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The Effect of Aromatherapy Inhalation on Nausea and Vomiting in Early Pregnancy: A Pilot Randomized Controlled Trial

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Abstract
Nausea and vomiting during pregnancy negatively impacts family relationships and has major consequences on the pregnant woman's working capabilities (Jewell and Young, 2003). Aim: This study aimed to estimate the effect of mixed essential oils inhalation on nausea and vomiting in early pregnancy. Design: Randomized controlled trial. Setting: This study was conducted in Abha maternity teaching hospital-King Khalid University at the outpatient clinics. In addition to three maternal and child health centers. Abha- Kingdom of Saudi Arabia. Sample: Simple random sample of one hundred one pregnant women with single fetus were recruited in the study. The inclusion criteria were women who can read and write, their age between 15-38 years, between 8 and 16 weeks gestational, free from any medical disorders, who had nausea and/or vomiting, required anti-emetics and were not hospitalized. Tools and measurements: The Rhodes index for nausea and vomiting assessment, visual analogue mood scale, the fatigue severity scale, oil burners, and lavender and peppermint oils were the tools have been used in this study. Procedure: Women in the study group were asked to use the predefined essential oils twice a day, prior napping or sleeping. All participants in the study group were asked to record episodes of nausea and number of vomitus within twelve hours starting from inhalation of fragrance daily for three days. Results: Nausea and vomiting episodes were decreased at third day essential oils inhalation compared with baseline assessment among pregnant women in the study group. Moreover, women felt energetic after essential oils inhalation. Mood scores ranged between mild to moderate energy. Finally, although there was a significant change in fatigue score at third day's treatment, the fatigue scores still high. Conclusion: Inhalation of mixed two perfumes of lavender and peppermint oils may minimize the severity of nausea episodes, enhance energy level and decrease fatigability sensation.
Key words: Nausea, Vomiting, Pregnancy, Aromatherapy, Essential oils, Lavender oil, Peppermint oil

Introduction

Nausea and vomiting are very common in early pregnancy (NVP). Pregnant women experience nausea, vomiting and retching mostly in the first trimester. Nausea and vomiting are common between six and twelve weeks, but this can continue to 20 weeks and persist after this time for up to 20% of women (Jewell & Young, 2003). The physical and emotional impact of NVP often results in anxiety and concern about possible fetal effects (Arsenault & Lane, 2002). Nausea and vomiting during pregnancy negatively impacts family relationships and has major consequences on the pregnant woman's working capabilities (Jewell & Young, 2003).The cause of nausea and vomiting during pregnancy is still unknown. Therefore, wide varieties of treatment have been used empirically (Nordeng & Havnen, 2004). Prescription drugs are usually avoided in early pregnancy due to concern for potential teratogenic effect. Vitamin B6 is frequently used as a first line treatment for pregnant women experiencing nausea and vomiting (Jennifer & Niebyl, 2010). However, a large number of pregnant women require additional drugs, such as dimenhydrinate and promethazine (Jueckstock, Kaestner & Mylonas, 2010; Mylonas, Gingelmaier & Kainer, 2007). These drugs may cause side effects such as sedation, mouth dryness, motor weakness and visual disturbance. Because of concern about pharmaceuticals in early pregnancy, non-pharmaceutical management is increasingly used to minimize nausea and vomiting in pregnancy.

The use of complementary therapies in mainstream medicine is increasing. Maternity health care providers are responding to this by incorporating these therapies into models of care within their services. Two national surveys in the USA reported the highest complementary and alternative medicine (CAM) uptake among women of reproductive age (Eisenberg, etal., 1993; Allaire, Moos & Wells, 2000). One of the most popular forms of complementary therapy is aromatherapy (Thomas et al. 2001).

Aromatherapy is the name given to a unique branch of herbal medicine that uses the medicinal and therapeutic properties of the oils found in various plants (Rankin, 2004). Actually, essential oils can be used in

many different ways. They can be applied to particular parts of the body through massage (Price and Price, 2002). Moreover, a few drops can be put on a handkerchief or tissue to help people sleep. Others are formulated into bath salts or gels which can be dissolved into running bath water to give a relaxing fragrance. The most popular way to use essentials oils is to put them in devices that allow the smell to diffuse into the air (Nanayakkara, 2001). In addition, aromatherapy is considered an ideal way to deal with emotions because the sense of smell is directly linked to the center of emotions and memory in the brain. Essential oils carry deep archetypal messages which work on the physical and spiritual basis of illness to heal body, mind and soul (Perry & Perry, 2006).

Aromatherapy may be perceived as natural and therefore lower risk than medications. Further, aromatherapy can be ideal to stem off morning sickness when used the right essential oil like ginger, cardamom or peppermint essential oils twice a day in form of eating or drinking (Chittumma, etal. 2007). Although aromatherapy has been used in childbirth for centuries, there are no high quality studies examining whether the treatment works (Allaire, Moos & Wells, 2000). All studies up till now examined the effect of aromatherapy considered it as a way to decrease nausea and vomiting through drinking or eating (Arsenault & Lane, 2002; Smith, etal. 2004, Borrelli, etal. 2005). In addition to decrease depression, anxiety, back pain during pregnancy (Field, 2010). As well as relieve intrapartum pain (Dhany, 2008; Burns, etal. 2007; Burns, etal. 2000). However, one report referred that, inhalation of pure medical-grade essential oils are generally safe in pregnancy (Nanayakkara, 2001).

Health care providers in general and midwives in specific need to justify their use of complementary therapies using the available evidence. This evidence should address issues of effectiveness and harm. While randomized controlled trials provide the most reliable form of evidence of effectiveness, further researches are needed to understand patient experience of therapies. In order to achieve this purpose, the present study conducted to determine the feasibility of using mixed essential oils (peppermint and lavender) inhalation as a care option that may improve nausea and vomiting in early pregnancy.

Methodology

Aim:

This study aimed to estimate the effect of mixed essential oils inhalation on nausea and vomiting in early pregnancy.

Hypotheses:

1. Inhalation of mixed essential oils will minimize nausea and vomiting episodes among pregnant women.

2. Inhalation of mixed essential oils will improve the energy level among pregnant women who have nausea and vomiting.

3. Inhalation of mixed essential oils will minimize the state of fatigue among pregnant women who have nausea and vomiting.

Design:

Randomized controlled trial.

Setting:

This study was conducted in Abha maternity teaching hospital-King Khalid University at the outpatient clinics. In addition to three maternal and child health centers (el Manhal, el Gabel and Shamasan). Abha-Kingdom of Saudi Arabia.

Sample:

Simple random sample of one hundred and one pregnant women with single fetus were recruited in the study. The inclusion criteria were women who can read and write, their age ranged between 15-38 years, between 8 and 16 weeks gestational age confirmed by ultrasound, free from any medical disorders, no history of smoking or drug use, who had nausea or/and vomiting, required anti-emetics and were not hospitalized. Women were excluded if they had taken other medications those might aggravate or alleviate nausea and vomiting, hospitalized for hyperemesis gravidarum, if they had any known chest allergy or/and had other medical disorders (i.e. gastrointestinal diseases) that might manifest with nausea and vomiting. The sample size has been

determined utilizing sample equation based on the daily numbers of admission into the outpatient clinics according sample criteria (7%).

Protection of human rights

This study was approved by the King Khalid University's review board for scientific research. An ethical consent was obtained from ethical committee in King Khalid University (REC╫2013-02-05). In addition, an official permission was obtained from the administrative authorities of Abha maternity teaching hospital, as well as from three maternal and child health care centers for conducting the study. The aim and the procedure of the study were explained to the subjects. Written consent was obtained from those who accepted the study's condition. Participants understood that they had the option to leave the study at any time. They were also informed that any cost resulting from the study would be paid by the researchers.

Tools and measurements

1- The Rhodes Index for assessment of nausea and vomiting. It is a 5-point Likert scale; it separately scores as categorical variables, the number of vomiting episodes per day, the size of the vomiting, the length of nausea and retching, as well as the distress associated with the condition. In addition to an overall score, one can report separately on the frequency and changes in nausea, vomiting, retching and stress. Lowest score was 3 and the highest score was 15 indicating severe nausea and vomiting (Rhodes, Watson & Johnson, 1984). This questionnaire was translated into Arabic, and content validity gained through its revision by three specialists in the same field.

2- Visual Analogue Mood Scale: It assesses internal mood states. The VAMS are reliable and valid measures of separate eight specific moods states; afraid, confused, sad, angry, energetic, tired, happy, and tense (William & Killgore 1999). The VAMS were found to have excellent discriminant and convergent validity (Hooper, 1997). The scale has a neutral schematic mood faces (and accompanying word) along 10cm vertical line. Respondents indicate the point that best describes how they are currently feeling. In the present study, we assessed energy level with nausea and vomiting according to mothers' judgment. The score of energetic mood ranged from 0-10cm, with 10cm representing a maximal level of energy and zero representing a minimal level (or absence) of energy. To achieve accurate scoring, the scale was categorized by the researchers into three colored categories (green, orange and red). Green color and its degrees (1-3.5cm) for mild energy, orange and its degrees (4-7.5 cm) for moderate energy and red with its degrees (7.5-10 cm) for extremely energetic. The energy level has been identified by choosing the appropriate face, word and color, and then confirmed by the degree related to the pre-identified color.

3- The Fatigue Severity Scale (FSS): It is seven points Likert scale, it is a method for evaluating the impact of fatigue on daily activity. The FSS is a short nine statements questionnaire that requires rating the level of fatigue. A low value (e.g., 1); indicates strong disagreement with the statement, whereas a high value (e.g., 7); indicates strong agreement. Women asked to make circle on the suitable number (from1 to 7); for every question. A total score of less than 36 suggests that woman may not be suffering from fatigue. A total score of 36 or more suggests that woman may need further evaluation by a physician (Lauren, etal. 1989).

4- Oil burner which has a small tea light candle and oil container in a receptacle above (Goldestin & Peter, 2009).

*5- Lavender and Peppermint oil*s. Each of these oils diluted in ratio of 2:100 percent, translated into 2 drops of essential oil per 100 drops of carrier oil in order to be safe (Ryan & Harrison, 2003; Peter, 2005). This form already prepared and packed in an opaque glass containers for commercial use and available in herbal stores.

Lavender: Is an anti-inflammatory and an anti-microbial. It has great effect on insomnia, depression, headaches, sore muscles and it soothes the stomach (Cavanagh & Wilkinson, 2002). Lavender essential oil is said to be very effective for nausea and vomiting (Holland, 2010).

Peppermint oil: Is an antispasmodic and antibacterial. It's good for nausea (Allaire, Moos and Wells, 2000). It is effective for treating a wide range of digestive complaints (i.e. easing irritable bowel syndrome and stomach spasms). Peppermint oil is refreshing to the mind, body and spirit (Ryan & Harrison, 2003). Peppermint oil has mood elevating properties enhance mental performance that make it useful for alleviating symptoms of anxiety and depression (Moss, etal. 2008).

Procedures

Data collection procedure took place between September 2012 and January 2013. The trial was promoted within the community by using media (posters in antenatal clinics). Referrals were made by general practitioners and other health care providers.

Recruitment of participants and randomization

In order to ensure accurate process of randomization. Allocation concealment was approached through two trained professional researchers. Two steps selection process were used to ensure the randomization. The first of which was identifying the random sample, this step was done on the admission to the antenatal clinics. Each mother enters the physician room for physical examination and uterine ultrasonography. Mother who met the eligibility criteria and who had an odd number on her admission ticket, cards or files was recruited in the study. The second drawing was random assignment of the sample into two groups after signing the written consent. Numbers from one to one hundred and two were inserted in separate opaque envelopes that were drawn in ascending consecutive order. Even numbers were assigned to the Study Group (SG) who received the essential oils, while odd numbers to the Control Group (CG) who received standard hospital's care in form of routine pregnancy check up. Table (1) demonstrates the total number of women who were interviewed through the data collection process.

Table 1. Inclusion of the sample into the trial.

A total of 300 pregnant women were interviewed through the data collection period
Women were ineligible (n=149)
Women received antiemetic drugs (n=45)
Women were diabetics (n= 30)
Women were asthmatics (n=34)
Women had previous history of recurrent abortion (n=25)
Women had history of hyperemesis gravidarum (n=15)
Women refused to participate in the trial (n=50)
Women who enter the trial (n=101)
Study group (n=50)
Control group (n=51)

Interviewing and history taken

Two steps interview were achieved. First step considered the demographic information and mother's obstetric history in order to reach the eligibility criteria. While second step approached after randomization process in order to explain the aim of the study as well as getting the baseline data of Rodes scale, visual analogue mood scale and fatigue severity scale. Each interview spent approximately thirty minutes. Each mother in the control group met once to record the baseline data for comparing purpose.

Implementation

The overall intervention elements were grounded by the Orem self care theory (Orem, 2001) and Neuman model **(**Neuman, 1974). According to Orem, self care is the practice of activities that individuals personally initiate and perform on their own behalf to maintain health and wellbeing. Orem identifies three basic types of nursing systems to meet the individual's needs. One of them is the supportive educative system. It is a system where the individual is able to learn in order to perform the required self care measure. In the present study, the pregnant woman taught how to use the mixed essential oils to minimize the episodes of nausea and vomiting. The five (A's) strategy has been used with the pregnant women (ask, assess, advise, assist and arrange follow up). While Neuman sees a person as an open system interacts with the environment. Neuman defined stressors as forces lead to state of instability within the clients system. She identified three types of preventions in order to avoid negative impact of these stressors; primary, secondary and tertiary prevention. The present study focused on primary prevention. Prevention of the unnecessary effects of an act or situation as possible. Strengthen the capacity of the pregnant woman to maintain an optimum level of functioning was the main core. This achieved by helping women to realize that there is a relationship between good nutrition, rest and their abilities to deal with stressors.

All participants in both groups received written instructions related to healthy habits with morning thickness. All participants in both groups were advised to avoid fatty, spicy foods and to increase the number of meals to five small meals throughout the day.

The pregnant women in the study group were asked to use the predefined essential oils twice a day, before napping or sleeping for three days (Raybern, 2010). All the study group's women were asked to take a semi-setting left lateral position in a well ventilated room. Ensuring that the way of dispersing the fragrance of essential oils was by heating the dissolved five drops, four drops from lavender oils and one drop from the peppermint oil in one big spoon of water (ratio 4:1:1) using the oil burner (Smith, 2012; Graham, etal. 2003). Breath deeply for twenty minutes till the room air becomes saturated with the fragrance. All participants in the study group were asked to record episodes of nausea and vomiting within twelve hours starting from inhalation of the fragrance daily for three days. Ensuring that, any abnormal sign (i.e. running nose, skin rash, itching, headache, burning eyes and abdominal pain) appeared throughout the treatment period, the treatment should be stopped and contact immediately with the researchers to check. Telephone contact had been used to follow woman condition after first session essential oils inhalation. In order to again mother's final report and complete the questionnaire, the pregnant women took an appointment to be revised by the obstetrician. The follow up visit included physical examination and uterine ultrasonography. All mothers in both groups did not take any other medication except their routine vitamins (i.e. folic acid).

Evaluation:

Primary outcome:

The primary outcome was assessment the change of nausea and vomiting post treatment scores.

Secondary outcome:

The secondary outcome was assessment the change of mood and fatigue post treatment scores.

Statistical analysis & results

Statistical package for the social science (SPSS) was used for statistical analysis of the data. For all the statistical tests done, the level of significance was fixed at the 5% level (P-value).

Descriptive characteristics of the sample

All pregnant women were Saudi. There were no statistical significant differences between groups related to age, gestational age, height, weight and educational level. The age ranged between 15-38 years old, height between 145-160 cm and weight between 45-85 kg. All participants had different levels of education and most of them were primigravida, nulliparous women (table 2).

Baseline assessment among both groups

On baseline assessment of nausea and vomiting episodes within 12 hours, the pregnant women among both groups reported that, nausea and vomiting episodes were recurrent. It may extend to five or six times within 12 hours with small amount, approximately half cup. The total Rode score indicated severe nausea and vomiting. In addition, all of women reported mild level of energy with severe level of fatigue. There were no statistical significant differences between groups related to both assessments (table 3).

Table 2. Characteristics of mothers among the study and the control groups.

Items	Study group (n=50)		Control group (n=51)		t	P
	Mean	**SD**	**Mean**	**SD**		
Age	24.94	1.23	25.38	1.19	-1.81	0.07
Gestational age (weeks)	10.0	2.61	10.2	2.29	- 0.40	0.68
Height (cm)	155.84	2.69	155.58	2.68	0.48	0.63
Weight (kg)	57.54	2.66	57.16	3.34	0.62	0.53
Education level						
	No.	**%**	**No.**	**%**	χ^2	**P**
Read & Write	4	8.0	2	3.9	0.70	0.40
Primary School	5	10.0	8	15.6	0.79	0.37
Preparatory School	2	4.0	3	5.8	0.19	0.66
Secondary School	15	30.0	17	33.4	0.18	0.66
University	24	48.0	21	41.3	0.47	0.49
Parity						
No. of pregnancy	**No.**	**%**	**No.**	**%**	χ^2	**P**
Primigravida	18	36.0	13	25.5	2.07	0.15
Gravida 2	10	20.0	7	13.7	0.71	0.39
Gravida 3	12	24.0	13	25.5	0.03	0.86
Gravida 4	5	10.0	6	11.7	0.08	0.77
Grand gravida >5	5	10.0	12	23.6	2.53	0.11
No. of deliveries						
Nullipara	18	36.0	13	25.6	1.31	0.25
Para 1	10	20.0	7	13.7	0.71	0.39
Para 2	12	24.0	13	25.6	0.03	0.86
Para 3	5	10.0	6	11.7	0.08	0.77
Para 4-5	3	6.0	6	11.7	1.03	0.30
Grand para >5	2	4.0	6	11.7	2.08	0.14

Level of significance at $p \leq 0.05$

Table 3. Comparisons between both groups related to baseline assessment.

Items	Study group (n=50)		Control group (n=51)		χ^2	P
	No.	**%**	**No.**	**%**		
Nausea episodes within 12 hours						
1-2 times	19	38.0	21	41.2	0.10	0.74
3-4 times	26	52.0	24	47.0	0.24	0.61
5-6 times	5	10.0	6	11.8	0.08	0.77
Vomiting episodes within 12 hours						
1-2 time vomiting	19	38.0	20	39.2	0.02	0.90
3-4 time vomiting	16	32.0	15	29.4	0.08	0.77
5-6 time vomiting	15	30.0	16	31.4	0.02	0.88
	Mean	**SD**	**Mean**	**SD**	**T**	**P**
Mean no. of nausea	2.72	0.64	2.70	0.76	0.10	0.91
Mean no. of vomiting	1.96	1.24	1.84	1.02	0.51	0.60
Total Rodes' scale						
	23.06	6.37	21.74	7.30	1.06	0.34
The fatigue severity score						
	50.68	7.66	49.50	7.79	0.76	0.45
Energy level						
	1.94	1.54	1.86	1.16	0.28	0.77

Level of significance at $p \leq 0.05$

Effect of aromatherapy on nausea and vomiting among the study group.

There were highly statistical significant differences were noticed on regular assessment of nausea and vomiting episodes throughout the three days treatment. Nausea and vomiting episodes were decreased at third day's essential oils inhalation compared with baseline assessment among the study group. Although there was an obvious effect of treatment that started at the second day, the essential oils inhalation had better effect on nausea than on vomiting episodes. None of mothers requested dose reduction and none of them reported an olfactory sensation. In addition, there was an obvious statistical significant difference between the two readings of the total Rode score, although it still high and indicated severe nausea and vomiting (table 4).

Table 4. Baseline and post-treatment nausea and vomiting scores among the study group.

Items	Study group (n=50)				t	P
	Mean	**SD**	**Mean**	**SD**		
	Baseline		After treatment			
Nausea episodes within 12 hours						
First day treatment	2.72	0.64	2.54	1.05	1.84	0.07
Second day treatment			2.16	0.79	6.47	0.0001
Third day treatment			1.86	0.70	6.72	0.0001
Vomiting episodes within 12 hours						
First day treatment	1.96	1.24	1.64	0.80	1.83	0.07
Second day treatment			1.22	0.73	5.01	0.0001
Third day treatment			1.12	0.68	5.54	0.0001
Total Rode's score at third day						
	23.06	6.37	17.60	6.08	7.92	0.0001

Paired t-tests: $p < 0.05$

Effect of aromatherapy on mother's mood and fatigue status among the study group

On comparison among the study group related to mood scores before and after essential oils inhalation, mothers reported that, they felt energetic after essential oils inhalation. Mood scores ranged between mild to moderate energy. Although, there was a significant change in fatigue score at third day's treatment, the fatigue scores still high. Data denoted that, there were statistical significant differences between baseline and the third day's scores (table 5).

Table 5. Baseline and post-treatment mood and fatigue scores among the study group

Items	Study group (n=50)				t	P
	Mean	**SD**	**Mean**	**SD**		
	Baseline		After treatment			
Mood score (Energy)						
Third day treatment	1.94	1.54	4.62	0.69	-11.42	0.0001
Fatigue severity score						
Third day treatment	50.68	7.66	44.92	6.83	9.06	0.0001

Paired t-tests: $p < 0.05$

Comparison among the study groups between mean baseline data and the third day's treatment.

On comparison among the study group between the baseline data and the third day's treatment, there were statistical significant differences between nausea and vomiting episodes as well as the total rode score. Further, there was a significance increase in energy level associated with little decrease in fatigue score (figure 1).

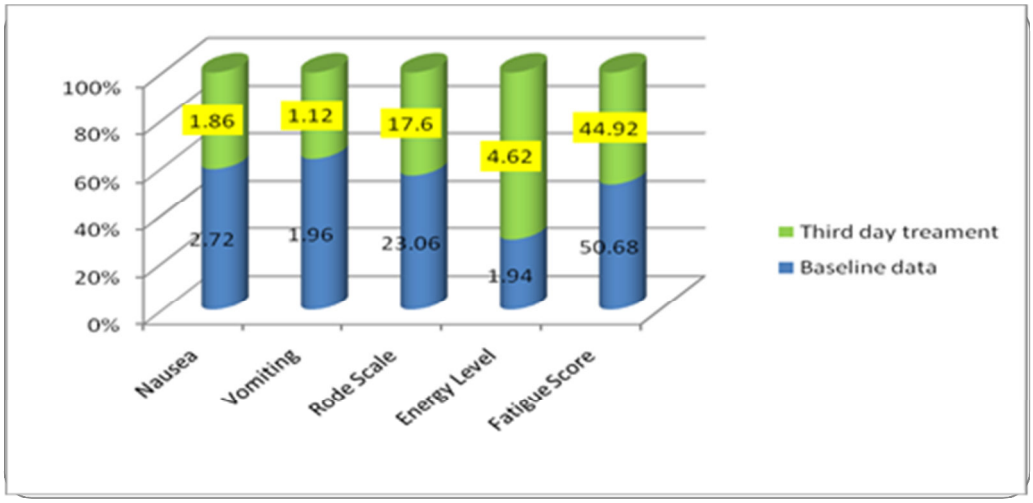

Figure 1. Comparison among the study group between mean baseline data and the third day's treatment.

Methodological consideration

According to Research Institute for Fragrance Materials and International Fragrance Research Association, Lavender and Peppermint considered safe oils for using in different way (Martin, 2012). And both peppermint and lavender oils are not contraindicated during pregnancy (National Center for Complementary & Alternative Medicine, 2004). There were no reports for any adverse effect in the extensive aromatherapy literature (Aromatherapy science, 2006). Inhalation of pure, medical-grade essential oils is generally safe in pregnancy (Schaal, Marlier & Soussignan, 2000).The short duration of treatment and few drops of essential oils are guided complied with the South Eastern Sydney Area Health Service procedural guidelines on complementary therapies (Gassib-Spain, etal. 2001). Additionally, it is common for aromatherapy texts to claim that combination oils are more effective than single-oil selections. Although the daily duration of exposure was relatively brief, rapid systemic absorption of these volatile oils by respiratory exposure occurred within a few minutes, and the duration of exposure to achieve absorption was more than adequate.

It was a challenge in the present study to be blinded. Although it may be possible to keep the researchers in the dark regarding which group is which, participants will certainly be aware of whether they smell something or not. Further, allocation concealment was achieved successfully by the assistant researchers. The process of randomization was under the consultant observation. Further, there was no drop out reported in the present study. All participants keen to follow the researchers in order to make further physical assessment and medical check. Finally, intention to treat analysis was utilized in the statistical analysis (i.e. data analyzed as randomized).

Discussion

Nausea and vomiting of pregnancy (NVP) affects negatively on 50 - 90% of pregnant women (Arsenault, 2002). The exact cause is unknown, but is probably due to number of factors such as increased hormones level, stress and fatigue (Quinlan & Hill, 2003). Reaching a state of balance requiring mother adequately copes with stressors by manipulating the environment to reduce stressors (Neuman, 1974). Self care is carried out to fulfill the main requisites in the interest of maintaining well-being (Orem, 2001). Raising women's awareness toward aromatherapy may help them to carry the responsibility of changing their lifestyle in order to overcome the negative feeling of fatigability.

Using essential oils inhalation for manipulating nausea and vomiting of pregnancy (NVP) has not been widely studied. So, this study aimed to estimate the effect of mixed essential oils inhalation on nausea and vomiting in early pregnancy. The aim of using mixed essential oils peppermint and lavender was that, the complex aromas prevent the unwanted side effect of conditioned aversion. In a study involving children undergoing chemotherapy and using peppermint oil only for relieving nausea, results denoted that the readily identifiable and ubiquitous nature of peppermint caused the patients to experience nausea whenever they smelled peppermint toothpaste, gum, mints, etc (Herrstedt, 2004). It is known that essential oils can be absorbed by the body through topical application to the skin, oral ingestion and by inhalation. The fastest, safest and simplest method is inhalation (Mirkarimi, etal. 2011). Absorption into the blood stream was rapid via the nasal and lung

mucosa and very low levels were required to produce sedative effect (Buckle, 2007). By smelling the aromatic vapor of essential oils, the molecules travel up the olfactory tract to the limbic system, which in turn, transmit the input to the central nervous system (Nopleprize, 2004). In addition, stimulation of trigeminal nerve by aromatic vapor which located within the lining of the nose can produce sensations such as warming or cooling. These nerve fibers can also affect the perception of nasal airflow during breathing (Savic, 2001). Another aspect of aroma processing is that, odor cues produce memories with greater intensity of emotions than any of the other senses (Herz, 2005). With one deep breath through the nose, a person will transmit the beneficial molecules from the essential oils to the central nervous system, recognize if the smell is pleasant or familiar and what memories are evoke or create (Savic, 2001).

Results of the present study suggested that, mixed essential oils of peppermint and lavender have been used effectively by number of pregnant women who suffered from nausea and vomiting of pregnancy. Their positive effect on nausea was better than their effect on vomiting. These results may be due to the peppermint effect. Peppermint affects on motion sickness, anorexia and dyspepsia. The aromatic, spasmolytic, carminative and absorbent properties of peppermint suggest that it has direct effect to exert its antispasmodic influence on the gastric lining and colon through its alcohol compounds menthone and menthol. In a small randomized, placebo controlled study of 18 women postoperative for gynecological surgery there was a statistically significant reduction in nausea and vomiting among women those received oral peppermint essential oil compared to others who received placebo (Tate, 1997). Further, peppermint oil show a relaxing effect on the gall-bladder and the former slows small intestinal transit in patients suffering from motility disorders (Goerg & Spilker, 2003).

In general, several studies have explored the ability of odorants to influence cognition and behavior states (Herz, 2001; Herz, Beland & Hellerstein, 2004; Herz, Schankler & Beland, 2005; Herz, 2005). Further, aromatherapy was administered to reduce fear, anxiety and alleviate pain (Bodeker, etal. 2005). One could say then that any treatment which results in relaxation and stress reduction can enable the body's organs and systems to function more effectively thus enabling the body to deal with potential illness (Jennifer & Niebyl, 2010). The present results denoted that there were positive effects of mixed essential oils on mood and fatigability state. The experience of fatigue in early pregnancy may be related to other physiologic changes, perhaps hormonal, that mediate physiologic and psychological variables (Reeves, etal. 2011). The correlation between fatigue and nausea is always positive; as nausea increased so did the severity of fatigue (Van Lier, etal. 2007). These results may interperated as, on emotional level, lavender oil is effective in dealing with depression, grief, low self-esteem, improving mental alertness and energy (Pollard, 2008; Wilkinson, 2005). Lavender (Lavandula angustifolia) is purported to have sedative effects when inhaled by humans and animals (Haze, etal. 2002). In addition to its' anticonvulsive, motor inhibitory and spasmolytic effect (Chien, etal. 2012). Inhalation of lavender demonstrated greater improvement in mood, less anxiety, greater relaxation, less depression among 77% of 122 patients in an intensive care unit (Moss & Cook, 2003). As the fine oil particles enter through the nose via cilia change the electrical conductivity cause an electrical charge to travel through the body (Sayorwan, et al. 2012). In addition, serotonin mediated vasodilating properties of both essential oils are propagated via nasal inhalation. Relaxation and induced sleeping effect may help to renew and raising energy level. Lavender is soothing and relaxing in cases of mental fatigue. It can both calm the mind and uplift the spirit, making it excellent for chronic fatigue symptoms (Motomura, Sakurai & Yotsuya, 2001).

On the other hand, on the physical level, peppermint inhalations was associated with increase in motivation, energy, speed, alertness, reaction time, confidence and strength as well as lower the levels of fatigue and frustration (Raudenbush, etal. 2004). Campenni, etal. (2004) attempted to determine whether the changes in mood and physiology brought about by odor administration would have any effect on athletic performance. They concluded that, peppermint odor administration significantly reduced perceived physical workload, temporal workload, effort, and frustration. Self-evaluated performance was also greater in the peppermint condition and participants rated their level of vigor higher and their level of fatigue lowers. In addition, Raudenbush, etal. (2004) attempted to determine if actual physical tasks would be augmented by the administration of peppermint odor. The peppermint odor condition resulted in increases in running speed, hand grip strength and number of push-ups. Finally, when the studies examined the effect of presenting lavender and peppermint odors on attention allocation and perceived exertion while performing a handgrip task. Olfactory stimuli have been found to exert influence over affective, physiological, biological, cognitive and behavioral variables (Barker, etal. 2003; Marchand & Arsenault, 2002).

However, any therapeutic strategy that addresses only physical symptoms, i.e. anti-emetic medications, but disregards the psychosocial morbidity and need for emotional support, is likely to be sub-optimal and possibly futile.

Conclusion

Inhalation of mixed two perfumes of lavender and peppermint oils may act as an alternative choice for manipulating nausea and vomiting in early pregnancy. They may minimize the severity of nausea episodes, increase energy level and decrease the sensation of fatigue.

Recommendation

Further randomized controlled trials with large sample size and longer treatment duration are recommended.

Implications for practice

Complementary modalities such as aromatherapy provide holistic approach which encompasses the body, mind, and spirit. Midwifery training should include the opportunity to learn about it as an alternative therapy.

Implications for research

Evidence that essential oils can produce changes has been predominantly anecdotal, deriving from small trials and case studies (Buckle, 2001; Wood, 2003). Few studies examined its effect in maternal and newborn field. So the present study's results may add in meeting the challenges of reducing morning sickness associated with early pregnancy.

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