Effect of Tailored Patient Education Program on the Outcomes of Pregnant Women with Hyperemesis Gravidarum

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ABSTRACT

Context: Hyperemesis gravidarum (HG) is a harmful condition associated with serious physical and psychological complications that affect pregnant women's health. The etiology of hyperemesis gravidarum is not well understood and mainly unknown but is probably unmodified multi-factorial risk factors.

Aim: This research aimed to examine the effect of a tailored patient education program on pregnant women's outcomes with hyperemesis gravidarum.

Methods: A quasi-experimental (study/control group) design was adopted in this study to achieve the stated aim. A convenience sample of 50 pregnant women diagnosed with hyperemesis gravidarum was recruited. The research was conducted at the inpatient obstetrics and gynecology department, Kafrelsheikh General Hospital, Kafrelsheikh Governorate, Egypt. Data collected using three tools: Structured interviewing questionnaire; Modified 24-hour Pregnancy-Unique Quantification of Emesis/Nausea (PUQE) index; and health status assessment record.

Results: The research findings revealed that 56.00% of the study group at baseline assessment have severe nausea and vomiting compared to 52.00% of the control group, with no statistically significant difference between both groups (P = 0.776). While at three-weeks post-program, no one of the study group women has severe nausea and vomiting compared to 16.00% of the control group with a statistically significant difference between both groups (P = 0.044). Concerning signs and symptoms of dehydration, there was no statistically significant difference between the study and control group regarding any signs and symptoms of dehydration at the three times of assessment. A statistically significant difference was revealed between the study and control group about the length of hospital stay (P = 0.041) and hospital readmission (P = 0.029).

Conclusions: Although there is no statistically significant difference between the study and control group regarding signs and symptoms of dehydration, the decreased severity of nausea and vomiting, length of hospital stay, and hospital readmission rate are valued outcomes. The study recommended that a pregnant woman be equipped with adequate health information related to HG by conducting such a health education program that should be tailored according to women's needs.

Keywords: Tailored patient education program, Outcomes, Pregnant Women, Hyperemesis Gravidarum

1. Introduction

Nausea and vomiting of pregnancy (NVP) are common complaints of early pregnancy that affects approximately 80% of pregnant women *(Kejela et al., 2018)*. Foremost, these symptoms are generally mild, self-limited, and while unpleasant are not clinically significant. In 0.5–2% of women, the symptoms can be severe and lead to dehydration, electrolyte disturbance, and significant weight loss, a condition known as hyperemesis gravidarum (HG) *(American College of Obstetrics and Gynecology (ACOG), 2018; Fiaschi et al., 2016)*. Although a self-limiting condition, the majority beginning by ten weeks and resolving by 20 weeks of gestation, in more severe cases, 10–45% of women, it does not resolve until after the birth *(Hizlil et al., 2012; Kramer et al., 2013; Rashid et al., 2012)*.

The etiology of HG is not well understood and mainly unknown but is probably multi-factorial involving hormonal, immunological, and psychosocial factors *(Rashid et al., 2012)*. The female fetus, previous HG, multiple gestations, current or prior molar pregnancy, hydrops fetalis, and immigrant populations are some of the many apparent risk factors for HG *(Munch et al., 2011; Veenendaal et al., 2011; Mekonnen et al., 2018)*.

Treatment is empirical, standardized, and involves antiemetic therapy and intravenous fluids to relieve nausea and vomiting, correct electrolyte imbalance, and maintain hydration *(ACOG, 2018; McCarthy et al., 2014)*. However, the treatment aimed at the symptoms of HG. Hence, while recovery after rehydration is relatively swift once the woman returns home, dehydration may recur, necessitating another hospital admission for further rehydration. Thus, HG is a common reason for multiple admissions to a hospital *(Rashid et al., 2012)*. Consequently, it consumes significant personal and health care resources *(ACOG, 2018)*.

Hyperemesis gravidarum is a harmful condition associated with serious physical and psychological complications that affect pregnant woman's health. Previous studies revealed that women with HG might be at

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higher risk than those without pre-eclampsia, placental abruption *(Bolin et al., 2013),* and spontaneous preterm birth *(McCarthy et al., 2011; Veenendaal et al., 2011)*. In rare cases, Wernicke's encephalopathy has been identified as a serious complication of this disease *(Di Gangi et al., 2012).* For newborns, HG has been associated with low birth weight and small for gestational age *(Bolin et al., 2013; Veenendaal et al., 2011).*

Psychologically, several studies show an association between HG and high levels of depression and anxiety *(Kramer et al., 2013; McCormack et al., 2011; Munch et al., 2011). Christodoulou-Smith et al. (2011)*, in their study, reported that the experience of HG might lead to posttraumatic stress syndrome (PTSS) in 18% of women, indicating that HG may have long term psychological effects. HG may also lead to loss of employment, time off from work, avoidance of future pregnancies, and marital and financial problems. Furthermore, *Power et al. (2010)* in their qualitative research reported common themes included inability to tolerate diet and fluids, fatigue, feelings of low mood, defeat, and hopelessness, worries about the unborn child, inability to manage home and work life, feelings of being disbelieved and difficulties with self-care.

Nurses have a crucial responsibility for antenatal care provision and can play an essential role in providing health care services for pregnant women with HG. This role starts from initial assessment and continues until giving a discharge plan that involves instruction to women about how to modify and adopt a healthy lifestyle to control and cope with HG *(Sykes et al., 2013).* Nursing care, as well, helps pregnant women in increasing their sense of wellbeing and reducing pregnancy complications *(Niebyl, 2010).*

2. Significance of the study

In Egypt, *Mahmoud (2012)* carried out a study to assess the prevalence and risk factors of hyperemesis gravidarum among Egyptian pregnant women at the Woman's Health Center, Assiut University. He concluded that the overall hospital rate of HG was 4.5%, which was considered a high prevalence concerning the universal prevalence of HG. Furthermore, three-quarters of women diagnosed with HG admitted to the hospital for the first time, and 94.6% of them admitted in the first trimester.

Given the high prevalence of HG, the lack of preventative measures in the community, and the increased rate of hospitalization, maternity nurses should pay more attention to pregnant women diagnosed with hyperemesis gravidarum. To reduce the impact of this condition on the woman and her fetus, nurses must provide appropriate, tailored healthcare and health teaching. The aim is to examine the effect of a tailored patient education program on the outcomes of pregnant women with hyperemesis gravidarum.

3. Aim of the study

This research aimed to examine the effect of a tailored patient education program on the outcomes of pregnant women with hyperemesis gravidarum.

3.1. Operational definitions

In this study, the *outcome* is defined as the severity of nausea and vomiting, signs and symptoms of dehydration, length of hospitalization, and readmission rate.

A tailored education program is recognized as an educational program designed based on women's complaints and needs.

3.1. Research hypotheses

Main hypothesis

Pregnant women with hyperemesis gravidarum who received tailored patient education program will exhibit improved outcomes compared to the controls

Sub-hypotheses

H.1. Pregnant women with hyperemesis gravidarum who received tailored patient education program will exhibit less severe nausea and vomiting than the controls.

H.2. Pregnant women with hyperemesis gravidarum who received tailored patient education program will exhibit fewer signs and symptoms of dehydration compared to the controls.

H.3. Pregnant women with hyperemesis gravidarum who received tailored patient education program will have shorter hospitalization and fewer readmission rates than the controls.

4. Subjects & Methods

4.1. Research design

A quasi-experimental (study/control group) design was adopted in this study. It is a research design that involves the manipulation of independent variables similar to experimental research. However, there is no control group and/or random selection *(Rajesh, 2016).*

4.2. Research setting

The research was conducted at the inpatient obstetrics and gynecology department, Kafrelsheikh General Hospital, Kafrelsheikh Governorate, Egypt. The department consists of 3 rooms, each of them includes six beds. It provides free services to women with different conditions such as; high-risk pregnancy, labor, and postpartum care.

4.3. Subjects

A convenience sample of 50 pregnant women diagnosed with hyperemesis gravidarum was recruited according to the following eligibility criteria: admission within the previous 24 hours, being aged 18 years or over, and having a single viable fetus. In contrast, pregnant women with vesicular mole or any other medical disorders were excluded from the study.

The sample size was calculated using the following formula:

$n = [(Z_{\alpha/2} + Z_{\beta})^2 \times \{2(SD)^2\}]/ (\mu1- \mu1)^2$
Where:
N= sample size required in each group
SD = standard deviation
$Z_{\alpha/2}$: This depends on the level of significance, for 5% this is 1.96
Z_{β}: This depends on power, for 80% this is 0.84
$\mu1- \mu1$: the mean difference between the two groups

4.4. Tools of data collection

Data pertinent to the study were collected using three tools. They were structured interviewing questionnaire, Modified 24-hour Pregnancy-Unique Quantification of Emesis/Nausea (PUQE) index, and health status assessment record.

4.4.1. Structured Interview Questionnaire

The researcher constructed it to assess women's data, obstetric history, present medical history, and hospitalization data.
A. Personal background data: This section included questions about age, telephone number, residence, level of education, and occupation.
B. Obstetric history: It consisted of 3 questions number of gravidities, parity, complication during previous pregnancies such as abortion, preterm labor, and hyperemesis gravidarum.
C. History of present pregnancy: It included three questions about the date of the last menstrual period, gestational age, and expected date of delivery.
D. hospitalization data: it included two questions about the length of hospital stay and readmission frequency.

4.4.2. Modified 24-hour Pregnancy-Unique Quantification of Emesis/Nausea (PUQE) Index

It is an objective and validated index adopted from *(Ebrahimi et al., 2009)* and used to measure the severity of symptoms of nausea and vomiting of pregnancy (NVP) in the previous 24 hours. This index contains three questions regarding the length of nausea per day in hours, the number of daily vomiting episodes, and the number of retching episodes. Each PUQE question has a rating from one to five. The total score is the sum of replies to each of the three questions. Thus, the composite sum ranged from three to fifteen. A total score of ≤6 was classified as mild NVP; a score of 7–12 was classified as moderate; and a score of ≥13 was classified as severe NVP /hyperemesis in pregnancy.

4.4.3. Health Status Assessment Record

This tool was constructed by the researcher to assess weight, height, BMI, the sign of dehydration such as thirst, dry mucous membrane, dry skin, tachycardia, and hypotension. Body mass index was calculated through the formula of ($wt./Ht^2$ m) and classified as: normal body weight (BMI 18.5 – 24.9 kg/m^2), overweight (BMI 25-29.9 kg/m^2), class I obesity (BMI 30- 34.9 kg/m^2), or class II obesity (BMI 35- 39.9 kg/m^2).

4.5. Procedures

Tools constructed by the researchers were submitted to five scholastic nursing specialists in the field of Maternity Nursing to test its content validity. Modifications were carried out according to the recommendations of the specialists. Tools validate for clarity, appropriateness, and completeness of the content.

The reliability of the proposed tools was tested using Cronbach's alpha coefficient test. For the structured interview questionnaire, Cronbach's alpha of 0.84 showed a strong, significant positive correlation between the tool's items. While for the health status assessment record, it was 0.80, which indicates accepted tools reliability.

Official permission was taken from Kafrelsheikh general hospital administration. After that, each pregnant woman with HG informed about the purpose of the research and its importance. The researchers emphasized that participation in the research is entirely voluntary, and all pregnant women informed that they could withdraw from the research at any time. Anonymity and confidentiality were assured through coding the data. Informed consent took from a pregnant woman who accepts to be included in the research.

A pilot study was conducted on 10% of the sample (5 pregnant women) who met the criteria of selection to assess the feasibility of the study process and clarity of the tools and to determine the needed time to complete the tools. The needed modifications performed, and those subjects were excluded from the study.

Data was collected through a period of 6 months from the beginning of January 2019 to the end of June 2019. The research was conducted through five phases: preparation, recruitment, assessment, implementation, and follow up phase.

Preparation phase: During this phase, the updated review of related literature has been done to construct data collection tools and develop the educational program. It also included the preparation of teaching materials, i.e., the Arabic brochure.

Recruitment phase. A convenience sample was taken then pregnant women with HG were randomly assigned using sealed envelopes technique into the study group and control group.

Assessment phase: After enrollment, the researchers hold a meeting with each pregnant woman to complete the three data collection tools individually. The questions were asked in Arabic, and the researchers signed the woman's responses. The time taken to complete the tools was about fifteen to twenty minutes, and the needed time to complete this phase was ten days. Then, pulse and blood pressured were assessed, besides the assessment of other signs of dehydration. After that, the woman's height was measured using tape measurement and weight using a bath scale. Accuracy was assured through balancing the scale to zero before obtaining weight. Then body mass index was calculated, and pregnant women classified according to the result. This assessment took about 10 minutes.

Implementation phase: Based on the result of the assessment phase, the complaints, and the needs of the pregnant woman were identified, and accordingly, teaching was tailored and offered to pregnant women in the study group during an individualized teaching session. This session was comprising teaching related to dietary advice and practical advice regarding effective measures for alleviating symptoms such as nausea, hypotension, dry skin, and mucous membranes. This session took place at the bedside and took about one hour.

Powerpoint presentation using a personal computer was used as a visual aid to clarify the presented knowledge. During and after the presentation, the researchers encouraged the active participation of the pregnant woman by asking questions and receiving feedback. After the completion of the session Arabic brochure containing brief information given during that session was distributed.

Follow-up phase: This phase took place one week and then three weeks after the implementation phase to assess the three primary outcomes: severity of nausea and vomiting, signs and symptoms of dehydration, the length of hospital stay, and readmission frequency. This follow-up was done for the study and the control group to examine the effect of the program. The researchers conducted a face-to-face interview if the woman is still hospitalized and a telephone interview if the pregnant woman was discharged from the hospital.

4.6. Data analysis

Statistical Package for Social Science (SPSS), version 20 was used for the statistical analysis of the data. Collected data were organized, coded, and entered into a personal computer. The arithmetic mean was used to describe the central tendency of observations for some variables, standard deviation as a measure of the dispersion of results around the mean, and frequency distribution was used for each qualitative variable. Comparison of categorical variables was made using the chi-square (X^2) test. P values less than or equal to 0.05 were considered statistically significant.

5. Results

As shown in table 1, 56% of the study group's age ranged between 18-<25 years, compared to 52.00% of the control group. Concerning the place of residence, 52.00% of the study group were lived in urban areas compared to 60.00% of the control group. Concerning education, 40.00% of the study group completed their secondary education compared to 48.00% of the control group. Regarding occupation, 80.00% of the study group are housewives compared to 88.00% of the control group. Concerning BMI, the majority of both groups have normal body weight 88.00% and 96.00% of the study and control group, respectively. There is no statistically significant difference between the study and control group regarding all sociodemographic data.

Concerning obstetric history, table 2 shows that 56.00% of the study group and 52.00% of the control group are gravida 2. Regarding parity, 40.00% of the study group are nulliparous women compared to 48.00%of the control group. Only 12.00% of the study group experiences complications during their previous pregnancies compared to 8.00% of the control group. Furthermore, there is no statistically significant difference between the study and control group concerning their obstetric history.

About gestational age, figure 1 reveals that 36.00% of the study group are pregnant in 12 weeks of gestation compared to 32.00% of the control group, and 32% of the study group compared to 38% are in the 14th week of gestation.

As shown in table 3 at baseline assessment, no one in the study and control groups had mild nausea and vomiting. Besides, 56.00% of the study group have severe nausea and vomiting compared to 52.00% of the control group, with no statistically significant difference between both groups (p= 0.776). While at a one-week post-program, 44.00% of the study group have severe nausea and vomiting compared to 48.00% of the control group with a non-statistically significant difference between both groups (p= 0.466). At three weeks post-program, no one of the study group had severe nausea and vomiting, compared to 16.00% of the control group with a statistically significant difference between the study and control group regarding the severity of nausea and vomiting (p=0.044).

Table 4 shows that at baseline assessment, the most common signs and symptoms of dehydration are thirsts and dry skin experienced by 60.00% and 56.00%, respectively of the study group compared to thirst and dry mucous membrane, which occurred at 68.00% and 56.00% respectively of the control group. At a one-week post-program assessment, the most common signs and symptoms of dehydration are dry skin and thirst experienced by 20.00% and 16.00%, respectively of the study group compared to dry skin and dry skin mucous membrane which experienced by 32.00% and 28.00% respectively of the control group.

Table 4 reveals that the most common signs and symptoms of dehydration at three-week post-program assessment are thirsts and dry mucous membrane thirsts, which experienced by 24.00% and 20.00% respectively of the study group compared to 36.00% and 40.00% of the control group. Moreover, there is no statistically significant difference between the study and control group regarding any signs and symptoms of dehydration at baseline and subsequent assessment.

Regarding hospitalization, table 5 shows that the mean ± SD of hospital stay length is 4.5 ±1.3 for the study group compared to 5.2 ±1.7 for the control group. There is A statistically significant difference between the study and control group regarding the length of hospital stay (P = 0.041). Concerning hospital readmission, 24.00% of the study group are readmitted than 52.00% of the control group. There is a statistically significant difference between the study and control group regarding total hospital readmission (P = 0.029).

Table (1): Frequency and percentage distribution of pregnant women according to their sociodemographic characteristics.

Variable	Study group [n=25]		Control group [n=25]		X^2	p
	Freq.	%	Freq.	%		
Age category in years						
18-<25 yrs.	14	56.00	13	52.00		
≥25 yrs.	11	44.00	12	48.00	0.081	0.776
Place of residence						
Urban area	13	52.00	15	60.00		
Rural area	12	48.00	10	40.00	0.325	0.659
Education						
Read and write	3	12.00	2	8.00		
Preparatory level	5	20.00	3	12.00		
Secondary level	10	40.00	12	48.00		
University level	7	28.00	8	32.00	0.948	0.814
Occupation						
Housewife	20	80.00	22	88.00		
Working	5	20.00	3	12.00	0.595	0.440
Body mass index (BMI)						
Underweight	2	8.00	1	4.00		
Normal body weight	22	88.00	24	96.00		
Overweight	1	4.00	0	0	1.420	0.492

Table (2): Frequency and percentage distribution of pregnant women according to their obstetric history.

Variable	Study group n=25		Control group n=25		X^2	P
	Freq.	%	Freq.	%		
Gravidity						
1	8	32.00	10	40.00		
2	14	56.00	13	52.00		
≥3	3	12.00	2	8.00	0.459	0.795
Parity						
Nullipara	10	40.00	12	48.00		
1-2	12	48.00	11	44.00		
≥3	3	12.00	2	8.00	0.425	0.809
Complications during previous pregnancies						
Yes	3	12.00	2	8.00		
No	22	88.00	23	12.00	0.222	0.638
Type of complications						
Preterm labor	1	4.00	0	00		
Abortion	2	8.00	1	4.00		
Hyperemesis Gravidarum	0	0	1	4.00	2.222	0.329

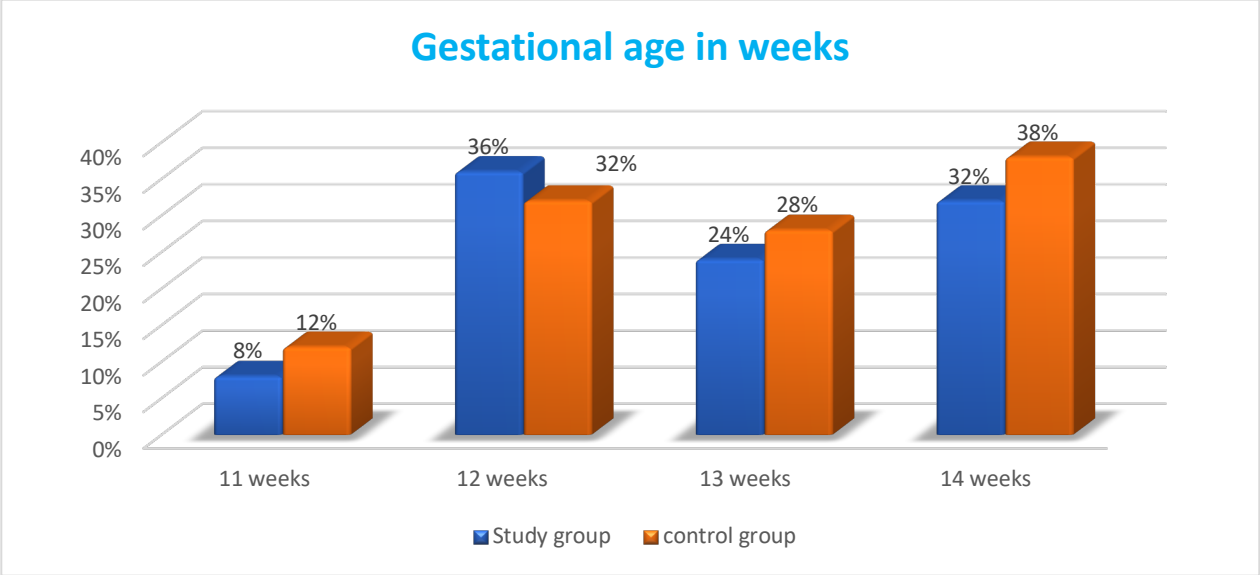

Figure (1): Percentage distribution of pregnant women according to their gestational age in weeks

Table (3): Comparison between study and control group according to the severity of nausea and vomiting.

Timing	Severity	Study group n=25		Control group n=25		X^2	P-value
		Freq.	%	Freq.	%		
Baseline (pre-program)	Mild	00	00	00	00		
	Moderate	11	44.00	12	48.00		
	Severe	14	56.00	13	52.00	0.081	0.776
One-week post-program	Mild	5	20.00	2	8.00		
	Moderate	9	36.00	11	44.00		
	Severe	11	44.00	12	48.00	1.529	0.466
Three-weeks post-program	Mild	17	68.00	11	44.00		
	Moderate	8	32.00	10	40.00		
	Severe	00	00	4	16.00	5.508	0.044

Table (4): Comparison between study and control group according to signs and symptoms of dehydration.

Timing	Variable	Study group n=25				Control group n=25				X^2	P-value
		Yes		No		Yes		No			
		Freq.	%	Freq.	%	Freq.	%	Freq.	%		
Baseline pre-program	Thirst	15	60.00	10	40.00	17	68.00	8	32.00	0.347	0.556
	Dry mucous membrane	13	52.00	12	48.00	14	56.00	11	44.00	0.081	0.776
	Dry skin	14	56.00	11	44.00	12	48.00	13	52.00	0.321	0.571
	Tachycardia	5	20.00	20	80.00	6	24.00	19	76.00	0.117	0.732
	hypotension	7	28.00	18	72.00	5	20.00	20	80.00	0.439	0.508
One-week post-program	Thirst	4	16.00	21	84.00	5	20.00	20	80.00	0.136	0.712
	Dry mucous membrane	3	12.00	22	88.00	7	28.00	18	72.00	2.000	0.157
	Dry skin	5	20.00	20	80.00	8	32.00	17	68.00	0.936	0.333
	Tachycardia	3	12.00	22	88.00	6	24.00	19	76.00	1.220	0.269
	hypotension	1	4.00	24	96.00	1	4.00	24	96.00	0	1.000
Three- weeks post-program	Thirst	6	24.00	19	76.00	9	36.00	16	64.00	0.857	0.355
	Dry mucous membrane	5	20.00	20	80.00	10	40.00	15	60.00	2.381	0.123
	Dry skin	3	12.00	22	88.00	7	28.00	18	72.00	2.000	0.157
	Tachycardia	4	16.00	21	84.00	6	24.00	19	76.00	0.500	0.479
	hypotension	3	12.00	22	88.00	5	20.00	20	80.00	0.595	0.440

Table (5): Comparison between study and control group regarding the length of hospital stay and frequency of readmission.

Variable	Study group n=25		Control group n=25		X^2	P-value
	Freq.	%	Freq.	%		
Length of hospital stay in days						
3 to 4	13	52.00	10	40.00		
5 to 6	11	44.00	9	36.00		
More than 6	1	4.00	6	24.00	5.163	0.041
Mean ± SD	4.5 ±1.3		5.2 ±1.7			
Readmission frequency						
One time	6	24.00	9	36.00	2.338	0.126
Two times	00	00	4	16.00		
Total	6	24.00	13	52.00	6.338	0.029

6. Discussion

Hyperemesis gravidarum is a harmful condition associated with serious physical and psychological complications that affect pregnant woman's health**.** This study aimed to examine the effect of a tailored patient education program on the outcomes of pregnant women with hyperemesis gravidarum. The following research hypotheses were formulated and tested to achieve this aim: H.1. Pregnant women with hyperemesis gravidarum who received tailored patient education program will exhibit less severe nausea and vomiting than the controls; H.2. Pregnant women with hyperemesis gravidarum who received tailored patient education program will exhibit fewer signs and symptoms of dehydration compared to the controls; H.3. Pregnant women with hyperemesis gravidarum who received tailored patient education program will have shorter hospitalization and fewer readmission rates than the controls. So, a discussion of the findings will be presented in order to scrutinize these hypotheses.

Concerning the severity of NVP, findings of the current study reveal that at baseline assessment, no one in the study or the control group has mild NVP. More than half of the women in the study and control groups had severe nausea and vomiting, with a non-significant difference between both groups. This finding could be explained by women who suffer mild NVP usually does not seek medical help, and if so, they usually treated at home. This finding is in agreement with the finding of *Fletcher et al. (2015),* who reported a mean PUQE score of 8.4, which means moderate NVP.

The current study also reveals that the severity of NVP decreased after implementation of the program, and more improvement occurred in the study group compared to the control group. At a one-week post-program, the severity of NVP decreased to become around two-fifths for the study group, and about one-half for the control group had severe NVP, but it did not reach the significant level. While at three weeks post-program, no one of the study groups had severe nausea and vomiting than about one-fifth of the control group, with a statistically significant difference between both groups (P = 0.044). These findings mean that the current tailored educational program needs more time to be effective. These findings are congruent with *Hassan et al. 's (2019)* findings. They carried out a study to assess the effect of nutritional guidelines on pregnant women with HG health status outcomes and reported that no one of their samples has severe NVP after two weeks of intervention. As well, these finding supported by *Farg and Hassan (2019),* who evaluated the effect of an educational program on the severity of symptoms and women's knowledge about HG and appropriate management of this condition and reported that no one of the study group has severe NVP compared two two-fifth of the control group after implementation of the program. These findings are supporting the first research sub-hypothesis.

The current study findings showed that there is a decrease in the percentage of women experienced signs and symptoms of dehydration either between the baseline and subsequent post-program assessment or between study and control group throughout the three phases of assessment. However, these differences were not statistically significant. A small sample size in the current study may explain this finding where the rule of sampling declared that when the effect size is small, a larger sample is needed to be apparent. Another explanation of this result may be the noncompliance of some pregnant women to the current program that cannot be assured in the current study and consider one of the study limitations.

For example, at baseline assessment, the most common signs and symptoms of dehydration are thirsts, which is experienced by about three-fifths of the study group compared to more than two-thirds of the control group. At three-weeks post-program assessment, thirst was experienced by more than one-fifth of the study group compared to more than one-third of the control group. However, the difference is not statistically significant (P = 0.355). These results disagreed with the results of *Anwar et al. (2019)*. They conducted a study to implement guideline for the management of hyperemesis gravidarum and reported a highly statistically significant difference between before and after implementation of the guideline among the studied sample regarding all signs and symptoms of dehydration (P<0.001). These findings are not supporting the second research sub-hypothesis.

Regarding hospitalization, the current study showed that there is a statistically significant difference between the study and control group about the length of hospital stay (P = 0.041). Furthermore, about one-quarter of the study group are readmitted to hospitals compared to more than one-half of the control group. There is a statistically significant difference between the study and control group about the frequency of hospital readmission (P = 0.029). This finding is a logic finding and may be explained by the positive effect of the current program on decreasing the severity of nausea and vomiting in the study group and, therefore, decreasing the length of hospitalization.

These findings are in line with *Fletcher et al. (2015) 's findings,* who reported that the average number of days in the hospital for the intervention group was significantly lower, 4.97, compared with 6.14 in the control group. On the other hand, they declared that the average number of admissions was not significantly different between the intervention and control groups. These findings are supporting the third research sub-hypothesis.

7. Conclusion

The study concluded that there was a statistically significant difference between study and control group regarding the severity of nausea and vomiting only at three-weeks post-program assessment ($p<0.044$), so that H.1: Pregnant women with hyperemesis gravidarum who received tailored patient education program will exhibit less severe nausea and vomiting compared to the controls was accepted.

Concerning, signs and symptoms of dehydration there was no statistically significant difference between study and control group regarding any signs and symptoms of dehydration at all times of assessment so, H.2: Pregnant women with hyperemesis gravidarum who received tailored patient education program will exhibit fewer signs and symptoms of dehydration compared to the controls was rejected.

There was a statistically significant difference between study and control group regarding the length of hospital stay (P = 0.041) and hospital readmission (P = 0.029) and therefore, H.3: Pregnant women with hyperemesis gravidarum who received tailored patient education program will have shorter hospitalization and fewer readmission rate compared to the controls was accepted. These findings are suggesting the effectiveness of the tailored education program in improving pregnant women with HG outcomes.

8. Recommendations

Based on the findings of this study, the following are recommended:

- Replication of this study on a larger probability sample at different settings is necessary to generalize the results.
- The pregnant woman should be equipped with health information related to HG through conducting such a health education program during their routine antenatal care.
- Increase awareness of pregnant women about HG's hazards and the importance of prompt medical care-seeking to avoid complications.
- Simple Arabic brochures or pamphlets should be available in maternity care units for the high-risk group and should contain updated evidence-based guidelines for nursing management and preventive measures of hyperemesis gravidarum.

9. References

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