

Effect of Foot Reflexology on Constipation and Fetal Movement During Pregnancy

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Abstract:

Background: Many women experience constipation during pregnancy and nowadays, non-pharmacological approaches such as reflexology have gained more attention than pharmaceutical ones when it comes to treating pregnancy-related ailments. **Aim of the study:** Evaluate the effect of foot reflexology on constipation and fetal movement during pregnancy. **Research design:** A quasi-experimental (case-control) research design was utilized in this study. **Settings:** This study was conducted at the El-Helal Maternal and Child Health Centre in Damanhour City, El-Beheira Governorate, Egypt. **Subjects:** Eighty pregnant women at 28-32 gestational weeks. **Data collection tools:** Tool I: Socio-demographic and clinical data; Tool II: Constipation Assessment Scale (CAS); and Tool III: Kick-chart. **Results:** In the reflexology intervention group, there is an improvement in constipation severity more than in the control groups, as it is clear that there are statistically significant differences between both groups in the third, fourth, and fifth weeks after the intervention ($P = 0.024, 0.037, \text{ and } 0.007$, respectively). Fetal movement frequency increases in the reflexology intervention group more than in the control group, as there are statistically significant differences between both groups in the fourth and fifth weeks after the intervention ($P = 0.001, P = 0.000$, respectively). **Conclusion:** Foot reflexology is a useful technique to relieve pregnancy-related constipation and a powerful way to improve fetal movement. **Recommendations:** Incorporate foot reflexology into routine antenatal care along with routine care provided by nurses to better manage pregnancy-related constipation and improve fetal movement.

Keywords: Reflexology, Foot reflexology, Foot massage, Constipation, and Fetal movement.

Introduction

Numerous physiological changes that occur during pregnancy can cause a variety of

symptoms, most typically gastrointestinal issues like heartburn, nausea, vomiting, and constipation (Gomes, Catarina., 2018).

Constipation is a prevalent symptom of pregnancy that may affect 11–40% of expectant mothers at some point during their pregnancy. In a study done on 7771 pregnant women, 37.5% of the women reported constipation symptoms at some stage (**Akselsson et al., 2020**).

Constipation that develops during pregnancy has a complex etiology. One of these reasons is the rise in the internal abdominal pressure that occurs during pregnancy, which causes alterations to the pelvic organs and the structures supporting the levator anal muscle and anal sphincters which are primarily responsible for the process of defecation. Moreover, reducing daily activities, stress, taking calcium and iron supplements, consuming inadequate amounts of fluids, and dietary modifications can cause constipation more frequently. Another issue is the decrease in bowel movements caused by the pregnancy-related increase in progesterone hormone. (**Sehhatti et al., 2020**).

The smooth muscle that lines the organs of the digestive system contracts to break down food and facilitate its passage through the digestive system. This smooth muscle requires a steady supply of oxygen to function. Recent research has shown that oxygen dynamics play a critical role in controlling intestinal homeostasis and that many intestinal diseases are caused by disruption of the oxygen gradient and lead to fetal hypoxia (**Sehhatti, et al., 2001**), (**levy et al., 2020**).

The reduction in fetal movement, or its absence, may be an indication of fetal hypoxia. A healthy central nervous system

and adequate oxygenation are often seen as being indicated by normal fetal movements at that point in pregnancy. Acute or persistent placental malfunction is associated with fetal hypoxia, which reduces the amount of oxygen and energy used by activating the peripheral chemoreflex, focusing cardiac output on essential organs, and decreasing fetal movement (**Thompson et al., 2021**), (**Turner et al., 2020**)

There are a variety of health risks associated with the occurrence of constipation in pregnancy for both mothers and infants. Constipation during pregnancy increases the incidence of anorectal diseases both during pregnancy and after delivery. It also increases the physical and psychological burden for pregnant women, which may lead to depression and anxiety. Moreover, it increases the risk of abortion, premature birth, and other severe complications, which jeopardize the safety of mothers and infants. It can lead to intestinal obstruction during pregnancy, and if so, emergency surgery should be performed. Furthermore, it increases the proportion of caesarean deliveries, delays the first bowel movement following delivery and gastrointestinal recovery and raise the incidence of hemorrhoids. Therefore, constipation in pregnancy can have serious harm for both mothers and their infants (**Fan, et al., 2020**), (**Shi et al., 2015**).

The choice of treatment for constipation brought on by pregnancy is still a difficult clinical issue today. The Complementary and Alternative Medicine (CAM) is a healthcare strategy that is not regarded as a component of general Western or traditional

medicine, according to the National Center for Complementary and Integrative Health (NCCIH). Herbal medicine, acupuncture, acupressure, relaxation techniques, aromatherapy, moxibustion, massage, and reflexology are some of the CAM practices that are most frequently used (Wang et al., 2015), (Mohamed et al., 2018).

The foundation of reflexology theory is the idea that energy moves through vertical zones of the body, as it does for pregnant women from the foot to the head. Reflexology is a wonderful complementary prenatal care option for pregnant women. It is a beneficial method for stress relief and wellness in general. Backaches, stiff necks, leg cramps, headaches, constipation, and oedema can all be relieved with massage. Additionally, massage eases pressure on weight-bearing joints in expectant women, promotes blood and lymph circulation, eases nervous tension to promote restful sleep, and can lessen depression or anxiety brought on by hormonal changes (Shobeiri et al., 2017).

Community health nurses working at mothers and child health care facilities play an important role in prenatal care. In addition to delivering health education, they are in charge of performing exams on expectant mothers and directing them to the proper resources when necessary. Likewise, minor discomforts and the practice of self-care to handle them are among the crucial topics that community nurses must address in their health education session for pregnant women (Hassan et al., 2020).

Significance of the study:

Constipation is a common pregnancy side effect for many women. These days, there is more interest in non-pharmacological approaches to treat pregnancy-related constipation than in pharmaceutical ones. (Zhou et al., 2019). Reflexology is predicated on the idea that the hands, feet, and ears serve as miniature maps of the body's organs. By applying pressure to the points associated with each organ, one can balance various bodily systems and alleviate constipation. Only a few research have looked into how fetal movements and constipation symptoms are affected by foot reflexology. Therefore, in addition to fetal activity, the purpose of this study was to determine the impact of foot reflexology on symptoms of constipation.

Aim of the study:

This study aimed to evaluate the effect of foot reflexology on constipation and fetal movement during pregnancy.

Research hypotheses:

H1: The degree of constipation is lower in pregnant women who undergo foot reflexology than in those who do not.

H2: Pregnant women who receive foot reflexology had better fetal movement than those who do not receive it.

Subjects & Methods

Research design: A quasi-experimental (case-control) research design was utilized in this study.

Setting: This study was conducted at the El-Helal maternal and child health center in Damanhour city, El-Beheira Governorate, Egypt.

Subjects: The study subjects comprised 80 pregnant women in their third trimester (28–

32 weeks), experiencing a single pregnancy, between the ages of 18–45 years, complaining of constipation, and without any medical history such as abortion or bleeding in the present pregnancy.

Exclusion criteria: Women with neurological disorders, inflammatory bowel disease, history of surgeries (other than appendectomy), fungal foot infections or leg verrucae, diabetes/gestational diabetes, heart conditions, hypertension, placenta previa, and unexplained abdominal pain and those who had previously undergone radiation therapy to the abdomen or pelvis.

Sample size: The sample size was estimated using the Epi Info 7 statistical program using the following parameters: Population size = 490/3 months, expected frequency = 50%, confidence level = 95%, and 10% acceptable error. The estimated minimum sample size was 80 women. Subjects were selected conveniently and randomly assigned to either the study or control group (40 women in each one) by lottery. The study group received foot reflexology, and the control group received the routine prenatal care.

Tools of data collection: Three tools were used by researchers to collect the necessary data.

Tool I: Socio-demographic and clinical data structured interview questionnaire:

This tool was developed by the researchers after reviewing the relevant literature to collect the required socio-demographic data, such as age, duration of marriage, level of education, occupation, place of residence, and income. In addition, it included clinical data such as, physical activity, history of

constipation before pregnancy, and consumption of coffee and tea.

Tool II: Constipation Assessment Scale (CAS) for pregnancy:

The primary outcome measure was constipation severity in the past week, which was assessed before and weekly after the intervention using CAS in both study groups for five weeks. This tool was originally developed by **McMillan & Williams (1989)**, and it was also revised and validated in a sample of pregnant women by **Broussard et al., (1998)**. The eight-item CAS for pregnancy has a 5-point summated rating scale with universal criteria of constipation ranging from “no problem” to “severe problem. The total score varied from 0 to 32, and higher scores indicated worse constipation symptoms. The total scores were 0–8 indicating no to minimal problems with constipation during pregnancy, 9–16 indicating some problems, 17–24 demonstrating some to moderately severe problems, and 25–32 indicating moderately severe to severe problems with constipation during pregnancy. This scoring system was modified in the current study to result in only three categories, as follows: no problem = 0–8, some problem = 9–20, and severe problem = 21–32.

Tool III: Kick-chart

This tool was developed by **Liston et al. (2007)**. Mothers were given a "kick-chart" to track the number of fetal movements and document the findings. Prior to the intervention, at baseline, and for the next five follow-up weeks, every week for the first two hours following each reflexology session in the intervention group, these data

were collected in both groups (**Liston, et al., 2007**).

Methods

- The Ministry of Health and Population (MOH) representative in the El-Beheira Governorate received an official letter from the Damanhour University Faculty of Nursing explaining the purpose of the study and asking for authorization.
- The study's goal was explained and the start time for the study was established during the meetings held with the director of the chosen center to get his agreement and cooperation.
- The study tool I was developed by the researchers after an extensive review of the relevant and recent literature. Tool II was adapted and translated into Arabic. Tool III was adopted and translated into Arabic.
- The content validity of the study tools was tested by a jury of five experts in the fields of community health nursing and obstetric and gynecologic nursing. Their opinions and suggestions were taken into consideration.
- The reliability of the study tools was tested for internal consistency using Cronbach alpha, where $r = 0.87$ for tool II and $r = 0.81$ for tool III.
- A pilot study was conducted on eight pregnant women (10% of the total sample size) at Naser Medical Centre in Damanhour City to evaluate the tools' content and the time required for data collection.

The program was conducted through the following phases:

Phase I: Assessment phase:

- The researchers explained the aim of the study and its pathway to all study participants.
- The initial assessment of the selected pregnant women (80 pregnant women) was

done using study tools I, II, and III before applying the nursing intervention (foot reflexology).

Phase II: Planning phase:

- The objectives and methodology of the program were prepared according to the recent relevant literature and the results obtained from the initial assessment. Simple instructional media with pictures was developed and distributed to the study group to assist them remember the technique of foot reflexology.

Phase III: Implementation phase:

- Before the application of foot reflexology, the researchers explained the procedure to each pregnant woman and her relative and showed them an instructional medium and a video to help them remember the technique.
- Researchers demonstrated the foot reflexology technique for each pregnant woman in the study group for 20 minutes at the same time, weekly, for five weeks in front of her relative in the center.
- Researchers asked the woman's relative to re-demonstrate the foot reflexology technique to ensure that she or he would be able to perform it correctly for pregnant women at home.
- Women's relatives were instructed to perform the steps of foot reflexology, exactly as they learned, to their pregnant relatives at home twice daily (morning and evening) for five weeks, and they were followed by phone to ensure their compliance.

Foot reflexology technique: (Liston et al., 2007)

- Each subject was instructed to close their eyes while lying on the examination bed in a silent room. To secure their body in the lateral position, two pillows were positioned

behind and in between their legs. In addition, a minute-long relaxation massage with the massage oil was applied to each sole, followed by "metatarsal kneading" foot reflexology.

- The right hand's fingers were put on the dorsum of the foot from the medial side, with the thumb resting vertically in the medial edge of the foot and the index finger placed just below the base of the toes, to perform metatarsal kneading. Form a fist with the left hand, pressing the flat portion against the metatarsal area, or plantar surface, directly across from the right hand. Keep both hands in contact with the foot at all times, first press the fist against the metatarsal pad, then knead with the holding hand, release some pressure with the fist, and repeat multiple times.



Phase IV: Evaluation phase:

- After the start of the implementation of foot reflexology, all pregnant women in both groups (study and control) were evaluated using study tools II and III weekly until the 5th
- Data was collected over a period of 6 months (from the beginning of February 2023 until the end of July 2023).

Ethical considerations

- Permission was obtained from the ethical committee in the faculty of nursing at Damanshour University and from a representative of MOH.
- Informed written consents were obtained from the study subjects after a brief explanation of the purpose and nature of the research.
- The study placed emphasis on the right to refuse participation, voluntary involvement, and the anonymity and confidentiality of responses.
- The study participants' privacy was preserved.

Statistical analysis

- The data was coded and transferred into specially designed formats so as to be suitable for computer feeding.
- The statistical package for social sciences (SPSS version 25) was utilized for both data entry and statistical analysis. Following data entry, checking and verification processes were carried out to avoid any errors during data entry.
- There was a usage of descriptive statistics including percentages, frequencies, arithmetic mean, standard deviation (SD), and range (minimum and maximum).
- The association between categorical variables was examined using the Chi square

test (χ^2). The level of significance selected for this study was $p \leq 0.05$.

Result :

Table 1 reveals that the study sample's age range was 18–41 years, with a mean age of 24.83 ± 5.95 years. In the reflexology group, 25.0% of the pregnant women were between the ages of 20 and 25, compared to 32.5% in the control group. While 2.5% of the pregnant women in both groups were over 40, Concerning the duration of marriage, less than two-thirds (65.0% and 60.0%) of the pregnant women in the reflexology group and the control group, respectively, were married for less than 5 years. In relation to education, less than half of the pregnant women in the control group and the reflexology group had secondary school education (47.5% and 40.0%, respectively). Regarding education, housewives made up 50.0% of the pregnant women in the reflexology group and more than half (57.5%) of the women in the control group. In terms of the place of residence, most of the pregnant women in the reflexology group and the control group (80.0% and 85%, respectively) were rural residents. As regards income, 100% of the pregnant women in both groups reported that their total income was insufficient to pay for the expenses. This table also indicates no statistically significant differences in terms of the socio-demographic parameters between the two groups ($P > 0.05$).

Table II illustrates that more than three-quarters (77.5%) of the control group and 65% of the reflexology group reported that they were practicing regular physical activities. Less than three-quarters (72.5%)

of women in the reflexology group had no history of constipation before pregnancy, whereas over three-quarters (80.0%) of women in the control group had no such history. Among the control and study groups, the majority of the pregnant women (92.5%) were regular consumers of coffee and tea. Regarding the clinical data, there was no discernible statistically significant difference between the two groups ($P > 0.05$).

Table III clarifies that at the first time before the intervention, less than half (45.0%) of the control group and slightly more than half (55.0%) of the reflexology group had moderate constipation, with no statistically significant difference between both groups ($X = 1.89$, $P = 0.420$). Moreover, the first section and the second section after intervention showed no statistically significant differences between the reflexology group and the control ($P = 0.655$, $P = 0.617$, respectively). Despite constipation severity levels improving in both groups over time, comparisons of the severity between the two groups showed statistically significant differences in the third, fourth, and fifth weeks after the intervention ($P = 0.024$, 0.037 , and 0.007 , respectively). In the reflexology group in the third, fourth, and fifth sections after the intervention, constipation severity improved in 67.5% of the participants at the third week, 72.5% of them at the fourth week, and 85.0% of them at the fifth week.

Table IV highlights that before the intervention, less than half (47.5%) of the control group and 52.5% of the reflexology group had less than six times of fetal

movement, with no statistically significant difference between both groups ($X = 0.2356, = 0.308$). Also, in the first, second, and third sections after the intervention, there were no statistically significant differences between the two groups ($P = 0.792, 0.658, \text{ and } 0.362$, respectively). Over time, there was an improvement in fetal movements in both groups; however, a statistically significant difference was observed between the two groups in the fourth and fifth weeks following the intervention ($P = 0.001, P = 0.000$, respectively). Improvements in fetal movement were observed in 57.5% and 60.0% of the participants in the reflexology group at the fourth and fifth weeks, respectively

Table I: Distribution of the studied groups according to their socio demographic data

Socio demographical data	Control Group (N=40)		Foot reflexology Group (N=40)		Total No= 80		Test of Significance χ^2
	No	%	No	%	No	%	
25>30	10	25.0	13	32.5	23	28.8	$\chi^2= 4.440$ P= 0.488
30>35	2	5.0	4	10.0	6	7.5	
35>40	1	2.5	4	10.0	5	6.3	
≥ 40	1	2.5	1	2.5	2	2.5	
Mean ±SD	23.32±4.79		26.35±3.97		24.83±5.95		
Min-Max	19-41		18-40		18-41		
Duration of marriage							$\chi^2= 0.3778$ P = 0.153
Less than 5 years	24	60.0	26	65.0	50	62.5	
5 years or more	16	40.0	14	35.0	30	37.5	
Mean ±SD	2.37±1.59		26.35±6.65		3.17±2.22		
Level of education							$\chi^2= 2.817$ P = 0.114
Primary school	16	40.0	13	32.5	29	36.3	
Secondary school	19	47.5	16	40.0	35	43.8	
University	5	12.5	11	27.5	16	20.0	
Occupation							$\chi^2= 1.846$ P = 0.171
House wife	23	57.5	20	50.0	43	53.8	
Worker	14	35.0	13	32.5	27	33.8	
Employee	3	7.5	7	17.5	10	12.5	
Place of residence							$\chi^2= 0.346$ P = 0.196
Rural	34	85.0	32	80.0	66	82.5	
Urban	6	15.0	8	20.0	14	17.5	
Income						
Enough	0	0.0	0	0.0	0	0.0	
Not enough	40	100.0	40	100.0	80	100	

χ^2 = Chi Square test * Significant at $p \leq 0.05$

Table II: Distribution of the studied groups according to their clinical data

Clinical data	Control Group (N=40)		Foot reflexology Group (N=40)		Total No= 80		Test of Significance χ
	No	%	No	%	No	%	
Regular physical activity							
Yes	31	77.5	26	65	57	71.2	$\chi^2= 1.5256$ P = 0.216
No	9	22.5	14	35.0	23	28.8	
History for constipation before pregnancy							
Yes	8	20	11	27.5	19	23.75	$\chi^2= 0.6212$ P = 0.430
No	32	80	29	72.5	61	76.25	
Consumption of coffee and tea							
Yes	37	92.5	37	92.5	76	95.0	$\chi^2= \dots\dots\dots$ P =.....
No	3	7.5	3	7.5	4	5.0	

χ^2 = Chi Square test * Significant at $p \leq 0.05$

Table III: Comparison between the studied groups according to their constipation severity levels at six-time points.

Constipation severity	Control group N=40		Reflexology Group N=40		Test of Significance χ
	No	%	No	%	
Before intervention					
No problem	14	35.0	16	40.0	$\chi^2= 1.819$ P = 0.402
Moderate problem	18	45.0	22	55.0	
Severe problem	8	20.0	4	10.0	
First section (after one week)					
No problem	17	42.5	18	45.0	$\chi^2=0.845$ P =0.655
Moderate problem	15	37.5	17	42.5	
Severe problem	8	20.0	5	12.5	
Second section (after two weeks)					
No problem	15	37.5	18	45.0	$\chi^2=0.965$ P =0.617
Moderate problem	17	42.5	17	42.5	
Severe problem	8	20.0	5	12.5	
Third section (after three weeks)					
No problem	17	42.5	27	67.5	$\chi^2=7.41$ P =0.024*
Moderate problem	18	45.0	11	27.5	
Severe problem	5	12.5	2	5.0	
Fourth section (after four weeks)					
No problem	20	50.0	29	72.5	$\chi^2=6.54$ P =0.037*
Moderate problem	13	32.5	10	25.0	
Severe problem	7	17.5	1	2.5	
Fifth section (after five weeks)					
No problem	21	52.5	34	85.0	$\chi^2=9.83$ P =0.007*
Moderate problem	16	40.0	5	12.5	
Severe problem	3	7.5	1	2.5	

χ^2 = Chi Square test * Significant at $p \leq 0.05$

Table IV: Distribution of the studied groups according to their fetal movement frequency at six time points.

Fetal movement	Control group (N=40)		Reflexology group (N=40)		Test of Significance χ
	No	%	No	%	
Before intervention					
< 6 times	19	47.5	21	52.5	$\chi^2=2.356$ P=0.308
6 < 10 times	9	22.5	4	10.0	
≥ 10 times	12	30.0	15	37.5	
First section (after one week)					
< 6 times	18	45.0	15	37.5	$\chi^2=0.464$ P=0.792
6 < 10 times	7	17.5	8	20.0	
≥ 10 times	15	37.5	17	42.5	
Second section (after two weeks)					
< 6 times	18	45.0	14	35.0	$\chi^2=0.834$ P=0.658
6 < 10 times	6	15.0	7	17.5	
≥ 10 times	16	40.0	19	47.5	
Third section (after three weeks)					
< 6 times	17	42.5	11	27.5	$\chi^2=2.032$ P=0.362
6 < 10 times	8	20.0	11	27.5	
≥ 10 times	15	37.5	18	45.0	
Fourth section (after four weeks)					
< 6 times	16	40.0	2	5.0	$\chi^2=14.69$ P=0.001*
6 < 10 times	7	17.5	15	37.5	
≥ 10 times	17	42.5	23	57.5	
Fifth section (after five weeks)					
< 6 times	18	45.0	3	7.5	$\chi^2= 14.703$ P= 0.000*
6 < 10 times	7	17.5	13	32.5	
≥ 10 times	14	35.0	24	60.0	

χ^2 = Chi Square test * Significant at $p \leq 0.05$

Discussion

As one special physiological stage for women, pregnancy has increased the occurrence of constipation. Constipation during pregnancy has the potential to negatively impact a woman's overall well-being and quality of life. Moreover, the

health of the mother and the fetus may suffer if pharmaceutical agents are used to treat constipation during pregnancy (Gillespie et al., 2016).

There has been an increasing interest in using non-pharmacological methods to treat a variety of illnesses over the last few years.

It is more safe, affordable, less risky, non-invasive, doesn't need costly equipment to be used, and nurses can use it as part of their nursing care. These methods are also considered more favorable by patients. Reflexology is one of the most widely used non-pharmacological methods to manage a variety of ailments **Woodward, et al., (2010)**. Therefore, the current study was conducted to evaluate the effect of foot reflexology on constipation and fetal movement during pregnancy.

The current study's findings showed no statistically significant differences in age, length of marriage, education level, occupation, place of residence, income, or physical activity between the control and study group. Furthermore, throughout the first two weeks, there was no a discernible difference in the degree of constipation or fetal movement between the two groups. These findings all roll out the confounding variables that could affect the results of foot reflexology.

Conversely, the present study's findings demonstrated that constipation severity improved in the reflexology and control groups over time. However, statistically significant differences between both groups are found in the third, fourth, and fifth weeks after the intervention ($P = 0.024$, 0.037 , and 0.007 , respectively). These findings are in line with those reported by **Sehhatti et al. (2020)** which reported substantial improvement in Constipation Assessment Scale (CAS) measures among 97.2% of the pregnant women in the reflexology group by the end of the sixth week following reflexology in comparison

with the control group. Moreover, these results are compatible with the results of the study conducted by **Woodward, et al., (2010)**, who conducted a pilot study on 19 female patients with idiopathic constipation and proved that a course of weekly reflexology treatment for six weeks had beneficial effects on idiopathic constipation symptoms.

Similarly, the current study's findings were in agreement with a study carried out by **Similarlyoli et al. (2016)** to compare the effectiveness of reflexology and abdominal massage on constipation among orthopedic patients. This study found significant differences in constipation severity between the intervention and control groups from the 3rd to the 6th days after the intervention.

Fetal movement counting is one of the important methods used to monitor a baby's health condition during pregnancy and is considered the only method that a mother can use without the need for a health care provider or equipment. In a healthy fetus, the number of movements per hour might range from four to one hundred / hour. Fetal movement can be increased, decreased, or even arrested by outside stimuli **Diego, et al., (2002)**. In this respect, the current study assessed fetal movement before and after foot massage.

The current study's results showed that both groups' fetal movement frequencies gradually improved. On the other hand, statistically significant changes were observed in the fourth and fifth weeks following the intervention when comparing the two groups ($P = 0.001$, $P = 0.000$, respectively). After five weeks, the change

became more noticeable, suggesting that foot reflexology massage had a cumulative effect. These findings align with those of a study by **Sehhatti et al. (2020)** which examined the frequency of fetal movements over seven-time points between the reflexology and control groups and discovered statistically significant differences between the two groups in the fourth ($P = 0.001$) and fifth weeks ($P = 0.008$).

Moreover, these results agreed with **Diego, et al., (2002)** who in their study examined the fetal reaction to stimulation of the abdomen using vibration compared with foot massage during pregnancy and found significant increase in fetal movements after foot massage.

Conclusion:

Based upon the results of the current study, it could be concluded that foot reflexology is a useful technique to relieve pregnancy-related constipation and a powerful way to improve fetal movement.

Recommendations:

In light of the present study's findings, the following recommendations are suggested:

- Incorporate foot reflexology into routine antenatal care along with routine care provided by nurses to better manage pregnancy-related constipation and improve fetal movement.
- Application of comprehensive health education programs for pregnant women to encourage them to use foot reflexology.
- Conduct a program for in-service training for nurses who work in antenatal care to raise their awareness about the benefits of

foot reflexology for pregnant women suffering from constipation.

- Integrate foot reflexology into nursing curricula to provide training for nursing students about how to use this technique to manage constipation during

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