Effect of Structured Postpartum Nursing Intervention Involving COVID-19 Precautions on Mother's Knowledge, Practice, Fear level and Neonatal care

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Abstract

The study aimed to evaluate the effect of structured postpartum nursing intervention involving COVID-19 precautions on mother's knowledge, practice, fear level and neonatal care. The study sample was purposive composed of 75 mothers during postpartum period**. Study design** was Quasi Experimental (pre-post)**. Setting:** the study conducted at the obstetrics and gynecology departments affiliated to University Hospital and Shebin El-Kom teaching hospital, Menoufia Governorate, Egypt. **Five tools** were used for data collection: a structured interviewing questionnaire, an observational checklist of mother practice of maternal and neonatal care, COVID-19 precautions knowledge questionnaire, Observational checklist of COVID-19 practice, and the COVID-19 fear scale. **Study results** revealed a statistically significant difference in the mothers' knowledge and practice regarding COVID-19 precautions and decrease in fear level on post and follow up intervention compared to pre intervention which indicated that the nursing intervention involving COVID-19 precautions had positive effect on mothers' knowledge, practice and fear level. So**,** integrating postpartum nursing intervention involving COVID-19 precautions as a routine care for all postpartum mothers is recommended.

Keywords: Nursing intervention, COVID -19 precautions.

1. INTRODUCTION:

The postpartum period is a critical phase in the lives of mothers and neonates. Most maternal and infant deaths occur during this time. Postpartum care refers to issues pertaining to the mother and the baby from birth up to 6 weeks **(WHO, 2014)**. The goal of care during the early postpartum period is to promote the physical well-being of both mother and baby. Besides; it can also support the development of infant feeding skills and strengthen the mother's knowledge and confidence in her and her baby's health and well-being **(Family Centered Maternity and Newborn Care (FCM), 2015)**.

Lack of appropriate postpartum care sometimes may result in death or disability of the mother and/or newborn as reported by **Beraki et al. (2020)**. According to **WHO (2014)** around two thirds of maternal and newborn deaths occur in the early postpartum period in developing countries and most of them in sub-Saharan Africa , Nearly half of postpartum maternal deaths occur within the first 24h and 66% occur during the first week.

Postpartum women experience changes in their body that may put them at a higher risk for contracting viruses such as influenza and other respiratory infections, including COVID-19, care should be taken to protect them from illness **(Indiana State Department of Health, 2020)**. COVID-19 is an emerging disease that has been associated with a rapid increase in afflicted cases and deaths since its first diagnosis in Wuhan, China, in December 2019 **(Lai, 2020)**. After emerging in China, there has been an increase in the number and spread of the virus worldwide. On January 11, 2020, the World Health Organization (WHO) issued a statement declaring the spread of the new coronavirus to be the sixth major public health emergency worldwide to pose a threat to all countries (**WHO, 2020**).

The cause of the outbreak of COVID-19 is still unknown. It is thought that person-to-person spread, similar to the outbreak of influenza and other respiratory pathogens, is caused mainly by respiratory droplets present in the affected person's cough or sneeze **(Center for disease control and prevention (CDC), (2020)**. A spectrum of symptoms ranging from colds to severe respiratory illness and death are the main symptoms. Patient manifestations include fever, cough, myalgia, headache, diarrhea, and gastrointestinal symptoms (**Chua, 2020**).

Postpartum anxiety and depression are common for mothers and new fathers. Concerns about exposure to COVID-19, combined with physical distancing and containment recommendations, may adversely affect the thoughts, emotions, and functioning of new mothers, thereby worsening depressive symptoms **(Zanardo, 2020)**. Medical and Nursing interventions involving COVID-19 precautions should be carried out immediately to promote maternal physical and psychological health and prevent deterioration of maternal and neonatal condition **(Hossain, 2020)**. Postpartum mothers can pass the critical postpartum period successfully if they have adequate knowledge regarding postpartum care in general as nutrition, activity, measures to relief postpartum discomfort and knowledge and adequate practice in particular regarding COVID-19 preventive measures as wash hands often with soap for at least 20 seconds ,wearing face mask , follow social distance guidelines…. ect which mainly the nurse role **(Mirzaee and Taghi, 2015 & Indiana State Department of Health, 2020)**.

1.1. Significance of the study

COVID-19 is a novel virus requiring a rapid response from health services, while ongoing, critical scientific evidence is being gathered and ascertained. Although the primary focus has been on vulnerable groups, particularly the elderly and individuals with underlying medical conditions, it is possible that postpartum mother and newborns are also at higher risk. COVID-19 infection can be prevented by post-partum women adherence to preventive measures, which is largely affected by their knowledge, attitudes, and practices (KAP) towards COVID-19 in accordance with KAP theory **(Ajilore, 2017).** Moreover, different studies added that from the Lessons learned from the SARS outbreak in 2003 that knowledge and practice towards infectious diseases are associated with level of panic emotion among the population especially high risk group, which can further complicate attempts to prevent the spread of the disease **(Schwartz& Graham, 2020)**. Various research studies clearly indicate the importance of improving COVID-19 knowledge via health education, which result in improvements in their practices towards COVID-19 **(Azlan,2020)**. To date, there have been limited data regarding COVID-19 precautions during postpartum period. However, there is concern about the infection's implications as well as appropriate care. Considering the effect of postpartum nursing intervention

involving COVID-19 precautions on mother knowledge and practice of maternal and neonatal care and mother's psychological status and scarcity of studies on this subject, this study was conducted to evaluate the effect of structured postpartum nursing intervention involving COVID-19 precautions on mother's knowledge, practice, fear level and neonatal care.

1.2. Aim: The aim of this study was to evaluate the effect of structured postpartum nursing intervention involving COVID-19 precautions on mother's knowledge, practice, fear level and neonatal care.

1.3. Research Hypotheses: H1- The postpartum mothers who are subjected to structured postpartum nursing intervention involving COVID-19 precautions will have satisfactory knowledge and adequate practice regarding postpartum maternal and neonatal care on post intervention than pre intervention. H2-The postpartum mothers who subjected to structured postpartum nursing intervention involving COVID-19 precautions will have satisfactory knowledge and adequate practice regarding COVID-19 precautions on post intervention than pre intervention. H3- The postpartum mothers who are subjected to structured postpartum nursing intervention involving COVID-19 precautions will have lower level of fear regarding COVID-19 infection on post intervention than pre intervention.

2. SUBJECTS & METHODS

2.1.Study design, setting and sample

Aquasi-experimental design (pre, post and follow up) was used.

2.1.1.*Sample*

Purposive sampling consisted of 75 mothers during postpartum period. Sample size was calculated at power 80% and confidence interval 95% by the following equation {n = 2SD2 (Z α/2+Zβ)2 / d2} , where Z α/2 = 1.96 and Zβ = 0.84 , SD is the standard deviation and d is the effect size so, the calculated sample size was 75 mothers. The inclusion criteria was: mothers delivered by caesarean section, mother – neonatal pairs, agreed to participate in the study. Exclusion criteria include mothers and neonate with diseases or disabilities because if the mother or her neonate has

disease or disability this may affect mothers' readiness to attend sessions and affect her fear level.

2.1.2. Study Setting: The study was conducted at obstetrics and gynecology departments affiliated to University Hospital and Shebin El-Kom teaching hospital, Menoufia Governorate, Egypt. These hospitals were purposively selected because they are known to present services to large sector of the governorate population as they having a high flow rate of laboring women. And also at maternal and child heath care centers at Shebin Elkom as it provides services to women and newborn as vaccination.

2.1.3. A pilot study: The pilot study was conducted on 10% (7 postpartum mother and their neonates) from the total sample in order to ensure the clarity, applicability of the measures and the time needed to be completed. According to the results obtained from the pilot study, the required modifications were performed.

2.2. Data collection measures:

This study utilized five data collection measures, which was filled by researchers and included the followings:

2.2.1. Measure I: A structured interviewing questionnaire (Pre / post and Follow up): It was developed by the researchers after reviewing of related literature and divided into three parts: **Part 1 (7 items):** Included demographic data and obstetric history as mother age, educational level, income, gravidity and parity. **Part 2 (7 items):** Included data about assessment of mother knowledge regarding postpartum maternal care as nutrition, exercise and activity, measures to relieve postpartum discomforts, dangerous signs, sexuality and contraception. **Part 3 (6 items):** Included postpartum neonatal care as frequency, initiation and duration of breast feeding, vaccination schedule and neonatal dangerous signs.

2.2.2. Measure II: An observational Checklist: (Pre / post and Follow up): was divided into two parts**: Part one:** included observation of mother practice of breast care and perineal care (**Ricci, 2013)**, **Part two:** included observation of mother practice of breast feeding technique, safe cord care and eye care **(Wilson & Rodgers, 2016)**.

2.2.3. Measure III: COVID-19 Precautions knowledge Questionnaire: Developed by the researchers. It consisted of three parts: **Part One**: Assessment of mother knowledge about maternal signs and symptoms of COVID-19 infection such as cough, shortness of breath, increase temperature, muscle pain, sore throat, new loss of taste or smell. **Part Two**: Assessment of mother knowledge about neonatal signs and symptoms of COVID-19 infection as tachypnea, cough, fever, vomiting, diarrhea, feeding intolerance or decreased intake. **Part Three:** Mother knowledge about COVID-19 precautions: as washing hands, social distancing, cloth face coverings and gloving indication, recommendation for visitors, cough etiquette and sneezing etiquette, stress management methods.

2.2.4. Measure IV: observational Checklist of COVID-19 Practice: It included observation of the mother practice of the following procedures; temperature checking **(Potter & Perry, 2017)**, hand washing, wearing and removing cloth face coverings (**Center for disease control and prevention recommendation (CDC), (2020)**.
2.2.5. Measure V: The Fear of COVID-19 Scale: It was developed **by Ahorsu, (2020)**. This scale was translated into Arabic., It included seven questions in the form of five points Likert scale to assess the mother's fear about COVID -19 as hands became clammy when think about COVID-19, afraid of losing your life, become nervous or anxious, cannot sleep because worrying about getting COVID-19 and heart races or palpitates when you think about getting COVID-19.

2.2.6. Data collection measures scoring system:

Knowledge questions scoring were measured by giving subjects responses a score of (1) for the correct answer and (zero) for the incorrect answer then for each area of knowledge, the scores of the items were summed. knowledge was considered satisfactory if the score was equal or more 60% of the total score and unsatisfactory if less than 60% of the total score.

Regarding Observation checklist scoring: the items observed to be adequately done were scored “2”, the items not adequately done were scored “1” and the items not done were scored “0”. For each area, the scores of the items were summed-up. The practice was considered adequate if the percentage score was 60% or more and inadequate if less than 60% and the practice was considered not done if the percent score was 0%. Regarding **The Fear of COVID-19 Scale Scoring system:** Each item

was scored as follows: 1 for disagree, 2 for strongly disagree, 3 for neither agree nor disagree, 4 for agree and 5 for strongly agree. The minimum score possible for each question is one and the maximum is five. A total score was calculated by adding up each item score (ranging from 7 to 35). Mild fear was scored from 7 to 14, moderate fear was scored from 15 to 22 and severe fear was scored from 23 to 35.

2.2.7. Validity and reliability the study measures*:* Study measures were reviewed and tested for content validity by 5 experts in the pediatric and obstetrical nursing, modifications were done accordingly to ascertain relevance and completeness. Test-retest reliability was used. The internal consistency of the measures was calculated using Cronbach's alpha coefficients. Study measures revealed reliable at Cronbach's alpha 0.761 for Measure (I), 0.842 for Measure (II), at 0.86 for measure (III), at 0.728 for measure (IV), at 0.828 for measure (V).

2.3. Ethical considerations: According to the Faculty of Nursing Ethical Research Committee, the researchers got the mother verbal consent before conducting the study. Assured them about confidentiality, safety and privacy of data obtained.

2.4. Data collection procedure:

The researchers reviewed the current local and international related literature to be more acquainted with the problem, to design the study measures, and to finalize them by using scientific books, articles, magazines and internet. The actual fieldwork was carried out from beginning of March 1, 2020 to June 30, 2020. The researchers were available in the study settings two days/week, at the morning shift from 8.00 AM to 2.00 PM. The researchers introduced themselves to the medical and nursing staff members in the previously mentioned settings. The researchers explained the nature and the purpose of the study and asked for cooperation. The researchers performed the research in the following phases:

1-Assessment Phase*:* The researchers met each postpartum mother individually, introduced themselves to the mother, and obtain their consent to the recruited in the study after explaining the purpose of the study and collected their demographic data and obstetric history, assessed their knowledge level and practice of postpartum maternal and neonatal care before the intervention by measures I &II. The researchers also assessed mother's knowledge of COVID-19 signs and symptoms for mothers and her neonate and mother's knowledge and practices of COVID -19 precautions by

measure III&IV. Lastly, the researchers assessed mother's level of fear of COVID-19 infection by using measure V.

2-Planning phase: The researchers prepared an educational material about postpartum care that include definition, importance, and information about: post-partum maternal care as nutrition, activity and exercise, measures to relieve postpartum pain, dangerous sign, contraception, sexuality and discharge planning. Postpartum neonatal care as initiation of breast feeding, frequency of breast feeding, duration of breast feeding, vaccination schedule as well as COVID-19 precautions for postpartum mother's knowledge and practice such as signs& symptoms of COVID-19 infection for mother's & neonate and how to apply COVID precautions e.g hand washing technique, taking temperature, wearing and removing cloth face covering.

3-Implementation phase

The researchers provided four educational sessions about postpartum maternal and neonatal care. Each session lasting 40 minutes -60 minutes. these 4 session was given during mothers stay at hospital with her newborn: two sessions per day and illustrated by using booklet and educational videos.

First session: each mother was given an individualized and comprehensive knowledge about maternal and neonatal postpartum care which include the following items: importance of immediate contact between the mother and the newborn, breast-feeding: advantages of breast-feeding, when to initiate breast feeding, duration of exclusive breast-feeding, postpartum pain comfort measures such as relaxation technique. Nutrition: component of healthy diet and to eat more high-protein and high-fibers foods with different choices to increase their energy and enhance the healing process. Postpartum exercises: importance of postpartum exercise and walking at least 30 minutes/day. Postoperative hygiene: keeping the incision site and body clean and dry to prevent getting cold. Pads are changed frequently to keep the vulva clean. Postpartum danger signs in the newborn and in the mother and to go to hospital immediately if any signs appear after discharge. Sexuality and contraceptive methods. Vaccination schedule for her newborn .

Second session: The researchers educated the mother the correct technique of cord care and newborn eye care by practicing the previous procedures on the newborn and allowing his mother to practice it again in front of researchers and also educated the

mother about correct technique of breast care, breast feeding and perineal care by using pictures and educational videos **(Ricci, 2013)** & **(Wilson & Rodgers, 2016)**.

Third session: COVID-19 precautions based on Center for disease control and prevention (CDC) (2020) and Queensland clinical guidelines (2020): Firstly, educating the mothers about signs and symptoms of COVID-19 infection. Secondly, teaching COVID-19 precautions: **Hand washing**; wash hands often with soap for at least 20 seconds. Hand washing indication: before eating or preparing food, before touching your face, after using the restroom, after blowing your nose, coughing, or sneezing, after handling your cloth face covering, and after changing a diaper. If soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol. If sensitizer will be used cover all surfaces of your hands and rub them together until they feel dry. **Following social distancing guidelines**: inside the home avoid close contact with people, who are sick, maintain 6 feet between the person who is sick and other household members. **Outside your home:** Put 6 feet of distance between yourself and people who do not live in your household. Cover your mouth and nose with a cloth face cover when around others. **Cloth face coverings (facemask) indications**: wear a cloth face covering when contacting with others and in public setting. **Recommendation for visitors:** all visitors who visit you wear mask, limit visitors to a few family members and friends. **Recommendation for new born:** restrict visitors for new born ensuring that you or your family member wash their hands with soap and water frequently or use alcohol-based hand before caring of baby. **Gloving indication:** wearing gloves when you are cleaning. **Follow cough and sneezing etiquette:** cough or sneeze into tissues**. Stress management:** avoid stressful situation and manage your stress as by using relaxation technique**. Recommended action when she experience signs and symptoms of COVID-19:** Inform doctor. **Recommended action when she contact with person having signs and symptoms of COVID-19:** avoiding close contact with people exhibiting symptoms of infection**. Other items of education of postpartum mothers includes:** avoid touching eyes, nose, or mouth with unwashed hands, using dedicated personal equipment and resources, get plenty of rest, drink fluids, eat healthy, Do not skip postpartum appointments. Do not delay getting emergency care because of COVID-19.

4- Fourth Session: - Practice session about COVID-19 precautions which included the followings:

- Hand washing in right Way (CDC, 2020): Wet your hands with clean, running water (warm or cold), turn off the tap, and apply soap. Lather your hands by rubbing them together with the soap. Lather the backs of your hands, between your fingers, and under your nails. Scrub your hands for at least 20 seconds. Rinse your hands well under clean, running water. Dry your hands using a clean towel or air-dry them**.**

-How to wear cloth face coverings (Mask) correctly (CDC, 2020): Wash your hands before putting on your face covering**.** Put it over your nose and mouth and secure it under your chin**.** Try to fit it snugly against the sides of your face**.** Make sure you can breathe easily

-How to remove cloth face coverings (Mask) correctly (CDC, 2020): Untie the strings behind your head or stretch the ear loops**.** Handle only by the ear loops or ties**.** Fold outside corners together**.** Be careful not to touch your eyes, nose, and mouth when removing and wash hands immediately after removing.

-How can take a temperature with oral thermometer (Potter & Perry's, 2013): wash your hands with soap and warm water. Use a clean thermometer. Do not eat or drink anything for at least five minutes before you take your temperature. Place the thermometer tip under the tongue. Hold the thermometer in the same spot for about 60 seconds. Read the measurement. Rinse thermometer in water, clean it with alcohol and rinse again.

4-Evaluation phase

Posttest was done immediately after intervention and follow up was done after one month of conducting posttest except for cord care done after one week. Follow up was done during Follow up visits to study settings and during infant vaccination (1st month vaccination). Each mother was phoned to assure her attendance. For mother who could not attend, follow up was done through phone call and online meeting.

Note: The researcher wear personal protective equipment and follow COVID-19 precautions when contacting with postpartum mother and her newborn.

2.5.Statistical analysis:

Data was collected, tabulated, statistically analyzed using an IBM personal computer with Statistical Package of Social Science (SPSS) version 22 where the following statistics were applied: Descriptive statistics: in which qualitative data were presented in the form numbers and percentages. Analytical statistics: used to find out the possible association between studied factors and the targeted disease. McNemar's test was used to assess the significance of the difference between two correlated proportions and the marginal homogeneity test: It is much like the McNemar test, but in the marginal homogeneity test, the variables can take on more than two categories. P value of >0.05 was considered statistically non-significant. P value of <0.05 was considered statistically significant. P value of <0.001 was considered statistically highly significant.

3. RESULTS

3.1. Study Measure I outcome:

Table (1):-Demographic data and obstetric history of study participants

Characteristics	Studied mothers (n = 75)	
	N	%
Age group (year)		
18 - 25 year	20	26.7%
26-30 year	29	38.7%
≥31 year	26	34.7%
Education level		
Primary school	5	6.7%
Secondary school	16	21.3%
High school	26	34.7%
University	28	37.3%
Employment condition		
Employed	21	35.0%
Unemployed	39	65.0%
Gravidity		
Multigravida	27	36.0%
Primigravida	48	64.0%
No of parity		
1	27	36.0%
2	28	37.3%
3	17	22.7%
4	3	4.0%
Duration of stay in hospital		
2 days	75	100%
Income		
Not enough	9	12.0%
Enough	54	72.0%
More enough	12	16.0%

Table (1) displayed that 38.7% of study participants were aged 26 - 30 year, percentage of participants that have finished high school was 34.7%, more than two third of them were unemployed .Regarding the gravidity 64% of study participants were prim gravida & all of them hospitalized for 2 days.

Table (2): Total knowledge score regarding maternal and neonatal care

Knowledge Items	Pre intervention (N=75)		Post intervention (N=75)		Follow up (N=75)		McNemar test	P value
	No.	%	No.	%	No.	%		
Maternal care								
Satisfactory	6	8.00	67	89.3	58	77.3	99.3 73.6 3.89	**P1:0.001**** **P2:0.001**** **P3:0.048***
Unsatisfactory	69	92.0	8	10.7	17	22.7		
Neonatal care								
Satisfactory	2	2.70	70	93.3	60	80.0	123.5 92.5 5.77	**P1:0.001**** **P2:0.001**** **P3:0.016***
Unsatisfactory	73	97.3	5	6.70	15	20.0		

** significant **High significant P1: Comparison between pre and post intervention P2: Comparison between pre and follow up intervention P3: Comparison between post and follow up intervention*

Table (2) showed that the percentage of satisfactory knowledge regarding maternal care at pre intervention was 8% compared to 89.3% and 77.3% on post and follow up intervention respectively and percentage of unsatisfactory knowledge was 92.0% at pre intervention compared to 10.7% and 22.7 % at post and follow up intervention respectively. There was highly statistically significant difference in participants total knowledge score of maternal care at pre and post intervention (McNemar test=99.3, P1=0.001). There was statistically significant difference in participant total knowledge score of maternal care at pre and follow up intervention (McNemar test=73.6, P1=0.001). There was statistically significant difference in participants' total knowledge score of maternal care between post and follow up intervention (McNemar test=3.89, P=0.048). Regarding neonatal care 2.70% of participants had satisfactory knowledge at pre intervention compared to 93.3% and 80.0% at post and follow up intervention respectively and percentage of unsatisfactory knowledge was 97.3% at pre intervention compared to 6.70% and 20% at post and follow up intervention respectively. There was highly statistically significant difference in participants total knowledge score of neonatal care at pre and post intervention (McNemar test=123.5, P1=0.001). There was statistically significant difference in participant total knowledge score of neonatal care between pre and follow up intervention (McNemar test=92.5, P1=0.001). There was statistically significant difference in participants total knowledge score of neonatal care between post and follow up intervention (McNemar test=5.77, P=0.016)

3.2. Measure II out come

Table (3):- Participants practice of maternal and neonatal care

Studied variables	Pre intervention (N=75)		Post intervention (N=75)		Follow up (N=75)		Marginal homogeneity test	P value
	No.	%	No.	%	No.	%		
Maternal care								
Breast care								
Not done	5	6.70	0	0.00	3	4.00	109.4	**P1:0.001****
Inadequate	63	84.0	4	5.30	12	16.0	77.1	**P2:0.001****
Adequate	7	9.30	71	94.7	60	80.0	7.92	**P3:0.019***
Perineal care								
Not done	5	6.70	0	0.00	3	4.00	109.4	**P1:0.001****
Inadequate	63	84.0	4	5.30	12	16.0	77.1	**P2:0.001****
Adequate	7	9.30	71	94.7	60	80.0	7.92	**P3:0.019***
Neonatal Care								
Cord care								
Not done	10	13.3	8	10.7	0	0.00	120.7	**P1:0.001****
Inadequate	65	86.7	3	4.00	10	13.3	115.3	**P2:0.001****
Adequate	0	0.00	64	85.3	65	86.7	11.7	**P3:0.003****
Breast feeding technique								**P1:0.001****
Not done	6	8.00	2	2.70	0	0.00	132.5	**P2:0.001****
Inadequate	69	92.0	3	4.00	3	4.00	138.5	P3:0.362
Adequate	0	0.00	70	93.3	72	96.0	2.03	
Eye care								
Not done	15	20.0	7	9.30	0	0.00	130.9	**P1:0.001****
Inadequate	60	80.0	0	0.00	7	9.30	124.9	**P2:0.001****
Adequate	0	0.00	68	90.7	68	90.7	14.0	**P3:0.001****

** significant **High significant P1: Comparison between pre and post intervention P2: Comparison between pre and follow up intervention P3: Comparison between post and follow up intervention*

Table (3) displayed that there was statically difference in the participants practice of maternal and neonatal care; breast care, perineal care, cord care, breast feeding technique and eye care in post and follow up intervention compared to pre intervention ($p<0.001$). There was statically difference between post and follow up intervention in previously mentioned items except breast feeding technique (P=.362).

3.3: Measure III outcome:

Table (4): Participants knowledge of maternal and neonatal signs and symptoms of COVID-19 infection

Studied variables	Pre intervention (N=75)		Post intervention (N=75)		Follow up (N=75)		McNemar test	P value
	Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory		
Maternal								
Cough	26(34.7)	49(65.3)	49(65.3)	26(34.7)	68(90.7)	7(9.30)	14.1 50.2 14.1	**P1: 0.001**** **P2:0.001**** **P3:0.001****
Shortness of breath or difficulty	28(37.3)	47(62.7)	65(86.7)	10(13.3)	68(84.0)	12(16.0)	38.7 37.3 0.09	**P1:0.001**** **P2:0.001**** P3:0.766
Increase temperature	36(48.0)	39(52.0)	75(100)	0(0.00)	75(100)	0(0.00)	52.7 52.7 0.00	**P1:0.001**** **P2:0.001**** P3:1.00
Chills	10(13.3)	65(86.7)	69(92.0)	6(8.00)	65(86.7)	10(13.3)	93.1 80.6 1.12	**P1:0.001**** **P2:0.001**** P3:0.290
Muscle pain	18(24.0)	57(76.0)	75(100)	0(0.00)	68(90.7)	7(9.30)	91.9 68.1 7.34	**P1: 0.001**** **P2:0.001**** **P3:0.006****
Sore throat	20(26.7)	55(73.3)	71(94.7)	4(5.30)	66(88.0)	9(12.0)	72.6 57.6 2.11	**P1:0.001**** **P2:0.001**** P3:0.146
New loss of taste or smell	4(5.30)	71(94.7)	54(72.0)	21(28.0)	50(66.7)	25(33.3)	70.2 61.3 0.50	**P1:0.001**** **P2:0.001**** P3:0.478
Neonatal								
Tachypnea	27(36)	48(64)	67(89.3)	8(10.7)	68(84.0)	12(16.0)	38.7 37.3 0.09	**P1:0.001**** **P2:0.001**** P3:0.713
Cough	26(34.7)	49(65.3)	49(65.3)	26(34.7)	68(90.7)	7(9.30)	14.1 50.2 14.1	**P1: 0.001**** **P2:0.001**** **P3:0.001****
Fever	36(48.0)	39(52.0)	75(100)	0(0.00)	75(100)	0(0.00)	52.7 52.7 0.00	**P1:0.001**** **P2:0.001**** P3:1.00
Vomiting	20(26.7)	55(73.3)	70(93.3)	5(6.70)	67(89.3)	8(10.7)	69.4 60.4 0.76	**P1:0.001**** **P2:0.001**** P3:0.383
Diarrhea	12(16.0)	63(84.0)	67(89.3)	8(10.7)	52(693)	23(30.7)	80.9 43.6 9.15	**P1:0.001**** **P2:0.001**** **P3:0.002****
feeding intolerance or decreased intake.	20(26.7)	55(73.3)	70(93.3)	5(6.70)	67(89.3)	8(10.7)	69.4 60.4 0.76	**P1:0.001**** **P2:0.001**** P3:0.383

** significant **High significant P1: Comparison between pre and post intervention P2: Comparison between pre and follow up intervention P3: Comparison between post and follow up intervention*

Table (4) displayed that there was highly statically difference in the participants knowledge regarding signs and symptoms of COVID-19 infection in post and follow up intervention compared to pre intervention ($p<0.001$). Meanwhile there was non statistically significant difference ($p<0.001$) in in the participants knowledge regarding signs and symptoms of COVID-19 infection between post and follow up

intervention in all signs and symptoms knowledge except for cough ,muscle pain , diarrhea .

Table (5):- Total knowledge score regarding COVID-19 precautions

Knowledge regarding COVID- 19	Pre intervention (N=75)		Post intervention (N=75)		Follow up (N=75)		McNemar test	P value
	No.	%	No.	%	No.	%		
Satisfactory	3	4.00	71	94.7	71	94.7	123.3 123.4 0.00	**P1:0.001**** **P2:0.001**** P3:1.00
Un Satisfactory	72	96.0	4	5.30	4	5.30		

** significant **High significant P1: Comparison between pre and post intervention P2: Comparison between pre and follow up intervention P3: Comparison between post and follow up intervention*

Table (5) showed that 4% of participants had satisfactory knowledge on pre intervention compared to 94.7% at post and follow up intervention meanwhile 96.0% of participants had unsatisfactory knowledge in pre intervention compared to 5.30% on post ad follow up intervention. It showed highly statistically significant difference between pre and post intervention (McNemar test=123.3, P=.001) and between pre and follow up intervention (McNemar test=123.4, P=.001) mean while it showed non statistically significant difference between post and follow up intervention (McNemar test=0.00, P=1)

3.4. Measure IV outcome

Table (6):-Participant' practice of COVID -19 precautions

Studied variables	Pre intervention (N=75)		Post intervention (N=75)		Follow up (N=75)		Marginal homogeneity test	P value
	No.	%	No.	%	No.	%		
1-Wearing cloth face covering								
Not done	50	667	17	22.7	17	22.7	56.1	**P1:0.001****
Inadequate	25	33.3	19	25.3	23	30.7	51.3	**P2:0.001****
Adequate	0	0.00	39	52.0	35	46.7	0.60	**P3:0.004****
2-Cloth face covering removal								
Not done	50	667	17	22.7	17	22.7	56.1	**P1:0.001****
Inadequate	25	33.3	19	25.3	23	30.7	51.3	**P2:0.001****
Adequate	0	0.00	39	52.0	35	46.7	0.60	**P3:0.004****
3-Temperature checking								
Not done	75	100	35	46.7	45	60.0	54.5	**P1:0.001****
Inadequate	0	0.00	4	5.30	4	5.30	37.5	**P2:0.001****
Adequate	0	0.00	36	48.0	26	34.7	2.86	P3:0.238
4-Hand washing								**P1:0.001****
Not done	0	0.00	0	0.00	0	0.00	86.8	**P2:0.001****
Inadequate	75	100	20	26.7	34	45.3	56.4	**P3:0.017***
Adequate	0	0.00	55	73.3	41	54.7	5.67	

** significant **High significant P1: Comparison between pre and post intervention P2: Comparison between pre and follow up intervention P3: Comparison between post and follow up intervention*

Table (6) clarified that there was statically significant difference in participants practice of COVID 19 precautions in post and follow up intervention in certain item which include wearing cloth face covering (facemask) , removal of cloth face covering, hand washing and temperature checking than pre intervention ($p<0.001$) It also showed that there was statically difference in participants practice of COVID 19 precautions between post and follow up intervention in all previously stated items except temperature checking (P3=0.238)

3.5. Measure V outcome

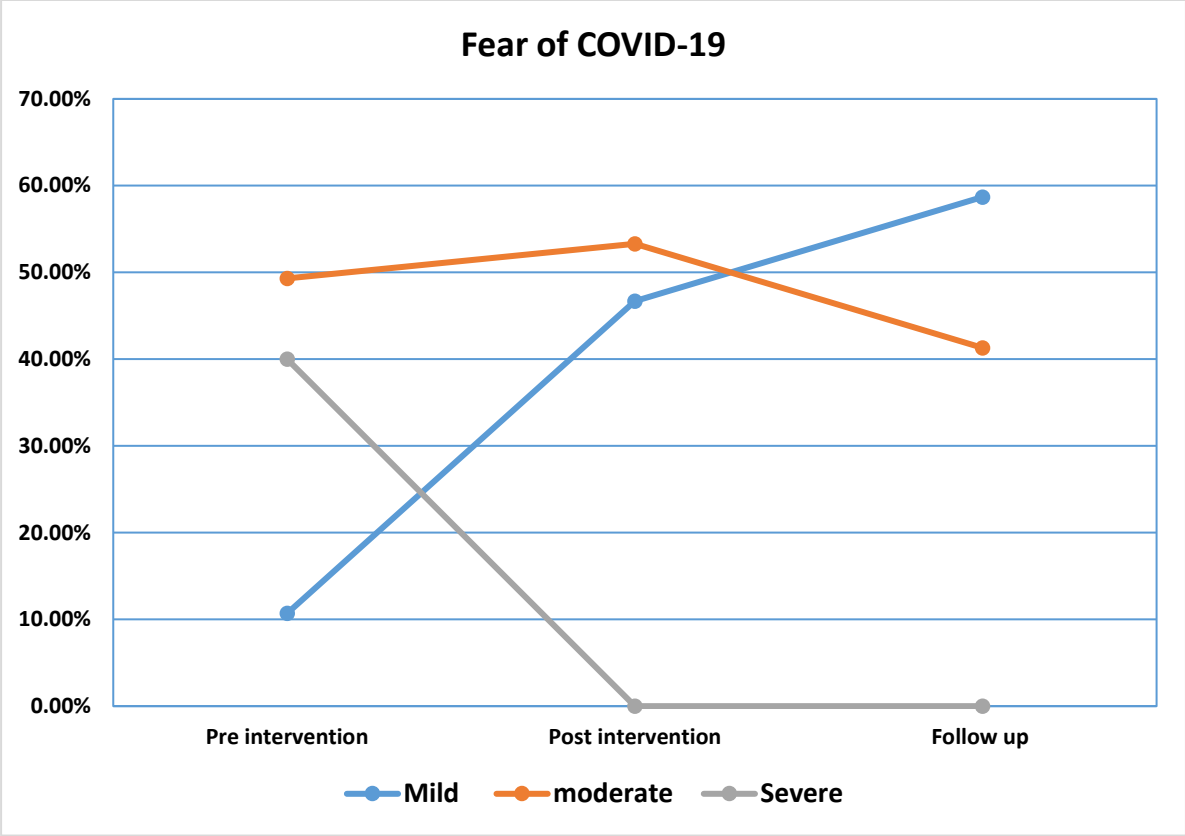

Figure (1): Fear level regarding COVID-19 infection among participants.

Figure (1) displayed that the severity of fear level of participants regarding COVID-19 infection was decreased in post and follow up intervention compared to pre intervention as follows percentage of severe fear level has decreased from 40% in pre intervention to 0% at post and follow up intervention. Moderate fear level percentage was 49.30% at pre intervention, slightly increased (53.30%) at post intervention then decreased at follow up intervention (41.30%) mean while the percentage of mild fear has increased from 10.70% at pre intervention to 46.70% and 58.70% at post and follow up intervention respectively.

3.6. Correlation matrix

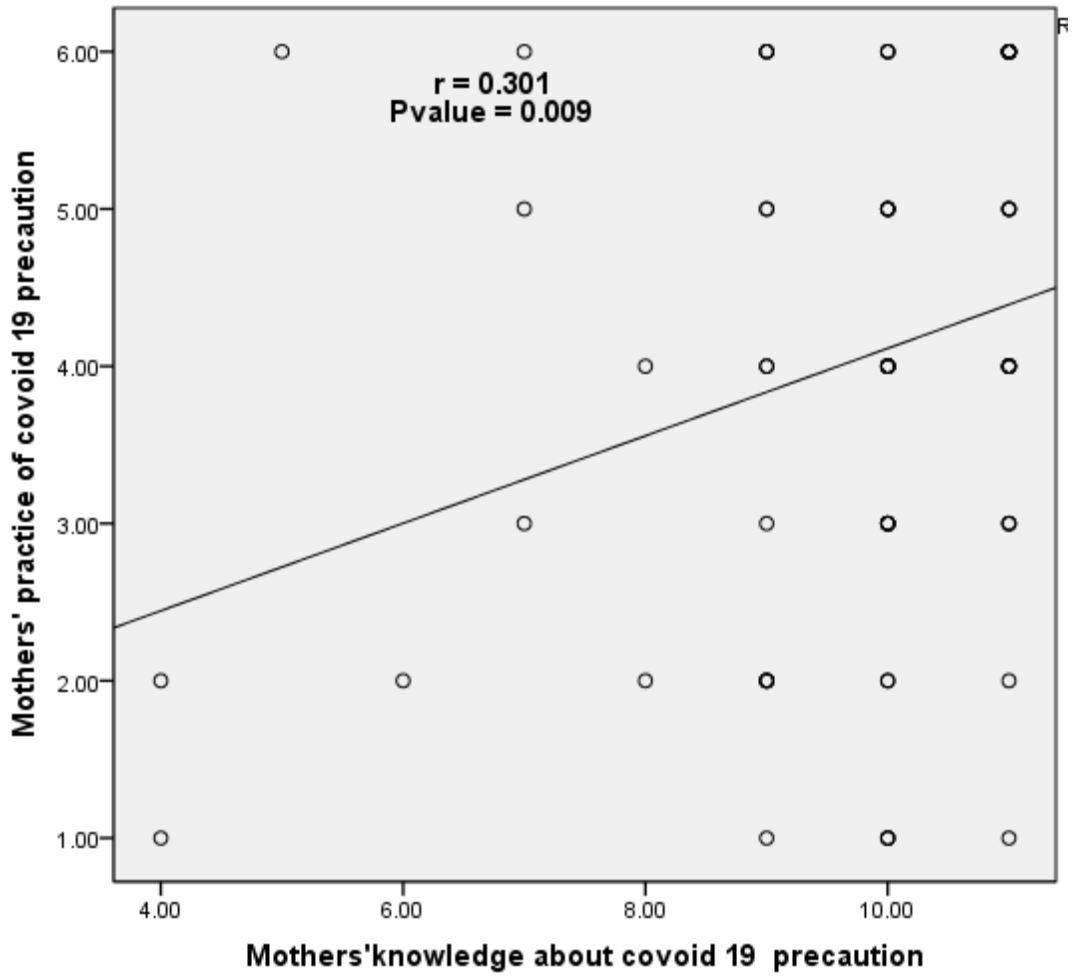

Figure 2: Correlation between participant knowledge about COVID-19 precautions and their practice post intervention

Figure (2) showed positive highly statistically correlation between participants knowledge of COVID-19 precautions and practice at post intervention (r=.301, P=.009)

Table (7): Correlation between fear level and COVID-19 precautions practice and COVID-19 precautions knowledge among participants.

Studied variables	Fear level					
	Pre intervention (N=75)		Post intervention (N=75)		Follow up (N=75)	
	R	P value	r	P value	R	P value
COVID-19 precautions practice	0.067	0.574	-0.231	0.046*	-0.237	0.041*
COVID-19 precautions knowledge	0.024	0.843	-0.329	0.004**	-0.256	0.026*

*Significant **High significant r: Pearson correlation

Table (7) clarified non statistically significant correlation between participant practice of COVID-19 precaution and fear level at pre intervention (r=.067, P=.574) mean while there was statistically significant negative correlation between participant practice of COVID-19 precautions and fear level at post intervention (r=-.231,P=.046) and (r=-.237,P=.041) at follow up intervention . The table showed non statistically significant correlation between participant knowledge of COVID-19 precautions and fear level on pre intervention (r=.024, P=.843) mean while there was highly statistically significant negative correlation between participant practice of COVID-19 precautions and fear level on post intervention (r=-.329,P=.004) and statistically significant negative correlation at follow up intervention(r=-.256,P=.026) .

Table (8): Correlation between participant's practice of neonatal care and fear level

Studied variables	Fear level					
	Pre intervention (N=75)		Post intervention (N=75)		Follow up (N=75)	
	r	P value	r	P value	r	P value
-Practice of neonatal care	-0.014	0.902	**-0.282**	**0.017***	**-0.254**	**0.028***

*Significant **High significant r: Pearson correlation

Table (8) displayed non statistically significant negative correlation between participants practice of neonatal care and fear level on pre intervention

(r=.014,P=.902) and statistically significant negative correlation between participants practice of neonatal care and fear level on post intervention (r=.282,P=.017) and follow up intervention (r=.254,P.028)

4. DISCUSSION

The postpartum period is a dangerous time for both mother and baby where morbidity and mortality are highly prevalent if proper care is not done. Postpartum care knowledge and practice of COVID-19 precautions has significant role during COVID-19 pandemic (**World Organization Health, 2020)**. So**,** this study aimed at studying the effect of structured postpartum nursing intervention involving COVID 19 precautions on mother's knowledge , practice, fear level and neonatal care.

4.1. Mothers' knowledge of maternal and neonatal care

Concerning postpartum mothers' knowledge regarding maternal care on pre, post and follow up intervention (table 2). The current study showed that the mother had satisfactory knowledge regarding postpartum maternal care on post and follow up intervention than pre intervention. This could be due to a positive effect of postpartum nursing intervention involving COVID-19 precautions on maternal knowledge about care immediately after birth. This study comes in agreement with **Sarkar et al., (2014)** who reported that on assessment of the knowledge of postpartum mothers regarding postnatal care showed that almost all the participants were knowledgeable about some aspect of postnatal care after nursing intervention. Besides, **Mohamadirizi et al., (2015**) who found that a lot of mother has had insufficient knowledge on postnatal care at pre intervention. But post nursing intervention the majority of mother's had sufficient postpartum care knowledge.

In addition to postpartum mothers' knowledge regarding neonatal care on pre, post and follow up intervention (table 2). The current study revealed that the mother's knowledge regarding newborn care was satisfactory on post and follow up intervention compared to pre intervention ($p<0.001$). This could be attributed to implementation of postpartum nursing interventions such as educational sessions. This result comes in agreement with **Beraki etal., (2020)** who investigated improving quality and efficiency of postpartum hospital education about neonatal care and found that more than three fourths (77.4%) of the mother responded to educational intervention about neonatal care. In addition, mother found that it is beneficial when

nurses remained with them during breastfeeding, offering guidance and answering questions in addition to using various teaching materials. Interacting with new mothers by demonstrating how to care for themselves and their newborn during hospitalization may reinforce understanding and confidence.

4.2. Mothers' practice of maternal and neonatal care

Regarding postpartum mothers practice of maternal and neonatal care on pre, post and follow up intervention (table 3). The current study showed that the mothers had adequate practice regarding maternal and neonatal care; breast care, perineal care, breast feeding technique, cord care and eye care on post and follow up intervention than pre intervention ($p<0.001$). This could be due to increase women awareness and practice about care during postpartum period. This study finding was supported by **WHO (2014)** which reported "postpartum care should respond to the special needs of the mother and her newborn during this special phase.

4.3. Mothers' knowledge and practice of COVID-19 precautions

In relation to postpartum mother's knowledge regarding maternal and neonatal signs and symptoms of COVID19 infection on pre, post and follow up intervention (Table 4). The finding of the current study clarified that there was statically improvement in the woman's knowledge regarding signs and symptoms of COVID-19 infection on post and follow up intervention than pre intervention ($p<0.001$). This indicated that the intervention program was a positive factor that affected scores of postpartum woman knowledge about signs and symptoms of COVID-19 infection. This finding similar with **Queensland Clinical Guidelines, (2020)** who reported that mothers had poor knowledge about COVID-19 manifestation for themselves and their newborn. So, all postpartum mothers should be advised to attend routine postnatal care and guidance with symptoms of new COVID-19 infection.

Concerning postpartum mothers' knowledge and practice level regarding COVID-19 precautions during postpartum period on pre, post and follow up intervention (Table 5, 6). The current study illustrated that there was statically improvement in mother's knowledge regarding COVID-19 precautions during postpartum period on post and follow up. This could be due to postpartum nursing intervention sessions were effective in raising mothers knowledge and practice level regarding COVID-19 precautions. This result is in line with **Johnbosco et al., (2020)** who found that over half (60.9%) of the mothers had adequate knowledge of the

preventive measures about COVID-19 precautions, whereas 39.1% of the mothers were classified as having inadequate knowledge of the preventive measures against COVID19 infection. On the same line **Fikadu etal., (2021)** who studied COVID-19 preventive measure practices and knowledge of pregnant women in Guraghe Zone Hospitals found that COVID-19 preventive measure practice and knowledge of women visiting Guraghe Zone hospitals was 76.2% and 54.84% and indicated that this results due to effective interventions measures taken by the government and health institution . In addition, the present study revealed statistically significant positive correlation between COVID-19 knowledge and practice **(Figure 2).** This result is in accordance with **Tesfamichael et al., (2021)** study who found that those who have good knowledge were 2.3 times more likely to have good prevention practice of COVID-19 as compared with their counterparts.

4.4. Mothers' Fear level

In relation to fear level of postpartum mothers regarding COVID-19 infection on pre, post and follow up intervention (Figure 1). The current study illustrated that the severity of fear level of postpartum mother regarding COVID-19 infection declined on post and follow up intervention than pre intervention. This could be due to postnatal counseling about COVID-19 precautions, and mother follow up. This is result consistent with **World Health Organization, (2020)** which reported that all postpartum mothers especially for those who may be hospitalized during COVID-19 pandemic had different levels of fear and stressors particular to COVID-19 include: fear of falling ill and dying, fear of being socially excluded/placed in quarantine, loss of livelihood and loss of loved ones, and feelings of helplessness. These stressors reduction after the health care providers follow practice of the COVID-19 precautions. The current study also showed that there was negative correlation between fear level and COVID-19 practice precautions and COVID19 knowledge precautions post and follow up intervention . The study findings is matching with study conducted by **Brett etal., (2021)** who found reduction in anxiety, depression and fear score after a multi-faceted education and support programme. The study findings also revealed negative-correlation between mothers practice of neonatal care and fear level. This could be due to increasing awareness of postpartum mothers about COVID-19 precautions either knowledge or practice help them to overcome their fear about transmission of COVID-19 for them or their babes (Table 8& 9)

5. CONCLUSION

This study showed that there was an improvement in the mothers' knowledge and practice level regarding postpartum maternal and newborn care on post intervention and follow up intervention than pre intervention this supports the research hypothesis No. (1). There was an improvement in the mothers' knowledge and practice level regarding COVID-19 precautions on post and follow up intervention than pre intervention. This supports the research hypothesis No.(2).There was also reduction in fear level of mothers during postpartum period in post and follow up intervention than pre intervention this supports the research hypothesis No. (3).Thus, all research hypotheses are accepted.

6. RECOMMENDATION

Postpartum nursing intervention involving COVID-19 precautions should be integrated as a routine care at obstetric hospitals. Ongoing training for maternity nurses about postpartum maternal and neonatal care involving COVID-19 precautions. Ongoing education for postpartum mothers about COVID-19 preventive measures during postpartum period. Replication on current study on larger sample size and at different settings.

7. RELEVANCE TO CLINICAL PRACTICE: The findings of this study suggest that postpartum mothers need to improve their knowledge and practice regarding COVID- 19 precautions, which is pandemic infection that commonly affect vulnerable group. Therefore, health care organization may benefit from developing a comprehensive strategy to promote postpartum women awareness regarding COVID-19 infection especially at rural areas through continuing education and mentoring programs.

8. ACKNOWLEDGEMENT

The authors would like to acknowledge deans of nursing college for their support and all nursing directors who had facilitated process of collecting data in their institutions.

9. CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

10. FUNDING STATEMENT: No external support

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