychiatric follow-up are required to supervise pain self-medication and implement non-pharmacological strategies to manage dysmenorrhea in this fragile community. (*Afr J Reprod Health* 2024; 28 [6]: 66-74).

**Keywords:** Women, refugees, dysmenorrhea, depression, PTSD, anxiety, insomnia

## Résumé

La dysménorrhée, le syndrome douloureux gynécologique le plus fréquemment signalé chez les femmes, est peu étudiée dans les communautés de réfugiés. De plus, l'association entre l'automédication de la dysménorrhée et les symptômes de santé mentale dans cette population est mal comprise. Nous avons pour objectif d'examiner si l'utilisation d'automédicaments analgésiques contre la dysménorrhée et d'autres facteurs cliniques sont associés au trouble de stress post-traumatique (SSPT), à la dépression, à l'anxiété et à la gravité de l'insomnie chez les réfugiées de guerre résidant dans le camp de Zaatari. Cette étude a suivi une conception transversale et a été réalisée sur une cohorte de femmes avec des critères d'inclusion prédéfinis. La gravité du SSPT, de la dépression, de l'anxiété et de l'insomnie a été évaluée à l'aide de l'échelle de traumatisme de Davidson, du questionnaire sur la santé du patient-9, du trouble d'anxiété général-7 et de la version arabe de l'indice de gravité de l'insomnie, respectivement. Les données ont été analysées auprès de 386 participants. L'utilisation de paracétamol en vente libre était significativement associée à une gravité plus élevée du SSPT ( $B = 4,16$ ,  $t = 2,43$ ,  $p = 0,01$ ) et à une dépression sévère ( $OR = 1,88$ ,  $IC \text{ à } 95 \% = 1,07-3,28$ ,  $p = 0,03$ ), tandis que les médicaments non stéroïdiens en vente libre les anti-inflammatoires (AINS) étaient associés de manière significative à l'insomnie sévère ( $OR = 1,62$ ,  $IC \text{ à } 95 \% = 1,05-2,49$ ,  $p = 0,02$ ). En conclusion, l'automédication avec des analgésiques était corrélée à une mauvaise santé mentale ; un suivi médical et psychiatrique étroit est nécessaire pour encadrer l'automédication de la douleur et mettre en œuvre des stratégies non pharmacologiques pour prendre en charge la dysménorrhée dans cette communauté fragile. (*Afr J Reprod Health* 2024; 28 [6]: 66-74).

**Mots-clés:** Femmes, réfugiés, dysménorrhée, , dépression, SSPT, anxiété, insomnie

## Introduction

The crosstalk between pain and mental health symptoms is established<sup>1</sup>. Dysmenorrhea (i.e., period pain) refers to pain experienced prior to menstruation. Though most often characterized by severe dull abdominal ache, symptoms of dysmenorrhea can also include pain at other sites such as the low back and thighs, as well as nausea, vomiting, diarrhea, fatigue, fainting, or headaches<sup>2</sup>. Dysmenorrhea is the most reported condition among women during reproductive age<sup>3</sup>, and has a considerable impact on quality of life. However, it remains relatively understudied and poorly managed in practice.

Refugee women experience significant challenges to menstrual health management and may be at increased risk of menstrual health problems. Menstrual health research among refugee women is in its relative infancy; however, there is evidence that dysmenorrhea is common among displaced refugee women<sup>4</sup>. A recent study found a dysmenorrhea prevalence rate of over 96% among Palestinian adolescent refugees living in camps in the West Bank and Jordan<sup>5</sup>. Though determinants of this high rate of prevalence in this group have not been well-explored, there are several potential factors involved. Social determinants of health and poor living conditions in refugee camps, including inadequate hygiene and privacy, may present barriers to effective self-management. Additionally, women and girls living in refugee camps may lack access to educational resources that could facilitate a better understanding of their own menstrual health and its effective self-management<sup>6</sup>. The chronic stress of living in refugee camps itself may also affect menstrual pain experiences, given the role of inflammation manifested by higher cytokines and prostaglandins in both stress and dysmenorrhea<sup>7,8</sup>. Dysmenorrhea among displaced refugees living in camp settings warrants further investigation.

An important factor that may play a role in dysmenorrhea among refugee women is mental health status. Refugee women are at significant risk of experiencing mental health problems relative to host populations<sup>9,10</sup>. There is some evidence to suggest higher rates of dysmenorrhea among individuals with depression, anxiety, high daily

stress<sup>11</sup>, and post-traumatic stress disorder (PTSD)<sup>12</sup>. It has been suggested that psychiatric symptoms, including depression, anxiety, and stress, may be bidirectionally related to dysmenorrhea, whereby psychological distress may exacerbate menstrual pain<sup>13</sup> and vice versa<sup>14</sup>. Further research to enhance our understanding of the relationship between common mental health problems and dysmenorrhea is needed. One recent study found that more than half of Jordanian young females experience severe dysmenorrhea as related to daily stress and eating habits<sup>15</sup>.

Self-medication is a common pain management strategy for dysmenorrhea<sup>16</sup>. Widely available over-the-counter analgesic medications such as paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs) such as Ibuprofen, Diclofenac, and Naproxen are often used, as well as herbal remedies such as fennel and anise preparations. Self-medication can provide a low-cost, quick, and accessible solution to menstrual pain; however, it can also be associated with inadequate dosing, masking of underlying pathology, and adverse drug interactions<sup>17</sup>. Inappropriate choice of therapy is a particularly common issue for those who self-medicate, as evidenced by a recent meta-analysis that demonstrates paracetamol is most used to manage dysmenorrhea despite being less effective than NSAIDs for treating menstrual pain<sup>18,19</sup>. Understanding self-medication behaviors among women with dysmenorrhea is important to ensure effective management of pain and limit functional impairment. We hypothesize that self-medication is associated with poor mental health outcomes as the patient suffers from a vicious cycle of chronic pain that could lead to depression, and insomnia, these symptoms could increase sensitivity to pain especially in vulnerable subjects with high stressing environment and minimal medical care.

To our knowledge, no research to date has examined whether menstrual pain self-medication could be related to poor mental health outcomes in women living in refugee camps. Therefore, the current study aims to explore whether pain self-medication options, namely OTC paracetamol, NSAIDs, or homeopathy remedies, and other clinical factors could be associated with severe PTSD, depression, anxiety, and insomnia

symptoms in female war refugees residing in Zaatari Camp in Jordan.

## Methods

### *Study design and settings*

This is a cross-sectional cohort study. This study was approved by the Institutional Review Board of our University IRB number (39/2022). The Jordan Health Aid Society JHAS society has four gynecological clinics operating inside the camp where the study participants were enrolled.

### *Participant recruitment and data collection*

Females attending the gynecological clinics were approached and the study objectives and methods were explained by one of the researchers. The study instrument was built using Google Forms and was presented to the participants on tablet devices in a private room where the consent was obtained electronically via the questionnaire. The researcher helped the illiterate participants to complete the study instrument. The sample size calculation based on confidence level of 95 %, confidence interval of 5 % and an estimated maximum population size of 1 million refugees revealed the need to recruit 384 participants.

### *Inclusion criteria*

Inclusion criteria comprised Syrian female refugees residing in the Zaatari camp for 10 years, between 18 - 40 years old, of reproductive age, with no history of hysterectomy or radiation therapy, using self-medication (i.e., over-the-counter analgesics or herbs) for dysmenorrhea and reporting significant perceived stress (above 14) according to the Perceived Stress Scale (PSS-10), a 10-item questionnaire used to assess individuals' perceptions of stress (Cohen et al., 1983). It assesses how much an individual has perceived life to be unpredictable, uncontrollable, and overwhelming in the previous month. Respondents are asked how frequently they felt a certain way on a five-point scale ranging from 'never' to 'very often' in each case. Possible scores range from 0 to 40 with a score >14 indicating significant perceived stress.

## *Study instrument*

### *Demographics and clinical variables*

A well-designed structured online questionnaire was used to obtain the demographic and the clinical information of the study sample. Information about age, employment, marital status, prior diagnosis with chronic diseases, the use of chronic medications, dysmenorrhea severity and over-the-counter self-medication dysmenorrhea analgesics was included.

### *Dysmenorrhea severity*

The WaLIDD (working ability, location, intensity, days of pain, dysmenorrhea) self-report scale was used to evaluate the severity of dysmenorrhea with acceptable reliability (Cronbach's alpha= 0.72)<sup>20,21</sup>. The scale provides measurements for different parameters such as the pain location, intensity, duration and impact on daily functioning. A score above 7 is indicative of severe dysmenorrhea as stated in<sup>21-23</sup>.

### *Menstrual pain self-medication*

The self-medication pattern of the participants was obtained by asking about the self-medication option for menstrual pain management; the participants were given the option to choose one or more answers to the provided options, namely: OTC paracetamol, OTC NSAIDs, OTC supplements, homeopathy herbal remedies, and hot water compresses.

### *Outcome variables*

#### *Post-traumatic stress disorder*

Post-traumatic stress symptoms severity was assessed using the validated Arabic version of the Davidson Trauma Scale (DTS)-DSM-IV<sup>24,25</sup>. This DSM-IV-based scale is composed of seventeen questions rated against five possible answers from 0-4, with a total score up to 68. A higher score indicates a higher PTSD symptom severity.

#### *Depression*

The Patient Health Questionnaire-9 (PHQ-9), Arabic-validated version, was used to screen for

severe depressive symptoms. It measures depressive symptoms over the previous two weeks, producing a score ranging between 0 to 27 with a cut-off score of 14 for severe depression and has high sensitivity and reliability with Cronbach's alpha= 0.88<sup>26,27</sup>.

### Anxiety

The General Anxiety Disorder-7 (GAD-7) Arabic version was used to screen for severe anxiety. This is a sensitive and reliable tool with Cronbach's alpha= 0.95<sup>28</sup>, that measures anxiety symptoms during the previous two weeks with a score range from 0 to 21 and a cut-off score of 14 for severe anxiety<sup>27</sup>.

### Insomnia

The insomnia severity index -Arabic version ISI-A was used to screen for severe insomnia symptoms. This well-established tool was developed by Morin et al.<sup>29</sup> and consists of seven questions with Likert-type answers and a score range between 0-28 with a cut-off score of 14 for severe insomnia. The ISI is validated to be used in the Arabic language with Cronbach's alpha= 0.84<sup>30</sup>.

### Data analysis

Descriptive demographical data were displayed as frequencies and percentages.

The study identifies four outcome variables (severe PTSD, severe depression, severe anxiety, and severe insomnia); therefore, four multivariate regression analyses were carried out, one for each outcome variable. A multivariate linear regression model was conducted for severe PTSD; however, multivariate binary logistic regression models were conducted for severe depression, severe anxiety, and severe insomnia. All the multivariate analyses were preceded by univariate analysis to identify the potential confounders (p<0.1). Statistical significance was set at 2-sided p < .05 and estimates were set at 95% CI.

## Results

### Response rate and demographic characteristics

A total of 395 participants were approached, nine declined participation and, therefore, data were

**Table 1:** Characteristics of the study sample (n=386)

Factor	Category	n (%)
Age	Less than 30 years	201 (52.1)
	30 years and above	185 (47.9)
Marital Status	Single	64 (16.8)
	Married	316 (83.2)
Employment	unemployed	325 (84.2)
	employed	55 (14.2)
Smoking Status	Non-smoker	347 (91.6)
	Smoker	32 (8.4)
Educational level	Secondary school	205 (54.1)
	High school	174 (45.9)
Diagnosed with chronic diseases	no	319 (83.9)
	Yes	61 (16.1)
OTC paracetamol		196 (50.8)
OTC NSAIDs		81 (21)
OTC supplements		21 (5.4)
OTC herbals		159 (41.2)
OTC hot comprises		38 (9.8)

**Table 2:** Prevalence of dysmenorrhea, depression, anxiety, insomnia, and PTSD mean score

		n (%)
Dysmenorrhea	Below threshold	216 (56.8)
	Above threshold	164 (43.2)
Severity	Below threshold	175 (46.5)
	Above threshold	201 (53.5)
Depression	Below threshold	224 (58.9)
	Above threshold	156 (41.1)
Anxiety	Below threshold	189 (49.7)
	Above threshold	191 (50.3)
Insomnia	Above threshold	191 (50.3)
PTSD mean score (± SD)		39.22±17.24

The WaLIDD self-report scale with a score >8 was used to indicate severe dysmenorrhea, severe depression was assessed using PHQ-9 scale using a cut-off score of >14, severe anxiety was assessed using GAD-7 scale using a cut-off score of >14, and severe insomnia was assessed using the ISI-A scale using a cut-off score of >14.

analyzed from 386 participants. Out of the 386 participants, 325 (84.2%) were married, 201 (52.1%) were below 30 years, and 61 (16.1%) were diagnosed with chronic diseases. Regarding dysmenorrhea self-medication, 196 participants (50.8%) reported using OTC paracetamol, 159 participants (41.2%) reported using homeopathy herbal remedies, and 81 participants (21%) reported using OTC NSAIDs. Data are presented in Table 1.

**Table 3:** Univariate and multivariate linear regression analysis for PTSD as an outcome variable

PTSD	Univariate analysis			Multivariate analysis		
	B	t	p	B	t	p
Age	3.85	2.17	0.03			
Marital Status	0.26	0.11	0.91			
Employment	-2.38	-0.95	0.34			
Smoking Status	4.47	0.07	0.16			
Educational level	-5.83	-3.32	0.001	-5.42	-3.15	0.002
Diagnosed with chronic diseases	9.05	3.83	<0.001	8.61	3.70	<0.001
Severe dysmenorrhea	4.43	0.13	0.01	4.23	2.45	0.01
OTC paracetamol	4.19	2.38	0.01	4.16	2.43	0.01
OTC NSAIDs	3.36	1.56	0.12			
OTC supplements	5.41	1.40	0.16			
OTC herbals	1.93	1.08	0.28			
OTC hot comprises	-0.40	-0.13	0.89			

**Table 4:** Univariate and multivariate logistic regression analysis for depression as outcome variable

Depression	Univariate analysis			Multivariate analysis		
	OR	95% CI	p	OR	95% CI	p
Age	1.34	0.89-2.01	0.16			
Marital Status	1.18	0.69-2.02	0.54			
Employment	1.14	0.60-1.87	0.86			
Smoking Status	2.40	1.08-5.33	0.03			
Educational level	0.66	0.44-0.99	0.04			
Diagnosed with chronic diseases	1.99	1.11-3.54	0.02	2.19	1.21-3.96	0.01
Severe dysmenorrhea	2.26	1.48-3.45	0.001	2.05	1.32-3.21	0.001
OTC paracetamol	1.36	0.91-2.05	0.13	1.88	1.07-3.28	0.03
OTC NSAIDs	2.37	1.40-4.03	0.001			
OTC supplements	0.78	0.32-1.89	0.58			
OTC herbals	1.37	0.90-2.06	0.13			
OTC hot comprises	0.63	0.32-0.19				

### ***The prevalence of PTSD, depression, anxiety and insomnia symptoms***

According to the DTS, the mean score for PTSD in our sample was  $39.22 \pm 17.24$ , whereby most of the participants were categorized as having moderate PTSD symptomatology. According to the PHQ-9 scale, 201 participants (53.5%) reported scores corresponding to severe depression. According to the GAD-7 scale, 156 participants (41.1%) reported severe anxiety, and according to the ISI-A scale, 191 participants (50.3%) reported scores corresponding to severe insomnia. See Table 2.

### ***The correlates of PTSD, depression, anxiety and insomnia symptoms***

The multivariate linear regression model for PTSD as the dependent variable was finally adjusted for “educational level,” “diagnosed with chronic diseases,” “severe dysmenorrhea” and “OTC paracetamol.” The model demonstrated that higher PTSD symptoms were significantly associated with “lower educational level” ( $B=-5.42$ ,  $t=-3.15$ ,  $p=0.002$ ), “diagnosis with chronic diseases” ( $B=8.61$ ,  $t=3.70$ ,  $p<0.001$ ), “severe dysmenorrhea” ( $B=4.23$ ,  $t=2.45$ ,  $p=0.01$ ) and “OTC paracetamol”

**Table 5:** Univariate and multivariate logistic regression analysis for anxiety as outcome variable

Anxiety	Univariate analysis			Multivariate analysis		
	OR	95% CI	p	OR	95% CI	p
Age	0.89	0.59-1.35	0.60			
Marital Status	1.11	0.63-1.91	0.72			
Employment	0.87	0.48-1.56	0.64			
Smoking Status	1.49	0.72-3.09	0.28			
Educational level	0.69	0.46-1.05	0.08			
Diagnosed with chronic diseases	3.06	1.73-5.41	<0.001	3.29	1.84-5.89	<0.001
Severe dysmenorrhea	1.67	1.10-2.54	0.01	1.82	1.18-2.79	0.006
OTC paracetamol	1.06	0.71-1.61	0.75			
OTC NSAIDs	1.64	1.00-2.68	0.05			
OTC supplements	0.88	0.36-2.17	0.77			
OTC herbals	1.18	0.78-1.78	0.43			
OTC hot comprises	0.63	0.31-1.30	0.21			

**Table 6:** Univariate and multivariate logistic regression analysis for insomnia as outcome variable

Insomnia	Univariate analysis			Multivariate analysis		
	OR	95% CI	p	OR	95% CI	p
Age	0.88	0.59-1.32	0.54			
Marital Status	1.48	0.86-2.54	0.16			
Employment	1.03	0.58-1.82	0.92			
Smoking Status	1.29	0.62-2.68	0.49			
Educational level	0.69	0.46-1.03	0.07			
Diagnosed with chronic diseases	1.52	0.88-2.65	0.13			
Severe dysmenorrhea	1.02	0.94-1.10	0.57	1.86	1.08-3.17	0.02
OTC paracetamol	1.15	0.77-1.73	0.48			
OTC NSAIDs	2.21	1.32-3.68	0.002	1.62	1.05-2.49	0.02
OTC supplements	0.73	0.30-1.77	0.48			
OTC herbals	1.30	0.87-1.96	0.21			
OTC hot comprises	0.78	0.39-1.53	0.47			

( $B=4.16$ ,  $t= 2.43$ ,  $p=0.01$ ). The multivariate logistic regression model for depression as the dependent variable was finally adjusted for “diagnosed with chronic diseases,” “severe dysmenorrhea” and “OTC paracetamol.” The model demonstrated that severe depressive symptoms were significantly associated with “diagnosis with chronic diseases” ( $OR=2.19$ ,  $95\%CI = 1.21-3.96$ ,  $p=0.01$ ), “severe dysmenorrhea” ( $OR= 2.05$ ,  $95\%CI= 1.32-3.21$ ,  $p=0.001$ ) and “OTC paracetamol” ( $OR= 1.88$ ,  $95\%CI= 1.07-3.28$ ,  $p=0.03$ ).

The multivariate logistic regression model for anxiety as the dependent variable was finally

adjusted for “diagnosed with chronic diseases,” and “severe dysmenorrhea.” The model demonstrated that severe anxiety symptoms were significantly associated with “diagnosis with chronic diseases” ( $OR=3.29$ ,  $95\%CI = 1.84-5.89$ ,  $p<0.101$ ), and “severe dysmenorrhea” ( $OR= 1.82$ ,  $95\%CI= 1.18-2.79$ ,  $p=0.006$ ).

The multivariate logistic regression model for insomnia as the dependent variable was finally adjusted for “diagnosed with chronic diseases,” “severe dysmenorrhea” and “OTC NSAIDs.” The model demonstrated that severe insomnia symptoms were significantly associated with

“severe dysmenorrhea” (OR= 1.86, 95%CI= 1.08-3.17, p=0.02) and “OTC NSAIDs” (OR= 1.62, 95% CI= 1.05-2.49, p=0.02). See Tables 3,4,5,6.

## Discussion

The present study aimed to examine whether menstrual pain self-medication analgesics are associated with severe PTSD, depression, anxiety and insomnia among female war refugees residing in the Zaatari refugee camp. Our findings indicate that severe dysmenorrhea was associated with PTSD, depression, anxiety and insomnia. Moreover, paracetamol was associated with severe PTSD and depression, and NSAIDs was associated with severe insomnia.

The current findings make an important contribution to the study of women’s health in the context of war displacement and resultant mental health problems. The burden of mental health problems was notably high in this group. Refugees are among the most vulnerable members of society and frequently experience physical and mental health problems (World Health Organization, 2022). Mental health among refugee groups has been extensively studied<sup>31-33</sup>; however, the current study is one of few to highlight the association between mental health and dysmenorrhea among refugee women. Previously, women surviving conflicts in Iraq with poorer mental health status were found to report more severe dysmenorrhea<sup>12</sup>. Similarly, high rates of dysmenorrhea have been demonstrated among traumatized young females surviving an earthquake<sup>34</sup>. Relationships between mental health and pain experiences are well-established generally and among refugee groups, specifically<sup>32,35</sup>; indeed, studies suggest that mental health disorders and pain share biological mechanisms<sup>36</sup> and may interact to affect treatment outcomes<sup>37</sup>.

We report that paracetamol and NSAIDs were associated with poor mental health outcomes. Although our previous published work<sup>22</sup> failed to show any association between analgesics and PTSD severity, the current study did. This difference is attributed to the difference in the sample recruited here, i.e. women residing in a refugee camp, whereas our previous work recruited Syrian refugees residing in urban districts of Jordan. This

implies that the difference in the lifestyle and the severity of conditions experienced in the camp-residing women could have interacted differently. Another explanation is that women suffering from severe mental health symptoms were more likely to use these available medications in an attempt to relieve symptoms of pain and distress. In support of this explanation, several lines of evidence pointed to the mood enhancing effects of paracetamol and NSAIDs based on anti-inflammatory roles<sup>38-40</sup>. The investigation of self-medication for pain and mental health is multifactorial issue, although in this study, the OTC medications used were associated with poor mental health outcome, however this association could be looked at as follows: participants with higher mental health burden tend to use these OTC self-medications for menstruation.

These findings, therefore, have important implications for mental and gynecological healthcare assessment and treatment for refugee women. A comprehensive, holistic approach to refugee women’s healthcare that addresses both the physical and mental health challenges they face is needed. In Jordan, the hosting country, one recent study demonstrated that lifestyle eating habits, such as the consumption of soft drink, tea, coffee, and sugar intake, were all associated with severe dysmenorrhea<sup>15</sup>. This could provide an important insight for educating the refugee communities to adopt healthy eating habits to alleviate the disabling symptoms of dysmenorrhea.

The current study makes a novel contribution to the literature. To our knowledge, this is the first study to identify dysmenorrhea self-medication as mental health-related determinants among war refugees residing in camps. Drawing the study sample from Syrian refugees residing across borders is an additional unique element to this study. The study also addressed a wide variety of common mental health problems among refugee groups, specifically depression, anxiety, insomnia, and PTSD, using well-validated tools. The large sample size of 380 participants further strengthens the study. There are, however, certain limitations that must be considered. The cross-sectional design did not allow for long-term follow-up of participants, which limits the conclusions we can draw from these findings. We did not address

motivations for analgesic choice in the questionnaire tool. Furthermore, we did not evaluate non-pharmacological pain management strategies the participants may have been using that could have impacted their data.

## Conclusion

In conclusion, pain self-medication was associated with mental health status in this sample of camp-residing refugees. Menstrual health campaigns aimed at refugee women have the potential to improve menstrual health literacy and promote the appropriate use of effective analgesics accompanied with healthy life-style habits.

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## Contribution of authors

Omar Gammoh conceived, Abdelrahim Alqudah, Esam Qnais designed the study, Yaroup Ajlouni, Shatha Bani Sakher, Nawaf Mohammad collected the data, Mervat Alsous, Omar Gammoh analysed the data, Omar Gammoh, Hannah Durand, Alaa A. A. Aljabali, Ammena Y. Binsaleh, Sireen Abdul Rahim Shilbayeh prepared the manuscript. All the authors mentioned in the article approved the manuscript.

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