

Effect of Self-Care Guidelines on Low Back Pain among Pregnant Women

Shimaa A. Sharaby¹, Mona A. B. Abd Ellatef²

¹Lecturer of Women's Health, Faculty of Nursing, Kafr ElSheikh University, Egypt.

e-mail: drshimaaamostafa757@gmail.com

²Lecturer of Community Health Nursing, Faculty of Nursing, Ain Shams University, Egypt.

e-mail: money_a2002@yahoo.com

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ABSTRACT

Background: Gestational low back pain is a significant complaint during gestation, being responsible for any negative impacts on the quality of life of pregnant women.

Aim: Evaluate the effect of self-care guidelines on low back pain among pregnant women.

Method: Quasi-experimental (pre/post-test) designed used to achieve the study aim. The study was carried out at the outpatient clinic for antenatal care in Kafr ElSheikh University Hospital. Purposive samples composed of 39 pregnant women included in this study. Tools used included a structured interview questionnaire; to assess demographic characteristics of the studied sample, assess the obstetric history of pregnant women, assess pregnant women's knowledge regarding low back pain and assess pregnant women reported practices toward relieving low back pain. The second tool was a visual analog scale to assess the degree of low back pain among pregnant women.

Result: Revealed statistically significant differences between mean scores of pregnant women knowledge, self-reported practices, and the mean scores of pain degree among pregnant women pre, post-self-care guidelines implementation.

Conclusion: The self-care guidelines improved pregnant women's knowledge, practices, and relieving low back pain, recommending self-care guidelines in obstetrics & gynecological departments and antenatal outpatient clinics to relieve low back pain among pregnant women. Besides, counseling and health education programs must be provided to all pregnant women to increase their knowledge regarding relieving low back pain during pregnancy.

Keywords: Self-care guidelines, low back pain, pregnancy

1. Introduction

World Health Organization defines low back pain (LBP) during pregnancy as a symptom of multiple cases involving the spine, low back, or pelvic pain during pregnancy, and this pain was recurrent or persistent for more than one week from the lumbar spine or pelvis during current pregnancy (Gharaibeh et al., 2018).

Pregnancy-related low back pain is a prevalent complaint among pregnant women and may adversely affect their quality of life; back pain is the single major cause of disability worldwide, preventing pregnant women from participating in a job and other daily activities. It has been estimated that about 50% of pregnant women will suffer from some low back pain at some point during their pregnancies or the postpartum period (American Chiropractic Association, 2018).

It arises in various medical, musculoskeletal, and neurological illnesses and is one of the most common problems associated with pregnancy. There are possible causes include hormonal and biomechanical factors correlated with pregnancy itself, this type of back pain (BP) referred to as pregnancy-related because it has its onset in pregnancy; it often appears around the second and third trimester of pregnancy (Ayanniyi Arinola, Sanya, Ogunlade, 2016).

Classification of LBP according to WHO in 2013: Sub-acute 6-12 weeks, acute less than six weeks, chronic longer than 7-12 weeks. In general, lumbar pain during pregnancy is similar to low back pain experienced by non-pregnant women; this form of pain typically increases with prolonged positions (such as sitting, standing, or repeated lifting) (Oltean et al., 2014).

Clinical practice guidelines have been developed to assist in guiding care for low back pain patients. These guidelines have been developed using a synthesis of research evidence, expert consensus, and patient perspectives (Oostendorp & Huijbregts, 2011). Guidelines generally include statements of expected practice and specify standards of care against which providers can be audited. Improvements in quality of care and outcomes and decreased costs and practice variation have been demonstrated when clinical-practice guidelines are followed (Kredo et al., 2016).

Guidelines recommend non-pharmacological and non-invasive management (Kredo et al., 2016). These include the providing of instruction to stay active and the use of patient education and exercise therapy. Guidelines regularly recommend using physical exercise for non-specific LBP; endorse the cautious use of medication and early non-pharmacological treatment, including education and self-management (Oostendorp & Huijbregts, 2011).

¹Corresponding author: Shaimaa Ahmed Sharaby

Self-management is a process by which pregnant women use their knowledge, beliefs, skills, abilities, and social facilitation to solve any minor health problems, especially during pregnancy. Self-management can decrease the burden of low back pain. It has been described mainly as a model of care where the pregnant women use strategies to manage and monitor their health, retaining a primary role in management, and learn skills to be used in the daily management of their minor discomfort during pregnancy (Martins & Silva, 2014).

Nurses play an essential role in improving the quality of antenatal care, which provides pregnant women with education and support regarding the conservative treatment of back pain during pregnancy that usually involves adequate exercise and proper body mechanics. These attempts encourage and support correct posture, which is vital to avoid excessive stress in supporting structures (Demoulin et al., 2012).

2. Significance of the study

Egyptian study conducted on a sample of 300 women attending at Kebbly MCH in El Menoufyia Governorate. The study revealed that the percentage of low back pain among pregnant women constituted 47.3% of the total study sample (Ayoub & Awed, 2018). Another study conducted in Port Saied General Hospital reported that low back pain is experienced by approximately 50 to 70% of women during pregnancy (compared with 11% of the general population who have low back pain severe enough to require sick leave) (Awad, Mohamed, Atta Allah, & Hennen, 2016). Besides, Mahrous, Shaheen, Hadhoud, & Ahmed (2017) reported a prevalence of LBP as 53.2%. It was (62.8%) among female patients. There was a statistically significant relationship between LBP and being female in a study conducted in a family health center in El-Dakahlia Governorate, Egypt.

Although LBP considered as one of the minor problems in pregnancy, it widely accepted as a consequence of pregnancy, pregnant women disabled to use potent analgesic and muscle relaxants due to its side effect on the fetus, so self-care guidelines were providing a base of knowledge and consider safe methods without adverse effect on mother and fetus health. Also, this study may enable women to identify new measures to relieve low back pain and provide appropriate guidance for them to help themselves through the utilization of self-care guidelines on managing their low back pain.

3. Aim of the study

The current study emerged aiming to evaluate the effect of self-care guidelines on low back pain among pregnant women through:

- Assess knowledge of pregnant women regarding low back pain
- Assess the practices of pregnant women regarding low back pain
- Assess the degree of low back pain.

- Develop and implement self-care guidelines for relieving low back pain among pregnant women.
- Evaluate the effect of self-care guidelines on low back pain among pregnant women.

3.1. Research hypothesis

Pregnant women with low back pain exposed to the self-care guidelines will have improved low back pain compared to their pre-self-care intervention level.

4. Subjects & Methods

4.1. Research design

Quasi-experimental (pre/post-test) design was utilized to achieve the aim of this study. Thus quasi-experimental is an empirical interventional study used to estimate the causal impact of an intervention on the target population without random assignment (Cook & Campbell, 1979).

4.2. Research Setting

The study was carried out at the outpatient clinic for antenatal care in Kafr ElSheikh University Hospital. This setting considers the leading obstetric clinic serves many villages around the governorate capital city and contains a high follow rate of pregnant women who perform antenatal visit.

4.3. Subjects

A purposive sample included 50 pregnant women who recurred for antenatal visits. The sample was chosen randomly, consisted of all pregnant women available at the time of study conduction. Every pregnant woman has the same chance to be included in the study from the previously mentioned settings under the following criteria:

Inclusion criteria

- Pregnant women complain of low back pain in the 2nd&3rd trimester
- Educated women
- Not exceed 34 weeks' gestation
- Different age groups
- Different types of delivery and different parity

Exclusion criteria

- Participants with serious spinal pathology and any risk factors predispose to early back pain in pregnancy were excluded from the study as polyhydramnios and twins
- Women with repeated abortion

The sample size calculated based on the previous year census report of admission in the previous setting, the total pregnant women attending the antenatal clinic was 1085 pregnant women utilizing the following formula:

$n = \frac{N}{1 + N(e)^2}$ Where: n= sample size. N= total population. e= margin error "0.05" (Jaykaran & Tamoghna, 2011)

4.4. Tools of data collection

There are two tools for data collection as following:

4.4.1. Structured Interview Questionnaire

The researcher developed it in Arabic form after reviewing the related literature to assess demographic characteristics of pregnant women. The questionnaire was divided into three parts with 30 multiple-choice questions and close and open-ended questions. It involved three parts as the following:

Part 1 assessed women's socio-demographic characteristics; it consisted of five open-end questions and was used once at the beginning of the interview. It contained such information as name, telephone number, age, educational level, occupation.

Part 2 assessed women's obstetric history and consisted of five open-end and closed-end questions. It was used once to assess the number of previous pregnancies, parity, mode of delivery, number of abortions and gestational age, problems associated with current pregnancy, and regular follow-up.

Part 3 is designed to assess pregnant women's knowledge. It used pre and post-self-care guidelines implementation. It consisted of 30 multiple choice questions regarding the definition of low back pain, time of starting, causes (6 questions), symptoms of low back pain (5 questions), measures to relieve (8 questions), effect on daily living activities (6 questions), and complication of low back pain (5 questions) (Clarke & Gross, 2004).

According to the literature, a scoring system for knowledge related to low back pain developed as correct answers were predetermined. The scoring used two points ranging from 0 to 2, (0) for an incorrect answer and (2) for the correct answer. Women's total knowledge scores are classified as good, that is, 75%, an average that is 50% - 74% and poor, and less than 50%.

Part 4 concerned with pregnant women's self-care, reported practices adopted from *Liddle and Pennick (2015)* to assess women reported practices regarding low back pain. It used pre and post-self-care guidelines implementation and consist of 40 multiple choice questions regarding following practices, back massage (8 questions), sleep on back with support pillows (5 questions), rest (5 questions), apply McKenzie exercise (10 questions), apply good body mechanics (7 questions), apply warm compresses (5 questions).

The scoring system has done using three points ranging from 0 to 2, (0) for never done and (1) for sometimes done (2) for usually done. Total practices score was considered satisfactory if the total scores were $\geq 60-89\%$ and considered unsatisfactory if the score $< 60\%$, and if the total scores were $\geq 90\%$ considered highly satisfactory.

4.4.2. Visual Analog Scale (VAS)

It was adopted from *Abou-Dakn, Fluhr, Gensch, Wockel (2011)* to assess the level of low back pain pre, post-self-care guidelines implementation. The scale is a visual analog scale ranging from 1-10 with the following point descriptions:

No pain gave (score 0), mild pain ranged from (score 1-4), moderate pain ranged from (score 5-7), and severe pain ranged from (score 8-10).

4.5. Procedures

A panel of five experts from obstetrics and women health nursing and community health nursing professors assessed the instruments for comprehensiveness, appropriateness, and legibility. The committee determined the tools' content validity. Reliability was performed by Cronbach's Alpha coefficient test, which revealed that each of the two instruments consisted of comparatively similar products as stated by each tool's moderate to high reliability. The internal consistency of knowledge was 0.89, and the internal consistency of practices was 0.91.

After explaining the purpose of the study, the official permission was granted by a formal letter from the Dean of the Faculty of Nursing, Kfir El Shikh University, to the administrators of the previously mentioned settings. Also, a copy of the study tools gave to them before data collection.

Ethical considerations: Each pregnant woman was informed about the purpose and benefits of the study, and then written consent was obtained before data collection. The pregnant women assured that all data used only for research purposes, and each pregnant woman informed of the rights to refuse or withdraw at any time with no consequences.

A pilot study was performed on 10 percent of the total number of the study sample (5 pregnant women) to evaluate the tools' clarity, objectivity, and feasibility of the study process. Also, to estimate the time needed for data collection. Those women in the pilot study included in the primary study sample as no modifications were made.

Actual fieldwork was carried out from the beginning of October 2018 to the end of March 2019 in the previously mentioned setting. The researchers allocated two days each week (Tuesday and Thursday), from 8:30 AM -12 PM, 3-4 pregnant women/day for data collection.

Self-care guidelines construction: This study was conducted in three phases, preparatory, implementation, and evaluation.

Preparatory phase: Based on the results obtained from the pilot study, the researchers designed the guidelines. It was revised and modified according to the related recent, national, and international literature, and the various aspects of the research problem took into considerations.

Development phase: The development of the guidelines based on pregnant women's assessment needs and the objective developed.

General Objective of the self-care guideline formulated (At the end of the self-care guidelines, pregnant women will be able to apply self-care practices to relieve low back pain). The content included physiological change during pregnancy, causes of low back pain, symptoms of low back pain, and practices to relieve low back pain (Body mechanics, McKenzie exercise, sleep and rest, sleep on the back with Support pillows, back massage, and warm compresses.

Teaching methods used included discussion, demonstration, re-demonstration, and group discussion. Suitable teaching aids prepared especially for the program such as printed materials, posters, the guiding Arabic

booklet, and PowerPoint presentation and educational videos using a laptop. A booklet prepared in simple Arabic language.

Self-care guidelines implementation: The self-care guidelines were implemented over six months; time allowed 5 hours distributed on five sessions: 1:45 hours for theory and 3:15 hours for practices. The time of every session ranged from 35 minutes to 45 minutes. The actual work started by meeting the pregnant women in the previously mentioned settings. First, the researcher introduced herself

to the participant and gave them a brief idea about the study and its purpose. The first session started with an orientation about the program, its purposes, and the time of the program sessions. Each session began with a previous session summary and goals of the new session, considering simple and clear language at all levels of the studied participants.

Self-care guidelines evaluation phase: Evaluation applied before and after the implementation of self-care guidelines through pre and post-test using the same study questionnaire, to estimate differences, similarities, and areas of improvement, as well as defects and estimate the effect of self-care guidelines on relief of back pain among pregnant women. Follow-up telephone interviews conducted after seven days of intervention in time, ranging from 2-8 minutes, to assess the women's signs of improvement and any problems arising.

4.6. Limitation of the study

Eleven women were excluded due to the wrong telephone number.

4.7. Data analysis

Data computed using the Statistical Package for Social Sciences (IBM SPSS) version 20, data collected, organized, revised, coded, tabulated, and analyzed. The following statistical techniques were used: Numbers, percentages, and chi-square (χ^2), and mean value.

$$-\chi^2 = \sum E_i(O_i - E_i)^2$$

- where C=degrees of freedom.

- O=observed value(s).

- E=expected value(s).

The chi-squared test is used to determine a significant difference between the expected frequencies and the observed frequencies in one or more categories.

Significant difference

- When $P > 0.05$, it is a statistically insignificant difference.
- When $P < 0.05$, it is a statistically significant difference.
- When $P < 0.01$ or $P < 0.001$, it is a highly statistically significant difference.

5. Results

Table 1 shows that age ranged 17-34 years with Mean \pm SD was 27.10 \pm 14.137, 76.9% of the pregnant women their age group was between 20-<30years, and 48.8% had a university education, 79.5% of them were housewives.

Table 2 shows that 64.1% of the study samples were multi-gravida, 30.8% of them were p0, while 38.5% of them were Para2. Concerning abortion, 92.3%of them had not aborted before. 84% of them delivered through cesarean section.

Table 3 shows that 61.6%of the study sample was in the 3rd trimester. Regarding problems associated with current pregnancy, 48.7% of them had mild anemia during pregnancy, followed up regularly with antenatal care.

Table 4 shows that 30.8% of the study sample complained of low back pain three months and five months ago. At the same time, 12.8% of them complained of low back pain at the beginning of pregnancy.

Table 5 shows a highly statistically significant difference between mean scores of pregnant women regarding all knowledge aspects of low back pain and total knowledge, pre- and post-self-care guidelines implementation with (p-value <0.001).

Figure 1 shows that 82.1% of pregnant women had poor knowledge, 17.9% of them had average knowledge, with no pregnant women had good knowledge of pre-self-care guidelines implementation. While this knowledge improved after self-care guidelines implementation to be 79.5% of pregnant women had good knowledge.

Table 6 shows that there were highly statistically significant differences between mean scores of self-reported practices pre and post-self-care guidelines implementation regarding all pain relief practices (p value< 0.001).

Figure 2 shows that 84.6% of pregnant women had unsatisfactory practice, while 15.4% had satisfactory knowledge, with no one had highly satisfactory practice pre-self-care guidelines implementation. This self-care practices level improved after self-care guidelines implementation to be 28.2% and 69.2% had satisfactory and highly satisfactory practice, respectively.

Table 7 shows highly statistically significant differences in the pain level between pre and post-self-care guidelines implementation by the seventh day (p-value <0.000).

Table 8 reveals a statistically significant correlation between knowledge score difference and pain level (p<0.05). There is no statistically significant correlation between pregnant women's practices and their obstetric history.

Table (1): Frequency and percentage distribution of the studied sample regarding their socio-demographic characteristics.

Variable s	No = 39	
	No	%
Age		
<20 years	1	2.6
20-<30	30	76.9
30- 40	8	20.5
Age range	17-34	
Mean±SD	14.137±27.10	
Women's education		
Read and write	2	5.1
Primary education	2	5.1
Secondary education	16	41
University education	19	48.8
Woman's occupation		
Worked	8	20.5
Housewife	31	79.5

Table (2): Frequency and percentage distribution of the studied sample according to their obstetric history (No=39).

Variables	No	%
Gravida		
Primi	14	35.9
Multi	25	64.1
Para		
p0	12	30.8
p1	10	25.6
p2	15	38.5
p three or more	2	5.1
Abortion		
One	2	5.1
Two	1	2.6
No	36	92.3
Mode of previous delivery: No (25)		
Cesarean Section	21	84
Normal vaginal delivery	4	16

Table (3): Frequency and percentage distribution of the studied sample according to the history of their current pregnancy (No=39).

Variables	No	%
Gestational age		
2 nd trimester	15	38.4
3 rd trimester	24	61.6
Problems associated with current pregnancy		
Anemia during pregnancy(mild)	19	48.7
Gestational diabetes	1	2.6
No problem	19	48.7
Antenatal follow-up		
Regular	39	100

Table 4: Frequency and percentage distribution of the studied sample regarding the start of low back pain (No. 39).

Time of start feeling of low back pain	No	%
At the beginning of pregnancy	5	12.8
less than one month	3	7.6
Two months ago	1	2.6
Three months ago	12	30.8
Four months ago	6	15.4
Five months ago	12	30.8

Table (5): The studied sample knowledge regarding low back pain pre, post-self-care guidelines implementation (No.39).

Knowledge items	Pre-intervention	Post-intervention	T-test	P-value
	Mean ±SD	Mean ±SD		
Causes of backache (6 items)	1.6923±0.73104	5.2308±1.01207	17.343	<0.001
Symptoms' of backache (5 items)	2.3333±0.47757	3.5897±1.20782	6.073	<0.001
Measures to relieve backache (8 items)	2.3077±1.34074	7.1282±1.17383	17.249	<0.001
Effects of back pain on daily living activities (6 items)	1.7949±0.83286	4.7692±1.15762	16.038	<0.001
The complication of back pain (5 items)	1.2821±0.97194	3.7949±1.59241	7.469	<0.001
Total knowledge (30 items)	9.4103±3.43142	24.5128±3.17782	21.236	<0.001

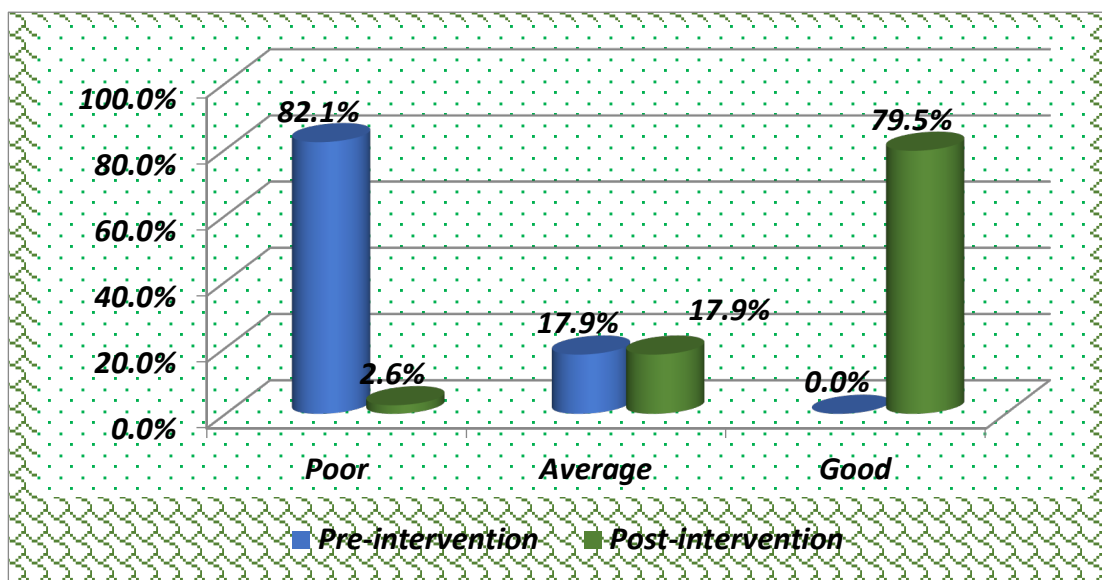


Figure (1): Percentage distribution of the total knowledge level regarding low back pain at pre, post-self-care guidelines implementation.

Table (6): The studied sample reported self-care practices pre- and post-self-care guideline implementation (No. 39).

Self-care practices	Pre-intervention	Post-intervention	T-test	P-value
	Mean ±SD	Mean ±SD		
Back Massage	0.2821±.45588	1.7949±0.40907	15.709	<0.001
Sleep on the back with support pillows	0.3846±.49286	1.6923±0.46757	10.659	<0.001
Rest	0.2564±.44236	1.7692±0.42683	14.678	<0.001
Apply McKenzie exercise	0.3333±.47757	1.7436±0.44236	13.002	<0.001
Apply good body mechanics	0.4359±.50236	1.5385±0.50504	8.391	<0.001
Apply warm compressed	0.3333±.47757	1.6154±0.49286	11.064	<0.001
Total self-care reported practices	2.0256±2.25350	10.1538±1.81425	15.638	<0.001

Figure (2): Percentage distribution of the total self-care reported practices level pre and post-self-care guidelines implementation.

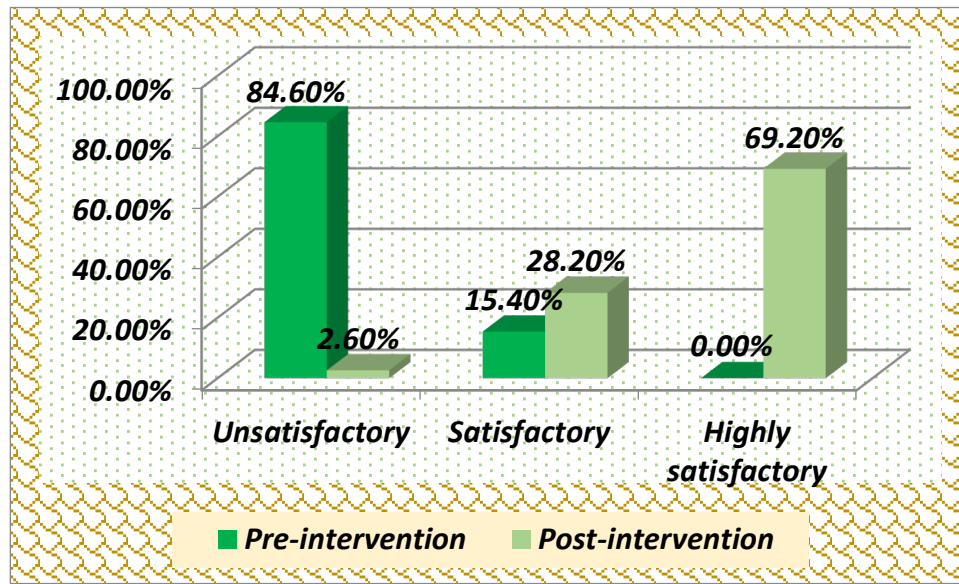


Table (7): Percentage distribution of the studied sample according to their level of low back pain pre and seventh-day post-self-care guidelines implementation.

Degree of pain	Pre-implementation		Post-implementation 7 th day		Chi-square	P-value
	No	%	No	%		
No pain	0	0	29	74.4	46.56	0.000
Mild pain	0	0	6	15.4		
Moderate pain	18	46.2	4	10.2		
Severe pain	21	53.8	0	0		

Table 8: Correlation between pre-post score difference in knowledge and practice with pain level and obstetric history.

	Spearman's rank correlation coefficient		
	Scores (post-pre difference)		Satisfaction score
	Knowledge	Practices	
Knowledge		0.280	0.093
Practices	0.280		0.093
pain level	0.004	0.197	0.044
Gravid	123	0.085	0.075
mode of the previous delivery	0.088	0.106	0.020

6. Discussion

Zhianian, Zareban, Moghaddam, and Rahimi (2015) reported a WHO survey of approximately 300 women to die from pregnancy or childbirth-related complications worldwide; one of the main objectives of pregnant women's health education programs is to promote self-care practices that can lead to decreased maternal morbidity and decrease the expenses of pregnancy-related health care.

Health care professionals involved in the care of pregnant women with low back pain must have access to up-to-date, evidence-based information to assist them in the treatment and decision-making. Self-care guidelines exist to promote consistent best practices, reduce unwarranted

variation, and reduce the use of low-value interventions in pregnant women's care. Low back pain/discomfort in pregnancy seems to be invisible and forgotten in contemporary antenatal care. Self-care guidelines for pregnant women and health professionals are a way of increasing attention to preventing and managing unnecessary low back pain/discomfort during pregnancy (Traeger, Buchbinder, Elshaug, Crofr, & Maher, 2019).

Based on these critical issues, the current study aimed to evaluate the effect of self-care guidelines on low back pain among pregnant women. The current study showed that women age ranged 17-34 years with mean±SD 27.10±4.13, about half of them had a university education, and more than three-quarters of them were housewives.

This result is supported by *Carvalho, Mota, Cardoso, and Marques (2017)*, who conducted a study about low back pain during pregnancy in Brazil and mentioned that the mean age of the study sample was 26.2 years; less than three quarters had completed university education. More than half of them were not working. In contrast with *Zhianian et al. (2015)*, who studied self-care behaviors in pregnant women in Zahedan, Iran, and found that the mean age of pregnant women was 24.49 years, two-thirds of them with secondary school diploma and the majority of them was a housekeeper.

Considering obstetric history, about two-thirds of pregnant women were multi-gravida. More than one-third of them were para2, most of them were not aborted before, and most of them delivered by cesarean section. These results agree with *Silveira, Milani, Velho, and Marques (2016)*, who studied the perception of pregnant women about self-care and maternal care. The study reported that two-thirds of the studied sample was multi-gravida. Also, this finding disagreed with *Kadham and Jihad (2016)*, who studied self-care practices during the prenatal period among mothers in Babylon City in Iraq and found that most of the study sample was para one to para three and less than a quarter of them were aborted.

Regarding the history of current pregnancy, about two-thirds of the study sample was in the ^{third} trimester. Less than half of them have a mild degree of anemia during pregnancy. This result may be related to the demand of pregnant women to iron during pregnancy for vital to fetus growth. Also, physiological anemia is developed due to the increase in blood volume during pregnancy.

This result disagrees with *Carvalho et al. (2017)*, who stated that more than a tenth of the study sample was in the third trimester. Also, this study was in agreement with *Kassa, Berhe, Muche, and Abeje (2017)*, who studied the prevalence and determinants of anemia among pregnant women in Ethiopia; and stated that more than a third of pregnant women had anemia during pregnancy. This finding agreed with *Rosmawati, Nazri, and Ismail (2012)*, who studied the rate and risk factors for anemia among pregnant mothers in Malaysia and revealed that less than two-thirds of pregnant women develop anemia during pregnancy.

Regarding the beginning of back pain, about one-third of the study sample complained of pain at three months and five months from the beginning of the pregnancy, while more than a tenth of them complained of pain at the beginning of pregnancy. This result may relate to physiological changes as posture changes, increase women's weight, and expand uterus muscles during pregnancy.

This result agrees with *Ayanniyi et al. (2016)*, who studied the effects of the McKenzie protocol on pregnancy-related back pain and revealed that all participants in the study were found to have back pain during pregnancy. Also, this result following *Miller Thompson and Hart (2012)*, who stated that sub-acute back pain started between 6-12 weeks, acute back pain started at less than six weeks, chronic longer back pain started between 7- 12 weeks.

According to pregnant women's knowledge regarding causes and methods of relieving back pain, the current study revealed a statistically significant difference between mean scores of pregnant women regarding all items of knowledge and total knowledge, pre and post-self-care guidelines implementation (p-value <0.001). This result agreed with *Abd-Elhaliem, Abd-Elhady, and Mohamed (2018)*. They studied self-care practices guidelines on relieving minor discomfort (ailments) among new pregnant women in Egypt. They revealed a highly significant statistical difference between all items of minor discomfort, including low back pain general knowledge at the pre and post-intervention.

This result disagreed with *Liddle, and Pennick (2015)*, who studied interventions for preventing and treating pelvic and back pain among pregnancy in London and indicated that there was low-quality evidence that, in general, the addition of exercise significantly not reduced pain. This different result may be related to the fact that the researcher used a different technique as support belts, neuro-emotional technique, or spinal manipulation, which may not effectively reduce low back pain.

According to self-care practices used to relieve low back pain pre and post-self-care guidelines implementation, the present study revealed statistically significant differences between mean scores of self-reported practices pre and post self-care guidelines implementation (P-value<0.001). This finding means that the self-reported practices used in the current study effectively reduced low back pain among pregnant women. This result agrees with *Kadham and Jihad (2016)*, who found that the overall assessment of the self-care practices during the prenatal period is good.

Also, this result agreed with *Zhianian et al. (2015)*, who found that there were changes in mean scores of the women practices and self-efficacy after the intervention. This result disagreed with *Hamed (2018)*, who studied self-care activities performed by pregnant women in Mansoura city and found that 10.3% of women only did the correct practices, maintaining good posture and body mechanics after the intervention.

According to their degree of back pain, the current study reported statistically significant differences in the pain level between pre and post-intervention by the seventh day (p-value <0.001). This result may be related to the self-care guidelines were containing vital practices, and all instructions were effectively related to relieving back pain. Also, this means that pregnant women were following the self-care guidelines carefully.

This result agrees with *Ayanniyi et al. (2016)*, who revealed a significant difference between the pre and post-treatment pain intensity scores. This result means that the McKenzie protocol was effective in relieving pregnancy-related back pain.

This result disagreed with *Shah et al. (2015)*, who studied pain management in pregnancy in the USA and reported that pregnant women experiencing constant pain requiring pharmacologic treatment should use acetaminophen as a first-line drug. This difference may be

related to women's awareness of safety measures and their perception regarding self-care practices during pregnancy.

There was a statistically significant correlation between the degree of pain, knowledge, and practice score difference of pregnant women pre and post guidelines implementation ($p < 0.05$). This study followed *Abd Elhaliem et al. (2018)*, who reported a highly positive association between pain score, knowledge, and practice difference that indicated knowledge improvement subsequently improves practices that reflected on the pain level.

The aim of the current study was significantly achieved through the present study findings within the frame of the previously mentioned research hypothesis, which was supported by the improvement of low back pain after applying self-care guidelines.

7. Conclusion

The study's results and research hypothesis concluded that there were statistically significant differences in the back pain level between pre and post-self-care guidelines implementation on the 7th day. There was a statistically significant difference between mean scores of pregnant women regarding knowledge and reported practices of relieving low back pain, pre, and post-self-care guidelines implementation, and the research hypothesis supported.

8. Recommendations

According to these findings, the current study recommended the following:

- Implementing self-care guidelines in obstetrics & gynecological department and antenatal clinics to relieve back pain during pregnancy.
- Counseling and health education programs must be provided to all pregnant women to increase pregnant women's knowledge regarding relieving back pain during pregnancy.
- Further research recommended investigating the effect of self-care practice guidelines in the current study during pregnancy to relieve low back pain.

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