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Original Article

Nursing Section

Effectiveness of Foot Exercise and Epsom Salt Water on Reduction of Foot Oedema among Antenatal Mothers

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ABSTRACT

Introduction: Pregnancy is a very special time for both woman and her partner. Physiological lower leg oedema is one of the cutaneous manifestations of pregnancy. The weight increase during pregnancy and effect of gravity, slows down the blood circulation in lower limbs, thus leading to accumulation of fluids in that region. It is envisioned that about 75% of women suffer from this excessive accumulation of fluid around the legs and ankles during pregnancy.

Aim: To evaluate the effect of foot exercise and Epsom salt water on reduction of foot oedema among the antenatal mothers at selected hospitals of Kheda district.

Materials and Methods: This was a Quasi experimental study, conducted from January 17, 2020 to March 18, 2020 at Dr ND Desai Hospital and Medical College, Nadiad, Gujarat, on 40 antenatal mothers having foot oedema, from selected hospitals of Kheda district by purposive non probability sampling techniques. The total sample of 40 mothers was randomly allocated to group 1 (n=20 of foot exercise) and group 2 (n=20 of Epsom salt water). Foot oedema level assessment was done using tools of data collection for both groups which included the performa of demographic variables and Modified Standardised Erin oedema scale.

Results: Amongst the total study subjects, 11 (55%) of those in group 2 were from 18-24 years of age. Oedema score analysis preinterventionally, showed moderate score in 18 (90%) of subjects in group 1 and 9 (45%) subjects in group 2. Severe score presented by 2 (10%) subjects in group 1 and 11 (55%) subjects in group 2. Postinterventionally, none of the subjects in group 1 and group 2 showed moderate and severe oedema. All gave the score of 0, trace or mild oedema. There was statistically significant difference found in level of foot oedema in group 1 and group 2 with mean difference of group 1 as 2.2 and Standard Deviation (SD) 0.51 and for group 2 mean difference was 2.95 and SD 0.68. The calculated value of Mann-Whitney test was group 1 (3) and group 2 (1.49). Among them the level of foot oedema reduced to 55% in group 1 (foot exercise) whereas in group 2 (Epsom salt water) it reduced to 73.75%.

Conclusion: Epsom salt water is more effective then foot exercise on reduction of foot oedema among the antenatal mothers.

Keywords: Foot rub down, Physiological leg oedema, Pregnancy, Socio-demographic

INTRODUCTION

Pregnancy is a very special time for both woman and her partner. Knowing what is happening to woman and her growing baby during the weeks ahead will help the woman and her partner to enjoy this exciting period in their lives. As a lady's body adapts to the adjustments that pregnancy deliver, she will start to evolve to prepare her body emotionally and almost ready for parenthood. A girl's body will trade as dramatically and as unexpectedly because it will for the duration of pregnancy. The nine month journey that a girl and her frame take will make each inner and external adjustment to the girl's frame [1].

It is envisioned that about 75% of women suffer this excessive accumulation of fluid around the legs and ankles during pregnancy [2]. The evidence strongly suggests there are maternal fitness advantages whilst healing massage is incorporated everyday as prenatal care. Massage remedy was anticipated to have a high-quality effect on pregnant ladies with the aid of lowering pain, tension and improvement in sleep [3].

Epsom salt bath acts like an analgesic for the human body. It helps to reduce pain and swelling. Epsom salt is usually to be had in a pharmaceutical form. It is most inexpensive and extra effective in decreasing oedema [4]. The cost-effective management is administered to scale back, reduces oedema and anxiety associated with care [5].

Roughly, 75% of pregnant women experience oedema, especially by the time they reach their third trimester. Oedema is considered to be worse at some point in summer and at the end of the day. 5-10% time oedema is related to pre-eclampsia. Strive to stay physically active throughout pregnancy to reduce swelling and have a healthy pregnancy [6].

Foot exercise as an intervention can be used for particular situations, including leg and foot oedema, because it acts on extravascular fluid without stressing on the intravascular fluid [6,7]. However, some subcutaneous oedema fluid can be pushed from the extravascular area into the venous system. Foot rub down includes the manipulation of the gentle tissue of the foot and is more widespread since, it does not affect precise regions that correlate with other body components, in contrast to reflexology [6,8].

Objectives of the study were to assess the foot oedema of antenatal mothers at selected hospitals of Kheda district, to evaluate and compare the effect of foot exercise and Epsom salt water on reduction of foot oedema among those mothers, to determine association between preintervention level of foot oedema of antenatal mothers with their socio-demographic variables.

MATERIALS AND METHODS

This was a Quasi experimental research design, conducted at Dr ND Desai Hospital and Medical College, Nadiad, Gujarat, from January 17,2020 to March 18, 2020 on 40 antenatal mothers, from selected hospitals of Kheda district, after obtaining Ethics Committee approval (Approval no. DPCN/2018-19/617, dated: 17/09/2019). Written informed consent was obtained from the antenatal mothers after explaining them about the secrecy maintenance of the data by coding methodology and their discretion to withdraw from the study anytime without being questioned.

Sample size calculation: Sample size=1.962 SD^2/E^2, where SD-standard deviation, E-standard error. Owing to short duration of study (two months), the authors constrained a limited sample of 40.

Inclusion criteria: Antenatal mothers in age group between 18-45 years, having moderate or severe foot oedema, who can understand Gujarati and Hindi language, and were in 25-42 weeks of gestation of pregnancy, those having foot oedema level at +3 to +4 and gave consent for the research were included in the study.

Exclusion criteria: Those antenatal mothers, who would take any Hypertensive drugs or any diuretics and those having foot oedema with any complications were excluded from the study.

Tools of the Study

Foot oedema level assessment was done using tools of data collection for both groups which included proforma of demographic variables and Modified Standardised Erin oedema scale and involved the subsequent:

Socio demographic data: The demographic variable in that age, height, weight, education, type of work, type of family, number of pregnancy, weeks of pregnancy, resting periods during day time, sleeping periods during night time, and area of living, etc… was used in this research.

Modified Standardised Erin oedema scale: [Table/Fig-1].

Score	Nature of oedema	Oedema assessment
0	None	No oedema
+1	Trace	Rapid return to normal
+2	Mild	Rebounds in a few seconds
+3	Moderate	10-20 seconds to return to normal
+4	Severe	>30 seconds to return to normal

[Table/Fig-1]: Modified Standardised Erin oedema scale.

Validity and reliability of the tool: The reliability is a criterion for measuring adequacy, consistency, accuracy of tool [9]. The reliability of the tool was assessed by using the test retest method and its Karl Pearson correlation coefficient r value is 0.87. The content validation of the tool was done by nine experts of medical field. Experts are master of Obstetrics and Gynaecological Nursing Postgraduate Faculties, Guide and Gynaecologist. The experts were selected on basis of their clinical teaching experience and interest, in the problem being studied. They were requested to give their opinions and suggestions for the item of the tool.

Pilot study: Pilot study was conducted among six antenatal mothers in the same study group as main study. The pilot study was conducted from 1st January, 2020 to 8th January, 2020 at Dr ND Desai Hospital and Medical College, Nadiad. Antenatal mothers with foot oedema (six) were selected using a non probability purposive sampling technique for the cause of the pilot study. The sample of the pilot study was accepted from the total sample to reassure the steadiness and strength of the result.

Data collection procedure: The data collection procedure was started on 17th January, 2020. During the first visit, the researcher introduced herself and explained the aim of the study and confirmed the willingness of the antenatal mothers to take part in the study by getting consent from them as per the inclusion criteria. The time taken for each client is 20 minutes. On the first day of sample selection, the demographic data and pre assessment of foot oedema level measured of the subjects were assessed. In group 1, foot exercise was given to the antenatal mothers. It applying for 20 minutes for three days once a day. Foot exercise consist of ankle pump exercise and circumduction of foot. In group 2, Epsom salt water application prepared by adding one cup (30 grams) of Epsom salts to one litre of Lukewarm water and applying for 20 minutes over the feet, for three days once a day would relieve the foot oedema level.

STATISTICAL ANALYSIS

Data were statistically analysed by Statistical Package for Social Sciences (SPSS) version 22. The data obtained from the samples was analysed by using descriptive statistics unpaired t-test (Mann-Whitney U Test) was used for parametric data. Descriptive statistics were expressed as mean and standard deviation for quantitative data or number and percentage for qualitative data. Chi-square test was done for finding correlation between the variables. p-value ≤0.05 to be statistically significant and ≤0.001 to be high statistically significant.

RESULTS

Demographically, amongst the total study subjects, maximum 11 (55%) of those in group 2 were from 18-24 years of age while those in group 1, subjects were in 25-31 years age group, 10 (50%) of patients in group 1 were primary educated. All (100%) from group 1 and 95% from group 2 were engaged in household work. Clinically, about 90% subjects in group 2 were in 31-36 weeks of pregnancy [Table/Fig-2]. Oedema score analysis preinterventionally, showed moderate score in 18 (90%) of subjects in group 1 and 9 (45%) of subjects in group 2. Severe score presented by 2 (10%) subjects in group 1

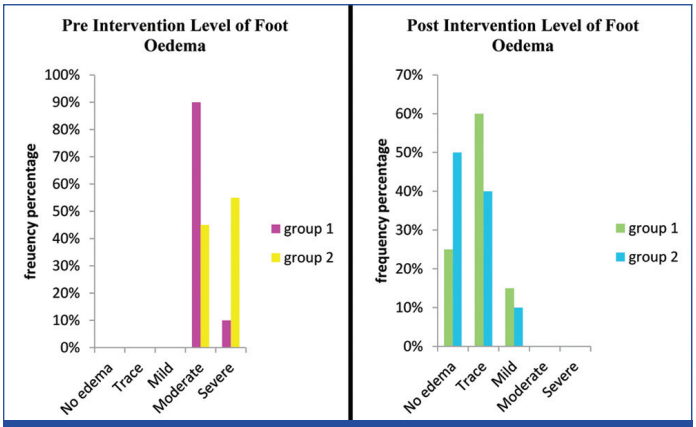
Demographic variables		Group			
		Group 1 (Foot exercise) N=20		Group 2 (Epsom salt water) N=20	
		n	%	n	%
Age (in years)	18-24	9	45%	11	55%
	25-31	11	55%	6	30%
	32-38	0	0	2	10%
	39-45	0	0	1	5%
Height (in cm)	141-150	8	40%	8	40%
	151-160	12	60%	12	60%
Weight (in Kg)	≤50	10	50%	4	20%
	51-60	9	45%	9	45%
	61-70	0	0	4	20%
	71-80	0	0	2	10%
	≥81	1	5%	1	5%
Educational status	Non formal education	2	10%	1	5%
	Primary	10	50%	6	30%
	Secondary	7	35%	8	40%
	Higher secondary	1	5%	3	15%
	Graduate or above	0	0	2	10%
Occupation	Household work	20	100%	19	95%
	Sedentary work	0	0	1	5%
Family type	Joint	18	90%	19	95%
	Nuclear	2	10%	1	5%
Number of pregnancy	1	12	60%	11	55%
	2	7	35%	9	45%
	3	1	5%	0	0
Weeks of present pregnancy	25-30	9	45%	2	10%
	31-36	7	35%	18	90%
	37-42	4	20%	0	0
Resting period during day time (in hour)	½-1	20	100%	14	70%
	1½-2	0	0	5	25%
	2½-3	0	0	1	5%
Sleeping period during night time (in hour)	≤6	0	0	1	5%
	7-8	20	100%	19	95%
Area of living	Urban	4	20%	8	40%
	Rural	16	80%	12	60%

[Table/Fig-2]: Description of all study patients in terms of their demographic variables.

and 11 (55%) subjects in group 2 [Table/Fig-3,4]. Postintervention, none of the subjects in group 1 and group 2 showed moderate and severe oedema score [Table/Fig-4,5]. The independent t-test applied for comparison of preintervention and postintervention level of foot oedema in both group 1 and group 2. The calculated t values of preintervention for both groups were 3.37 and postintervention value for both groups was 1.43. After that researcher applied Mann-Whitney U test. The calculated Z-value for group 1 was 3 and for group 2 it was 1.49 and the table value for both groups were 1.96 [Table/Fig-6]. Among them, the level of foot oedema reduced 55% in group 1 (foot exercise) whereas in group 2 (Epsom salt water) it reduced 73.75% [Table/Fig-7]. This shows the Epsom salt water is more effective than the foot exercise in reduction of foot oedema among the antenatal mothers.

Level of foot oedema	Group 1 (Foot exercise) N=20		Group 2 (Epsom salt water) N=20	
	n	%	n	%
Moderate	18	90%	9	45%
Severe	2	10%	11	55%
Total	20	100%	20	100%

[Table/Fig-3]: Analysis of the data related to evaluate the effectiveness of foot exercise and Epsom salt water on reduction of foot oedema among antenatal mothers before intervention of foot exercise in group 1 and Epsom salt water in group 2.



[Table/Fig-4]: Preintervention and postintervention of foot oedema level in both groups group 1 (foot exercise) and group 2 (Epsom salt water).

Level of foot oedema	Group 1 (Foot exercise) N=20		Group 2 (Epsom salt water) N=20	
	n	%	n	%
No oedema	5	25%	10	50%
Trace	12	60%	8	40%
Mild	3	15%	2	10%
Total	20	100%	20	100%

[Table/Fig-5]: Analysis of data to find out effectiveness of foot exercise and Epsom salt water on reduction of foot oedema among antenatal mothers after intervention of foot exercise in group 1 and Epsom salt water in group 2.

Analysis of subjects according to intervention	No of antenatal mothers	Group 1 (Foot exercise) (Foot oedema scores)		Group 2 (Epsom salt water) (Foot oedema scores)		Student's independent t-test
		Mean	SD	Mean	SD	
Preintervention	20	3.1	0.30	3.55	0.51	t=3.37 p=**0.02**
Postintervention	20	0.9	0.64	0.6	0.68	t=1.43 p=0.15

[Table/Fig-6]: Comparative analysis of level of foot oedema interventionally.

DISCUSSION

This study described the effectiveness of foot exercise and Epsom salt water in reduction of foot oedema among antenatal mothers at selected hospitals at Kheda district.

Level of foot oedema	Max scores of foot oedema	Preintervention	Postintervention	Mean difference with 95% confidence interval	Reduction from baseline data
Group 1	4	3.1	0.9	2.20	55%
Group 2	4	3.55	0.6	2.95	73.75%

[Table/Fig-7]: The effectiveness of foot exercise and Epsom salt water on reduction of foot oedema level between the group 1 and group 2.

The present study showed that in pre assessment, in group 1, 90% of the antenatal mothers are having moderate foot oedema and 10% of the antenatal mothers are having severe foot oedema level. In group 2, 55% of the antenatal mothers are having severe foot oedema level and 45% of them are having moderate foot oedema level. The result of the present study are supported by a study conducted by Ochalek K et al., with the aim to evaluate risk elements and to research strategies implemented in the prevention and treatment of lower limb oedema in pregnant ladies with a specific specialisation in compression remedy and exercising. A random sampling technique adopted to select 54 women with swellings of lower limbs at some stage of pregnancy have been assigned to two group- either to a set with help during being pregnant, located mostly within the region of feet and lower legs (Group A, n=42), or to a gaggle without oedema (Group B, n=12) [10]. The present study was also supported by Rahimikian F et al., who described the impact of foot massage on physiological oedema during pregnancy [11]. According to them, there was statistically good sized distinction between the average of the foot conditions (around the ankle, heel and metatarsal joints between the finger bones) in both treatment and control groups [11].

In a study the Epsom salt water group had 50% of the antenatal mothers with foot oedema, 40% of them are having trace level of foot oedema and 10% of them were having mild foot oedema level. In the group 2 (Epsom salt water), preintervention data was suggesting that the level of oedema was more than postintervention data and it was statistically proven. This study has been supported by Health and Wellness Common illnesses 2007 where it was suggested to add half-a-teaspoon of salt to a tumbler of hot water and rinse with the solution. Apply an ice pack to the side of the face where the pain is felt. Add one tablespoon of Epsom salts and a same amount of ordinary salt to a little amount of boiled water. A hot foot bath for approximately 20 minutes will frequently relieve the headache, joint pain, leg ache and different joint muscle alignments. Fill the bathtub with hot water and Epsom salts and just sink right in. This will relieve the pain associated with muscle and joint injury [12].

In the present study in group 1, 90% of the antenatal mothers were having moderate foot oedema and 10% of the antenatal mothers were having severe foot oedema level. In the group 2, 55% of the antenatal mothers were having severe foot oedema level and 45% of them were having moderate foot oedema level. In the group 1 (foot exercise), postinterventionally 25% of the antenatal mothers were having no foot oedema, 60% of them are having trace level of foot oedema and 15% of the antenatal mothers had mild level of foot oedema. In the group 2 (Epsom salt water), 50% of the antenatal mothers had no foot oedema, 40% of them had trace level of foot oedema and 10% of them had mild foot oedema level.

The educative measure studied shows there is a significant reduction in foot oedema regarding interventions among antenatal mothers. The post assessment level of foot oedema was highly significant when compared with pre assessment level of foot oedema. The present study showed that the level of foot oedema reduced to 55% in group 1 (foot exercise) whereas in group 2 (Epsom salt water) it reduced to 73.75%. In group 2 (Epsom salt water) the reduction of foot oedema was more than the group 1 (foot exercise).

Present study findings were also supported by the study of Khedr NF and Hemida R which was a quasi-experimental study [13]. The goal of their study was to evaluate the impact of leg elevation versus water immersion on leg oedema in first trimester of pregnancy. Their study revealed that leg elevation and water immersion are necessary to relieve oedema in lower extremities throughout pregnancy. The result of the present study also showed that Epsom salt water is more effective than foot exercise in reduction of foot oedema among the antenatal mothers.

Limitation(s)

The study is limited to 40 antenatal mothers i.e small sample size from only limited selected hospitals and antenatal mothers only between 25 to 40 weeks of gestation were a part of the study, hence limits the generalisation of the results.

CONCLUSION(S)

The purpose of the present study was compare the effectiveness of foot exercise and Epsom salt water on foot oedema among antenatal mothers at selected hospital of Kheda district using a quasi-experimental study design. After providing the interventions the level of foot oedema was significantly reduced in both groups. The study concludes that Epsom salt water is more effective than foot exercise on reduction of foot oedema among the antenatal mothers. The findings of the study enlighten the fact that lukewarm water with Epsom salt therapy can be used to reduce the level of foot oedema among the patients with physiological foot oedema, A protocol steps for implementation of the Epsom salt water compress can be developed and used in all nursing care settings, These findings would help nursing faculty to give importance to Epsom salt water therapy as a nursing intervention in the management of foot oedema among patients. Further future studies are recommended for epsom salt water use in other oedemas as well, for a longer duration of time and also followed-up for comparison between antenatal and post natal mothers, with larger sample size for better generalisation of results.

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