



Effectiveness of Jacobson's and Benson's Relaxation Techniques on Severity of Nausea and Vomiting during Pregnancy

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ABSTRACT

Background: Nausea and vomiting during pregnancy can have a profound effect on the quality of life and social performance of pregnant women. **The aim of this study was to:** Determine the effectiveness of Jacobson's and Benson's relaxation techniques on severity of nausea and vomiting during pregnancy. **Subjects and Method:** A quasi-experimental research design was utilized to conduct this study on 100 primigravida women. The study was conducted at the antenatal out-patient clinics of Tanta University Hospitals, El-Menshawey General Hospital and Three Maternal and Child Health Centers at Tanta city, Egypt. **Three tools were used: Tool (I):** Pregnant women's knowledge regarding nausea and vomiting during pregnancy assessment sheet, **Tool (II):** Modified 24-hour Pregnancy-Unique Quantification of Emesis (PUQE) & **Tool (III):** Visual Analog Maternal Satisfaction Scale. **Results:** The total severity of nausea and vomiting according to (PUQE) index was significantly decreased from moderate among (80% & 78% respectively) of the studied pregnant women of both Jacobson's and Benson's groups before interventions to mild among (54% & 52% respectively) of them one week post intervention. As well as, (80% & 78% respectively) of the studied pregnant women were highly satisfied with Jacobson's and Benson's relaxation techniques without statistically significant differences between the two groups ($P= 0.207$). **Conclusion:** The severity of nausea and vomiting was significantly reduced among the studied primigravida women after the application of Jacobson's and Benson's relaxation techniques with higher satisfaction among both groups. **Recommendations:** Jacobson's and Benson's relaxation techniques should be integrated into the management of nausea and vomiting during pregnancy.

Keywords: Jacobson, Benson, Nausea and Vomiting, Pregnancy.

Introduction

Pregnancy is the most pleasant and a potentially stressful experience in a woman's life that needs unique and special attention from the moment of conception to the puerperium

(Mohammed, et al., 2022; Panuccio et al., 2022).

It is marked by significant physiological and psychological changes that may negatively impact the pregnant woman's quality of life even in healthy pregnancies (Thatal et al., 2020; Parmar

& Tiwari 2021; Gomes et al., 2018). These changes result in symptoms known as minor ailments or discomforts such as nausea, vomiting, constipation, and heartburn. However, if these minor discomforts are not early diagnosed and properly managed, they may exacerbate and develop into more serious complications (Devkate et al., 2022).

Nausea and vomiting typically occur early in pregnancy at the first trimester between 4th – 7th weeks, reaching their peak at 8th and 12th week and continue until 16-20 weeks (Bottone-Post, 2022; Soliman et al., 2023; Irawan et al., 2024). Although the exact cause of nausea and vomiting during pregnancy are still unknown. However, the alteration of hormones production during pregnancy may be a factor. These hormones include; human chorionic gonadotropin, progesterone, estrogen, placental prostaglandin E2 and the thyroid-stimulating hormone (Beyazit & Sahin 2018). In addition, women's psychological condition -such as; eating and neurotic disorders, pregnancy rejection or unintended pregnancy, fear, anxiety and emotional strains associated with low income or marital conflicts- is considered to be a very influential factor in causing pregnancy related nausea and vomiting (Fateme et al., 2019; Beyazit & Sahin 2018; Shakiba et al., 2019). Worldwide, pregnant women will experience varying intensity of nausea and vomiting ranged from mild to highly severe, which may differ from one pregnant woman to another and even between the same woman's pregnancies (Zhu et al., 2023; Smith, 2022; Beyazit & Sahin 2018).

Generally, nausea and vomiting are not linked with a higher incidence of adverse pregnancy outcomes. Yet, they have a significant negative impact on women's daily lives and affect their ability to function in social, professional, and household contexts (Mohammed et al., 2022; Bottone-Post, 2022; Fateme et al., 2019). Moreover, severe cases of nausea and vomiting during pregnancy may lead to electrolyte disorder, dehydration, acid–base imbalance, weight loss and even a diagnosis of pathological hyperemesis gravidarum that necessitates hospitalization (Smith, 2022; Beyazit & Sahin 2018). Therefore, a variety of interventions have been used in the management of nausea and vomiting related to pregnancy. These include; conservative management as dietary and/ or lifestyle changes; supportive therapy as fluid replacement and/or anti-emetics drugs; complementary and non-pharmacological methods such as acupressure, acupuncture and relaxation techniques (Anggraini et al., 2021; Abbasi et al., 2022; Lu et al., 2021; Ibrahim et al., 2020; Mady et al., 2019; Hu et al., 2024).

Relaxation techniques are simple, most effective, inexpensive and non-invasive methods that connect the mind and the body. In addition, these methods have no side effects, reduce the need for anti-emetic drugs and save the cost of hospitalization. Moreover, pregnant women can independently carry out them as self-care strategies (Jadidi et al., 2021 & Fateme et al., 2019). Muscular relaxation techniques are anticipated to decrease the intensity of pregnancy-related nausea

and vomiting, anxiety, stress, fatigue, and sleep difficulties. Because, they can lower maternal blood pressure, heart rate and the activity of the sympathetic nervous system as well as increase the vasovagal blood flow (**Mansour & Saadoon, 2022 & Jadidi et al., 2021**).

Jacobson's Progressive Muscle Relaxation (JPMR) technique is one of the relaxing strategies that improves the pregnant women's quality of life and reduces nausea and vomiting (**Mohammed et al., 2022; Aswitami, et al., 2021; Lamadah et al., 2021**). It was first identified by Edmund Jacobson in 1920 and known as progressive muscle relaxation. Jacobson's relaxation technique is known as a deep relaxation technique based on the idea that physical relaxation is linked to mental calmness. It's involving a systemic consecutive contraction of the muscles for 5-7 seconds and then relaxation for 10-12 seconds. This creates a deep relaxation state alleviating muscle tension mentally and physically (**Sahu et al., 2023**).

Furthermore, Benson's Relaxation Technique (BRT) is another best effective muscular relaxation technique which was developed by Herbert Benson (1975). This technique is a type of meditation practice that focuses on the complete deep relaxation of the central nervous system and muscles followed by regulated paced breathing. It is a quite and total relaxation state of all muscles from the head to the legs with closing eyes to suppress the sensation of tension (**Mansour & Saadoon, 2022; Belchamber, 2021; Hidayati et al., 2019**). Given the simplicity and ease of learning and application of Jacobson's and

Benson's relaxation techniques, it is crucial to educate primigravida women about these methods for effectively managing nausea and vomiting during pregnancy.

Significance of the study:

A highly significant proportion of primigravida women more than 80% complain from nausea and vomiting of pregnancy. (**Wang et al., 2020; Putri et al., 2020**). Despite the fact that nausea and vomiting during pregnancy is not a life-threatening condition, it can be distressing and have a profound effect on the quality of life for both pregnant woman and their families. (**Fateme et al., 2019; Boelig et al., 2018; Gadsby et al., 2021**) The unpleasant sensation of nausea and vomiting during pregnancy can be the source of considerable distress, discomfort, irritability, anxiety, sleep disorders and temporary disability even when the symptoms are not very severe. Therefore, integrating stress-reduction methods as Jacobson and Benson relaxation techniques in educating pregnant women particularly primigravida could be effective in controlling nausea and vomiting (**Shakiba et al., 2019**). So, this study was conducted to determine the effectiveness of Jacobson's and Benson's relaxation techniques on severity of nausea and vomiting during pregnancy.

I. Aim of the study:

The aim of this study was to:

Determine the effectiveness of Jacobson's and Benson's relaxation techniques on severity of nausea and vomiting during pregnancy.

Research hypothesis:

- Severity of nausea and vomiting during pregnancy may be reduced after the application of Jacobson's relaxation technique.
- Severity of nausea and vomiting during pregnancy may be reduced after the application of Benson's relaxation technique.
- Pregnant women who practising Jacobson's relaxation technique would be satisfied with the technique.
- Pregnant women who practising Benson's relaxation technique would be satisfied with the technique.

III. Subjects and Method:

Research Design: A quasi-experimental research design was utilized to conduct this study.

Setting: The study was conducted at the antenatal out-patient clinics of the following settings.

- Two main health sectors at Tanta city:

1. Tanta University Hospitals affiliated to the Ministry of Higher Education and Scientific Research.

2. El-Menshawey General Hospital affiliated to the Ministry of Health and Population.

- **Three Maternal and Child Health (MCH) Centers** which were randomly selected from all MCH centers in Tanta city included:

1. Tanta rabae at Kohafa.
2. Tanta Khames at El-agizy.
3. Medical center at Segar.

- Each of the previously mentioned ante-natal clinics provide diagnostic and therapeutic services to pregnant women all over the week except Friday, from 9 a.m. to 1 p.m. The clinic consists of reception area, waiting hall, examination and ultrasound rooms. Also it contains lecture hall equipped with a number of seats, computer and data show device whereas the researchers interviewed the pregnant women to conduct this study.

Subjects: A purposive sample of 100 pregnant women were selected from the previously mentioned settings according to the number of women's attending at each setting:

Name of the Health Setting	Average Number of Women's Attending Within the Last 3 Months	Number of Selected Pregnant Women
Tanta University Hospitals	110	32
El-Menshawey General Hospital	100	30
Tanta rabe at Kohafa	60	16
Tanta Khames at El-agizy	40	10
Medical center at Segar	50	12
Total	360	100

- **The study sample was selected according to the following inclusion criteria:** Primigravida women who suffering from nausea & vomiting during the 1st trimester,

aged from 18-35 years with gestational age ranged from 5-10 weeks, had singleton pregnancy, free from any medical or obstetrical disorders and willing to participate

in the study.

- **Sample calculation:** The sample size and power analysis was calculated using Epi-Info 7 software statistical package created by World Health Organization and center for Disease Control and Prevention, Atlanta, Georgia, USA version 2020. **The sample size was calculated according to the following formula:**

$$1. n = z^2 * p * (1 - p) / e^2$$

$$2. n \text{ (with finite population correction)} = [z^2 * p * (1 - p) / e^2] / [1 + (z^2 * p * (1 - p) / (e^2 * N))]$$

Where:

n is the sample size,

z is the z-score associated with a level of confidence,

- **The study sample was divided into two groups (Jacobson's and Benson's groups) according to the following flow chart:**

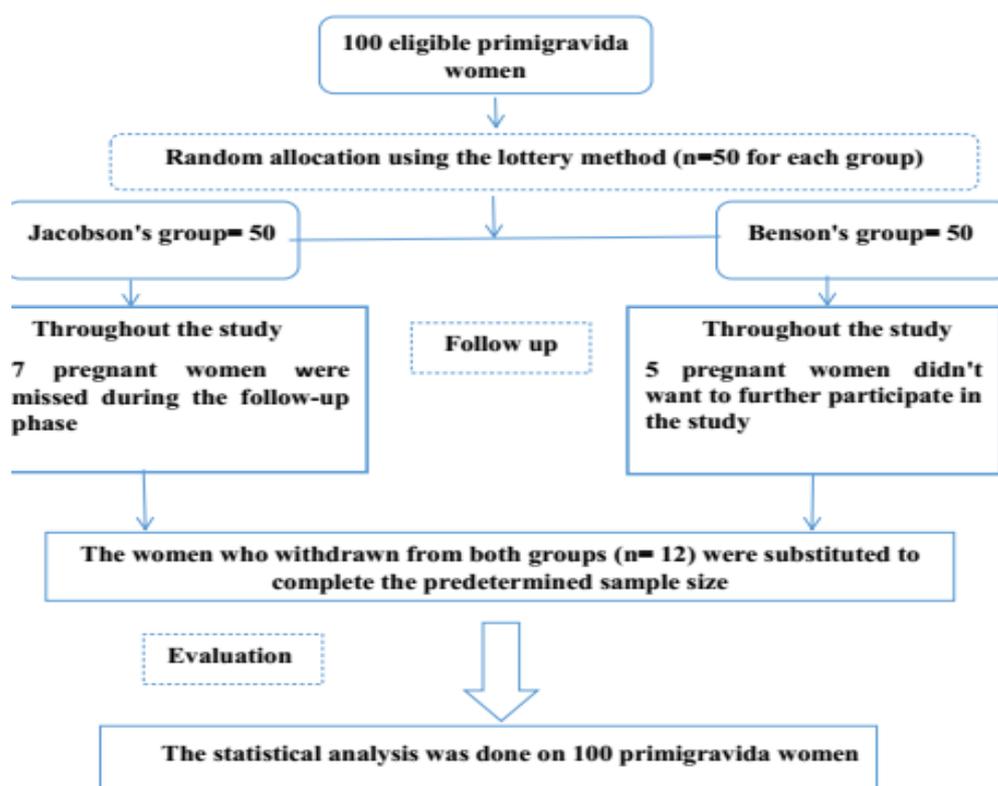


Figure 1: Flow chart of the study sample recruitment

p is the sample proportion, expressed as a decimal,

The sample size (n) is calculated according to the formula: $n = [z^2 * p * (1 - p) / e^2] / [1 + (z^2 * p * (1 - p) / (e^2 * N))]$

Where: z = 1.96 for a confidence level (α) of 95%, p = proportion (expressed as a decimal), N =

population size, e = margin of error.

z = 1.96, p = 0.1, N = 360, e = 0.05

$$n = [1.96^2 * 0.1 * (1 - 0.1) / 0.05^2] / [1 + (1.96^2 * 0.1 * (1 - 0.1) / (0.05^2 * 360))]$$

$$n = 138.2976 / 1.3842 = 99.914$$

$$n \approx 100$$

The sample size (with finite population correction) is equal to 100

Tools of data collection: Three tools were used to fulfill the aim of this study.

Tool (I): Pregnant women's knowledge regarding nausea and vomiting during pregnancy assessment sheet: The researchers were designed this tool after reviewing the most recent relevant literatures (Manderville 2019; Ricci et al., 2020; Cunningham et al., 2022). It was included two parts:

Part a: Socio-demographic characteristics of the pregnant women: This part was used to collect basic data including: age, residence, educational level, occupation, and gestational age.

Part b: Assessment of pregnant women's knowledge regarding nausea and vomiting during pregnancy: This part included; definition of nausea and vomiting during pregnancy, their causes, complications and management as well as the pregnant women's source of knowledge about nausea and vomiting during pregnancy.

The scoring system for the pregnant women's knowledge regarding nausea and vomiting was as follow:

- Correct and complete answer was given a score of (2).
- Correct and incomplete answer was given a score of (1).
- In-correct and/or don't know the answer was given a score of (0).

The total knowledge score was as follow:

- High level of knowledge $\geq 75\%$ of the total score.

- Moderate level of knowledge 50-<75% of the total score.
- Low level of knowledge <50% of the total score.

Tool (II): Modified 24-hour Pregnancy-Unique Quantification of Emesis (PUQE) score:

The PUQE is a validated, internationally widely used questionnaire that adopted from (Soliman et al., 2023). It was applied to assess and classify the severity of nausea and vomiting and categorize the studied women into three groups depending on the severity of their symptoms. The scale is consisted of four items; the number of hours of nausea, the number of episodes of retching, the number of episodes of vomiting and the most frequent time of vomiting and nausea within the last 24 hours. The score for each item of the scale was ranged from 1 to 5 points, then the PUQE score was calculated by adding the values of each category. This resulted in a total score ranged from 4 to 20 points.

The scoring system: Mild = ≤ 6 points, Moderate = 7-12 points, Sever = ≥ 13 points.

Tool III: Visual Analog Maternal Satisfaction Scale was adapted from (Singer & Thode 1998) to assess the studied women's satisfaction regarding Jacobson's and Benson's relaxation techniques, this scale consists of a 10 cm straight line ranging from 0 for un-satisfied to 10 for highly satisfied. Then, the pregnant women were asked to mark their level of satisfaction.

The scoring system:

- 0= Unsatisfied.
- 1-9 = Satisfied.

10= Highly satisfied.

Method

The study was conducted according to the following steps:

Administrative approval:

- Before beginning this study, an official permission was obtained from the responsible authority of the Faculty of Nursing, Tanta University after clarifying the purpose of the current study through official letters directed to the directors of the selected hospitals as well as MCH centers to obtain their cooperation and approval to conduct the study.

Ethical consideration:

- Approval of the Faculty Ethical Committee for Scientific Research was obtained for the fulfillment of the study, Approval code: 303-9-2023.
- The study participant's informed consent was obtained after clarifying the aim of the study. In addition, the nature of the study did not cause any harm and /or pain for the entire sample.
- The researchers ensured that confidentiality and privacy was maintained regarding the collected data as well as the participants' right to withdraw from the study at any time.

Tools development:

- **Tool I** was developed and utilized by the researchers after extensive reviewing of the most recent and current relevant literatures (**Manderville 2019; Ricci et al., 2020; Cunningham et al., 2022**).

- **Tool II** was adopted and **Tool III** was adapted then were used by the researchers in this study.

Validity and Reliability:

- **Tool I** was validated by a panel of five obstetrics and gynecological nursing experts to ascertain its relevance and completeness and the required modification was done.
- The face validity of **Tool I** was calculated based on experts' opinion after calculating content validity index (%) of its items and it was 93.5%.
- The reliability of **Tool I, Tool II and Tool III** was tested by using test-retest method by Cronbach's Alpha coefficient statistical test analysis which is used to measure the internal consistency, which was 0.878, 0.845 and 0.933 respectively. This demonstrates the highly internal consistency of the tools.

Pilot study:

- A pilot study was applied on 10% of the total sample {10 pregnant women (5 from each group)} after developing **Tool I** to ascertain its feasibility, applicability, relevance and content validity as well as to detect any problem that may be faced during the study. All the primigravida women of the pilot study were involved into the study sample as no changes in the **Tool I** was done.

Data collection:

- The data was collected over a period of three months from (September 4 to December 8, 2023).
- The researchers attended the previous mentioned settings for data collection 3

days/week (Sunday, Monday and Wednesday) until the predetermined sample size was collected.

- **The study was carried out through three phases including preparatory, implementation, and evaluation phase.**

I. Preparatory phase:

- It is the initial phase of the study where the researchers adequately reviewing the recent and related literatures about nausea and vomiting during pregnancy and the effectiveness of applying Jacobson's and Benson's relaxation techniques on their management using the available recent books and articles as well as internet resources to acquire more information about the various aspects of the study problem, then tools of data collection were developed and tested for validity & reliability.
- In addition, an instructional educational brochure was prepared to clarify the definition of nausea and vomiting during pregnancy, their causes, complications and management, plus the benefits and the steps of the selected relaxation technique either Jacobson or Benson technique.
- A variety of teaching methods were prepared included brain storming, group discussion power-point presentation, videos, demonstration and re-demonstration.
- Also, the researchers secured the presence of a well-prepared, quiet and private room at the study setting before the beginning of the study.

II. Implementation phase:

- In this phase, the researchers interviewed every primigravida woman individually; they greeted her respectfully with kindness to gain her cooperation and introduced themselves to each woman. The pregnant woman who fulfilled the inclusion criteria was selected.
- The pregnant women were allocated equally into Jacobson's and Benson's groups as follow; the researchers were prepared a container that included papers by names of the different relaxation techniques (Jacobson and Benson) and then each woman selected the type of the relaxation technique randomly.
- Then, the researchers clarified the purpose of the study to the selected pregnant woman individually and the needed time for collecting data as well as took her consent to participate in the study.
- The researchers collected the pregnant women's basic data including socio-demographic characteristics using **Tool I (part a)**, assessed the pregnant women's knowledge regarding nausea and vomiting during pregnancy using **Tool I (part b)** and assessed the severity of nausea and vomiting using **Tool II (pre-test)**. This interview had taken 10-15 minutes.
- The studied pregnant women of Jacobson's group and Benson's group were divided into ten subgroups each group consist from 4-6 primigravida women.

- **Two sessions** were given by the researcher for the pregnant women in both groups as follow:
- **The first session (theoretical session):** The aim of this session was to provide the pregnant women with basic knowledge about definition of nausea and vomiting during pregnancy, their causes, complications and management. In addition, providing them with knowledge about the benefits of the selected relaxation technique either Jacobson's or Benson's technique through using power-point presentation, brain storming & group discussion. This session lasted from 15 to 20 minutes
- **The second session (practical session)** this session focused on applying the steps of the selected relaxation technique either Jacobson's or Benson's technique through showing them videos as well as demonstration and re-demonstration. This session lasted from 25 to 35 minutes. The session included the following instructions:
 - At first, the researchers encouraged the pregnant woman to wear more comfortable clothes, empty her bladder and assume a comfortable position in a well-ventilated quite room. This helps to enhance the relaxation as much as possible before do the techniques at home.
 - Then, according to the group (Jacobson's group or Benson's group), the researchers explained the selected technique and became confident that each pregnant woman had adequately performed the practical training of Jacobson's or Benson's technique, after that the researchers asked them to re-demonstrate the technique step by step and re-explained any step if not understood well.
- **Jacobson's group:** The woman was instructed to focus their attention on the muscle group that is tense and then further tenses that muscle group and maintaining the tension for 5–7 seconds, and then relaxing the muscle group, as the muscles relax, the woman is asked to focus on the feelings associated with this relaxation and take break with a deep breath for 10 to 12 seconds apart.
- **Benson's group:** The researcher instructed the woman to assume a comfortable position, close her eyes, relax slowly all her muscles of the body from the lower legs, gradually relaxing towards the face and keep calm down. Breathe through nose and be aware of her own breath and slowly remove the breath from her mouth, and when exhaling, repeat the number 1 under her lips and breathe out comfortably.
- Both groups were also instructed to practice the selected technique (Jacobson's or Benson's relaxation technique) daily in early morning and in the evening (for 15-20 minutes) for one week.
- At the end of the sessions a colourful illustrated instructional educational brochure was distributed to each pregnant woman to be used as a guide to practice the technique efficiently.
- Furthermore, throughout the duration of the study, the researchers contacted with the women via telephone to follow up them,

answer any questions and ensure that they adequately practice Jacobson's or Benson's relaxation technique daily.

- **Evaluation phase:** this phase was done one week post-intervention through which the pregnant women's knowledge regarding nausea and vomiting were assessed using **Tool I (part b)**, the severity of nausea and vomiting was evaluated using **Tool II**, while, **Tool III** (Visual Analog Maternal Satisfaction Scale) was used to evaluate the pregnant women's satisfaction with Jacobson's or Benson's technique for relief of nausea and vomiting via telephone calls. Accordingly, the differences between Jacobson's and Benson's groups were compared to determine the effectiveness of using Jacobson's and Benson's relaxation techniques on the severity of nausea and vomiting during pregnancy among the study sample.

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 20, SPSS Inc. Chicago, IL, USA). For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, which describe a categorical set of data by frequency, percentage or proportion of each category, comparison between two groups and more was done using Chi-square test (χ^2). For comparison between more than two means of parametric data, F value of ANOVA test was

calculated. Significance was adopted at $p < 0.05$ for interpretation of results of tests of significance.

VI: Results:

Results of the current study presented into four main parts: **I.** Socio-demographic characteristics of the studied pregnant women; **II.** Knowledge of the studied pregnant women regarding nausea and vomiting during pregnancy; **III.** Effectiveness of Jacobson's & Benson's relaxation techniques on severity of nausea and vomiting during pregnancy; **IV.** The studied pregnant women's satisfaction regarding Jacobson's & Benson's relaxation techniques.

I. Socio-demographic characteristics of the studied pregnant women:

Table (1): Demonstrates the mean age of the studied pregnant women in both Jacobson's and Benson's groups respectively was (21.25 ± 0.76 and 22.56 ± 0.82) with more than half (54.0% and 52.0% respectively) of them were from rural areas. Concerning the educational level, it was recorded that nearly two fifths (40.0% and 36.0% respectively) of the studied pregnant women in both Jacobson's and Benson's groups had secondary education with nearly two thirds (68.0% and 66.0% respectively) of them were housewives. In addition, the mean gestational age was (7.66 ± 0.76 and 7.06 ± 0.73 respectively) among the Jacobson's and Benson's groups. It was obviously that there was no statistically significant difference between the two groups in relation to socio-demographic characteristics, confirming the homogeneity of the studied population among both groups.

II. Knowledge of the studied pregnant women regarding nausea and vomiting during pregnancy:

Table (2): Clarifies that nearly one tenth (10%, 12%, 10% & 14% and 8%, 12%, 10% & 12% respectively) of the studied pregnant women of Jacobson's and Benson's groups gave correct and complete answers regarding definition of nausea and vomiting, their causes, complications and management pre-intervention. While one week post intervention, there was a significant increase in the percent of correct and complete answers among the vast majority (96%, 98%, 98% & 96%) of the Jacobson's group compared with nearly most (92%, 84%, 88% & 90%) of the Benson's group. There was statistically significant difference within each group pre and post-intervention where ($P < 0.001^*$) in both groups.

Figure (2): Demonstrate that nearly half (45% and 50 % respectively) of the studied pregnant women in both Jacobson's and Benson's groups get their knowledge regarding nausea and vomiting from their mothers.

Figure (3): represents that nearly four fifth (84% & 80% respectively) of the studied pregnant women in both Jacobson's and Benson's groups had low level of knowledge regarding nausea and vomiting pre-intervention which significantly improved to high level among most (94% & 92% respectively) of them one week post intervention, with highly statistically significant differences within each group pre and post-intervention where ($P < 0.001^*$) in both groups.

III. Effectiveness of Jacobson's & Benson's relaxation techniques on severity of nausea and vomiting during pregnancy:

Table (3): Displays that there was a significant improvement in the total mean score of Modified 24-hour Pregnancy-Unique Qualification of Emesis (PUQE) among both Jacobson's & Benson's groups before and after intervention. Where the total mean score of PUQE was (12.19 ± 0.06 & 12.08 ± 0.66 respectively) among the Jacobson's & Benson's groups pre intervention, which reduced to (7.54 ± 1.06 & 8.54 ± 0.96 respectively) among both study groups one-week post-intervention, with highly statistically significant differences within each group pre and post-intervention where ($P < 0.001^{**}$) in both groups.

Figure (4): illustrates that nearly four fifth (80% & 78% respectively) of the studied pregnant women in both Jacobson's and Benson's groups had moderate nausea and vomiting before intervention. Meanwhile, after intervention, more than half (54% & 52% respectively) of both Jacobson's & Benson's groups had mild nausea and vomiting.

IV. The studied pregnant women's satisfaction regarding Jacobson's & Benson's relaxation techniques:

Figure (5): reveals that nearly four fifth (80% & 78% respectively) of the studied pregnant women in both Jacobson's and Benson's groups were highly satisfied with Jacobson's and Benson's relaxation techniques without statistically significant differences between the two groups ($P = 0.207$).

Table (1): Distribution of the studied pregnant women (Jacobson's and Benson's groups) according to their socio-demographic characteristics (n=100)

Variables	Jacobson's Group n=50		Benson's Group n=50		x ²	P
	No.	%	No.	%		
Age (Years)					1.207	0.547
• 18 - < 25	32	64.0	36	72.0		
• 25 - <30	18	36.0	13	26.0		
• 30 - 35	5	10.0	6	12.0		
Rang Mean±SD	19-35 21.25±0.76		18-35 22.56±0.82			
Residence					0.58	0.201
• Rural	27	54.0	26	52.0		
• Urban	23	46.0	24	48.0		
Education level					0.050	0.975
• Read and write	7	14.0	8	0.16		
• Primary/ Preparatory	11	22.0	10	0.20		
• Secondary	20	40.0	18	0.36		
• University/Higher	12	24.0	14	0.28		
Occupation					2.857	0.240
• Housewife	34	68.0	33	66.0		
• Worker/Employee	16	32.0	17	34.0		
Weeks of Gestation					4.068	0.131
• 5 - 7	23	46.0	22	0.44		
• 8 - 10	27	54.0	28	0.56		
Rang Mean±SD	6-10 7.66±0.76		5-10 7.06±0.73			

*Significant: P < 0.05

Table (2): Distribution of the studied pregnant women (Jacobson's and Benson's groups) in relation to their knowledge regarding nausea and vomiting during pregnancy pre and one-week post-intervention (n=100).

Knowledge items	Jacobson's Group n=50				Test of Sig. Q	p	Benson's Group n=50				Test of Sig. Q	P
	Pre intervention		post intervention				Pre intervention		post intervention			
	No.	%	No.	%			No.	%	No.	%		
Definition of nausea and vomiting												
Incorrect and did not know	42	84.0	0	0.0	63.931	<0.001*	43	86.0	0	0.0	51.905	<0.001*
Correct and incomplete answers	3	6.0	2	4.0			3	6.0	4	8.0		
Correct and complete answers	5	10.0	48	96.0			4	8.0	46	92.0		
Causes of nausea and vomiting												
Incorrect and did not know	44	88.0	1	2.0	74.569	<0.001*	44	88.0	8	16.0	47.580	<0.001*
Correct and incomplete	6	12.0	0	0.0			0	0.0	0	0.0		
Correct and complete answers	0	0.0	49	98.0			6	12.0	42	84.0		
Complications of nausea and vomiting												
Incorrect and did not know	41	82.0	0	0.0	76.532	<0.001*	42	84.0	0	0.0	9.250	0.010*
Correct and incomplete answers	5	10.0	1	2.0			3	6.0	6	12.0		
Correct and complete answers	4	8.0	49	98.0			5	10.0	44	88.0		
Management of nausea and vomiting												
Incorrect and did not know	36	72.0	0	0.0	80.897	<0.001*	39	78.0	2	4.0	49.914	<0.001*
Correct and incomplete answers	14	28.0	2	4.0			6	12.0	3	6.0		
Correct and complete answers	0	0.0	48	96.0			5	10.0	45	90.0		

Q: Cochran's test

p: p value for comparing pre and post-intervention

*: Statistically significant at p ≤ 0.05

Figure (2): Distribution of the studied pregnant women (Jacobson’s and Benson’s groups) according to their source of knowledge regarding nausea and vomiting during pregnancy (n=100)

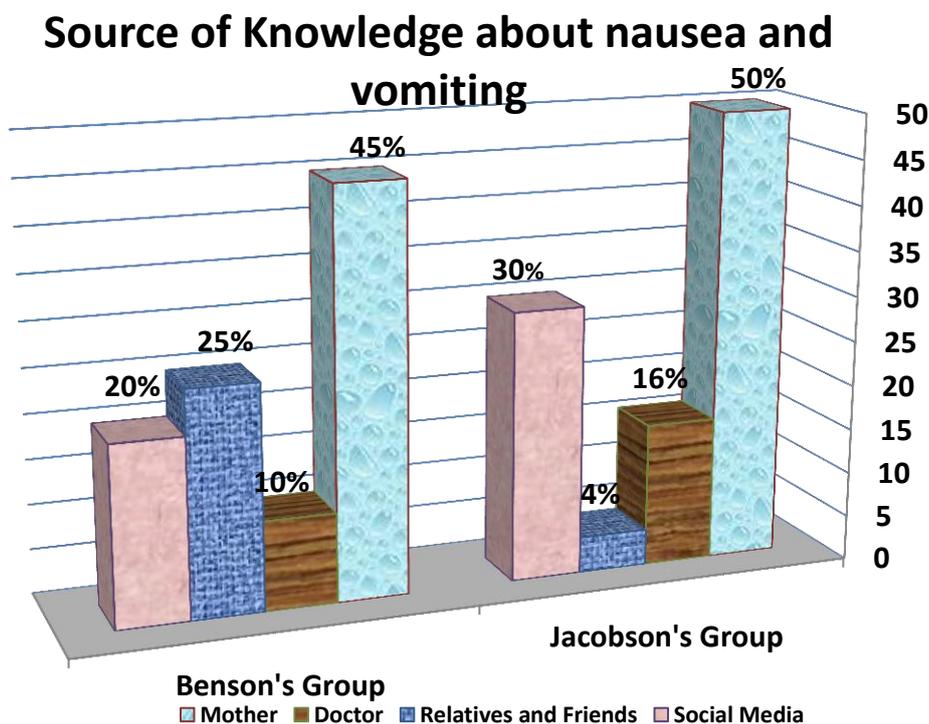
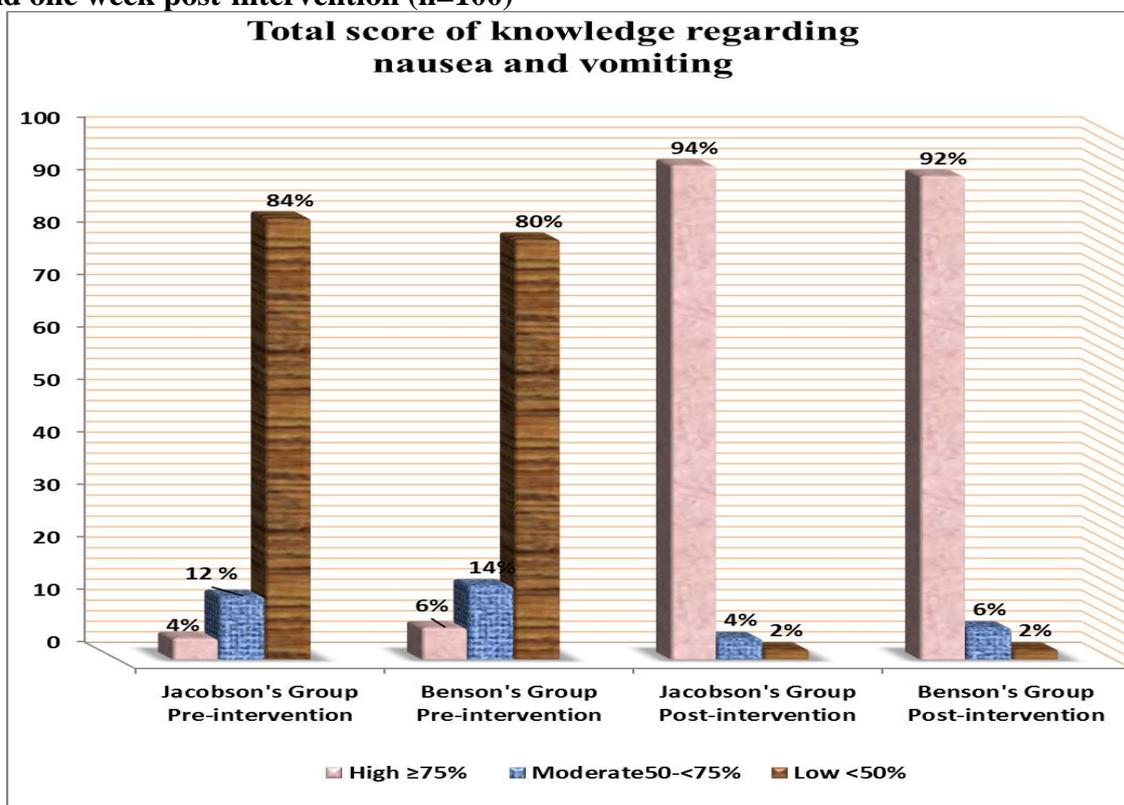


Figure (3): Distribution of the studied pregnant women (Jacobson’s and Benson’s groups) according to their total score level of knowledge regarding nausea and vomiting during pregnancy pre and one week post-intervention (n=100)



Significant test pre and post- intervention

$$\chi^2 = 50.850$$

P=< 0.001

Table (3): Mean scores of Modified 24-hour Pregnancy-Unique Qualification of Emesis (PUQE) of the studied pregnant women (Jacobson's & Benson's groups) pre and one-week post-intervention (n=100)

Modified 24-hour Pregnancy-Unique Qualification of Emesis (PUQE)		Jacobson's Group n=50	Benson's Group n=50	Independent t-test	P
		Mean±SD	Mean±SD		
Number of hours of nausea within the last 24 hours.	Pre- intervention	3.54±1.06	3.34±1.08	2.75	0.253
	Post- intervention	2.34±0.08	2.68±0.41	9.79	0.005**
Number of episodes of retching within the last 24 hours.	Pre- intervention	2.74±1.06	2.54±0.96	3.46	0.483
	Post- intervention	1.74±0.68	1.97±0.80	10.42	0.004*
Number of hours of vomiting within the last 24 hours.	Pre- intervention	2.54±0.36	2.04±0.06	7.06	0.116
	Post- intervention	1.19±0.41	1.81±0.63	12.43	0.002*
Most frequent time of vomiting and nausea within the last 24 hours.	Pre- intervention	3.52±1.06	3.04±1.01	4.70	0.095
	Post- intervention	2.71±0.40	2.84±0.94	10.04	0.004*
Total Score	Pre- intervention	12.19±0.06	12.08±0.66	1.176	0.555
	Post- intervention	7.54±1.06	8.54±0.96	11.31	0.003*
Significance test within the group total score pre and post-intervention		$\chi^2 = 26.69$ P=<0.001**	$\chi^2 = 14.75$ P=<0.001**		

p: p value for comparing pre and post-intervention

*: Statistically significant at $p \leq 0.05$

** : Highly statistically significant at $p \leq 0.001$

Figure (4): Distribution of the studied pregnant women (Jacobson's and Benson's groups) regarding to their total severity of nausea and vomiting according to (PUQE) index pre and one week post-intervention (n=100)

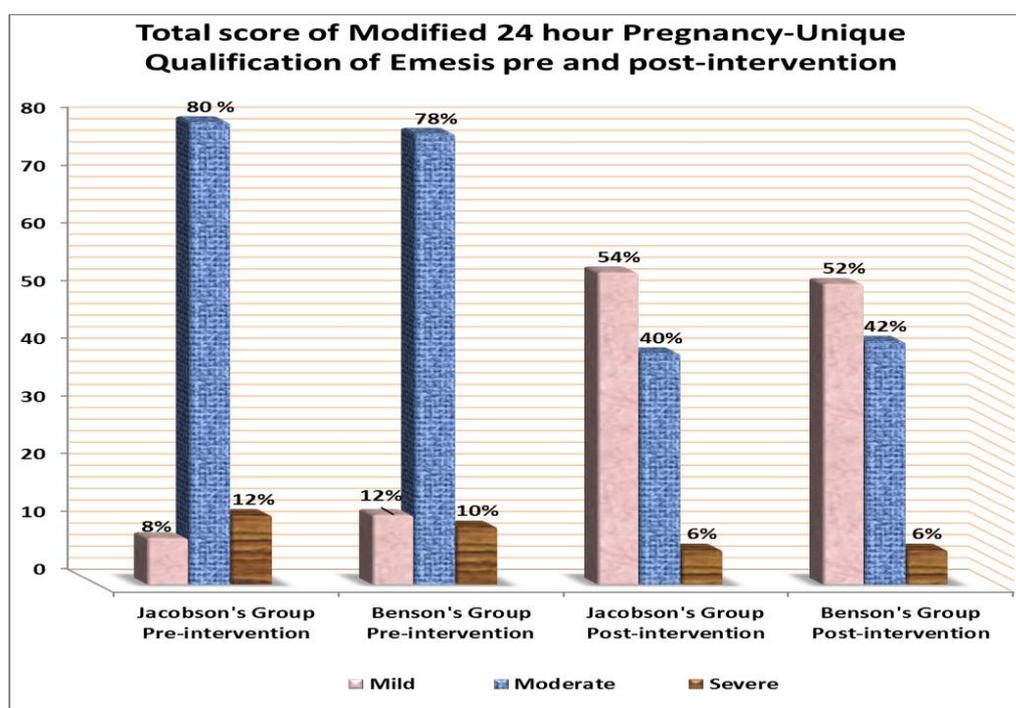
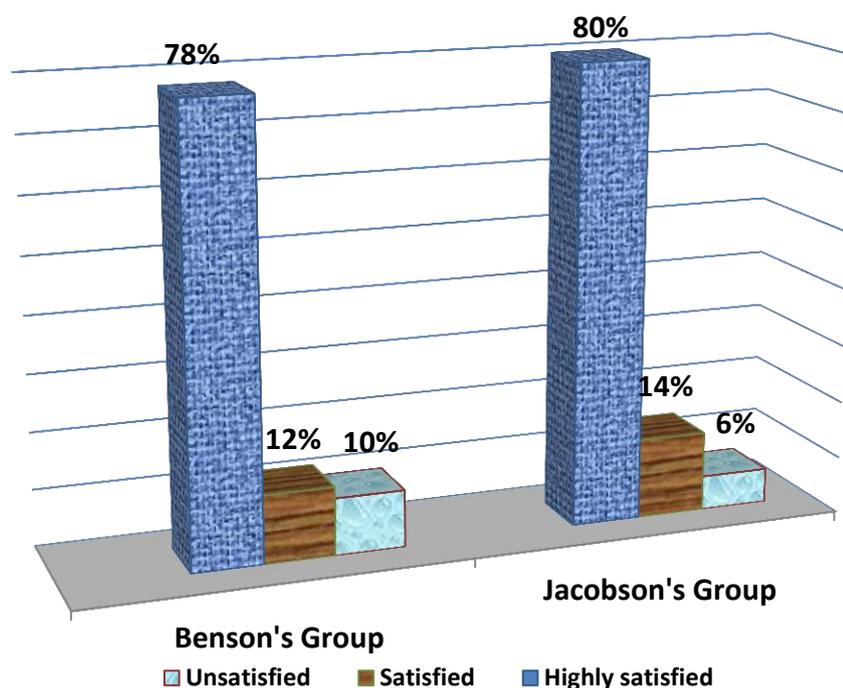


Figure (5): Total score level of the studied pregnant women's satisfaction regarding Jacobson's and Benson's techniques.

Women's satisfaction regarding Jacobson's and Benson's relaxation techniques



Significant test between two groups

$$\chi^2 = 3.15$$

$$P = 0.207$$

Discussion

Nausea and vomiting during pregnancy can negatively affect the mental health, quality of life, and functional capacity of primigravida women. Therefore, the present study aimed to determine the effectiveness of Jacobson's and Benson's relaxation techniques on severity of nausea and vomiting during pregnancy. The results of the current study illustrated that before the relaxation intervention i.e., Jacobson's and Benson's relaxation techniques, the severity of nausea and vomiting was moderate among nearly four fifth of the studied pregnant women in both Jacobson's and Benson' groups. While, this severity was decreased to be mild among more than half of them in both groups with higher satisfaction of the studied pregnant women with both Jacobson's and

Benson's relaxation techniques. This achieved the aim and the hypothesis of the current study.

In relation to **socio-demographic characteristics** of both Jacobson's and Benson's groups, the findings of the current study revealed that there was no statistically significant difference between the two groups regarding their personal characteristics which included (age, residence, educational level and occupation) as well as regarding their gestational weeks. The homogeneous between the two groups may be attributed to the choice of the sample using the purposeful random sampling. This could be advantageous for this study since it ensured the avoidance of the confounding variables' effect and generalization of the study outcomes.

Pregnancy-related nausea and vomiting are common health issues and minor disorders in the first trimester **Sharma et al., (2023)**. They aren't serious in themselves, but their presence can affect and decrease a woman's feeling of wellbeing and comfort. Pregnancy-related nausea and vomiting can be managed by proper education about lifestyle pattern modification and simple relaxation techniques **Hassan et al., (2020)**. Consequently, one of the important strategies in the care of pregnant women is to provide them with the basic knowledge about nausea and vomiting and educate them about how to overcome these specific problems (**Arun, 2020**). The results of the present study clarified that the majority of the studied pregnant women of both groups gave incorrect or didn't know the answers for definition of nausea and vomiting, their causes, complications and management. This was appeared on their total score level of knowledge regarding nausea and vomiting which was low among nearly four fifth of them before the intervention in both groups. These results may be due to the first experience of pregnancy. Also, the studied primigravida women weren't provided with enough and suitable information about pregnancy-related nausea and vomiting by health care providers. This was approved by the results of the present study which illustrated that nearly half of the studied pregnant women of both groups had their knowledge about nausea and vomiting from their mothers.

Meanwhile, there was a significant improvement in the total score level of the studied pregnant women's knowledge regarding nausea

and vomiting during pregnancy where most of them in both groups had high level of knowledge one week post – intervention. This was supported by **Hassan et al., (2020)** who studied "Impact of Tailored Educational Program on Primigravida Anxiety and Knowledge Regarding Minor Discomforts in Upper Egypt", they found that the majority of the participant women had poor total knowledge score regarding to minor discomforts of pregnancy including nausea and vomiting before the educational session. While after the program, there was a statistically improvement in the total knowledge score which became good among the majority of the studied primigravida. From the researchers' point of view, the improvement in the total score level of knowledge among the study sample in the current study may be attributed to the effect of the educational session as well as the motivation of mothers who are pregnant for the first time to know everything about their pregnancy. This clarification of the study results is proved by **Rahayuning & Sunarsih (2022)**, whose study was "Nausea and Vomiting Handling Behavior in terms of Parity and Level of Knowledge of First Trimester Pregnant Women in the Ngajum Health Center Work Area", who concluded that "The behaviour of pregnant women in the first trimester in handling nausea and vomiting is strongly influenced by the knowledge of pregnant women about nausea and vomiting and parity of pregnant women".

Concerning the severity of pregnancy related nausea and vomiting, the results of the present study revealed that the total severity of nausea and

vomiting according to (PUQE) index was significantly improved from moderate among nearly four fifth of the studied pregnant women of both groups before implementing the relaxation interventions (Jacobson's and Benson's relaxation techniques) to mild among more than half of them one week post intervention. These results may be contributed to the effect of both Jacobson's and Benson's relaxation techniques on reducing muscle tension, stress and anxiety which are related to the existence of nausea and vomiting, creating a state of calmness and relaxation

Consistence with these results **Shakiba et al., (2019)** whose study was to identify "The Effect of Psycho-Education Intervention Based on Relaxation Methods and Guided Imagery on Nausea and Vomiting of Pregnant Women", they cleared that "the psycho-education based on progressive muscle relaxation methods (PMR) had a positive and significant effect on reducing the intensity of Hyperemesis Gravidarum (HG) ". On the same line, **Mohammed et al., (2022)** who studied "Effect of Progressive Muscle Relaxation Exercise on the First Trimester Nausea among Primigravida Women", whose results showed that "there was a statistically significant decrease in nausea severity and frequency in the progressive muscle relaxation group compared to the control group".

In addition, **Fateme et al., (2019)** who conducted a study to determine "The effect of Benson's muscle relaxation technique on severity of pregnancy nausea ", their findings showed that "there was a significant reduction in the severity of

nausea among the study group compared to the control group "This was agreed with **Jadidi et al., (2021)** who studied "The effect of Benson's relaxation training on the severity of nausea and vomiting in pregnant women, they mentioned that the severity of nausea and vomiting was significantly lower in the intervention group than the control group and with statistically significant differences ($P < 0.001$)". Moreover, **Soliman et al., (2023)** whose research was "Effect of Benson's Relaxation Techniques on Nausea and Vomiting among Primigravida Women in The First Trimester of Pregnancy, they concluded that applying Benson's relaxation technique significantly decreasing nausea and vomiting during pregnancy.

Satisfaction of primigravida women regarding the used relaxation techniques is one of the important indicators of the quality of the care provided and represent the positive effect of these techniques **Ebrahimian et al., (2021)**. This was obviously appeared in the findings of the current study where nearly four fifth of the studied primigravida were highly satisfied with Jacobson's and Benson's relaxation techniques without statistically significant differences between the two groups ($P = 0.207$). This is in agreement with **Mohammed et al., (2022)** whose results proved the presence of higher satisfaction with progressive muscle relaxation technique as simple and convenient method for reliving of nausea among primigravida women. Also, **Soliman et al., (2023)** who declared that most women in the study group were satisfied with Benson's relaxation technique

application. The results of the present study may be related to the effectiveness of both Jacobson's and Benson's relaxation techniques in reducing the severity of nausea and vomiting among the studied primigravida women. In addition, the studied women reported that both techniques are easy to apply, take short period of time, require no preparation or equipment, have no cost, have no side effects on their pregnancy and safe for their fetuses. So, they favoured using this simple non-pharmacological methods rather pharmacological methods which potentially have side effects.

Conclusion:

The severity of nausea and vomiting was significantly reduced among the studied primigravida women after the application of Jacobson's and Benson's relaxation techniques with higher satisfaction among both groups.

Recommendations:

The current study recommend the following:

- Jacobson's and Benson's relaxation techniques should be integrated into the management of nausea and vomiting during pregnancy as simple and safe non-pharmacological method.
- Distribution of educational booklets or brochures for all pregnant women at all antenatal health sectors to enhance their knowledge and skills about the benefits and the steps of Jacobson's and Benson's relaxation techniques for reducing nausea and vomiting during pregnancy.
- Providing an in service training program periodically and regularly for maternity

nurses regarding the application of Jacobson's and Benson's relaxation techniques to educate pregnant women about pregnancy related nausea and vomiting.

- **Further research studies are** needed to investigate the effect of applying of Jacobson's and Benson's relaxation techniques on larger sample to generalize the study results.

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