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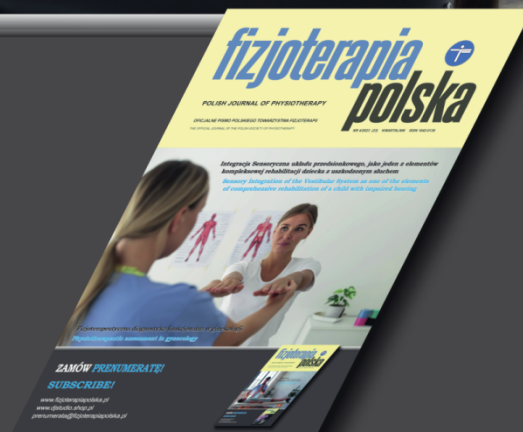
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# Effect of smartphone application-assisted nursing intervention on breastfeeding self-efficacy of postpartum women with multiple sclerosis

*Wpływ interwencji pielęgniarstwa wspomaganego aplikacją na smartfon na samoocenę karmienia piersią kobiet po porodzie ze stwardnieniem rozsianym*

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## Abstract

**Objective.** This study aimed to study the effect of mobile application-assisted nursing intervention on exclusive breastfeeding self efficacy of postpartum multiple sclerosis women.. **Materials and Methods:** The researchers utilized a quasi-experimental research design (case-control). The study was conducted at the maternal and child health centers (MCH) at Shebin El-Kom, Menoufia Governorate, Egypt. A purposive sample of 50 multiple sclerosis postpartum women was the target population of the present study. Three instruments were used for data collection. A structured interviewing questionnaire, breastfeeding self-efficacy scale and relation between breastfeeding and postpartum multiple sclerosis relapse questionnaire. **Results and discussion:** There was a statistically significant difference between both groups regarding self-management during postpartum period. The improvements were related to mothers' relationships with their health care providers and knowledge and information about multiple sclerosis during this transitional phase, which indicated that the nursing intervention had positive effect on postpartum women with multiple sclerosis. **Conclusion:** Postpartum women with multiple sclerosis have a satisfactory level of breastfeeding self-efficacy after mobile application-assisted nursing intervention. Hence conducting a multidisciplinary program to monitor and support mothers with MS improves self-management during the postpartum period.

## Keywords

smartphone application, nursing intervention, breastfeeding self-efficacy, postpartum period, multiple sclerosis

## Streszczenie

**Cel.** Celem tego badania było zbadanie wpływu interwencji pielęgniarstwa wspomaganego aplikacją mobilną na samoocenę wyłącznego karmienia piersią kobiet po porodzie ze stwardnieniem rozsianym. **Materiały i metody:** Badacze wykorzystali quasi-eksperymentalny plan badawczy (przypadek-kontrola). Badanie przeprowadzono w centrach zdrowia matki i dziecka (MCH) w Shebin El-Kom, w muhafazie Menofia w Egipcie. Celowe próbki 50 kobiet po porodzie ze stwardnieniem rozsianym były docelową populacją niniejszego badania. Do zbierania danych wykorzystano trzy narzędzia: strukturalizowany kwestionariusz wywiadu, skalę samooceny karmienia piersią oraz kwestionariusz dotyczący związku między karmieniem piersią a nawrotami stwardnienia rozsianego po porodzie. **Wyniki i dyskusja:** Stwierdzono statystycznie istotne różnice między obiema grupami odnośnie samodzielnego zarządzania okresem połogu. Poprawy były związane z relacjami matek z ich opiekunami zdrowotnymi oraz wiedzą i informacjami o stwardnieniu rozsianym w tym okresie przejściowym, co wskazuje, że interwencja pielęgniarstwa miała pozytywny wpływ na kobiety po porodzie ze stwardnieniem rozsianym. **Wnioski:** Kobiety po porodzie ze stwardnieniem rozsianym mają zadowalający poziom samooceny karmienia piersią po interwencji pielęgniarstwa wspomaganego aplikacją mobilną. Dlatego przeprowadzenie multidyscyplinarnego programu monitorowania i wsparcia matek ze stwardnieniem rozsianym poprawia samodzielne zarządzanie okresem połogu.

## Słowa kluczowe

aplikacja na smartfon, interwencja pielęgniarstwa, samoocena karmienia piersią, okres połogu, stwardnienie rozsiane



## Introduction

Mobile phone services in Egypt, were initially accessible in 1996. By the year 2000, approximately 1.98% of the population had subscribed to mobile phone services. The relevance of mobile internet use has increased, from 39 million in the fourth quarter of 2019 to 52.4 million in the same period of 2020 [1]. As COVID-19 affected Egyptians' daily life in 2020 and advised self-quarantine, smartphones are frequently used electronic items to identify consumer attributes, such as geographical and temporal trajectory and social interactions. Additionally, they might be sued for providing medical services through websites and programmes (apps) as WeChat, Twitter, and Facebook, which was the start of mobile health (mHealth) [2].

Using mobile health apps during pregnancy and postpartum provides an opportunity for women who are frequently more motivated to improve their health and change their lifestyle [3]. Pregnancy and the postpartum period cause physiological, hormonal, and immunologic changes that are linked to a reduced ability to clear infections which is especially worrisome for pregnant women with COVID-19 [4]. Indeed, pregnant, and postpartum women have worse COVID-19 outcomes than non-pregnant women [5]. The COViMS Registry (COVID-19 Infections in Multiple Sclerosis and Related Diseases) was launched early in the pandemic specifically inquiring regarding pregnancy or the postpartum period at the time of COVID-19 [6].

Multiple sclerosis (MS) is a central nervous system autoimmune disease [7]. It is the most common debilitating neurological disease affecting young adults aged 20 to 50 years worldwide [8]. In Egypt, the Ministry of Health and Population's statistics show that MS cases comprise 1.4% of all neurological diseases [9]. Despite MS is not common, it is a complex condition that can result in serious difficulties that have an impact on both the patient's and their family's quality of life [10].

Multiple sclerosis primarily affects females, especially during their reproductive years; thus, pregnancy and childbirth become a significant issue for those with MS. Multiple sclerosis clinical presentation and disease activity are reduced through the third trimester because of the pregnancy-related rise of numerous hormones [10]. On the other hand, due to the hormones returning to their pre-pregnancy form during the first three months postpartum, there is a substantial risk for a disease relapse [11]. Exclusive breastfeeding is recommended by both the World Health Organization and the American Academy of Pediatrics for at least 6 months due to the significant benefits to both infant and maternal health. Breastfeeding is also advised for women with MS because it has not been proven to be harmful and is likely to protect against postpartum relapses. A systematic review and meta-analysis of 24 research that aggregated data from 16 studies, published in 2020, showed that breastfeeding was related with, on average, 37% reduced risks of postpartum relapse than not breastfeeding [12]. It is challenging to rule out confounding, which suggests that women with milder MS may be more likely to breastfeed when using DMT (Disease Management Therapy). On the other hand, breastfeeding remained protective in the four studies that controlled for confounding factors, with a 43% lower rate of postpartum relapse with breastfeeding [13]. Breastfeeding ap-

pears to have a protective effect against relapses, but only for the first six months after delivery and only when it is exclusive breastfeeding (no regular formula addition for at least two months) rather than partial breastfeeding [14].

Breastfeeding self-efficacy refers to a mother's perceived ability to breastfeed her new infant and is a salient variable in breastfeeding duration as it predicts whether a mother chooses to breastfeed, how much effort she will expend, whether she will have self-enhancing or self-defeating thought patterns, and how she will emotionally respond to breastfeeding difficulties. In relation to breastfeeding self-efficacy, a mother determines her ability to breastfeed her new infant based on whether she has previous breastfeeding experience, observed successful breastfeeding behaviors by others, or received encouragement from significant others to breastfeed. In addition, her current physiological and affective state, including fatigue, stress, and anxiety, is an important source of information through which she evaluates her ability to breastfeed [15]. Therefore, this study aims to discuss breastfeeding self-efficacy as a means of disease management for MS during postpartum period.

## Significance of the study

Multiple sclerosis (MS) is a central nervous system demyelinating disease that is chronically progressive and complicated [16]. The incidence of MS varied significantly across nations, with developed countries having a higher incidence than developing countries [17]. In 2016, over 2 221 188 patients worldwide were diagnosed with MS, representing nearly 164.6 cases and 3.3 cases per 100,000 population in North America and Africa, respectively [18]. The expected prevalence of MS in Egypt is 1.4% of all neurological diseases [9].

By reviewing available body of knowledge, exclusive breastfeeding reduced incidence of postpartum relapse for at least two months. It is seen as good for the mother-infant relation and lowers the baby's risk of developing allergies and illnesses. Furthermore, breast-feeding mothers had a lower relapse rate than non-breast-feeding mothers [19].

By investigating how women with multiple sclerosis seek out health information, it is shown that these women chiefly use the internet and mobile devices for such purposes, and commonly download health-related apps on their smart-phones to cope with their medical condition especially during the social-distancing period of COVID-19. Being on an immunosuppressing medication, MS women try to avoid seeking medical care in crowded places so that smart phone application may help [20]. Therefore, the current study contributes to fill-in the gap of knowledge by examining the effect of mobile application-assisted nursing intervention on breastfeeding-self efficacy of postpartum multiple sclerosis women.

## Aim of the study

To study the effect of mobile application-assisted nursing intervention on breastfeeding-self efficacy of postpartum multiple sclerosis women.

## Research hypotheses

1. Postpartum multiple sclerosis women will have a satisfactory level of breastfeeding self-efficacy after mobile application-assisted nursing intervention.

## Methods

Researchers utilized a quasi-experimental research design (case-control) was used for conducting the current study. This study was conducted at the maternal and child health center (MCH) at Shebin El-Koom, Menofya. This setting was selected because of the high flow rate of women in the post-natal clinics, well baby clinics and immunization services. Moreover, the center serves the rest of governorate areas. Data collection started on the first of October 2019 and extended to the end of December 2021.

## Sample

A purposive sample of 50 multiple sclerosis postpartum women were recruited in this study. Women were divided into two equal groups, group I (study group 25 women) received mobile application-assisted nursing intervention and group 2 (control group 25 women) received routine management at the postnatal clinics. breastfeeding self-efficacy were measured and compared in both groups.

Inclusion criteria: Women were recruited from the postnatal clinic during their routine follow-up visit and from the child immunization clinic according to the following inclusion criteria: postpartum women, diagnosed with multiple sclerosis before pregnancy, primipara, had normal labor, free from any other maternal and neonatal complications that may interfere with breastfeeding, their infants were not having formula feeding, and agree to participate in the study.

## Sample size

The sample size was obtained using the two-proportion formula using the power of 80% and significance level  $\alpha$  at 0.05 with 95% confidence interval. The calculated minimum sample size needed considering the 30% non-response rate was 50 women. Using the formula: Sampling fraction =  $n / N = 120$ , hence, systematic sampling with the ratio of 1:2 was used to select samples for this study.

## Ethical consideration

Ethical permission to conduct the study was taken from the Research and Ethics Committee at the Faculty of Nursing, Menofya University. Written approval was obtained from the medical directors at the previously mentioned setting after explaining the purpose and procedures of the study. Voluntary participation was ensured so that informed consent was obtained after explaining the purpose and procedures of the study. Women were assured that the data would be treated as strictly confidential.

## Measurement instruments

Three tools were used for collecting the necessary data, these tools were: Tool 1: A Structured Interviewing Questionnaire: used to evaluate women socio-demographic data. This instrument was developed by researchers and submitted to validity and reliability tests. The instrument composed of two parts. Part 1 including questions about personal data of the studied women as age of the women, education level and residence, part 2 including questions about medical history like disease duration, use of immunotherapies and previous relapses. Tool

II: Breastfeeding Self-Efficacy Scale: used to evaluate women's breastfeeding self-efficacy, this instrument was based on a standard scale named the Breastfeeding Self-Efficacy Scale-Short Form (BSES-SF) [21-22]. The instrument was translated to Arabic and then submitted to validity and reliability tests. Tool III: Postpartum Multiple Sclerosis Relapse Questionnaire: was developed by the researchers and submitted to validity and reliability tests. The instrument including questions about onset of breastfeeding, breastfeeding duration /months, number of postpartum relapses with breastfeeding, Severity of disease activity with breast feeding and disease-modifying therapy (DMT) use during postpartum period.

Validity and reliability of the tools: Instruments were reviewed and tested for content validity by 5 experts in obstetrical nursing, modifications were done as needed. Test-retest reliability was used. The internal consistency of the instruments was calculated using Cronbach's alpha coefficients.

## Pilot study

A pilot study was conducted on 10% (5 women) of the sample to ensure the clarity, applicability of the instruments, and the time needed for completion. According to the results of the pilot study, the required modifications were performed. The pilot study sample was not excluded from study as the total population was limited in number.

## Data collection/procedure

The study was carried out during COVID-19 outbreak through three phases: preparatory, operational and evaluation phase, data collection process was extended from October 2019 till December 2021.

## Preparatory phase

An extensive review of available electronic data related to MS, postpartum care, breastfeeding and using mobile phone applications in health care during COVID-19 outbreak. A literature review to collect relevant knowledge pertinent to study participants was also used in developing data collection instruments.

Zoom mobile app was selected to be used in this study as it is compatible with both IOS and Android- compatible mobiles, common, free and also supports both audio and video calls.

The required awareness package for educating mothers was designed based on [23]. The contents used for the mobile application-assisted nursing intervention had many sections: breastfeeding and MS, the importance of breastfeeding for the postpartum mother and her infant, behavioral methods for MS mothers, complementary feeding and exclusive breastfeeding, pumping and manual expression, managing common breast-related and breastfeeding problems and answering common queries about lactation in case of MS.

## Operational phase

The researchers visited the MCH center two days per week during the data collection period, the researcher allocated all Sundays for selecting study group participants and all Tuesdays for control group participants. Women were selected based on the previously mentioned inclusion criteria. First, the researchers introduced themselves to women, took their oral informed con-



sent, gave simple overview about the study, its aim, direct benefits for participating woman, then interviewed each eligible woman using instrument I, the interview took about 20 minutes to fill in the instrument. Woman's phone number was recorded and added to a WhatsApp group to facilitate communication with group I" study group". Each woman from study group was asked to download Zoom mobile application and a timetable was set with woman for attending Zoom sessions.

For the study group, three Zoom video sessions and a series of healthy tips messages were sent to study group through WhatsApp group to encourage exclusive breastfeeding and adherence to the given nursing intervention. The sessions were given once per week for three consecutive weeks for a group or only one woman according to the availability of sample as the data collection process took about one year due to limited population number. Each session lasted 20-30 minutes.

The first session included: breastfeeding and MS, the importance of breastfeeding for the postpartum mother and her infant and behavioral methods for MS mothers. The second session explained and compared complementary feeding and exclusive breastfeeding, pumping and manual expression. The third session was devoted to managing common breast-related and breastfeeding problems then answering common queries about lactation in case of MS.

### Teaching sessions

The ILOs of the teaching session were Knowledge: Define MS and exclusive breastfeeding, identify benefits of exclusive breastfeeding for the newborn and the mother during the postpartum period and know the relationship between breastfeeding and MS relapses. Skills: Demonstrate proper positions for breastfeeding and demonstrate pumping and manual expression. Competence: Value the importance of exclusive breastfeeding in preventing disease relapses during the postpartum period and value the importance of pumping and manual expression of breast milk to promote exclusive breastfeeding.

For the control group participants, and after interviewing at the MCH center women were encouraged to follow-up at the center according to the schedule for postpartum follow-up visits. They were not given any intervention by researcher. They were reached through a WhatsApp group every week to maintain contact.

### Evaluation phase

For the study group: follow-up of women was done through the WhatsApp group to check if women follow the nursing instructions and intervention given during the Zoom sessions. Researchers fill-in the breastfeeding self-efficacy scale (instrument II) from each woman at the study group through a special Zoom session after three weeks from the last intervention session, women were followed-up after one year to examine disease condition. At the end of the study period women were thanked for their time and participation.

For the control group: at women's last postpartum visit to the MCH at the 6th postpartum week; they were interviewed by the researchers to fill-in the breastfeeding self-efficacy scale (instrument II). Each woman was gratefully thanked for her time and sharing in the study.

### Data analysis

The data collected were analyzed and tabulated by SPSS software, statistical package version 23 on an IBM compatible computer. Frequency distribution, percentages, mean and standard deviation were calculated, Chi-square and Paired sample T-test were used to describe the level of statistical significance which was considered at  $p < 0.05$ .

### Results

The majority of the study participants were university educated, employee with moderate income and urban residents with no difference between groups. As for the age, there was no difference between groups and the majority of case group was at the age of (36-40) versus (31-35) at the control group (table 1).

**Table 1. Comparison of the socio-demographic characteristics of the women between case and control group**

Clinical data	Control (n = 25)		Case (n = 25)		Chi-Square / Fisher's exact test	
	n	%	n	%	X <sup>2</sup>	P
<b>Age (Years)</b>						
25 – 30	6	24.0	9	36.0	3.324	0.190
31 – 35	11	44.0	5	20.0		
36 – 40	8	32.0	11	44.0		
<b>Education</b>						
Basic Education	3	12.0	3	12.0	2.529	0.282
Secondary	5	20.0	10	40.0		
University or Higher	17	68.0	12	48.0		
<b>Woman occupation</b>						
Housewife	9	36.0	12	48.0	0.739	0.390
Employee	16	64.0	13	52.0		

Clinical data	Control (n = 25)		Case (n = 25)		Chi-Square / Fisher's exact test	
	n	%	n	%	χ <sup>2</sup>	P
Husband occupation						
Unemployed	1	4.0	2	8.0	2.920	0.232
Employee	9	36.0	14	56.0		
Self-employed	15	60.0	9	36.0		
Residence						
Urban	23	92.0	22	88.0	0.222	0.637
Rural	2	8.0	3	12.0		
Income to cost ratio						
Cost > Income	19	76.0	20	80.0	0.892	0.640
Cost = Income	2	8.0	3	12.0		
Cost < Income	4	16.0	2	8.0		

Also, the majority of the study participants delivered by cesarean section, had wanted pregnancy, and satisfied with infant gender without difference between case and control groups (table 2).

**Table 2. Comparison of the obstetric history of the women between case and control group**

Clinical data	Control (n = 25)		Case (n = 25)		Chi-Square / Fisher's exact test	
	n	%	n	%	X <sup>2</sup>	P
Number of pregnancies						
1 – 3	1	4.0	2	8.0	2.920	0.232
4 – 6	9	36.0	14	56.0		
More than 6	15	60.0	9	36.0		
Number of deliveries						
1 – 3	2	8.0	5	20.0	3.646	0.162
4 – 6	11	44.0	14	56.0		
More than 6	12	48.0	6	24.0		
Number of abortions						
None	22	88.0	19	76.0	1.220	0.269
1 – 3	3	12.0	6	24.0		
Delivery mode						
C.S	13	52.0	16	64.0	0.739	0.390
Vaginal	12	48.0	9	36.0		
Type of pregnancy						
Wanted	22	88.0	23	92.0	0.222	0.637
Unwanted	3	12.0	2	8.0		
Infant gender						
Male	15	60.0	16	64.0	0.085	0.771
Female	10	40.0	9	36.0		
Satisfaction with infant gender						
Satisfied	23	92.0	22	88.0	0.222	0.637
Unsatisfied	2	8.0	3	12.0		



It was noticed that, there was no statistically significance difference between groups regarding disease duration, use of immunotherapies, number of previous relapses, and frequency of relapses (P-value 0.744, 0.384, 0.699, 0.235) respectively (table 3).

**Table 3. Characteristics of participants with MS at onset of pregnancy**

Clinical data	Control (n = 25)		Case (n = 25)		Chi-Square / Fisher's exact test	
	n	%	n	%	χ²	P
Disease duration [years]						
1 – 3	4	16.0	2	8.0	1.240	0.744
4 – 6	12	48.0	11	44.0		
7 – 10	7	28.0	10	40.0		
> 10	2	8.0	2	8.0		
Use of immunotherapies (IMA)						
Yes	21	84.0	23	92.0	0.758	0.384
No	4	16.0	2	8.0		
Number of previous relapses						
None	4	16.0	2	8.0	1.429	0.699
Once	2	8.0	1	4.0		
Twice	10	40.0	10	40.0		
Thrice	9	36.0	12	48.0		
Frequency of relapses						
Less than a year	13	61.9	18	78.3	1.411	0.235
A year or more	8	38.1	5	21.7		

There was a highly statistically significance difference between groups regarding continuation of breastfeeding and being comfortable during breastfeeding with presence of family member around at (P-value < 0.001). Moreover, there was a statistical significance difference between groups regarding

ascertain that the baby is getting enough milk, management of breastfeeding even if the baby is crying, and deal with the fact that breastfeeding can be time-consuming (P-value 0.007,0.002,0.003) respectively. The findings at this table shows the effectiveness of the study intervention. (table 4).

**Table 4. Comparison between case and control groups regarding breastfeeding self-efficacy**

Clinical data	Control (n = 25)										Case (n = 25)										Chi-Square / Fisher's exact test	
	Not at all confident		Not very confident		Sometimes confident		Confident		Very confident		Not at all confident		Not very confident		Sometimes confident		Confident		Very confident		$\chi^2$	P
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%		
Determine that my baby is getting enough milk	0	0.0	7	28.0	8	32.0	3	12.0	7	28.0	3	12.0	12	48.0	2	8.0	7	28.0	1	4.0	14.016	0.007*
Successfully cope with breastfeeding like I have with other challenging tasks	0	0.0	3	12.0	11	44.0	5	20.0	6	24.0	5	20.0	6	24.0	5	20.0	2	8.0	7	28.0	9.613	0.047*
Breastfeed my baby without using formula as a supplement	0	0.0	7	28.0	3	12.0	12	48.0	3	12.0	3	12.0	12	48.0	4	16.0	5	20.0	1	4.0	8.341	0.080
Ensure that my baby is properly latched on for the whole feeding	0	0.0	3	12.0	7	28.0	7	28.0	8	32.0	5	20.0	6	24.0	6	24.0	5	20.0	3	12.0	8.683	0.070
Manage the breastfeeding situation to my satisfaction	0	0.0	7	28.0	4	16.0	10	40.0	4	16.0	3	12.0	12	48.0	5	20.0	4	16.0	1	4.0	8.798	0.066
Manage to breastfeed even if my baby is crying	0	0.0	3	12.0	5	20.0	7	28.0	10	40.0	5	20.0	7	28.0	5	20.0	8	32.0	0	0.0	16.667	0.002*

Clinical data	Control (n = 25)										Case (n = 25)										Chi-Square / Fisher's exact test	
	Not at all confident		Not very confident		Sometimes confident		Confident		Very confident		Not at all confident		Not very confident		Sometimes confident		Confident		Very confident		X <sup>2</sup>	P
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%		
Keep wanting to breastfeed	0	0.0	9	36.0	5	20.0	11	44.0	0	0.0	3	12.0	15	60.0	7	28.0	0	0.0	0	0.0	15.833	< 0.001**
Comfortably breastfeed with my family members present	0	0.0	3	12.0	5	20.0	5	20.0	12	48.0	6	24.0	8	32.0	9	36.0	2	8.0	0	0.0	22.701	< 0.001**
Be satisfied with my breastfeeding experience	0	0.0	13	52.0	5	20.0	4	16.0	3	12.0	3	12.0	12	48.0	4	16.0	5	20.0	1	4.0	4.262	0.372
Deal with the fact that breastfeeding can be time-consuming	0	0.0	4	16.0	9	36.0	3	12.0	9	36.0	5	20.0	7	28.0	7	28.0	6	24.0	0	0.0	16.068	0.003*
Finish feeding my baby on one breast before switching to the other breast	0	0.0	7	28.0	8	32.0	3	12.0	7	28.0	3	12.0	12	48.0	4	16.0	5	20.0	1	4.0	10.649	0.031*
Continue to breastfeed my baby for every feeding	0	0.0	5	20.0	13	52.0	5	20.0	2	8.0	5	20.0	7	28.0	4	16.0	6	24.0	3	12.0	10.389	0.034*
Manage to keep up with my baby's breastfeeding demands	0	0.0	7	28.0	4	16.0	11	44.0	3	12.0	3	12.0	13	52.0	5	20.0	3	12.0	1	4.0	10.483	0.033*
Tell when my baby is finished breastfeeding	0	0.0	3	12.0	8	32.0	4	16.0	10	40.0	5	20.0	6	24.0	5	20.0	6	24.0	3	12.0	10.862	0.028*

It was obvious that, there was a statistically significant difference between groups regarding breastfeeding self-efficacy score (P-value 0.024). The results shows the effectiveness of the study intervention (table 5).

**Table 5. Comparison between case and control groups regarding breastfeeding self-efficacy score**

Clinical data	Control (n = 25)		Case (n = 25)		Chi-Square / Fisher's exact test	
	n	%	n	%	X <sup>2</sup>	P
<b>Breastfeeding Self-Efficacy Scale Score</b>						
Low breastfeeding self-efficacy	4	7	21	4	5.128	0.024*
High breastfeeding self-efficacy	12	2	4	2		

Based on the results at table 4 and 5; the study hypothesis can be accepted.

There was a highly statistically significant difference between groups regarding duration of breastfeeding and number of post-

partum relapses with breastfeeding (P-value < 0.001). Moreover, there was a statistically significance difference between groups regarding the onset of breastfeeding and severity of disease activity with breast feeding (P-value 0.015, 0.013) respectively (table 6).

**Table 6. Comparison between case and control groups regarding the risk of postpartum multiple sclerosis relapse at the follow-up phase of the study**

Clinical data	Control (n = 25)		Case (n = 25)		Chi-Square / Fisher's exact test	
	n	%	n	%	X <sup>2</sup>	P
<b>The onset of breastfeeding/ days</b>						
First day postpartum	0	0.0	9	36.0	12.210	0.015*
Second day postpartum	6	24.0	4	16.0		
Third day postpartum	3	12.0	4	16.0		
Fourth day postpartum	8	32.0	4	16.0		
Fifth day postpartum	8	32.0	4	16.0		



Clinical data	Control (n = 25)		Case (n = 25)		Chi-Square / Fisher's exact test	
	n	%	n	%	χ <sup>2</sup>	P
Breastfeeding duration /months						
Breastfeeding for < 12 months	21	84.0	8	32.0	13.875	< 0.001**
Breastfeeding for ≥ 12 months	4	16.0	17	68.0		
Number of postpartum relapses with breastfeeding						
None	0	0.0	18	72.0	32.521	< 0.001**
1	5	20.0	2	8.0		
2	4	16.0	4	16.0		
≥3	16	64.0	2	8.0		
Severity of disease activity with breast feeding						
Low disease activity	9	36.0	15	60.0	8.553	0.013*
Moderate disease activity	9	36.0	10	40.0		
Sever disease activity	7	28.0	0	0.0		
Disease-modifying therapy (DMT) use during postpartum period						
None	7	28.0	4	16.0	1.870	0.760
Interferon-beta	6	24.0	5	20.0		
Glatiramer acetate	3	12.0	4	16.0		
Dimethyl fumarate	4	16.0	7	28.0		
Natalizumab	5	20.0	5	20.0		

The breastfeeding self-efficacy score positively correlates with age, education, occupation, and income (table 7).

**Table 7. Association between socio-demographic characteristics of the women and breastfeeding self-efficacy score**

Clinical data	Control (n = 25)				Chi-Square / Fisher's		Case (n = 25)				Chi-Square / Pearson	
	Low self-efficacy (n = 17)		High self-efficacy (n = 8)				Low self-efficacy (n = 9)		High self-efficacy (n = 16)			
	n	%	n	%	X <sup>2</sup>	P	n	%	n	%	X <sup>2</sup>	R
Age (Years)												
25 – 30	6	35.3	0	0.0	5.573	0.062	3	33.3	6	37.5	5.745	0.235
31 – 35	5	29.4	6	75.0			4	44.4	1	6.3		
36 – 40	6	35.3	2	25.0			2	22.2	9	56.3		
Education												
Basic Education	1	5.9	2	25.0	2.040	0.361	3	33.3	0	0.0	10.171	0.476
Secondary	4	23.5	1	12.5			5	55.6	5	31.3		
University or Higher	12	70.6	5	62.5			1	11.1	11	68.7		
Woman occupation												
Housewife	7	41.2	2	25.0	0.618	0.431	3	33.3	9	56.3	1.212	0.354
Employee	10	58.8	6	75.0			6	66.7	7	43.8		
Husband occupation												
Unemployed	0	0.0	1	12.5	4.371	0.112	0	0.0	2	12.5	3.057	0.00
Employee	8	47.1	1	12.5			7	77.8	7	43.8		
Self-employed	9	52.9	6	75.0			2	22.2	7	43.8		

Clinical data	Control (n = 25)				Chi-Square / Fisher's		Case (n = 25)				Chi-Square / Person	
	Low self-efficacy (n = 17)		High self-efficacy (n = 8)				Low self-efficacy (n = 9)		High self-efficacy (n = 16)			
	n	%	n	%	X <sup>2</sup>	P	n	%	n	%	X <sup>2</sup>	R
Residence												
Urban	16	94.1	7	87.5	0.324	0.569	8	88.9	14	87.5	0.011	0.00
Rural	1	5.9	1	12.5			1	11.1	2	12.5		
Income to cost ratio												
Cost > Income	14	82.4	5	62.5	4.622	0.099	7	77.8	13	81.3	0.188	0.612
Cost = Income	2	11.8	0	0.0			1	11.1	2	12.5		
Cost < Income	1	5.9	3	37.5			1	11.1	1	6.3		

There was a negative correlation between disease duration and BSE, the shorter duration, the higher score. The same result was as regard to No. of relapses, the less No. of previous

relapses, the higher the BSE score. As for relapses frequency, there was also a negative correlation as the less frequent the relapses, the higher the BSE score (table 8).

**Table 8. Association between the ms characteristics at onset of pregnancy and breastfeeding self-efficacy score**

Clinical data	Control (n = 25)				Chi-Square / Fisher's		Case (n = 25)				Chi-Square / Person	
	Low self-efficacy (n = 17)		High self-efficacy (n = 8)				Low self-efficacy (n = 9)		High self-efficacy (n = 16)			
	n	%	n	%	X <sup>2</sup>	P	n	%	n	%	X <sup>2</sup>	R
Disease duration [years]												
1 – 3	4	23.5	0	0.0	4.648	0.199	0	0.0	2	12.5	5.311	−0.390
4 – 6	6	35.3	6	75.0			2	22.2	9	56.3		
7 – 10	5	29.4	2	25.0			6	66.7	4	25.0		
> 10	2	11.8	0	0.0			1	11.1	1	6.3		
Use of immunotherapies (IMA)												
Yes	15	88.2	6	75.0	0.709	0.400	8	88.9	15	93.8	0.185	0.367
No	2	11.8	2	25.0			1	11.1	1	6.3		
Number of previous relapses												
None	4	23.5	0	0.0	6.822	0.078	1	11.1	1	6.3	1.056	−0.438
Once	0	0.0	2	25.0			0	0.0	1	6.3		
Twice	6	35.3	4	50.0			3	33.3	7	43.8		
Thrice	7	41.2	2	25.0			5	55.6	7	43.8		
Frequency of relapses												
Less than a year	7	53.8	6	75.0	0.940	0.332	5	62.5	13	86.7	1.791	−0.381
A year or more	6	46.2	2	25.0			3	37.5	2	13.3		

## Discussion

The current study was conducted with the purpose of studying the effect of smartphone application-assisted nursing intervention on breastfeeding self-efficacy of postpartum women with multiple sclerosis. The study findings can be successfully used to accept the proposed hypothesis. The findings in relation to the aim & hypothesis will be discussed in the following order:

Description of the studied sample, findings about breastfeeding self-efficacy, risk for postpartum relapse and factors affecting breastfeeding self-efficacy. The studied sample was postpartum women diagnosed with multiple sclerosis before pregnancy, and this was the main inclusion criterion, such se-

lection help ensuring the effectiveness of the study intervention and establish the causal relationship. Similar sample was previously studied by [14]. at a study titled "Exclusive Breastfeeding and the Effect on Postpartum Multiple Sclerosis Relapses" the sample had pregnant women with relapsing-remitting MS collected with 1-year follow-up post-partum in the nationwide German MS and pregnancy registry. The aforementioned study reported that relapse in the first 6 months post-partum may be diminished by exclusive breastfeeding, but once regular feedings are introduced, disease activity is likely to return.

The studied sample was divided into two groups for ensuring the effectiveness of the main intervention. Groups were similar



regarding their sociodemographic data, obstetric history, and disease characteristics. As for the findings reflecting the effectiveness of the study intervention, it can be clearly evident through comparing both groups regarding breastfeeding self-efficacy. The comparison showed that there was a high statistically significant difference between groups regarding continuation of breastfeeding. This piece of result agreed on by [24] who studied the burden of multiple sclerosis and self-management's challenges among postpartum women with multiple sclerosis at El Manial University Hospitals, Cairo University, Egypt and reported that there was a statistically significant difference between both groups with regards to the onset of breastfeeding and its continuation.

Moreover, the same comparison showed a highly statistically significance difference between groups regarding being comfortable during breastfeeding with the presence of family member around, this result was supported by [25] who studied breastfeeding self-efficacy and related factors among postpartum Vietnamese women at Tu Du hospital in Vietnam and found that perception of greater support was with family member presence correlated with higher breastfeeding self-efficacy. Social support including family member, friends, and health care providers is one source of information affecting breast feeding self-efficacy.

The same comparison between the studied groups also showed that there was a statistically significant difference between groups regarding eight main points which were: (1) determining that the baby got enough milk, (2) Successful coping with breastfeeding, (3) managing breastfeeding even with crying baby, (4) dealing with the fact that breastfeeding can be time-consuming, (5) finishing feeding on one breast before switching to the other, (6) continue feeding only using breastfeeding, (7) keep-up when the baby's breastfeed and finally know when the baby finished feeding.

These findings were supported by many studies like that of [26] who studied determinants of high breastfeeding self-efficacy among nursing mothers at Najran, Saudi Arabia and found that having adequate breastfeeding knowledge resulted in positive attitudes and thus higher breastfeeding self-efficacy with all included items. The aforementioned study supported the eight points.

The second comparison between groups which showed how effective was the intervention was regarding the total score of breastfeeding self-efficacy scale. There was a statistically significance difference between groups regarding the total scale score. This result was in line with by [27] who studied the effectiveness of a breastfeeding programme on breastfeeding self-efficacy and breastfeeding practice among primigravida mothers at Kamla Nehru Hospital, Shimla and reported that breastfeeding self-efficacy score of the experimental group was significantly higher than the control group and there was a positive correlation observed between breastfeeding self-efficacy and breastfeeding practice.

Regarding the risk for multiple sclerosis relapse and its link to breastfeeding, recent studies showed that breastfeeding was not associated with increased risk of relapse [28]. The current study compared such risk along 1 year after delivery between breast-feeding group and the control group. The comparison

results showed that the study group started to breastfeed from the 1st day postpartum and continued along the follow up phase (one year).

The comparison showed that the number of relapses was less among study group compared to control group. This can be rationalized by the fact that breastfeeding modulates maternal immunity thus helps the action of immunomodulators medication and decreases risk for relapse. This result was in harmony with [29] who studied "Interactions between multiple sclerosis and pregnancy" focused on multiple sclerosis and pregnancy, disease-modifying drugs (DMT), breastfeeding, and peripartum outcomes and reported that a study conducted in North America pointed to the protective role of exclusive breastfeeding and showed a reduction in the risk of postpartum relapses of approximately 5-fold during exclusive breastfeeding. The study argued that the protective role of breastfeeding is correlated with an increase in interferon producing CD4 T cells that are expressed due to breastfeeding amenorrhea.

The same comparison showed that there was a statistically significant difference between groups regarding disease activity as it was low among study group compared to control group. This finding can be explained by the main fact linking breastfeeding to immunomodulation [30]. The finding was supported by [31] who studied breastfeeding, ovulatory years, and risk of multiple sclerosis at California among women who had live births with multiple sclerosis. The study reported that mothers who breastfeed longer may be at lower subsequent risk of developing multiple sclerosis. Breastfeeding can have long-term effects on immune homeostasis as well as cardiovascular health mediators. For example, prolonged breastfeeding reduces proinflammatory CD41 tumor necrosis factor- $\alpha$ -producing cells in both healthy and MS women, but cell counts increase again after menstruation resumes.

The results of the current study showed an association between some factors as age, education, occupation, and income to cost ratio and breastfeeding self-efficacy.

The older the woman, the higher the breastfeeding self-efficacy. This association can be explained by the idea that older age was linked to more breastfeeding previous experience and training thus more self-efficacy. The higher the education degree, the higher the breastfeeding self-efficacy, as highly educated woman can breastfeed more effectively and be aware of different factors affecting effective breastfeeding. Housewives were experiencing higher breastfeeding self-efficacy compared to employee, housewives were having more time to practice breastfeeding effectively.

These results agreed on by [32] who studied determinants of high breastfeeding self-efficacy among nursing mothers at Najran, Saudi Arabia and found multiparous mothers with experience of exclusive breastfeeding had a higher probability of high BSE, higher BSE was related to previous positive breastfeeding. In addition, The BSE scale score was considerably influenced by higher educational level. The knowledge and awareness of breastfeeding are undoubtedly significantly influenced by educational level. A mother's ability to seek out health care and learn about it may be enhanced by her high level of education [33]. Moreover, there was a significant association between the employment situation and the BSE score. The

housewives were 1.6 times more likely to have a high BSE compared with working mothers [34].

Income to cost ratio was linked to breastfeeding self-efficacy. Women with high income were having a high breastfeeding self-efficacy as high income was associated with more psychological comfort, gaining adequate nutrition and other factors leading finally to effective breast feeding. This result is agreed on by [35] who studied breastfeeding self-efficacy as a dominant factor affecting maternal breastfeeding satisfaction at Indonesia among breastfeeding mothers and found a link between household income and breastfeeding satisfaction. Mothers with a greater household income or more educated partners, as well as mothers who have a partner and are employed, are more likely to breastfeed more effectively than women whose partner or themselves are unemployed.

### Conclusions

The results of the current study showed that the mobile application-assisted nursing intervention had a significantly positive effect on breastfeeding self-efficacy for educating postpartum women with MS on breastfeeding. There was a statistically significant difference between groups regarding breastfeeding self-efficacy score after the intervention. Moreover, there was a statistically significance difference between groups regarding the onset of breastfeeding and severity of disease activity with breast feeding after the intervention. There was a highly statistically significant difference between groups regarding duration of breastfeeding and number of

postpartum relapses with breastfeeding after the intervention. Based on the current findings, the study hypothesis can be accepted.

### Recommendations

Reinforce using mobile application-assisted nursing intervention and other types of technology-based interventions as a part of routine postpartum care for vulnerable women.

As approved by the current findings; it is advised that MS women should be encouraged to start breastfeeding after delivery. Replication of the current study with a comparison between exclusive and non-exclusive breastfeeding

### Ethical approval

The official approval for conduction of this study was granted from the Ethical Research Committee, Faculty of Nursing at Menoufia University (Institutional board review no. 926). All authors hereby confirm that the "verbal consent method" was approved by the "Ethical Research Committee" (Institutional board review no. 926)".

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### Piśmiennictwo/ References

1. Ministry of Communications and Information Technology. Retrieved on 30 June 2021.
2. Wood CS, Thomas MR, Budd J, Mashamba-Thompson TP, Herbst K, Pillay D, et al. Taking connected mobile-health diagnostics of infectious diseases to the field. *Nature*. 2019;566(7745):467–74 Available from: <https://www.nature.com/articles/s41586-019-0956-2>. [cited 2021 Feb 7]. Nature Publishing Group.
3. Olander EK, Darwin ZJ, Atkinson L, Smith DM, Gardner B. Beyond the 'teachable moment' - A conceptual analysis of women's perinatal behavior change. *Women Birth* 2016 Jun;29(3): e67-e71. [doi: 10.1016/j.wombi.2015.11.005] [Medline: 26626592].
4. Abu-Raya, B., Michalski, C., Sadarangani, M., Lavoie, P.M. Maternal immunological adaptation during normal pregnancy. *Front. Immunol.* 2020,11, 575197.
5. Overton, E.E., Goffman, D., Friedman, A.M. The epidemiology of COVID-19 in pregnancy. *Clin. Obstet. Gynecol.* 2022, 65, 110–122.
6. Salter, A., Fox, R.J., Newsome, S.D., Halper, J., Li, D.K.B., Kanellis, P., Costello, K., Bebo, B., Rammohan, K., Cutter, G.R., Cross, A.H. Outcomes and risk factors associated with SARS-CoV-2 infection in a North American registry of patients with multiple sclerosis. *JAMA Neurol.* 2021, 78, 699–708.0.
7. Thompson AJ, Banwell BL, Barkhof F, Carroll WM, Coetzee T, Comi G, et al. Diagnosis of multiple sclerosis: 2018 revisions of the McDonald criteria. *Lancet Neurol.* 2018; 17:162–73.
8. Correale, J., Gait'án, M.I., Ysraelit, M.C., Fiol, M.P. Progressive multiple sclerosis: from pathogenic mechanisms to treatment. *Brain*. 2017, 140 (3), 527–546.
9. The Ministry of Health and Population's statistics, 2022. MS in Egypt: Doctors shed light on the challenges and new treatments. <https://english.ahram.org.eg/NewsContent/7/48/466230/Life--Style/Health/MS-in-Egypt-Doctors-shed-light-on-the-challenges-a.aspx>
10. Koch-Henriksen N, Thygesen LC, Stenager E, Laursen B, Magyari M. Incidence of MS has increased markedly over six decades in Denmark particularly with late onset and in women. *Neurology*. 2018;90(22):e1954–e63.
11. Bsteh G, Algrang L, HegenH, AuerM, Wurth S, Di Pauli F, et al. Pregnancy and multiple sclerosis in the DMT era: a cohort study in Western Austria. *Mult Scler.* 2020; 26:69–78.
12. Krysko KM, Rutatangwa A, Graves J, Lazar A, Waubant E. Association between breastfeeding and postpartum multiple sclerosis relapses: a systematic review and meta-analysis. *JAMA Neurol.* 2020;77(3):327–38. A comprehensive systematic review and meta-analysis summarizing the protective effect of breastfeeding on postpartum MS relapses.

13. Langer-Gould A, Smith JB, Albers KB, Xiang AH, Wu J, Kerezi EH, et al. Pregnancy-related relapses and breastfeeding in a contemporary multiple sclerosis cohort. *Neurology*. 2020;94(18):1–e11. A contemporary cohort study suggesting that postpartum MS relapse risk may not be elevated in women with milder MS exclusively breastfeeding.
14. Hellwig K, Rockhoff M, Herbstritt S, Borisow N, Haghighi A, Elias-Hamp B, et al. Exclusive breastfeeding, and the effect on postpartum multiple sclerosis relapses. *JAMA Neurol*. 2015;72(10):1132–8.
15. Smith J, Cattaneo A, Iellamo A, Javanparast S, Atchan M, Gribble K et al. Review of effective strategies to promote breastfeeding. The Sax Institute, 2018. 204.
16. Luessi F, Siffrin V, Zipp F. Neurodegeneration in multiple sclerosis: novel treatment strategies. *Expert Rev Neurother* 2012; 12:1061–1076.
17. Campbell JA, Simpson Jr S, Ahmad H, Taylor BV, van der Mei I, Palmer AJ. Change in multiple sclerosis prevalence over time in Australia 2010–2017 utilizing disease-modifying therapy prescription data. *MultScler J* 2020; 26:1315–1328.
18. Wallin MT, Culpepper WJ, Nichols E, Bhutta ZA, Gebrehiwot TT, Hay SI, et al. Global, regional, and national burden of multiple sclerosis 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet Neurol* 2019; 18:269–285.
19. Ali Mahmoud Ahmed, Mohamed Al-Bahay M. G. Reda, & Ahmed Hassan Elsheshiny. Outcomes of pregnancy in Egyptian women with multiple sclerosis in the new treatment era: a multi-center retrospective observational study. *Egypt J Neurol Psychiatry Neurosurg* (2021) 57:130 <https://doi.org/10.1186/s41983-021-00386-1>
20. Osma J, Barrera AZ, Ramphos E. Are pregnant and postpartum women interested in health-related apps? Implications for the prevention of perinatal depression. *Cyberpsychol Behav Soc Netw*. 2016;19(6):412–5. <https://doi.org/10.1089/cyber.2015.0549>.
21. Bastani F, Rahmatnejad L, Jahdi F, Haghani H. Breastfeeding self-efficacy and perceived stress in primiparous mothers. *Iran J Nurs*. 2008;21(54):9–24.
22. Dennis CL, Faux S. Development and psychometric testing of the breastfeeding self-efficacy scale. *Res Nurs Health*. 1999;22(5):399–409. [https://doi.org/10.1002/\(SICI\)1098-240X\(199910\)22:5 < 399::AID-NUR6 > 3.0.CO;2-4](https://doi.org/10.1002/(SICI)1098-240X(199910)22:5 < 399::AID-NUR6 > 3.0.CO;2-4).
23. Barakati S, Sad Vandian S, Alayi Sh FM, Homayoonfar N. A guide for mothers on breast-feeding: Ministry of Health and Hygiene The Department of Population Health; 2011. p. 7.
24. Amel Dawod Kamel, Rania Mahmoud Abdel Ghani, Mona Rkhiyes Alanazi, Shahira Mohamed Metwaly, Sandra Mohamed Ahmed, Sahar Mansour Ibrahim. The burden of multiple sclerosis among postpartum women and self-management's challenges: Pilot study of supportive program. <https://doi.org/10.1016/j.msard.2022.103694> Received 13 December 2021; Received in revised form 26 January 2022; Accepted 18 February 2022. 2211-0348/© 2022 Elsevier B.V. All rights reserved.
25. Ly Thi Hai Ngo, Hsueh-Fen Chou, Meei-Ling Gau, Chieh-Yu Liu. Breastfeeding self-efficacy and related factors in postpartum Vietnamese women. *Midwifery*, Volume 70, March 2019, Pages 84-91. <https://doi.org/10.1016/j.midw.2018.12.014> 0266-6138/© 2018 Elsevier Ltd. All rights reserved.
26. Al-Thubaity, D.D.; Alshahrani, M.A.; Elgzar, W.T.; Ibrahim, H.A. Determinants of High Breastfeeding Self-Efficacy among Nursing Mothers in Najran, Saudi Arabia. *Nutrients* 2023, 15, 1919. <https://doi.org/10.3390/nu15081919>.
27. Parmar S1, Viswanath L. The Effectiveness of a Breastfeeding Self-Efficacy Programme on Breastfeeding Self-Efficacy and Breastfeeding Practice among Primigravida Mothers. *International Journal of Nursing Care*, January-June 2019, Vol. 7, No. 1
28. Kristen M. Krysko, Alice Rutatangwa, Jennifer Graves, Ann Lazar, Emmanuelle Waubant. Association Between Breastfeeding and Postpartum Multiple Sclerosis Relapses A Systematic Review and Meta-analysis. *JAMA Neurol*. 2020;77(3):327-338. doi: 10.1001/jamaneurol.2019.4173 Published online December 9, 2019.
29. Maria Añños-Urrea and Pedro J Modrego. Interactions between multiple sclerosis and pregnancy. *Current landscape of approved treatments*. *Clin Res Trials*, 2020 doi: 10.15761/CRT.1000296. Volume 6: 5-7
30. Alhomoud, F. K., Alsadiq, Y., Alghalawin, L., Alhifany, A., & Alhomoud, F. Pharmacy students' knowledge and practices concerning the storing and disposal of household medication in Saudi Arabia. *Currents in Pharmacy Teaching and Learning*, (2021), 13(1), 5-13.
31. Annette Langer-Gould, Jessica B. Smith, Kerstin Hellwig, Edlin Gonzales, Samantha Haraszi, Corinna Koebnick, Anny Xiang. Breastfeeding, ovulatory years, and risk of multiple sclerosis. *Neurology* 89 August 8, 2017
32. Elgzar, W.T.; Al-Thubaity, D.D.; Alshahrani, M.A.; Essa, R.M.; Ibrahim, H.A. The Relationship between Maternal Ideation and Exclusive Breastfeeding Practice among Saudi Nursing Mothers: A Cross-Sectional Study. *Nutrients* 2023, 15, 1719. [CrossRef]
33. Alyousefi, N.; Alemam, A.; Altwajiri, D.; Alarifi, S.; Alessa, H. Predictors of Prenatal Breastfeeding Self-Efficacy in Expectant Mothers with Gestational Diabetes Mellitus. *Int. J. Environ. Res. Public Health* 2022, 19, 4115. [Google Scholar] [CrossRef] [PubMed]
34. Titley, C.R.; Dibley, M.J.; Ariawan, I.; Mu'asyaroh, A.; Alam, A.; Damayanti, R.; Do, T.T.; Ferguson, E.; Htet, K.; Li, M.; et al. Determinants of low breastfeeding self-efficacy amongst mothers of children aged less than six months: Results from the BADUTA study in East Java, Indonesia. *Int. Breastfeed. J.* 2021, 16, 12. [CrossRef]
35. Awaliyah Siti Nurbayanti Awaliya, Imami Nur Rachmawati and Hayuni Rahmah. Breastfeeding self-efficacy as a dominant factor affecting maternal breastfeeding satisfaction. *BMC Nursing* 2019, 18(Suppl 1):30 <https://doi.org/10.1186/s12912-019-0359-6>