Journal of Chemical Health Risks

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JCHR (2023) 13(4S), 990-999 | ISSN:2251-6727

Efficacy of herbal ginger tea in reduction of morning sickness among first trimester primi mothers

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KEYWORDS:-
Pregnancy, Ginger, Nausea, Vomiting, Retching, Morning sickness, Pilot study

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ABSTRACT:

Introduction: Nausea and vomiting during pregnancy (NVP) which is also called as morning sickness, occur commonly due to some hormonal effects. Possible harmful side-effects of conventional medicine to the developing foetus create the need for alternative options to relieve NVP. This study investigated current research evidences and possible benefits regarding orally administered ginger for the treatment of NVP. The primary objective was to assess the effectiveness of ginger in treating NVP.

Methods: This study was conducted in antenatal clinic of selected hospital of Jaipur, among 30 first trimester primi mothers having morning sickness. A quantitative research approach with quasi experimental pre test and post test nonrandomized control group design was adopted, and the participants were selected using non probability convenience sampling comprising 15 antenatal mothers each in experimental and control group. Experimental group received intervention 200 ml of herbal ginger tea, once a day for 4 days and the control group did not receive any intervention. The post-test was conducted for both the groups after 4 days to assess the level of nausea, vomiting and retching. Demographic variables were used to collect personal information and Rhodes Index of nausea, vomiting and retching scale was used to assess the level of morning sickness.

Results: Result revealed that 200 ml ginger tea prepared from 500 mg ginger once a day for 4 days was very effective in reduction of morning sickness among 1st trimester primi mothers in experimental group as compared to control group. This difference was found statistically significant at 0.05 level of significance.

Conclusions: This pilot study suggests potential benefits and significant effects of ginger in reducing morning sickness in pregnancy. Ginger could be considered a harmless and possibly effective alternative option for women suffering from NVP. It is highly recommendable natural remedy to relieve morning sickness.

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Introduction

Morning sickness or Nausea and vomiting are the most common symptoms experienced in early pregnancy, with nausea affecting between 70 and 85% of women. About half of pregnant women experience vomiting. The peak time for NVP is between the 6th and 12th week of gestation[1]. Although morning sickness gets spontaneously recovered with the time passing, it can cause a great stress on the pregnant woman, disturb her work and decrease her quality of life.[2,3,4] Only 1% of these might progress to develop a severe form of NVP known as hyperemesis gravidarum.[2]

Hyperemesis gravidarum may occur during pregnancy in which chances of morbidity may be about 1.1%. It is characterized by constant vomiting (causes weight loss more than 5% of pre pregnancy weight), dryness, and ketonuria. This rarer form if not treated, can eventually lead to hospitalization and liver damage. Foetal harm may also occur.[5,6]

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JCHR (2023) 13(4S), 990-999 | ISSN:2251-6727

Exact cause of NVP/HG is unknown. Pathophysiology of NVP/HG may be attributed to biological, physiological, and psychological factors.[7] NVP incidence is more likely to be caused by genetic factors.[8]Terrible forms of NVP/HG are caused by neurohormonal factors (especially human-chorionic gonadotropin).[9] NVP symptoms can also be correlated with delayed gastric emptying.[10]

Treatment modalities incorporate identifying trigger factors and avoiding them, utilizing pharmacological and complementary agents and supportive therapy.[11,12,13]

The severity of the symptoms will determine which treatment plan is the best. It might range from minor dietary modification to hospitalization or even complete parenteral supplementation.[6] Because of the risk of teratogenicity, pregnant women choose not to use chemical medications during their pregnancy rather they want to go some safe and herbal treatment.[14]

Ginger *(Zingiber officinale)*, which is a most common and frequently used popular ingredient in Asian meals, is natural herbal and traditional alternative treatment modality for morning sickness.[15]

Herbal preparations of ginger herb helps to provide relief from nausea, vomiting and retching symptoms in pregnancy. Fortunately, it is found that ginger root consists many plant compounds that are effective in some of discomforts associated with pregnancy. Specifically, two types of ginger compounds are – gingerols and shogaols - are supposed to act on receptors in digestive system and leads to speed stomach emptying, which in turn may result in reduction in feelings of morning sickness. Gingerols is found abundantly in raw ginger, while shogaols are found more abundantly in dried ginger.[16]

However, herbal or complementary medicine tends to be more accepted as they are perceived to be a safer option.[17] Hence, this pilot study aims at investigating the efficacy of ginger in relieving NVP or morning sickness. Although investigating the safety of this ingredient is imperative, the majority of literature revealed that intervention of ginger was done for a very short period, and used different doses and dosage forms of ginger. With the clearly formulated research question in mind, this study was designed to investigate potential efficacy of ginger tea in terms of morning sickness treatment or symptoms relief.

Need of the Study

The woman experiences with sudden and dramatic increases in oestrogen and progesterone during pregnancy intended to aid in the foetal and maternal development. But these hormonal changes lead to some pregnancy associated discomforts like nausea and vomiting, heart burn, constipation, backache, varicose veins, ankle oedema, pica etc. Among these discomforts nausea vomiting in pregnancy or morning sickness is very common and disturbs her routine life and activities. Nausea and vomiting is associated with pregnancy in first trimester because of fast increase in oestrogen and hcg level.[18] Symptoms of NVP usually peak between 10 and 16 weeks of pregnancy and usually disappear on their own. [19]

Usually nausea and vomiting begins at 6-7 weeks of gestation, and it peaks at 9-13 weeks, and decreases in most cases by 12-14 weeks with a symptoms of nausea and vomiting. Symptoms continue beyond 20 weeks in up to 10% of pregnancies. It is estimated that, 1 in 5 women suffer with morning sickness in 2nd trimester and few for the complete duration of their pregnancy**.** A survey findings on women having nausea and vomiting at 2nd week of gestation, reveal that 73 of 409 women (17.8%) were having nausea without vomiting and from 409 (2.7%) 11 women were having nausea with vomiting.. It is the most common disorders during pregnancy and affecting almost 80% of pregnant women.[20]

Most of the women have NVP only in 1st trimester whereas, very thin population of pregnant
mother's experience a long period of NVP extended until the initiation of labour process. The data of pregnant women affected with NVP in US and shows that, around 4,000,000 and 3, 50,000 women are experiencing the symptoms of NVP each year respectively.[21]

A study conducted in New Delhi, India on prevalence of minor ailments during pregnancy among antenatal mothers reported that out of 30 antenatal mothers, 23(77%) had morning sickness which was the most common minor disorder prevalent in the sample subjects [3].

Bala M. A descriptive study to assess the prevalence of minor ailments during pregnancy, home care remedies adopted by primigravida mothers and to develop an information regarding the management of minor ailments during pregnancy in a selected Hospital of Delhi.[22]

According to a study conducted by **Heitman K (2017)** "The burden of nausea and vomiting during pregnancy: severe impacts on quality of life, daily life functioning and willingness to become pregnant again". So, this was a cross-sectional population-based study conducted in Norway. This study included 712 women with nausea and vomiting of pregnancy. It was significantly associated with several characteristics, including daily

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JCHR (2023) 13(4S), 990-999 | ISSN:2251-6727

life functioning, quality of life and willingness to become pregnant again and quality of life. The result showed that negative impact was greater there and were more severe the symptoms , although considerable adverse impacts were also seen among women having mild and moderate symptoms. Over one fourth of women with severe nausea vomiting symptoms accepted terminating the pregnancy due to nausea and vomiting and three in four considered not to become pregnant again.[23]

Data analysis from the Collaborative Perinatal Project, one of the largest research studies to date of pregnant women, found NVP was more common in younger women, primigravidas, women with less than 12 years of education, non-smokers, and obese women. Increased risk of NVP in the first trimester has also been reported in women with multiple gestation as compared to women with singleton pregnancies (87% vs. 73%, $p<0.01$) . [24]

According to a research report published by Med. India, women born in India and Srilanka found three times more susceptible for extreme morning sickness.[25] NVP is an extremely common pregnancy disorder that ranges from mild to moderate; severe nausea and vomiting are the second most common indications for pregnancy hospitalization,and are considered as pathological HG. (26, 27)

In a meta-analysis to quantify global rates, Einarson et al.researched that the reported rates of pregnant women having NVP varied widely. They also reported that of their cohort of women having NVP symptoms, the severity was rated as mild in 40%, moderate in 46%, and severe in 14%, while HG prevalence is typically 1.1%.[28] In a review of meta-analyses, researchers found that NVP was strongly correlated with a reduced risk of miscarriage.[29]

However, NVP still has some adverse results, such as an increased risk of intrauterine growth restriction in women having severe NVP. [30]

Women with severe nausea and vomiting during pregnancy may have hyperemesis gravidarum (HG), which if left untreated may lead to significant maternal and foetal morbidity. In 1 in 200 women, the condition progresses to hyperemesis gravidarum, which is characterised by prolonged and severe nausea and vomiting, dehydration, and weight loss. if nausea and vomiting are severe and persistent, the condition can progress to hyperemesis, especially if the woman is unable to maintain adequate hydration, fluid and electrolyte balance, and nutrition.[31]

Linda L. (2021) conducted a study on sleep quality in women with nausea and vomiting of pregnancy: a cross-sectional study. In this study the participants were women attending to routine mid-pregnancy visits in maternity health care clinics in Turku city, Finland. In this study sleep disturbances during the past 3 months were assessed with selected questions (difficulty falling asleep, night awakenings, too early morning awakenings and sleepiness during the day) from Basic Nordic Sleep Questionnaire (BNSQ). In addition, general sleep quality, as well as physical and mental quality of life was rated with three visual analogue scales (VAS). In this study the association between PUQE categories (severity of NVP) and sleep disturbances, general sleep quality, physical quality of life and mental quality of life were evaluated with multinomial regression analysis. According to PUQE, NVP was most frequently moderate (n = 629, 52.3%), followed by mild (n = 361, 30.0%) and severe (n = 77, 6.4%). Only 11.3% had no NVP (n = 136). The most frequent sleep disturbance was night awakenings (69.9%, n = 837), followed by sleepiness during the day (35.7%, n = 427), too early morning awakenings (12.0%, n = 143) and difficulty falling asleep (7.1%, n = 81). In adjusted analysis (age, parity, body mass index, smoking, employment), more severe NVP was associated with night awakenings (3.9, 95% CI 1.79-8.47, $P < 0.0001$) and sleepiness during the day (4.7, 95% CI 2.20-9.94, $P < 0.0001$). In VAS, women with more severe NVP rated worse general sleep quality and worse physical and mental quality of life. In multivariable analysis, however, the link between the severity of NVP and physical and mental quality of life was stronger than the link between sleep and quality oflife.[32]

Similarly, women with severe NVP are at increased risk of low birth weight, possibly owing to the deleterious effects of nausea and vomiting on maternal nutrition.[33] Robinson et al. reported that maternal malnutrition owing to HG can lead to vitamin K deficiency.[34] In addition, HG (severe nausea and vomiting) may be associated with many complications, including Wricked encephalopathy (brain damage caused by vitamin B_1 deficiency), acute liver and kidney failure, oesophageal rupture, pneumothorax, preeclampsia, placental abruption, and neurodevelopment delay of the foetus. Other adverse outcomes include preterm birth, small for gestational age, electrolyte disturbances which can lead to cardiac dysrhythmia, neuromuscular and renal complications, thyrotoxicosis, and maternal death.[35-39]

Purneswari, Latha P and Arumugam I, (2018) conducted a study “to evaluate the effectiveness of ginger tea on management of pregnancy induced nausea and vomiting among antenatal mothers at selected Villages, Nellore, A.P. An experimental study conducted to assess the efficacy of ginger extract on the symptoms of morning sickness among 40 antenatal mothers. The sampling technique was convenience

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sampling technique. In this study severity of morning sickness symptoms was assessed by '5 point' Likert scale. Among experimental group, In pre-test 1(3%) had mild symptoms, 5(17%) had moderate symptoms and 9(30%) had severe symptoms. In post-test 8(26%) had mild symptoms and 7(24%) had moderate symptoms. Among control group, In pre-test 1(3%) had mild symptoms, 9(30) had moderate symptoms and 5(1) had severe symptoms. In the post test 1(3%) had mild symptoms, 9(30%) had moderate symptoms and 5(17%) had severe symptoms. The study concluded that there was a significant reduction in pregnancy induced nausea and vomiting among antenatal mothers in experimental group as compared to the control group. This shows that the ginger tea was very effective in reducing the morning sickness symptoms associated with pregnancy.[40]

Ginger tea is a cost-effective treatment in reduction of morning sickness during pregnancy. There is risk of potential teratogenic effects in many pregnant women while using conventional antiemetic medication to manage nausea and vomiting during pregnancy. Women feel more convenience taking a natural or herbal remedy to manage nausea and vomiting. In addition, the severity and intensity of nausea and vomiting during pregnancy depends on many factors. So, researcher got insight and has developed special interest to find out the efficacy of herbal ginger tea among first trimester primi mothers.

Methodology

It was A quantitative research approach with quasi experimental pre test and post test nonrandomized control group design conducted in antenatal clinic of selected hospital of Jaipur among 30 first trimester primi mothers having morning sickness within 4th to 12th weeks of period of gestation and the participants were selected using non probability convenience sampling comprising 15 antenatal mothers each in experimental and control group.

Before taking part in the trial, informed consent was obtained from the sample under the study. The researcher carried out the study design and sampling procedures only after receiving approval from the Nivik hospital ethics committee in Jaipur. The primigravida mothers were all diagnosed by an obstetrician and confirmed by ultrasonography to be in the first trimester of pregnancy at the time of their selection. Primigravida women who had any known medical complications related to pregnancy as well as any physical disability were not included in the study. Demographic variables were used to collect personal information and Rhodes Index of nausea, vomiting and retching was used to assess the level of morning sickness.

Samples in the experimental group were demonstrated to prepare the 200 ml herbal ginger tea by adding 500 mg of ginger and were instructed to take the ginger tea once a day for four consecutive days. The control group did not receive any intervention. The post-test was conducted for both the groups after 4 days to assess the level of nausea, vomiting and retching. Descriptive and inferential statistics were used to analyse the data. Compliance was achieved in both groups by having participants to sign at the beginning of the initial demo session, having frequent phone calls to participants, and instructing participants to maintain a record in diary format.

Results

The research included a total of 30 participants, with 15 respondents assigned as members of the experimental group and 15 to be a part of the control group. Prior to data collection, informed consent was given by each and every participant, and the inclusion and exclusion criteria were revised. In this study, various demographic variables regarding personal information were analysed for both the experimental group and the control group. (Table 1).

Distribution of primi mothers according to their demographic variables

Table : 1.1 Distribution of respondents according to the Age N = 30

Demographic Variables	**Experimental group N = 15**		**Control Group N = 15**	
	F	**%**	**F**	**%**
Age (In Years)				
18 to 22	4	26.66	4	26.66
23 to 27	6	40	5	33.33
28 to 32	3	20	4	26.66
Above 32	2	13.33	3	20
Total	15	100%	15	100%

The above table shows that in experimental group 4(26.66%) primi mothers belongs 18-22 years of age , 6(40%) belong to 23-27 years of age,3(20%) belongs to 28-32 years of age and (13.33%) belongs to above 32 years of age group.

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In control group 4(26.66%) were in 18-22 years, 5(33.33%) were in 23-27 years, 4(26.66%) were in 28-32 years and 3(20%) primi mothers were in above 32 years age group

Table :- 1.2 Distribution of respondents by Duration of pregnancy

N = 30

Demographic variable	**Experimental group**		**Control group**	
	F	**%**	**F**	**%**
Duration of Pregnancy				
4-8 weeks	6	40	5	33.33
9-12 weeks	9	60	10	66.66
Total	15	100%	15	100%

In relation to duration of pregnancy in experimental group 6(40%) of the samples belonged to 4-8 weeks, and 9(60%) of the samples belonged to 9-12 weeks of pregnancy. In control group 5(33.33%) belonged to 4-8 weeks and10 (66.66%) belonged to 9-12 weeks of gestation.

Table: 1.3 Distribution of respondents by Educational status

N = 30

Demographic variable	**Experimental group**		**Control group**	
	F	**%**	**F**	**%**
Educational status				
Formal	0	00	1	6.66
Primary	1	6.66	1	6.66
Secondary	1	6.66	2	13.33
Higher Sec.	4	26.66	4	26.66
Degree and above	9	60	7	46.66
Total	15	100%	15	100%

In relation to Educational status in experimental group 1(6.66%) of the samples had primary sec. education, 1(6.66%) of the samples had secondary education,4(26.66%) had higher sec. education and 9(60%) had degree and above education. In relation to Educational status in control group1 (6.66%) of the samples had formal education, 1(6.66%) had primary education, 2 (13.33%)4 had secondary education, (26.66%) had higher sec. education, and 7(46.66%) of the samples had degree and above education.

Table: 1.4 Distribution of respondents by occupational status

N = 30

Demographic variable	**Experimental group**		**Control group**	
	F	**%**	**F**	**%**
Occupational status				
Employed	6	40	7	46.66
House wife	9	60	8	53.33
Total	15	100%	15	100%

With regard to occupational status in experimental group 6(40%) were employed and 9(60%) were house wife. In control group, 7(46.66%) were employed and 8(53.33%) were house wife.

Table: 1.5 Distribution of respondents by Type of family

N = 30

Demographic variable	**Experimental group**		**Control group**	
	F	**%**	**F**	**%**
Family Type				
Nuclear	10	66.66	8	53.33
Joint	5	33.33	7	46.66
Total	15	100	15	100

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With regard family type in experimental group 10(66.66%) were from nuclear family and 5(33.33%) were from joint family. In control group, 8(53.33%) were from nuclear family and 7(46.66%) were from joint family

Table: 1.6 Distribution of respondents by Presence of motion sickness

N =30

Demographic variable	Experimental group F	%	Control group F	%
Presence of motion sickness				
Yes	3	20	1	6.66
No	12	80	14	93.33
Total	15	100%	15	100%

In relation to presence of motion sickness, in experimental group majority 12(80%) of primi mothers were not having problem of motion sickness, only 3(20%),was having problem of motion sickness. In control group 1(6.66%) were not having motion sickness whereas majority of women 14(93.33%) were having motion sickness.

Table: 1.7 Distribution of respondents by Residence

N = 30

Demographic variable	Experimental group F	100%	Control group F	100%
Residence				
Rural	5	33.33	4	26.66
Urban	10	66.66	11	73.33
Total	15	100	15	100

Regarding the residence in experimental group 5(33.33%) were rural residents and 10(66.66%) were urban residents. In control group, 4 (26.66%) were rural residents and 11(73.33%) were urban residents.

Table: 1.8 Distribution of respondents by Family history N = 30

Demographic variable	Experimental group F	%	Control group F	%
Family History				
Yes	12	80	13	86.66
No	3	20	2	13.33
Total	15	100%	15	100%

In regards to family history of morning sickness, in experimental group, majority 12(80%) of primi mothers had family history of morning sickness and 3(20%) had no family history.
In control group 13(86.66%) had family history of morning sickness and 2(13.33%) had no history.

Table:- 2 Comparison of Mean, Standard Deviation, Mean difference of Morning Sickness in Experimental group and Control Group.N=30

S. No.	Group	Pre test		Post test		Mean Difference
		Mean	SD	Mean	SD	
1	Experimental Group	23.12	4.98	10.62	5.022	12.5
2	Control Group	21.87	4.62	20.62	4.84	1.25

The above table shows the overall pre-test and post-test level of morning sickness. In the experimental group, the mean pre-test morning sickness score was 23.12± 4.98 and the post-test mean score was 10.62 ± 5.022. The mean difference was 12.5.

In the control group, the mean pre-test morning sickness score was 21.87 ± 4.62 and the mean post -test morning sickness score was 20.62 ± 4.84 SD. The mean difference was 1.25.

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Table-3 Effectiveness of herbal ginger tea on morning sickness among primi mothers in Experimental group and Control group N=30

S. no	Group	Post test		' t ' value	'p' value	Df
		Mean	SD			
1	Exp. Group	10.62	5.022	4.06	P<0.05	28
2	Control group	20.62	4.84			

The table 3 shows mean post test morning sickness level for experimental group was 10.62 ± 5.022 and for control group 20.62 ± 4.84. This difference was statistically significant (P<0.05). Here |t tab| < |t cal| and p<0.05 at 0.05 level of significance. There was significant difference in post test morning sickness level of experimental group and control group. So herbal ginger tea is effective to reduce morning sickness.

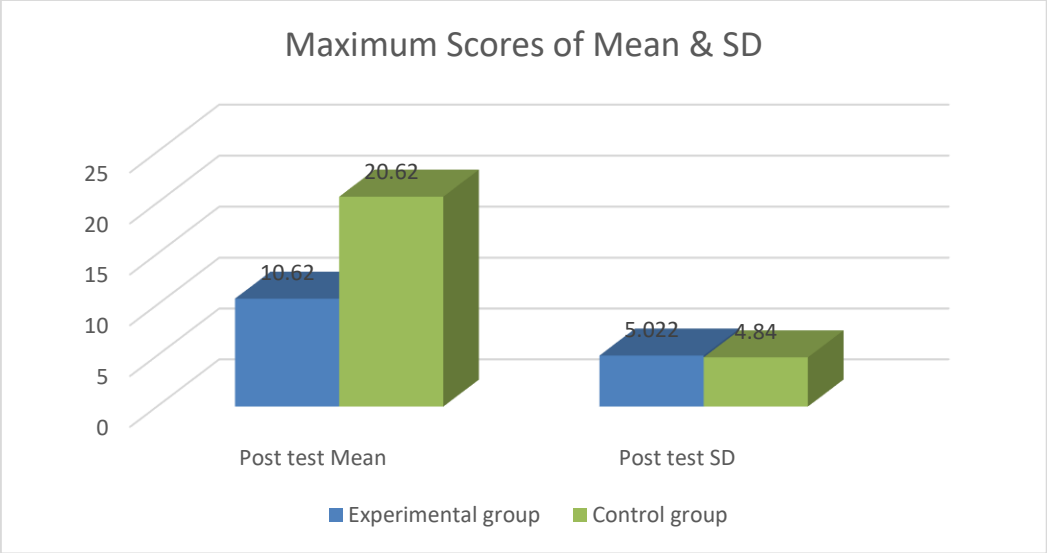

Fig.1 Bar diagram representing post test Mean and SD of morning sickness level of Experimental group and Control group

Discussion

Nausea and vomiting experienced by pregnant women more than 5 times a day can harm pregnant women and their foetuses because pregnant women need balanced and adequate nutrition. Most pregnant women consider nausea and vomiting as a normal thing during pregnancy, some feel it as something that is uncomfortable and can interfere with daily activities.[41]

In general, pregnant women who experience morning sickness feel uncomfortable and want to end this period. Therapy to reduce nausea and vomiting in the medical world, are of two types therapies, namely pharmacological therapy and non-pharmacological therapy. Pharmacological drugs, if used freely and continuously without a doctor's supervision can pose a risk that can endanger the body, as an alternative, various studies are carried out to find herbal therapy or complementary therapies which are safer as compared to pharmacological therapy, named as non-pharmacological therapies. Ginger is often and frequently used.[42]

This was a cross sectional study that was aimed to assess effectiveness of herbal ginger tea on reduction morning sickness among first trimester primi mothers.

The findings revealed that those mothers who were administered herbal ginger tea got a significant relief from morning sickness symptoms .In relation to the findings of the study it was shown that that there was a significant difference (12.5± .042) between pre test and post test mean of experimental group in comparison to mean difference (1.25± 0.22) found in control group. These findings support the study of Shiradwade D, Satvekar R (2018) In experimental group mean value was 12.80±3.32 before ginger administration and 5.7±1.82 after ginger administration it shows a significant relief from morning sickness. In control

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group mean score before ginger administration and after ginger administration were 12.13±3.48 and 8.73±2.58 respectively.

Ginger is a rhizome plant having the Latin name *Zingiber officinale* it belongs to the Zingiberaceae family. The chemical components of ginger are shogaols, gingerols, bisapolene, zingiberene, zingiberol, sesquiphellandrene, essential oils, and resins. Ginger contains volatile oil or essential oil which is refreshing and acts to block the gag reflex, while gingerols and shogaols, improve blood circulation and nerves work well and resulting anti-nausea, anti-vomiting, analgesic, sedative, antipyretic, and anti-bacterial effects.[43] One of the pharmacological functions of ginger is anti-vomiting (antiemetic) it is an ingredient that helps to expel gas from the stomach which will control vomiting by enhancing intestinal peristaltic movements. About 6 compounds in ginger had shown to be effective antiemetic. These compounds are supposed be more directed at the stomach wall than central nervous system. Ginger is usually effective and safe as herbal remedy or medicine; ginger does not have any toxicity at doses which commonly consumed for food and medicine.[44]

Management of minor discomforts during pregnancy is very essential including nausea and vomiting for good quality of life and better pregnancy outcomes .This study results further shown that mean post test morning sickness level for experimental group was 10.62 ± 5.022 and for control group 20.62 ± 4.84. This difference was statistically significant (P<0.05). There was significant difference in post test morning sickness level of experimental group and control group. This study results are consistent with findings of the study done by purneswari et al.in which post test morning sickness level in experimental group was 18.2 ± 5.47 and in control group was 23.6 ± 6.23.These findings strongly supports that herbal ginger tea is effective to reduce morning sickness..

This study had some limitations, first as it was done on only primi mothers, second small sample size and third it was conducted in only one antenatal clinic of selected hospital in Jaipur.

Conclusion

Ginger is an herbal remedy that has long been known to treat morning sickness, it is very effective and safe to use and highly recommendable now a days in clinical practice, but people do not know more about the benefits of ginger for pregnant women. Therefore this study was done to analyze the effect of herbal ginger tea in reducing the level of morning sickness in first trimester primi mothers and communicate the findings to increase awareness.

Acknowledgement

The authors extend their sincere thanks and gratitude to the Mahatma Gandhi University of Medical Science and Technology's ethics committee for awarding ethical approval for this pilot study, as well as Nivik Hospital in Jaipur for executing it out.

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