

Effect of Ginger on Relieving Nausea and Vomiting During Pregnancy

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Abstract:

Background, Nausea and vomiting affect 50-90% of women in the first trimester of pregnancy. Ginger is one of non-pharmacologic methods can help women to cope with these symptoms of pregnancy.

Aim of the study, was to evaluate the effect of using ginger on relieving nausea and vomiting during pregnancy.

Design, a quasi-experimental design was adopted. **Setting**, MCH centers of Hai el-Salam and AL Shohadaa in Ismailia city. **Sample**, convenient sample of 80 pregnant women fulfilled the selection criteria were divided into 2 groups Ginger group and standard medical treatment (control group).

Tools of data collection, three tools were used; Structured Interview questionnaire, Visual Analogue Scale and Rhodes Index Scale.

Results, based on Visual Analogue Scale; pain related to nausea and vomiting decreased among studied pregnant women who receiving ginger than women in control group with statistical significant difference. According to the mean of the total Rhodes index score; the criteria of nausea and vomiting decreased significantly among women receiving ginger (12.63 ± 5.886) compared to control group (16.78 ± 7.694).

Conclusions, based on these findings; this study concluded that, ginger were effective in reducing nausea and vomiting during pregnancy compared to medical treatment standard.

Recommendation, involve applying ginger supplement as a method of management of nausea and vomiting during pregnancy at MCH centers.

Key wards: Ginger, nausea and vomiting during pregnancy.

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I. Introduction

Pregnancy is a normal, healthy condition and simultaneously the most common altered physiologic state to which human beings are subject to maternal systems which remodel to deliver substantial energy to the fetus and remove inappropriate waste products (Ward et al., 2016). Nausea during pregnancy is typically one of the most experienced and complained about symptoms that women report. About one in 4 pregnant women have only mild nausea. Three of every 10 pregnant women have nausea that is bad enough to interfere with their daily lives. Half of all pregnant women have both nausea and vomiting during the first months of pregnancy. Nausea and vomiting during pregnancy tends to be the worst at 8 to 10 weeks after last menstrual period (American College of Nurse-Midwives (ACNM), 2016). Nausea and vomiting not only is it known to be one of the early signs of pregnancy, but it is a symptom that is common throughout the first trimester, and sometimes even longer (The Society of Obstetricians and Gynecologists of Canada (SOGC), 2012).

Nausea is the unpleasant urge to vomit. Vomiting is the forceful ejection of stomach contents through the mouth. This is generally a protective mechanism to remove harmful ingested substances, but can occur from many unrelated infectious and inflammatory conditions in the body. Muscles in the abdominal wall contract vigorously to create the pressure necessary for vomiting (retching). Retching, also called 'dry heaving' can also occur without vomiting, or can precede or follow vomiting. Similarly, nausea can occur without vomiting or may precede vomiting. A few lucky women do not have nausea or vomiting during pregnancy (Porter & Gyawali, 2015).

The underlying etiology is unknown, but there are many theories explain nausea and vomiting during pregnancy. It may be a result of the physiological changes especially hormonal changes as Human chorionic gonadotrophin (HCG) which measured to diagnose pregnancy. Symptoms typically begin at around nine weeks'

gestation when concentrations are at their highest. Hyperemesis gravidarum is reported more often in women with high concentrations of HCG as those with multiple and molar pregnancies (Ward et al., 2016). Estrogen is another hormone that rises during early pregnancy and could contribute to HG by stimulating the production of nitric oxide via nitrogen oxidase synthetase, which in turn relaxes smooth muscle slowing gastric intestinal transit time and gastric emptying (Lee & Saha, 2011).

Progesterone has softening effect on the muscles in the body. It is thought it helps prevent preterm labor by affecting the uterine muscles and causes relaxation of involuntary muscle and thus dilatation of the blood vessels resulting in a fall in blood pressure. It is common for a fall in blood pressure to make people feel faint and occasionally nauseated, and this may be an additional factor. It also affects other muscles, such as the stomach and intestines. The progesterone relaxes the working of the whole digestive tract, which makes the elimination of bodily wastes slower, which can lead to a slow emptying of the stomach which leads to excess stomach acids (pillitteri, 2014; Nguyen et al., 2006).

A serious complication may be developed by persistent nausea and vomiting. Hyperemesis gravidarum is a more severe form of nausea and vomiting, which occur in 1% of pregnancy. It sometimes called persistent vomiting or pernicious. It is characterized by maternal weight loss greater than 5% of pre-pregnancy weight and ketonuria. A significant maternal weight loss may be associated with fetal intrauterine growth restriction (IUGR) and possible fetal anomalies or central nervous system malformation. If it is uncontrolled, fetal deaths can occur. In addition, the risk of preterm delivery is increased four times over that in a normal pregnancy. Dehydration and electrolyte imbalance and often requires hospitalization for intravenous rehydration (Taylor, 2014; Friedel, 2010; Baby center medical advisory board, 2009).

Management focuses on improving symptoms while minimizing risks to mother and fetus. Treatment modalities depend on the severity of the symptoms and range from non-pharmacological which include: dietary changes, intravenous fluid rehydration (including electrolytes, vitamins, and thiamin), pharmacologic treatment, and hospitalization (Gilboa et al., 2014). Ginger as a non pharmacological method. It has the advantage of the fresh root being widely available, and not being associated with significant side effects.

The exact mechanism of action of ginger in relation to its antiemetic properties is unclear, although it appears to inhibit serotonin receptors and to exert antiemetic effects at the level of the gastrointestinal system and the central nervous system. Ginger effectively reduced nausea, tachy-gastric activity, and vasopressin release induced by circularvection (Ming-Luen, 2011; Hudson, 2009).

Significance of the study

Nausea and vomiting of pregnancy (NVP) are the most common medical condition during gestation, affecting 50%-90% of women during their first trimester, and many in the second and third trimester. NVP affects women's quality of life and exerts a large economic impact on patients, caregivers and society. A highlight on the new modalities of non-pharmacological methods to relieve nausea and vomiting is one of nurses' roles to keep on pregnant woman healthy and without complication.

So; the nurse take a complete review which followed by a physical examination that includes formulation of appropriate nursing diagnoses as determine whether client is able to carry out usual activities or not, assess if client needs additional suggestions from team expert for dealing with nausea or not and assess whether client would like to try a complementary therapy, such as ginger to promote health for the pregnant women (Ward et al., 2016; Pillitteri, 2014).

Aim of the study

This study aimed to:-

The aim of the study is to evaluate the effect of using ginger on relieving nausea and vomiting during pregnancy.

Research hypothesis:

Using ginger is more effective for relieving nausea and vomiting compared to medical treatment standard during Pregnancy.

II. Subjects and Methods

Research design

A quasi-experimental design was adopted to achieve the stated aim (non- equivalent control group design).

Setting

The study was conducted at MCH centers (Hai el-Salam and AL Shohadaa) in Ismailia city.

Sample size

The sample size will be calculated according to the following equation (Kirby et al.,2002):

$$n = \frac{2(Z_{\alpha} + Z_{1-\beta})^2 \sigma^2}{\Delta^2}$$

n Sample size

Z_{α} Z_{α} , Z is a constant (set by convention according to the accepted α error and whether it is a one-sided or **two-sided effect**) at 1% = 2.5758

$Z_{1-\beta}$ $Z_{1-\beta}$, Z is a constant set by convention according to power of the study at 95% = 1.6449

Σ σ is the standard deviation (estimated)

Δ Δ the difference in effect of two interventions which is required (estimated effect size). 48% when using ginger, 13% for the placebo (**Saberi et al., 2014**). Thus, the effect size would be 35% (i.e., 0.35).

$$n = \frac{2(2.5758 + 1.6449)^2 (0.1)^2}{(0.35)^2} = 73$$

Calculating for a 10% drop-out rate one would need to complete approximately 80 pregnant women.

Type of sample:

A purposive sample of 80 pregnant women was recruited for this study. Forty studied pregnant women received ginger, other forty received medical treatment as (Navoproxine, Emetryx, Emeral, Vomistop) or health education as dietary modifications ,or psychological support according to women condition. The sample was selected based on **inclusion criteria:** women age 18-40 years; normal body mass index; singleton pregnancy; no history of treatment with other anti-emetic drugs within the last three weeks; suffering from nausea and/or mild to moderate vomiting or retching and gestational age up to 20 weeks' gestation. **Exclusion criteria:** high risk pregnancies as hyperemesis gravidarum; women who had acute medical disorders such as hepatitis, pyelonephritis, diabetic ketoacidosis, and food poisoning; Gastrointestinal diseases that might manifest with nausea and vomiting as acute appendicitis, acute cholecystitis, and peptic ulcer.

Tools of data collection

Three research tools were used to achieve the study aims.

I- Structured Interview Questionnaire that developed by the investigator and consists of two parts as the following:

Part 1: Included sociodemographic data as age, education level and occupation.

Part 2: Included past obstetrical history as: number of pregnancies, mode of delivery, and NV experiences.

II: Visual Analogue Scale: a 10-centimeter horizontal line with clearly defined boundaries with descriptive ranging from "no pain" to the "worst possible pain".

III: Rhodes Index Scale that include:

It is a reliable and valid and a patient self-report instrument to assess the objective and subjective factors of nausea, vomiting and retching in a separately scores nausea experience: duration of nausea, distress from nausea, frequency of nausea. Vomiting experience: frequency of vomiting, distress from vomiting, amount of vomiting each time. Retching experience: distress from retching, frequency of retching. Total experience: sum of nausea, vomiting and retching experiences (**Dass et al., 2015; Kim et al., 2007**).

Content validity

Tools were submitted to a panel of 5 experts; two experts in the field of Maternity Obstetrics and Gynecology Nursing and three experts in the field of Obstetrics and Gynecology medicine to test the content validity. Modifications were carried out according to the panel judgment on clarity of sentences and appropriateness of content.

Ethical considerations

Orally approval was obtained from the nulliparous women and informed about the nature, process, and expected outcomes of the study, Reassured that, the study was safe, assured them that information obtained was confidential and was used only for the purpose of the study and informed about her rights to withdraw at any time she want throughout the study.

Pilot study

Pilot study was carried out on 10 % of the sample (8 of nulliparous women) who were excluded from study sample in order to assess the feasibility and clarity of the tools and determine the needed time to answer the questions. The pilot study lasted for 1 month. Based on its result minimal changes were carried out.

Procedure

Data collected through a period of 8 months from beginning of June 2016 to the January 2017. Data were collected 3 days every week (Monday, Tuesday, Thursday) from Hai el-Salam, AL Shohadaa. The investigator started the study interventions with the ginger group first and, then control group. These data collected through five phases which are; preparatory; interviewing; assessment; implementation and evaluation phase.

Preparatory phase: the investigator bought ginger tablets that is produced by Arab Company for Pharmaceuticals & Medicinal Plants (MEPACO-MEDIFOOD). The tape contains 10 tablets of ginger each tablet has brown color, divided into two parts by imagine line contains fine powder of Ginger (400mg) with the brand named "Ginger as dietary supplement". The price of the tape is 2 pounds but is given free of charge to pregnant women participating in this study.



Figure (I): Ginger supplement
This figure was taken by the Investigator

2) Interviewing Phase: suitable pregnant women were asked to participate in the study according to selection criteria. After obtaining studied pregnant women agreement and at the medical examination room the investigator was interviewing them individually to collect data related to demographic & present obstetrical history. The investigator asked the questions in Arabic and recorded answers in the questionnaire. The interview took about 10 minutes for each studied pregnant woman.

3) Assessment Phase the investigator started to ask the studied pregnant women about the onset of nausea and vomiting and what are aggravated factors and measures that were followed to overcome nausea and vomiting. Also, assess the severity of pain using Visual Analogue Scale. Finally, the investigator used Rhodes index to assess nausea and vomiting for frequency, duration and intensity in addition to frequency and intensity of retching.

The investigator told the studied pregnant women that the intensity of pain was recorded (for Ginger or control group) twice daily for 4 sequence days after intervention using Visual analogue scale and Rhodes index scale. The studied pregnant women asked to mark on VAS (from point zero to point ten) the point where she felt it express her pain level. Assessment phase consumed about 20 minutes to cover these items for studied pregnant women.

4) Implementation Phase

Pregnant women were instructed to take Ginger tablets (400mg) at 8am and 8 pm 15minutes before meals and marked their signs using VAS and Rhodes index questionnaire at 10 a.m. and 10 pm for 4 sequence days.

Control group: the pregnant women received routine care that was medical treatment (Navoproxine, Emetryx, Emeral or Vomistop) or health education as dietary modifications, or psychological support according to their condition.

5) **Evaluation:** the investigator followed up the studied pregnant women by telephone twice daily for 4 sequence days. The studied pregnant women asked to mark their signs using VAS and Rhodes index questionnaire at 10 a.m. and 10 pm for 4 sequence days. Investigator evaluated the studied pregnant women at 8-10 am and 8-10 pm and asked about their condition and if there was an increase in vomiting more than 5 times per day to be excluded from the study and ask medical advice.

Statistical analysis:

Statistical Package for Social Science (SPSS), version 20.0 (statistical packages for social science, released 2011) was used for the statistical analysis of the data that coded and entered into computer. Inferential statistics were used Chi-square to compare between two or more qualitative variables as well as we used T-test to compare between quantitative variables. Statistical significance was considered at *p-value* <0.05.

III. Results

The sociodemographic data of the pregnant women in this study indicated that ; the mean and standard deviation of age for ginger group and control group was 27.10 ± 4.579 , 26.73 ± 4.878 respectively. And they were housewives and .had a secondary level of education. The obstetrical data showed that; 52.5% of the ginger and 55% of the control group had 1-2 pregnancies, and 60% of ginger group versus 50.0% of the control group had 1-2 deliveries, hadn't abortions and the previous mode of their deliveries were normal or cesarean section. In the current pregnancy the gestational age was ranged between 10th-11th weeks for studied pregnant women. The highest frequency of studied women had past history of severe nausea and vomiting and received pharmacological and other not receive any treatment.

Table (1): Comparison between studied groups Related to nausea characteristics before Intervention.

Table (1) demonstrates that the comparisons of the characteristics of nausea among studied groups before intervention were statistically insignificant except frequency and duration of nausea. It shows that, more than one third had nausea 7 times or more, that lasting through one hour for about two third and more than one third felt excruciate. In the control group, less than two third of the group had nausea 7times or more, with more than half lasting more than 6 hours, and more than two third felt excruciate.

Table (2): Comparison between studied groups Related to nausea characteristics after Intervention.

Table (2): shows Comparison between studied groups Related to nausea characteristics after Intervention in which there was statistical significant improvement in ginger group compared to control group related to feeling of distress through the 1st 2nd and 4th day of intervention(P= 0.001,0.002, 0.002respectively) .

Table (3): Comparison Between Studied Groups Related to Retching Characteristics before and after Intervention.

Table (3): reveals comparison between studied groups related to retching characteristics before and after intervention. There is a decrease of retching for ginger group than the control group except 2nd day after intervention without statistical significant difference.

Table (4): Comparison between Studied Groups Related to Vomiting Characteristics before

Intervention.

Table (4): shows comparison between studied groups related to vomiting characteristics before intervention. There is a statistical significant differences related to frequency of vomiting in ginger group than control group.

Table (5): Comparison between Studied Groups Related to Vomiting Characteristics after Intervention.

Table (5): shows comparison between studied groups related to vomiting characteristics after intervention. There was an improvement in the characteristics of vomiting in ginger group than control group with statistical significant difference related to frequency of vomiting during 1st and 2nd day of intervention and the amount of vomiting during 2nd and 4th day of intervention.

Table (6): Comparison between Studied Groups Related to Visual Analogue Scale and Total Rhodes Index Before and After Intervention

Table (6): shows comparison between studied groups related to visual analogue scale and total Rhodes index before and after intervention. There was a decrease of pain related to VAS in ginger group than control group with statistical significant difference during 2nd day after intervention. There was significantly decrease of the total Rhodes index score in ginger group than control group (P= .016, .000, .001, .008 respectively).

Table (1): Comparison between studied groups Related to nausea characteristics before Intervention.

	Nausea		Ginger		Control		X ² test	p-value
			Freq.	%	Freq.	%		
Before intervention	Frequency	Nothing	0	0.0	0	0.0	12.83	.234
		1-2	10	25.0	7	17.5		
		3-4	9	22.5	6	15.0		
		5-6	5	12.5	2	5.0		
		>=7	16	40.0	25	62.5		
	Duration (hrs)	Nothing	0	0.0	0	0.0	14.56	.035*
		>=1	26	65.0	15	37.5		
		2-3	2	5.0	4	10.0		
		4-6	1	2.5	0	0.0		
		>6	11	27.5	21	52.5		
	Feeling of distress	Nothing	0	0.0	0	0.0	16.11	.037*
		Mild	4	10.0	1	2.5		
		Moderate	13	32.5	4	10.0		
		Severe	7	17.5	8	20.0		
		Excruciating	16	40.0	27	67.5		

Table (2): Comparison between studied groups Related to nausea characteristics after Intervention.

	Nausea		Ginger		Control		X ² test	p-value
			Freq.	%	Freq.	%		
1st day after of intervention	Frequency	Nothing	7	17.5	4	10.0	5.918	0.356
		1-2	14	35.0	12	30.0		
		3-4	10	25.0	10	25.0		
		5-6	3	7.5	5	12.5		
		>=7	6	15.0	9	22.5		
	Duration (hrs)	Nothing	7	17.5	4	10.0	13.6	0.210
		>=1	25	62.5	21	52.5		
		2-3	0	0.0	2	5.0		
		4-6	2	5.0	3	7.5		
		>6	6	15.0	10	25.0		
	Feeling of distress	Nothing	7	17.5*	4	10.0	24.266	.001*
		Mild	5	12.5	0	0.0		
		Moderate	17	42.5	8	20.0		
		Severe	5	12.5	7	17.5		
		Excruciating	6	15.0	21	52.5		
	2nd day of Intervention	Frequency	Nothing	13	32.5	8	20.0	10.64
1-2			17	42.5	14	35.0		
3-4			4	10.0	8	20.0		
5-6			1	2.5	3	7.5		
>=7			4	10.0	7	17.5		
Duration (hrs)		Nothing	13	32.5	8	20.0	14.9	.065
		>=1	20	50.0	17	42.5		
		2-3	2	5.0	3	7.5		
		4-6	0	0.0	3	7.5		
		>6	4	10.0	9	22.5		
Feeling of distress		Nothing	13	32.5	8	20.0	24.81	.002*
		Mild	5	12.5	1	2.5		
		Moderate	15	37.5	8	20.0		
		Severe	2	5.0	6	15.0		
		Excruciating	4	10.0	17	42.5		

4 th day of intervention	Frequency	Nothing	13	32.5	12	30.0	7.01	.684
		1-2	15	37.5	15	37.5		
		3-4	4	10.0	4	10.0		
		5-6	2	5.0	1	2.5		
		>=7	5	12.5	8	20.0		
	Duration (hrs)	Nothing	13	32.5	12	30.0	11.6	.594
		>=1	20	50.0	16	40.0		
		2-3	0	0.0	3	7.5		
		4-6	0	0.0	2	5		
		>6	6	15.0	7	17.5		
	Feeling of distress	Nothing	13	32.5	12	30.0	27.98	.002*
		Mild	10	25.0	0	0.0		
		Moderate	8	20.0	5	12.5		
		Severe	5	12.5	6	15.0		
		Excruciating	3	7.5	17	42.5		

Table (3): Comparison Between Studied Groups Related to Retching Characteristics before and after Intervention.

Retching			Ginger		Control		X ² test	p-value
			Freq.	%	Freq.	%		
of Before intervention "	Frequency	Nothing	37	92.5	36	90.0	13.99	.930
		1-2	1	2.5	3	7.5		
		3-4	0	0.0	0	0.0		
		5-6	1	2.5	0	0.0		
		>=7	1	2.5	0	0.0		
	Feeling of distress	Nothing	37	92.5	36	90.0	11.74	.853
		Mild	0	0.0	1	2.5		
		Moderate	1	2.5	0	0.0		
		Severe	0	0.0	1	2.5		
		Excruciating	2	5.0	1	2.5		
1 st day after intervention	Frequency	Nothing	38	95.5	33	82.5	11.63	.431
		1-2	1	2.5	5	12.5		
		3-4	0	.0	2	5.0		
		5-6	0	0.0	0	0.0		
		>=7	0	0.0	0	0.0		
	Feeling of distress	Nothing	38	95.0	33	82.5	11.02	.277
		Mild	0	0.0	0	0.0		
		Moderate	0	0.0	0	0.0		
		Severe	0	0.0	2	5.0		
		Excruciating	1	2.5	5	12.5		
2 nd day of Intervention	Frequency	Nothing	1	2.5	35	87.5	11.12	.207
		1-2	38	95.0	2	5.0		
		3-4	0	0.0	3	7.5		
		5-6	0	0.0	0	0.0		
		>=7	0	0.0	0	0.0		
	Feeling of distress	Nothing	1	2.5	35	87.5	11.3	.238
		Mild	0	0.0	0	0.0		
		Moderate	0	0.0	0	0.0		
		Severe	0	0.0	2	5.0		
		Excruciating	38	95.0	3	7.5		
4 th day of Intervention	Frequency	Nothing	38	95.0	34	85.0	9.81	.268
		1-2	1	2.5	5	12.5		
		3-4	0	0.0	1	2.5		
		5-6	0	0.0	0	0.0		
		>=7	0	0.0	0	0.0		
	Feeling of distress	Nothing	38	95.0	34	85.0	9.12	.193
		Mild	0	0.0	0	0.0		
		Moderate	0	0.0	1	2.5		
		Severe	0	0.0	2	5.0		
		Excruciating	1	2.5	3	7.5		

Table (4): Comparison between Studied Groups Related to Vomiting Characteristics before Intervention.

Vomiting			Ginger		Control		X ² test	p-value
			Freq.	%	Freq.	%		
Before intervention	Frequency	Nothing	11	27.5	5	12.5	11.17	.023*
		1-2	18	45.0	16	40.0		
		3-4	8	20.0	7	17.5		
		5-6	2	5.0	8	20.0		
		>=7	1	2.5	4	10.0		
	Amount	Didn't throw up	11	27.5	5	12.5	14.09	.590
		Small	6	15.0	8	20.0		
		Moderate	5	12.5	3	7.5		
		Large	2	5.0	10	25.0		
	Feeling of distress	Nothing	11	27.5	5	12.5	7.625	.146
		Mild	2	5.0	1	2.5		
		Moderate	2	5.0	1	2.5		
		Severe	4	10.0	5	12.5		
		Excruciating	21	52.5	28	70.0		

Table (5): Comparison between Studied Groups Related to Vomiting Characteristics after Intervention.

Vomiting			Ginger		Control		X ² test	p-value
			Freq.	%	Freq.	%		
1 st day after Intervention	Frequency	Nothing	30	75.0	17	42.5	13.1	0.004*
		1-2	9	22.5	15	37.5		
		3-4	1	2.5	5	12.5		
		5-6	0	0.0	1	2.5		
		>=7	0	0.0	2	5.0		
	Amount	Didn't throw up	30	75.0	17	42.5	11.27	0.47
		Small	3	7.5	8	20.0		
		Moderate	2	5.0	3	7.5		
		Large	0	0.0	6	15.0		
	Feeling of distress	Nothing	30	75.0	17	42.5	10.85	0.001*
		Mild	2	5.0	0	0.0		
		Moderate	1	2.5	0	0.0		
		Severe	2	5.0	5	12.5		
		Excruciating	5	12.5	18	45.0		
	2 nd day after Intervention	Frequency	Nothing	31	77.5	25	62.5	13.1
1-2			6	15.0	10	25.0		
3-4			2	5.0	4	10.0		
5-6			0	0.0	0	0.0		
>=7			0	0.0	1	2.5		
Amount		Didn't throw up	31	77.5	25	62.5	16.8	.021*
		Small	4	10.0	2	5.0		
		Moderate	2	5.0	2	5.0		
		Large	0	0.0	6	15.0		
Feeling of distress		Nothing	31	77.5	25	62.5	11.27	.077
		Mild	1	2.5	5	12.5		
		Moderate	1	2.5	5	12.5		
		Severe	1	2.5	2	5.0		
		Excruciating	5	12.5	3	7.5		
4 th day after Intervention		Frequency	Nothing	33	82.5	26	65.0	10.85
	1-2		4	10.0	11	27.5		
	3-4		1	2.5	3	7.5		
	5-6		1	2.5	0	0.0		
	>=7		0	0.0	0	0.0		
	Amount	Didn't throw up	33	82.5	26	65.0	13.5	.022*
		Small	3	7.5	2	5.0		
		Moderate	1	2.5	2	5.0		
		Large	1	2.5	6	15.0		
	Feeling of distress	Nothing	33	82.5	26	65.0	10.99	.055
		Mild	0	0.0	0	0.0		
		Moderate	1	2.5	0	0.0		
		Severe	0	0.0	1	2.5		

		Excruciating	5	12.5	13	32.5		
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Table (6): Comparison between Studied Groups Related to Visual Analogue Scale and Total Rhodes Index Before and After Intervention

	Ginger n=40	Control n=40	t- test	P- value
	Mean ±SD	Mean ±SD		
Before intervention	8.00± 2.000	8.70± 1.800	1.645	.104
1 st day after intervention	6.25± 2.478	7.25± 2.762	1.704	.092
2 nd day after intervention	4.65±2.558	6.30± 3.473	2.420	.018*
4 th day after intervention	4.45±2.782	5.82±4.082	1.760	.083
Total Rhodes index				
Before intervention	23.18±6.744	26.73 ± 6.097	2.470	.016*
1 st day after intervention	13.26 ± 4.903	18.00 ± 5.910	3.878	.000*
2 nd day after intervention	12.75 ± 5.674	17.70 ± 7.505	3.328	.001*
4 th day after intervention	12.63 ± 5.886	16.78 ± 7.694	2.709	.008*

IV. Discussion

The present study was conducted to evaluate the effect of using ginger on relieving nausea and vomiting in which supposed that ginger is more effective for relieving nausea and vomiting compared to medical treatment standard during pregnancy.

Nausea during pregnancy is typically one of the most symptoms experienced and complained by women. It is affecting on the majority of women in their first trimester. Ginger as a non-pharmacological treatments used in this study, which aimed to compare their effectiveness on both nausea and vomiting. Ginger was taken orally as a tablet (400mg) twice daily for four days. Control group received routine care that was medical treatment (Navoproxine, Emetyrx, Emeral, Vomistop) or health education as dietary modifications ,or psychological support according to the studied pregnant women condition at MCH centers. In this study, nausea and vomiting were assessed by using two scales; visual analogue, and Rhodes index scales at 1st, 2nd and 4th day.

Visual analogue scale (VAS), is a subjective, numeric and descriptive pain intensity scale was used to assess severity of nausea, vomiting and retching it was divided into mild, moderate and severe. Rhodes index scale is a patient self-report instrument to assess the objective and subjective factors of nausea, vomiting and retching in a separate score.

In the present study, according to VAS; there is a decrease of pain in ginger group. For a control group pain decreased gradually until 4th evaluation. Then there was a fluctuation between the increase and the decrease in pain until 8th evaluation. There is a significant decrease of ginger group compared to control group after 2nd, 3rd, 5th and 7th evaluation (p> 0.007, 0.01 and 0.01) respectively. According to Rhodes scale; The mean difference in ginger group is more than the control group with a statistical significant difference.

Sharifzadeh et al. ; (2017) conducted a study to evaluate the effect of ginger, pyridoxine (vitamin B6), and placebo for the treatment of the first trimester nausea and vomiting in pregnancy (NVP) by using Rhodes index scale. The studied women received ginger, 500 mg twice daily, and other women received vitamin B6 40 mg twice daily and placebo group. They found that, Ginger and vitamin B6 were more effective than placebo (p = .039 and p = .007, respectively); however, total scale of Rhodes did not show significant difference between ginger and vitamin B6 (p = .128). Ginger was more effective for nausea (intensity and distress) and distress of vomit.

Waheeb et al.; (2014) examined the effect of ginger in comparing to antiemetic agent on relieving mild to moderate nausea and vomiting during the first trimester of pregnancy in Suez Canal University hospital in Cairo. They used two groups; ginger and control group who take standard medical treatment. They found that, 1 gm of ginger drink shown statistically significant improvement in the frequency and severity of nausea and vomiting than control group (P=0.0001, p=0.002 respectively).

Maitre et al.; (2011) conduct Cochrane review to assess the effectiveness and safety of interventions for nausea and vomiting in pregnancy before 20 weeks gestation. There was more than one type of interventions included in this review such as acupressure, ginger, vitamin B6, and other interventions. They found that, four trials of ginger versus placebo revealed that ginger, reduce nausea, and three studies showed reduced vomiting with it. A meta-analysis of four RCTs that compared ginger (975 to 1,500 mg per day) with pyridoxine (30 to 75

mg per day), divided three or four times per day for up to three weeks. Two trials of them (n = 251) found no difference in nausea and vomiting by day 3. The other two trials (n = 361), surveying the percentage of women reporting no relief, also found no statistically significant difference between ginger and pyridoxine (relative risk = 0.84; 95% confidence interval, 0.47 to 1.5).

In addition to that; **Kwak et al.; (2014)** aimed to study the effect of dried ginger powder on improvement of nausea and vomiting associated with early pregnancy or motion sickness. This study was conducted in Korea. Among the nine studies including 809 women in early pregnancy before 20 weeks of gestation, ginger supplementation was superior to placebo in five studies (n = 305), and as effective as positive control (vitamin B6 or dimenhydrinate) in four studies (n = 504). They found that, ginger powder supplements might improve the symptoms of nausea or vomiting related to early pregnancy or motion sickness without significant adverse events.

Also, Thomson et al.; (2014) conducted a meta-analysis. They identified 135 potentially relevant records; only 6 studies met the selected criteria. In which 256 patients were randomly assigned to receive ginger for nausea and vomiting in pregnancy, and 252 patients were randomly assigned to receive placebo. They found that, 180 of the 256 subjects in the ginger group and 126 of the 252 subjects in the placebo group reported improvement in symptoms of nausea and vomiting. They concluded that, the use of 1 g daily ginger for at least 4 days is an effective nonpharmacological treatment for NVP.

In the same line, **Basirat et al.; (2006)** studied the effect of Ginger biscuit on nausea and vomiting in early pregnancy in Iran. In this study the subjects were randomized in a double-blind design and divided into two groups to take biscuits. 0.5g of ginger as fine powder was incorporated in each biscuit. Subjects received 5 ginger biscuits per day or an identical placebo biscuit for 4 days. Their results showed a reduction in the severity score for nausea in the group taking a ginger biscuit compared to placebo biscuit (P=0.01). Although the decrease in the number of vomiting was greater in ginger group, but no statistically significant difference was found (P=0.24).

More than that, Ozgoli et al., (2009), agreed that ginger was more effective than control group in reducing nausea and vomiting. They conducted a Randomized Controlled Trial (RCTs) was done in Iran included 70 pregnant women of whom 67 finished the trial. They study the effects of ginger in nausea and vomiting of pregnancy. They found that, A daily total of 1g of ginger in a capsule preparation presented a higher rate of improvement than the control group for both nausea and vomiting ($p < 0.01$). The vomiting decreased significantly in the ginger group than the placebo group ($p < 0.05$). From the point of view of the researcher this improvement may be due to increase the dose of ginger than the present study.

Willetts et al., (2003) conducted a double blind RCT in Australia, including 120 women of whom 99 finished the trial. They received either 125mg ginger extract capsules, or placebo capsules for 4 times per day along 4 days. They found that, a decrease of nausea with statistical significant difference in the ginger extract group compared to the placebo group after the first day and for each treatment day. Retching was also decreased by the ginger extract, although to a lesser extent. But regarding to vomiting, there is no significant difference between ginger extract and placebo was mentioned.

In addition to **Vutyavanich et al.; (2001)** who studied the effectiveness of ginger for the treatment of nausea and vomiting of pregnancy. All participants except three in the placebo group remained in the study. They found that, the visual analog scales decreased significantly in the ginger group compared with the placebo group (P=.014). The number of vomiting episodes also decreased significantly in the ginger group compared with the placebo group (P <.001). So, they agreed with our results that ginger is effective for relieving the severity of nausea and vomiting of pregnancy.

Chit-tumma et al.; (2007) conducted a double-blind parallel RCT in Thailand. It aimed to study the effect of ginger versus vitamin B6 on change in nausea and vomiting scores and the occurrence of side effects. 325mg of ginger powder capsules were taken three times daily compared to Vitamin B6 capsules along 4 days of treatment. Dietary advice was given to both groups before the start of treatment. By using Rhode's index scale; they found that, ginger was more effective than vitamin B6 for relieving pregnancy symptoms of nausea and vomiting ($p < 0.05$).

Also, **Ding et al.; (2013)** who examined the evidence for the safety and effectiveness of ginger for NVP. They found that, All trials found orally administered ginger to be significantly more effective than placebo in reducing the frequency of vomiting and intensity of nausea.

Also, this study results confirmed by **Ensiyeh & Sakineh (2009)** who conducted a RCT study in Iran. Seventy pregnant women were included and 69 finished the trial. They compared the effectiveness of ginger and vitamin B6 for the treatment of nausea and vomiting in early pregnancy. They found that, ginger is more effective than vitamin B6 for reducing the severity of nausea ($p = 0.024$), and is equally effective for decreasing the number of vomiting episodes in early pregnancy ($p = 0.52$). This result may be due to an increase in the dose of ginger to 1 gram per day than the dose of the present study.

In addition, **Borrelli et al.; (2005)** studied the effectiveness and safety of ginger in the treatment of nausea and vomiting in pregnancy. This study included Six double-blind RCTs with a total of 675 participants and a prospective observational cohort study (n = 187) met all inclusion criteria. They approved that ginger have superiority as a treatment of nausea and vomiting in pregnancy than placebo or vitamin B6.

On the other hand, **Lindblad & Koppula; (2016)** aimed to study the effectiveness of ginger for nausea and vomiting of pregnancy. Systematic reviews of RCTs evaluated ginger; A Cochrane review found statistically significant results of placebo group that was more effective than ginger group related to vomiting on 6th day.

Firouzbakht et al.; (2014) examined the effect of ginger in nausea and vomiting during pregnancy in comparison with vitamin B6 and placebo. 120 women were selected by simple random sampling method, and divided into three groups and were given vitamin B6, placebo, and ginger, respectively. 97 women completed the treatment. They were given treatment for 4 days and were followed after a week. They found that; ginger is as effective as B6 in reducing gestational nausea and vomiting which can be used as a simple, accessible, and convenient approach.

Also, **Javadi et al.; (2013)** disagrees with this results when compared the effectiveness of vitamin B6 (40 mg twice daily) and ginger (250 mg four times daily) in treatment of pregnancy nausea. They found that; there was no significant difference between effectiveness of ginger and vitamin B6 in reducing the symptoms of pregnancy-induced nausea, and both were similarly effective. Vitamin B6 was more effective in reducing retches; however, this effectiveness was not significant. Both medications were equally effective in reducing occurrence of vomiting and duration of nausea.

Smith et al.; (2005) promote these results when studied a randomized controlled trial in Australia, which included 291 pregnant women of which 235 completed the trial. They received either 350mg of ginger capsules or 25mg of vitamin B6 capsules 3 times per day, for 21 days and assessed by using the Rhodes Index of Nausea and Vomiting (a 5-point, 5-item Likert type scale). The participants were allowed to continue with other medications throughout the trial. They found that, Ginger was equivalent to vitamin B6 in improving nausea, vomiting and dry retching in pregnancy. This results may be explained with large doses of both ginger (1050mg/day) and vitamin B6 (75mg/day) that keep them with the same effectiveness.

Also, **in Iran, Modares et al., (2012)** also, aimed to study the effect of Ginger and Chamomile capsules on nausea and vomiting in pregnancy. They found that, there is no difference about the Rhodes index scale (after and before) between Ginger and Chamomile and Ginger and placebo. This results may be caused by the first preparation for the studied groups along one week before the intervention and to frequency of ginger capsule per day

In addition to beigi et al.; (2011) disagrees with our results. They aimed to study the effects of ginger and metoclopramide in the treatment of pregnancy nausea. They found statistically significant difference between ginger and metoclopramide, where, ginger is less effective than metoclopramide in reducing nausea and vomiting (p < 0.05). This may be due to decrease of ginger dose (600 mg/ daily)

From all of researches; there were many researches included in this discussion studied ginger and its effect on nausea and vomiting during pregnancy, nearly all of them agree with our results. Finally, the results of this study can prove that ginger is effective on relieving nausea and vomiting during pregnancy compared to medical treatment standard.

V. Conclusion

Based on this findings; this study concluded that, ginger are effective compared to medical treatment standard during Pregnancy in relieving pain accompanied by nausea and vomiting. So, the result of current study support hypothesis.

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