Effect of Hoffman's Exercise on Successful Breastfeeding and Satisfaction among Postnatal Women with Flat and Inverted Nipples

Hanan Moustafa Ashour Elkhatib[1], Hanan Abd Elrahman Mostafa Kandeel[2], Elham Gomaa Ramdan Elgmal[3]

[1] Lecturer of Obstetric& Gynecologic Nursing, Faculty of Nursing, Damanhur University

[2]Assistant professor of Obstetric and Gynecologic Nursing, Faculty of Nursing, Alexandria University

[3]Lecturer of Obstetric & Gynecologic Nursing, Faculty of Nursing, Damanhur University

Abstract:

Background: Breastfeeding is the most cost-effective intervention for reducing infant morbidity and mortality worldwide. Having flat or inverted nipples is among the reasons that prevent exclusive breastfeeding. Hoffman's exercise is a manual exercise that may help break adhesions at the base of the nipple that keep it inverted. **Aim**: To determine the effect of Hoffman's exercise on successful breastfeeding and satisfaction among postnatal women with flat and inverted nipples. **Design**: a quasi-experimental research design. **Setting**: The study was conducted at the postnatal unit of Damanhour Medical National Institute. **Subjects:** A convenience sample of 80 postpartum women **Tools**: three tools were used for data collection. **Tool I:** Socio-demographic and reproductive history structured interview schedule. **Tool II:** LATCH scale for the assessment of the level of breastfeeding. **Tool III** Maternal Breastfeeding Evaluation Scale (MBFES) is the Likert scale to assess maternal satisfaction with breastfeeding response. **Results**: Findings of the present study revealed that the total score of the LATCH scale was statistically significantly increased among the study group after intervention ($p=<0.001$). Regarding the degree of satisfaction with breastfeeding following the intervention, there were highly statistically significant differences between the analyzed groups ($p<0.001$), favoring the study group. In addition, the study findings showed that 42.5% and 27.5% of the subjects in the study group were either very satisfied or satisfied respectively, compared to only 5% and 7.5% of the subjects in the control group after intervention. **Conclusion:** The study concluded that postnatal women who practice Hoffman's exercise exhibit higher scores on the LATCH scale which means that Hoffman's exercise had a positive effect on the level of breastfeeding and women's satisfaction. **Recommendations**: Hoffman's exercise should be recommended as a safe, simple, painless, and effective, non-pharmacological method for treating flat and inverted nipples.

Keywords: Breastfeeding, Hoffman's exercise, Postnatal, Flat, and Inverted nipple.

Introduction

Breastfeeding is considered the golden standard for health and the ideal feeding method during infancy. It is the most cost-effective technique for lowering newborn morbidity and mortality around the world **(Muluneh, 2023)**. Research has demonstrated that breast milk confers several health advantages to both the mother and the infant. Given that human milk contains numerous essential nutrients, live cells, and defense components. It helps infants develop physically and mentally, boosts immunity, and guards against respiratory and diarrheal illnesses, among other non-communicable diseases later in life **(Kaur, Saini, and Sharma, 2020)**. In addition, it supports bonding and emotional interaction between mother and baby and lowers the risk of ovarian, and breast cancer **(Jebena & Tenagashaw, 2022)**.

Globally it is recognized as an optimal intervention for improving maternal and child health through starting breastfeeding within an hour after the infant's birth **(Prentice, 2022)**. As well as exclusive breastfeeding for the first six months, followed by continued breastfeeding up to two years of age. Data from the Egyptian

Demographic and Health Survey indicate that only four out of ten infants in Egypt under six months of age were exclusively breastfed, indicating that breastfeeding practices are not always adequate **(Elsayed & Aldossary, 2018)**. All mortality risk factors are higher in non-breastfed infants compared to infants under five months of age who receive exclusive breastfeeding (EBF). Despite numerous established maternal and newborn health benefits, breastfeeding practices continue to be inadequate internationally **(Lawrence &Lawrence, 2021) .**

Furthermore, A higher percentage of breastfeeding exclusivity was linked to breastfeeding satisfaction. In addition, maternal satisfaction with breastfeeding plays a pivotal role in the success of this practice. Many aspects were found to have a positive impact on maternal satisfaction with breastfeeding including early skin-to-skin contact, ensuring proper latch-on technique, staying in rooming-in settings, and breastfeeding the baby on demand (**Bizon, Giugliani, & Giugliani, 2023).**

On the other side, postpartum mothers may experience dissatisfaction or difficulty in breastfeeding. The majority of breastfeeding women encounter breast problems mainly at the beginning of breastfeeding, which may lead to failure of the breastfeeding process both problems originating from the mother and the baby. Feeding difficulties may arise from several possible breast abnormalities, such as cracked nipples, flat and inverted nipples, and very short nipples **(Aryeetey & Dykes, 2018 & Gianni et al, 2019)** .

One of the things that make exclusive breastfeeding difficult is having nipples that are flat or inverted. Women who have inverted nipples may find it difficult to initiate and continue breastfeeding. A condition known as an inverted nipple occurs when the nipple retracts inward rather than pointing outward as is typical in anatomy. It can be congenital or acquired, and it can affect people of both sexes **(Mangialardi et al, 2020 & Priya et al, 2023).** Furthermore, the protrusion of the inverted nipple is positioned anatomically opposite to the typical nipple's location, below the areolar plane. When it extends past the areolar breast's plane. Moreover, the appearance can be psychologically disturbing for the affected woman, as well as it can be more problematic during breastfeeding in lactating women. Management of nipple inversion mainly depends on its grade **(Baker, 2022 & Kalaaji, Jönsson & Schnegg, 2022)**.

Nipple inversion has been treated with a range of surgical and non-surgical methods over time, with both positive and negative results. An inverted nipple is most effectively managed with an interprofessional team approach, as it is a condition that affects the patient's appearance as well as their mental health

(Rao & Winters, 2023). Whether the correction is being made to improve the appearance or establish functionality, the primary reason for the correction should be communicated to the treating physician. Proper patient counseling about their condition and the available treatment options seems to be more effective in helping them make an informed decision about their management. **(Kalaaji, Jönsson & Schnegg, 2022)**.

In contrast to pharmaceutical treatments, non-pharmacological strategies are more popular lately. Examining the anticipated role of non-pharmacological strategies in continuing breastfeeding can help in the establishment and strengthening of cooperation among multidisciplinary healthcare providers. Moreover, developing multidisciplinary breastfeeding enhancement strategies **(Elgzar et al, 2023)**. Among all the non-pharmacological measures, the most practiced approaches were found as Hoffman's exercise, nipple exercise, the inverted syringe method, using a rubber band over the nipple, and multidimensional postpartum home visits. Seems to be the most effective in breastfeeding and nipple correction in women complaining of flat and/or inverted nipples **(Kaya et al, 2023).**

Hoffman’s exercise is a technique of historic significance, presented in 1953 by Dr. J Brooks Hoffman. Hoffman's exercise is a manual, non-invasive technique for correcting adhesions at the nipple's base to keep the nipple inverted. Using this exercise, both thumbs were

placed on opposing sides of the nipple, above the areola. Next, press firmly downward on the breast to get the nipple to protrude. This repeated itself all over, progressively extending the nipple as you moved away from it many times (**Hoffman technique 2016)**. This exercise can be performed up to five times daily. The nipples can be prepared for postpartum breastfeeding throughout pregnancy. Moreover, It can be used just after delivery in a safe manner to facilitate nipple protraction and prevent problems that can hinder the natural breastfeeding process **(Kaur, Saini,& Sharma, 2020)**.

Currently, studies on non-pharmacological treatments used for the management of breast problems are limited, and the need for more evidence-based studies are recommended. As postnatal women encounter many difficulties in coping with breastfeeding problems during this period and they need thorough teaching and counseling on breastfeeding and breast care. Therefore, midwives have a great responsibility to inform women about breast care in the antenatal period and correct breastfeeding techniques that will be used later after childbirth. In addition, they should also include training on alternative approaches for managing common breast problems that can hinder the satisfactory breastfeeding process **(Özhüner & özerdoğan, 2022).**

Significance of the study

Nipple abnormalities such as flat and inverted nipples are a condition with a prevalence of 10% to 20%. Moreover, it is most frequent during the first few days after giving birth, which inhibits successful breastfeeding. The majority of postpartum mothers are unable to breastfeed their newborns effectively due to breast difficulties including flat and inverted nipples, so despite great efforts, the practical concerns with breastfeeding continue to increase and flourish (**Prentice, 2022)**. Thus, providing education about breastfeeding has proven to be an effective intervention to increase exclusive breastfeeding. Holistic breastfeeding education is increasingly being developed because it helps in managing many breastfeeding difficulties that can hinder the normal breastfeeding process **(Rosa, Rohana & Ulfa, 2022)**. Furthermore, Hoffman's exercise in the treatment of certain nipple anomalies in Egypt has not received much scientific attention and there are limited researches in this aspect. Thus, the purpose of this study was to evaluate Hoffman's Exercise's impact on postpartum women with flat or inverted nipples' satisfaction and ability to breastfeed successfully.

Aims of the study

The aim of the study is to:

Determine the effect of Hoffman's exercise on successful breastfeeding and satisfaction among postnatal women with flat and inverted nipples.

Research hypothesis:

- Hypothesis 0: Postnatal women with flat or inverted nipples who practice Hoffman's exercise exhibit the same scores on the LATCH scale and satisfaction with the level of breastfeeding as those who do not.

- Hypothesis I: Postnatal women with flat or inverted nipples who practice Hoffman's exercise exhibit higher scores on the LATCH scale on the level of breastfeeding than those who do not .

- Hypothesis II: Postnatal women with flat or inverted nipples who practice Hoffman's exercise are more satisfied with the level of breastfeeding than those who do not.

Materials and Method

Materials:

Research design:

In the present study, a quasi-experimental design was employed.

Settings:

This study was conducted at the postnatal unit of Damanhour Medical National Institute. The unit includes 4 rooms for the admission of postpartum women immediately after delivery where the researchers interviewed the recruited women. This setting was selected as it is the only primary hospital in Damanhour

Governorate offering an enormous number of deliveries and obstetrics and gynecologic services. It conducted about (4980) annual deliveries according to its local statistics for the year 2023 (Obstetric and Gynecological Department, Damanhour National Medical Institute, 2023).

Subjects:

A purposive sample of 80 postpartum women were selected from the previously mentioned setting. Utilizing Epi info 7 statistical programs based on the following parameters: population size = 415 (per month), minimal sample size = 78, final sample size = 80 for a potential normal response, predicted frequency = 50%, tolerable error = 5%, confidence coefficient = 95%. The study subjects were selected according to the following **inclusion criteria**:

- Had at least one non-protractile or inverted nipple.
- Conceived a singleton.
- Plan to breastfeed their babies.
- No prior history of areola or nipple surgery.
- Baby free from any neonatal congenital anomalies that can interfere with breastfeeding like tongue-tie, cleft lip, and cleft palate.
- Willing to participate in the study.

The chosen participants were equally assigned to the study group (40) and the control group (40).

Tools: three tools were used:

Tool one: Socio-demographic and reproductive history structured interview schedule: It was developed by the researcher to collect the necessary data from women. It included Socio-demographic characteristics (such as age, level of education, occupation, current residence, and family type), reproductive history (such as gravidity, parity, number of abortions, and type of delivery), and history of last pregnancy.

Tool two: LATCH Scale

The acronym LATCH, which originated from Jensen et al. (1994), refers to L refers to the latching of the infant onto the nipples, A refers to the amount of audible swallowing, T refers to the type of nipples, C means mother comfort, and finally H assistance needed by the mother to hold the baby to her breast. Each item assigns a numerical score [0, 1, or 2] and the total score ranges from 0 -10. A LATCH score of seven or more is considered successful, whilst a score of less than seven is considered unsuccessful. The total LATCH score was as follows;

- Poor level of breastfeeding (0-3).
- Fair level of breastfeeding(4-6).
- Good level of breastfeeding(7-10).

Tool three: Maternal Breastfeeding Evaluation Scale (MBFES): It was first developed by Leff, et al (1994) to measure maternal satisfaction with breastfeeding experience. Then it was modified by Nabulsi, et al (2021) into an Arabic version Maternal Breastfeeding Evaluation Scale (MBFES-A). It comprises 26 items each item has 5-point Likert-type answers; Very unsatisfied is denoted by 1, unsatisfied by 2, not very satisfied by 3, satisfied by 4, and extremely satisfied by 5. Greater satisfaction with the employed strategy for breastfeeding is indicated by a higher score. The total score may range from 26-130 (higher scores indicate greater satisfaction). The total score of the Maternal Breastfeeding Evaluation Scale was categorized as follows:

- 26 - < 60 low satisfaction
- 60 - < 95 moderate satisfaction
- 95 - 130 high satisfaction

Field work:

First phase (Preparatory phase):

- An ethical approval from the Research Ethics Committee, of Damanhour University, Faculty of Nursing was obtained on 16 February 2023 before conducting the study.

- After outlining the purpose of the study, the Faculty of Nursing Damanhour University delivered an official letter to the relevant authorities in the study settings requesting their consent to collect data.

- Tool one was developed by the researchers, while tools two & three were adopted.

- The tools were evaluated for content validity by a panel of three expert professors in the field of obstetric & gynecologic nursing and some modifications were done accordingly.

- The reliability of tools two and three was assessed using Cronbach's alpha test and both were found to be reliable. The result was (0.82) for tool two and (0.78) for tool three.

- A pilot study was conducted on 8 (10%) women to review the tools' clarity and applicability.

- Data was collected from the beginning of July 2023 until the end of October 2023.

Second phase (Implementation phase):

- Each postnatal woman who had the inclusion criteria was randomly assigned to either study or control group. The researchers were started by the control group to avoid contamination of the study.

- **The control group**: included 40 postpartum mothers who were given routine postnatal care. After a 30-minute postpartum individual interview with each mother, the researcher used tool one to gather baseline data as a pre-test. The researcher requested the mother to breastfeed her newborn and collected data using tools two and three as pre-test.

- **The study group**: comprised 40 postpartum women who practiced Hoffman's exercises. To collect baseline data using tool one, the researcher spent roughly thirty minutes postpartum interviewing each woman in the study group personally.

- Before providing intervention, a pre-test was administered, and the mothers were informed about the study's nature and objectives.

- Data of tool one was collected individually from postpartum mothers upon arrival to the postpartum department after delivery through an interview schedule before intervention.

- Level of breastfeeding using the LATCH scale and maternal satisfaction with breastfeeding using the Maternal Breastfeeding Evaluation Scale (MBFES) was assessed as a pre-test for both groups.

- Comprehensive information regarding flat and inverted nipples causes, management, and their effect on the breastfeeding process, the importance of Hoffman's exercise, and its effect on correcting flat and inverted nipples was given to each woman then demonstrated to the mothers how it can be done.

- The researcher starts to explain how to practice Hoffman's exercises using photos, video, and demonstration of how to practice the technique while she is watching through the following steps:

- At the base of the nipples, place the thumbs of both hands in opposition to one another.

- The thumbs are firmly yet softly pulled apart both horizontally and vertically, pressing against the breast.

- Next, the thumbs are turned around the nipple's base.

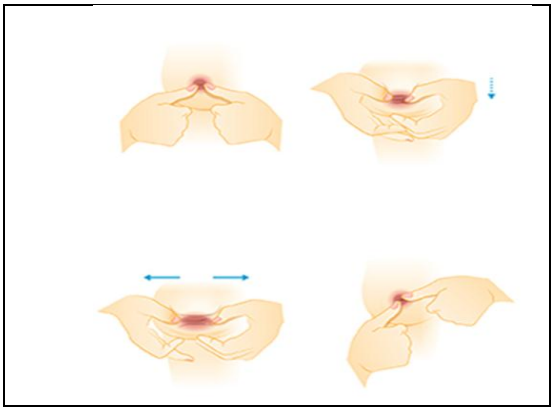


Figure (1): Application of Hoffman's exercise. Arrows show the directions for the vertical and horizontal thumb pressure (https://www.google.com/url?sa=i&url=https%3A%2F%2Fmilkology.)

- This exercise has to be done 5 times a day for 10 minutes. The mother was advised to do the exercise regularly even after discharge from the hospital for two consecutive weeks

- Also, the researcher verified whether the exercise was done regularly through regular phone calls to remember the woman and encourage her to perform the exercise.

Third phase (Evaluation phase):

- Both groups were followed up after 15 days postpartum (post-assessment) at the hospital to determine the extent of breastfeeding and the degree of mother satisfaction with breastfeeding using tools two & three (post-test)

- Each group's level of breastfeeding was compared before and after intervention and the differences between the two study groups were determined.

Ethical considerations:

Each research participant provided informed written consent following an explanation of the study's purpose. The confidentiality of the data gathered, the subjects' freedom to withdraw at any moment, and their anonymity and privacy were all maintained.

Statistical analysis:

- Statistical Package for Social Science (SPSS) version 20 was used to analyze the data. There was a significance level of < 0.05.

Results:

Table (1) demonstrates that there were no statistically significant variations in the sociodemographic characteristics among the study and control groups. It revealed that around half (50%, 52.5%) of the control and study groups age ranged from 18-24 years. Furthermore, 17.5% of the study group had a university degree compared to 15% of the control group. Around three-quarters (77.5%, 72.5%) of the control and study groups were housewives. Moreover, both the study group and the control group had a majority residence at rural residents.

As shown in **Table (II)** There were no statistically significant variations in reproductive history between the study and control groups. This table displays that the control group consisted of almost half (52.5%) primigravida and primipara compared to more than two-thirds (70% &72.5%) of the study group. Around two-thirds (65%) of the control group had regular antenatal visits and had > 4 visits compared to more than one-half (55% & 57.5%) of the study group respectively.

Table (3) demonstrates how the LATCH scale items are used to compare the two study groups. It displays that repeated attempts to latch on were reported by 70% and 52.5% respectively before the intervention among the control and study groups. After the intervention, these percentages decreased to 65.5% and 32.5% among the study group and the control group respectively. Moreover, the absence of audible swallowing was observed among 75% and 45% of the control and study groups respectively before intervention. This percentage decreased after the intervention to 67.5% and 7.5% among the control and the study groups respectively. Regarding the type of nipple, it was found that before intervention 55% and 52.5% of the control and study groups

respectively, had inverted nipples. After the intervention, this percentage decreased to 42.5% of the control group and only 2.5% among the study group this means that Hoffman's exercise had a positive effect on nipple correction.

Before the intervention, 82.5% and 60% of the control and study groups respectively exhibited mild or moderate nipple discomfort. After the intervention, these percentages decreased to 62.5% and 50% among the control and study groups. Similarly, before the intervention, 57.5% of participants in the control group and 50% of subjects in the study group, respectively, required full help to hold their newborns or while breastfeeding; after the intervention, this percentage changed to 15% and 75%, respectively, of the study group and the control group. Regarding the LATCH breastfeeding ratings, there were highly statistically significant differences between the two groups (P <0.001), in favor of the study group.

Table (4) shows a comparison between the two studied groups according to the overall LATCH scale. It was found that concerning the study group, the majority (82.5%) had a high degree of breastfeeding following the intervention, compared to none in the control group. Regarding the degree of breastfeeding following the intervention, there were highly statistically significant variations among the studied groups (p<0.001) in favor of the study group.

Figure (I) portrays a comparison between the two studied groups according to the level of maternal satisfaction with breastfeeding. It showed that 42.5% and 27.5% of the subjects in the study group were either completely satisfied or satisfied respectively, compared to only 5% and 7.5% of the subjects in the control group on the same scale. Regarding the degree of satisfaction with breastfeeding following the intervention, there were highly statistically significant differences between the analyzed groups (p<0.001), favoring the study group.

Table (I): The distribution of the study's and control groups' numbers and percentages based on their sociodemographic characteristics.

Demographic data	Control (n = 40)		Study (n = 40)		P
	No.	%	No.	%	
Age					
18-24	20	50.0	21	52.5	0.968
25-29	13	32.5	12	30.0	
≥30	7	17.5	7	17.5	
Education					
Illiterate/read and write	11	27.5	10	25.0	0.678
Middle	13	32.5	9	22.5	
Secondary	10	25.0	14	35.0	
Faculty and more	6	15.0	7	17.5	
Occupation					
Housewife	31	77.5	29	72.5	0.797
Worker	9	22.5	11	27.5	
Residence					
Rural	22	55.0	23	57.5	0.822
Urban	18	45.0	17	42.5	
Family type					
Nuclear	29	72.5	26	65.0	0.469
Extended	11	27.5	14	35.0	

χ^2: **Chi square test** MC: **Monte Carlo**
p: p value for comparing between the two studied groups
*: Statistically significant at p ≤ 0.05

Table (II): Number and percent distribution of the study and control groups according to their reproductive history.

Reproductive history	Control (n = 40)		Study (n = 40)		p
	No.	%	No.	%	
Gravidity					
1	21	52.5	28	70.0	$^{MC}p=$ 0.108
2	19	47.5	11	27.5	
3	0	0.0	1	2.5	
Parity					
1	21	52.5	29	72.5	0.065
2	19	47.5	11	27.5	
No. of abortion					
0	21	52.5	28	70.0	$^{MC}p=$ 0.108
1	19	47.5	11	27.5	
2	0	0.0	1	2.5	
Type of delivery					
Normal	20	50.0	21	52.5	0.823
Cesarean	20	50.0	19	47.5	
Antenatal care					
Regular	26	65.0	22	55.0	0.361
Irregular	14	35.0	18	45.0	
No. of antenatal visits					
<4	14	35.0	17	42.5	0.647
≥4	26	65.0	23	57.5	

χ^2: **Chi square test** MC: **Monte Carlo** p: p value for comparing between the two studied groups
*: Statistically significant at $p \leq 0.05$

Table (3): Comparison between the two studied groups according to LATCH scale items

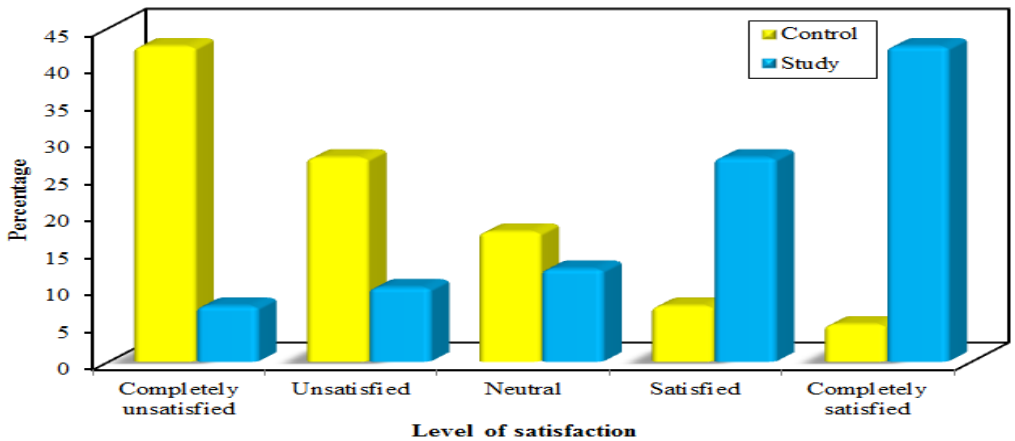
LATCH scale	Control (n = 40)				Study (n = 40)				χ^2 (p_1)	χ^2 (p_2)
	Pre		Post		Pre		Post			
	No.	%	No.	%	No.	%	No.	%		
L " latch"										
No latch	5	12.5	12	30.0	13	32.5	0	0.0	4.632 (0.099)	37.885* (<0.001*)
Repeated attempts	28	70.0	26	65.0	21	52.5	13	32.5		
Graspe breast	7	17.5	2	5.0	6	15.0	27	67.5		
MH (p_0)	15.00 (0.058)				38.00* (<0.001*)					
A " audible swallowing"										
None	30	75.0	27	67.5	18	45.0	3	7.5	7.500* (0.006*)	32.589* (<0.001*)
Few	10	25.0	7	17.5	22	55.0	11	27.5		
Spontaneous	0	0.0	6	15.0	0	0.0	26	65.0		
MH (p_0)	8.500 (0.072)				35.50* (0.001*)					
T " type of nipple"										
Inverted	22	55.0	17	42.5	21	52.5	1	2.5	0.050 (0.823)	52.480* (<0.001*)
Flat	18	45.0	23	57.5	19	47.5	8	20.0		
Everted	0	0.0	0	0.0	0	0.0	31	77.5		
Test of Sig. (p_0)	MCN=1.251 (0.332)				MH =44.50* (0.001*)					
C "breast/nipple comfort"										
Severe discomfort	7	17.5	15	37.5	16	40.0	3	7.5	4.943* (0.026*)	25.556* (<0.001*)
Mild or moderate discomfort	33	82.5	25	62.5	24	60.0	20	50.0		
No discomfort	0	0.0	0	0.0	0	0.0	17	42.5		
Test of Sig. (p_0)	MCNp(0.096)				MH =30.00* (0.001*)					
H "hold positioning"										
Full assist	23	57.5	30	75.0	20	50.0	6	15.0	1.592 ($^{MC}p=$ 0.498)	33.793* (<0.001*)
Minimal assist	16	40.0	10	25.0	20	50.0	19	47.5		
No Assist	1	2.5	0	0.0	0	0.0	15	37.5		
MH (p_0)	14.000 (0.144)				24.50* (0.001*)					

χ^2: **Chi square test** MC: **Monte Carlo** **McN: McNemar test** **MH: Marginal Homogeneity Test**
p_0: p value for comparing between **pre** and **post** in each other group
p_1: p value for comparing between the two studied groups in **pre** period
p_2: p value for comparing between the two studied groups in **post** period
*: Statistically significant at $p \leq 0.05$

Table (4): Comparison between the two studied groups according to overall of LATCH scale

Overall of LATCH scale	Control (n = 40)				Study (n = 40)				Test of Sig. (p_1)	Test of Sig. (p_2)
	Pre		Post		Pre		Post			
	No.	%	No.	%	No.	%	No.	%		
Poor (0-3)	29	72.5	27	67.5	22	55.0	3	7.5	χ^2=	χ^2=
Fair (4-6)	11	27.5	13	32.5	18	45.0	4	10.0	2.650	56.965*
Good (7-10)	0	0.0	0	0.0	0	0.0	33	82.5	(0.104)	(<0.001*)
Test of Sig. (p_0)	MCNp (0.804)				MH=56.00* (<0.001*)					
Total Score (0 – 10)										
Min – Max.	2.0 – 5.0		0.0 – 6.0		0.0 – 5.0		3.0 – 10.0		U=	U=
Mean ± SD.	3.03 ± 0.80		2.68 ± 1.69		2.95 ± 1.69		7.58 ± 2.01		762.000	92.500*
Median	3.0		3.0		3.0		8.0		(0.707)	(<0.001*)
Z (p_0)	1.251 (0.211)				5.511* (<0.001*)					

SD: **Standard deviation** **U: Mann Whitney test** Z: **Wilcoxon signed ranks test**
χ^2: **Chi square test** **McN: McNemar test** **MH: Marginal Homogeneity Test**
p_0: p value for comparing between **pre** and **post** in each other group
p_1: p value for comparing between the two studied groups in **pre** period
p_2: p value for comparing between the two studied groups in **post** period
*: Statistically significant at $p \leq 0.05$



Figure(2):Comparison between the two studied groups according to the level of satisfaction

Discussion

Breastfeeding is the best strategy to promote maternal health, good growth, and the development of the infant. However, not all postpartum mothers successfully breastfeed their babies. Mothers encounter various breastfeeding problems after giving birth, for instance, a delayed lactation period, flat and inverted nipples, and difficulty of the baby latching on to the mother's nipple. In most cases, Mothers who have inverted or flat nipples typically have trouble breastfeeding, which might lead them to stop breastfeeding too soon **(Elisa, Wagiyo, & Kuntari, 2023).**

Currently, approaches for managing flat and inverted nipples include surgical and non-surgical treatments, which may be satisfactory or non-satisfactory. As well as nonpharmacological approaches which are safe, inexpensive, simple, have minimal side effects, and are practiced on large scales in numerous conditions. Hoffman's exercise is among the secure non-pharmacological approaches used for correcting flat and inverted nipples that any woman can practice at any time without the need for assistance from a healthcare provider **(Kaur, Saini, Sharma, 2020).**

Therefore, the goal of this study was to ascertain how Hoffman's exercise improved

postpartum women with flat and inverted nipples' satisfaction and ability to breastfeed successfully.

The current study's findings showed that in the pre-test, the mean LATCH score of postnatal mothers in the study group was 2.95 and, in the post-test, there was an improvement, and the LATCH score was 7.58 with the mean difference score of 4.63 which was statistically significant ($p<0.001$) favoring the study group. Meanwhile, such a difference was not found among the control group after the application of their routine care.

This finding suggests a possible positive effect of Hoffman's exercises on the improvement of the level of breastfeeding among postnatal mothers with flat and retracted nipples. This could be related to the fact that Hoffman's exercise as a manual technique based on rolling and traction of the nipple was very effective in the correction of any nipple adhesions and aided in the protrusion of the nipple.

The findings of the current study were relatively similar to the findings of **Madhavi et al, (2023),** in India who investigated "The effectiveness of practicing Hoffman's technique on the level of breastfeeding among postpartum females who had nipple defects. Who reported that in the pre-test, the mean LATCH score of postnatal mothers was 5.63.While, in the post-test, there was an improvement, and the LATCH score was 8.58 with the mean difference score of 2.95 which was statistically significant ($p<0.001$). After Hoffman's exercise, in the post-test, none of the mothers had an inadequate level of LATCH score. This showed how well Hoffman's workout affected the level of breastfeeding among new mothers who had nipple problems.

Additionally, **Hirlekar & Xavier (2023)** conducted a quasi-experimental study using a purposive sample of 60 postnatal mother to compare the benefits of Hoffman's exercise versus the syringe technique for breastfeeding women who were admitted to postnatal units and had flat or inverted nipples. They added that before the intervention, the mean LATCH score was 6.5 and after the planned Hoffman's exercise it increased to 10.4 the level of significance ($p = 0.0001$) which shows that Hoffman's exercise was successful in raising the level of breastfeeding.

Likewise, a study by **Thurkkada et al. (2023)**, who conducted an Indian study for 55 postnatal women to examine Hoffman's exercise efficacy in postpartum mothers whose nipples were grade 1 inverted. Who discovered that among the subjects who had Hoffman's exercise, the degree of breastfeeding was considerably higher in the post-test than it was in the pre-test. Also, concluded that Hoffman's exercise was a successful way to help postnatal mothers with grade 1 inverted nipples breastfeed their babies better.

Moreover, another relatively supportive Egyptian study was undertaken by **Youssef & Fouad (2021)** who investigated the effect of Hoffman's exercises on the level of feeding among 110 primiparous mothers with nipple inversion. There was a statistically significant difference ($p <0.001$) between the study group's subjects (58.2%) and the control group's 7.3% who had an excellent level of breastfeeding. Additionally, discovered that participants in the study group demonstrated a substantial improvement in their breastfeeding levels, with better LATCH ratings than those in the control group.

Furthermore, Hoffman's exercise had a very statistically significant ($p=<0.001$) impact on breastfeeding within the groups studied, according to a study by **Kaur et al. (2020)**. Who carried out a study to evaluate Hoffman's exercises' effect on 60 antenatal mothers with nipple defects reported that according to the Christi breastfeeding scale, more than 75% of the study group's participants were breastfeeding at low risk, and 5% were breastfeeding at medium risk. The average mean ± SD of these individuals was 7.80±1.12.

Additionally, Ghosh & Singh (2019), conducted a narrative review about the Hoffman exercise's ability to help primipara women with retracted and flat nipples breastfeed. Found that after performing the Hoffman exercise, primipara mothers' flat and retracted nipples significantly decreased. This suggests that the

exercise is a useful method for lowering flat and retracted nipples.

In contrast to these findings, **Hediger &Koenig (2020)** performed a randomized controlled trial in Maryland, United States to assess the effect of nipple shells and Hoffman's exercises as antenatal treatments for the success of breastfeeding among 463 pregnant women with at least one inverted or non-protractile nipple. Who reported that after analyzing the LATCH score for breastfeeding among the study subjects, the breastfeeding rate did not differ between women who had performed the Hoffman exercise and those who did not. These findings can be explained by stating that one study restriction could be that the trial participants disobeyed the treatment instructions because they were uncomfortable or ashamed.

Based on how satisfied mothers are with their breastfeeding experiences. According to the study's findings, just 5% and 7.5% of the respondents in the control group were highly satisfied or satisfied, whereas 42.5% and 27.5% of the study group's participants were highly satisfied or satisfied. Regarding the degree of satisfaction with breastfeeding following the intervention, there were highly statistically significant differences between the analyzed groups ($p<0.001$), favoring the study group.

This finding may reflect the fact that this sense of satisfaction is obtained from the psychological comfort each mother feels while naturally breastfeeding their babies and improving maternal-child attachment and bonding that can be achieved during breastfeeding all of these satisfying the instinct of motherhood. These findings were in the same line with the previously mentioned study of **Youssef & Fouad (2021)**. In comparison, just 3.6% and 5.5% of the control group were either highly satisfied or satisfied, respectively. While, roughly 34.5% and 29.1% of the study group's participants were either highly satisfied or satisfied, respectively on the same scale.

Furthermore, another study by **Ponmathi et al. (2017)** identified the impact of Hoffman's technique on the quality of breastfeeding among Indian postpartum mothers with flat nipples. Who discovered that the participants in Hoffman's group were highly satisfied with the breastfeeding experience after applying Hoffman's technique which was effective in correcting flat nipples.

Conclusion:

The findings of the present study confirm the acceptance of H1 and H2; while H0 is rejected, where postnatal women who performed Hoffman's exercise had higher scores on the LATCH breastfeeding scale and Hoffman's exercise was more promptly and efficiently helped in correcting nipple defects for the achievement of successful breastfeeding after delivery. In addition, postnatal women with flat or inverted nipples who practiced Hoffman's exercise had higher satisfaction with breastfeeding than those who did not practice it.

Recommendations

- Hoffman's exercise should be incorporated into in service training program for nursing staff in maternity health agencies for demonstrating the exercise and teaching postnatal mothers with flat and inverted nipples how to apply it.

- Hoffman's exercise should be recommended as a safe, effective, non-pharmacological method for treating flat and inverted nipples.

- Maternity nurses should organize and design prenatal sessions for women to expand their understanding and practice of Hoffman's exercise to overcome nipple abnormalities that can hinder the breastfeeding process.

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