Effect Of An Educational Program About Prevention Of Neonatal Skin Breakdown On Nurses' Knowledge In Neonatal Intensive Care Units

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ABSTRACT

Background: Neonatal care places a high priority on preventing and treating neonates with skin breakdown by revising clinical skin care guidelines, developing new techniques, and improvement staff knowledge. **The study was aimed t**o evaluate the effect of an educational program about prevention of skin breakdown on nurses' knowledge in neonatal intensive care units. **Subject and method: Research design:** A quasiexperimental research design was utilized. **Setting:** Research was conducted in NICUS at four hospitals affiliated to the Universal Health Insurance Authority (UHIA) in the governorate of Port Said**,** namely (Al-Hayat -El-Salam -Specialized obstetric -EL-Nasr specialised hospital). **Sample:** All nurses (70) who were employed in the above settings, along with 50 neonates in each program phase (150) who admitted during the time of data collection. **Tools::** Data was gathered using two tools; a structured interviewing questionnaire sheet and Neonatal Skin Condition Score scale. **Results:** Findings of the present study revealed statistically significant differences between nurses' knowledge pre & immediate post (p1), pre & follow up phase (p2) ($p \leq 0.001$),and between immediate post and follow up phase (p3) ($P \leq 0.021$). **Conclusion:** The educational program improved nurses' knowledge and as well as decreased skin breakdown in the neonates. **Recommendations:** Providing nurses with ongoing education and training program about skin breakdown prevention in NICUs.

Key Words: Educational program- Neonates –Nurses' knowledge -Prevention of skin breakdown.

INTRODUCTION

Neonatal phase is the term used to describe the first 28 days of life. Neonates can be full term, preterm, or post-term. Neonate needs time to adjust to the outside world and nature. A few of the tasks that the skin performs include controlling transepidermal water fluxes, preventing dehydration and excessive water loss, maintaining electrolyte homeostasis, protection from toxins, injuries, and ultraviolet (UV) rays as well as controlling body temperature and reducing caloric loss, tactile sensitivity, and antimicrobial defense ability (Lauren, 2021).

Neonatal skin transitions from the aqueous uterine environment to dry; aerobic settings upon birth with skin function progressively developing throughout the course of infancy. Skin care techniques that emphasize protection and the integrity of the skin's barrier are therefore a crucial part of care throughout the first few days and weeks of life. Preventing skin deterioration, which can result in infection and dehydration, is the main objective of skin care. Also, it's possible that a newborn's early exposure to skin irritants and pollutants contributed to the later development of atopic skin problems (New, 2019). Neonatal skin is very fragile, thin, and sensitive. Also, it is susceptible to injury and low in resistance to infection. Neonates have 30% thinner stratum corneum and 20% thinner epidermis is. Neonatal skin is immature, making (Cooke et al., 2018; Lund and Kuller, 2021).

When one or more layers of the skin have been disrupted, skin breakdown happens. The expression "change to intact skin" was used to define skin breakdown, which also included abrasion, tissue loss, simple skin penetration, and inflammation and pressure ulcers that were deep and widespread (Palmer, 2013). Skin breakdown is currently recognized among the top five neonatal safety issues that can be prevented and one of the leading five causes that can harm neonate. Also, it is widely used as a measurement of the standard of care provided by health care team (Thomas, 2018).

The neonatal health at delivery has a direct factor that raise the risk of skin breakdown. Skin integrity, birth weight, immobility, gestation, impaired tissue perfusion; surgery, malnutrition, and sepsis are some of these intrinsic causes. Research has reported a direct correlation between lower gestation when the skin is at its most fragile and higher risk of skin breakdown. When extrinsic factors are taken into account,

past research has shown that neonates who use medically supporting equipment have a significant risk of skin breakdown (Broom, Dunk, & Mohamed, 2019).

Due to the light, repeated touch, diagnostic and therapeutic procedures that take place in the NICU, term or preterm neonates are at risk for developing skin breakdown during their hospitalization. Neonatal skin is disturbed by factors such as removing tapes, bathing, antimicrobial skin disinfection, friction, diaper dermatitis, and pressure sores, so the barrier function of the skin is weakened, which increases the risk of mortality (Bişgin, Taplak & Polat, 2022).

Potential harms from skincare practices include risk of sepsis from the use of topical petrolatum ointment, acute hypothyroidism due to suppression of endogenous thyroxine from the use of povidone–iodine, and chemical burns from the use of chlorhexidine solution**.** Neonates have very delicate skin, and probes from conventional monitors can cause it to breakdown due to physical irritation or heat generated by the probes (Ethawi et al., 2018; Mishra et al., 2021).

Prevalence of pressure ulcers (PUs) in NICU ranges from 23 to 31.2%, putting hospitalized neonates, especially those who are preterm, at risk for skin breakdown. In addition, compared to the "acid mantle" of older children and adults, neonates, particularly those born at term, have a neutral skin pH. Above 90% of PUs in premature neonates are associated with interventional medical devices. Epidermal stripping, diaper dermatitis, skin tears, extravasation injuries, and burns are further types of skin breakdown (Liversedge et al., 2018).

Nurses play a key role in implementing plan of care also providing care for neonates. Neonatal skin care practices are considered crucial for a neonate’s survival and are closely related to healthcare professionals’ knowledge and skills in delivering scientifically valid neonatal care interventions. During the critical period for neonates in NICU, the nurses play a crucial and essential role in preserving skin integrity, assessing physiological state, and prevent the risk of developing skin breakdown (Molina & López, 2017, Metallinou, Nanou, Tsafonia, Karampas, & Lykeridou, 2022). Comprehensive skin care for neonates for prevention of skin breakdown includes initial and everyday assessments, selection of suitable preventative procedures, management of existing skin conditions, and review of preventative and treatment methods on a regular basis (Melnyk & Fineout, 2021).

Significant of the study:

The effects of skin breakdown in pediatric population included higher medical costs, infections, higher morbidity and mortality, as well as psychological effects from hairlessness or scars, and longer hospital stays (Schindler, 2010). Environmental elements that could be harmful to the neonatal skin include adhesives, emollients, semi-permeable membranes, humidity, and bathing (Allwood, 2011). The successful care of neonates' skin presents a challenge for neonatal staff since it calls for a practice that is based on educated understanding of the scientific literature, with in-depth knowledge connected to the skin and its characteristics. Hence, the establishment of an education program can aid in standardizing skin care in neonatal critical care units and aid in lowering the skin breakdown prevalence.

AIM OF THE STUDY:

The present study aimed to evaluate the effect of an educational program about prevention of skin breakdown on nurses' knowledge in neonatal intensive care units through:

- Assess nurses' knowledge about skin breakdown prevention in neonatal intensive care units
- Design an educational program for nurses about neonates skin breakdown prevention.
- Implement an educational program about neonates skin breakdown prevention for nurses.
- Evaluate the effect of an educational program about skin breakdown prevention on nurses' knowledge immediately post the program and 3 months later.
- Evaluate the effect of program implementing on the neonatal skin breakdown immediately post the p
- rogram and 3 months later.

Research hypothesis:

- Nurses' knowledge regarding prevention skin breakdown expected to be improved after implementation of an educational program.
- Neonatal skin condition score expected to be improved after the program than before.

SUBJECTS AND METHOD

A. Technical design

Study design:

A quasi-experimental one-group pre-post-follow up test design was utilized.

Study setting:

This research was conducted in $NICU_S$ of four hospitals affiliated to the Universal Health Insurance Authority (UHIA) in the governorate of Port Said**,** namely (Al-Hayat - El-Salam -Specialized obstetric -EL-Nasr specialised hospital).

3- Study Sample:

All nurses (70) who are working in the above settings and decided to join in the study regardless of their gender, age, level of experience, or education as well as 50 neonates in each program phase (150) who admitted during the time of data collection.

4- Data collection tools and technique:

In this research, there were two tools used.

Tool 1: Structured interviewing questionnaire tool:

After reading relevant studies, the researcher developed this tool, which consisted of two parts in straightforward Arabic to assess the nurses' knowledge about skin breakdown prevention in NICU:

Part I:

Nurses' characteristics: It contained 3 questions about nurses' age (in years), years of experience at NICU, and their educational level.

Training courses: It contained 4 questions about attendance of any previous training courses about prevention of skin breakdown, training place, number of training courses, and availability of standard guidelines.

Part II:

It was concerned with nurses' knowledge about skin breakdown prevention in NICU. It included the following:

1) Knowledge about structure and functions of the skin (3 questions).
2) Knowledge about skin breakdown included the definition, stages, intrinsic, and extrinsic factors of skin breakdown (7 questions).
3) Knowledge about prevention of skin breakdown, which included;
    - Assessment of neonatal skin, such as frequency and tool used for assessment (3 questions).
    - Minimizing pressure (2 questions).

- Dipper care and prevention of dipper dermatitis (6 questions).
- Epidermal striping and adhesive tape (3 questions).
- IV management and extravasation injuries (4 questions).
- Prevention of skin breakdown from medical devices as nasogastric tube and phototherapy (3 questions).

Scoring system:

Nurses' knowledge evaluated upon completion of the interviewing questionnaire as the studied nurses' knowledge checked with a model key answer. Accordingly, the complete, correct answer scored (2) scores, the incomplete correct answer was given (1) score and (0) for incorrect or do not know answers. The total score was calculated by summing up and converted into a percent score. The total score of the knowledge was 62 scores. Then, nurses' total level of knowledge has been categorized as a score of 75%, and more considered satisfactory and a score less than 75% was considered unsatisfactory.

Tool 2: Neonatal Skin Condition Score scale (NSCS (NSCS): NSCS was addressed the general condition of a neonatal skin, was developed for a neonatal skin care evidence based practice project supported by the Association of Women's Health, Obstetrics, and Neonatal Nurses (AWHONN, 2018). It evaluates three main signs of skin, included- dryness, erythema, and breakdown. Each item score of the three subscales ranges from 1 to 3. Score 1 indicates good skin integrity, whereas score 3 indicates poor skin integrity for each item. The scores range from 3-9. A score of 3 is the best possible score and 9 being the worst.

B.Operational design;

The operational design involved the preparatory phase, pilot study and field work.

1-Preparatory phase:

An overview of appropriate literature from the past and present covering various parts of NICU skin breakdown prevention, using books, articles, periodicals, the websites, textbooks, scientific journals, and magazines, to become familiar with the research problem and construct the study tools.

2- validity of the tools:

The tools were reviewed for clarity, relevance, applicability, comprehensiveness, and understanding by a jury made up of five experts in Pediatric Nursing, and minor modifications were made in response to their findings.

3-Reliability of the tool:

The tool's internal consistency was evaluated using the Cronbach alpha coefficient, and nurses' knowledge value was 0.781.

4-Pilot study:

Before the beginning of the data gathering phase, a pilot study was conducted on 10% of the total number of nurses in the above settings to assess the precision, applicability, and viability of the research tools as well as it was used to determine how long it would need to complete the tools. It also assisted in identifying problems and barriers that would impair data collection. The study tools were modified as needed. Participants in the pilot study were excluded from the study sample. Pilot study was conducted during the period from 1st to the end of March2022.

5-Field work:

This fieldwork was achieved through assessment, planning, implementation and evaluation phases.

Assessment phase:

Prior to collecting data, the researcher first visited the study settings, conducted interview with each nurse, introduced herself to them, and discussed the purpose, timeline, and activities of the research, then asked them to join in the study and obtained their agreement. In order to gather baseline data and evaluate nurses' knowledge about prevention of skin breakdown in NICU, tool1 was used to interview each nurse individually and asked them to complete a structured interviewing questionnaire sheet. Following each interview, the researcher double-checked the information on each questionnaire sheet to make sure it was accurate. About 20 to 30 minutes were needed to complete the structured questionnaire sheet. Likewise, the researchers started to assess neonatal skin a condition after they received routine hospital care from nurses was performed using tool 2. Researcher visited study's settings 3 days each week (Sunday, Tuesday, and Thursday). The data gathered used as a pretest for baseline comparisons. Also, it helped to prepare the educational program based on identified needs. This phase continued three months from April 2021 to June 2021.

Planning phase:

By using work done in phase one as a baseline, the researcher designed the educational program based on the real need assessment of the nurses under study, using both recent evidence based guidelines for skin breakdown prevention together with relevant literature. Educational program covered the theoretical parts related to skin

breakdown prevention in NICU. The researcher developed a booklet explaining the program's content, which was written in clear Arabic and illustrated via pictures to aid in comprehending it.

Program consisted of theoretical knowledge about anatomy, skin function, definition of skin breakdown, skin breakdown stages, neonatal skin breakdown factors in NICU, and skin assessment. Additionally, methods of prevention as dipper care, minimize pressure, IV management and extravasation injuries, adhesive tape application and removal, and prevention of burn injuries from phototherapy.

Implementation phase:

Three theoretical sessions, lasting 45–60 minutes each, were used to apply the developed skin breakdown prevention educational program. Before beginning the educational program, each group received a brief summary of the educational program as (introduction, its importance, training plan, learning objectives). To facilitate theory sessions, nurses were separated into small groups (5–6 per group). There were 3 sessions each week according to the number of nurses in each hospital. Several teaching methods including lectures, brain storming, and small group discussion were used. Several teaching media as presentations, posters, audiovisual materials, in addition to, handouts were used. Also, the educational booklet was distributed to each nurse to encourage them, get them interested, and aid in home review. Neonatal skin condition was assessed for each neonate. This phase was implemented through a period of 4 months from September 2021 until December 2021.

Evaluation phase:

Assessing the improvement in nurses' knowledge was the basis for determining the program's effectiveness. This was accomplished by comparing the pretest and posttest taken immediately following the program with the follow-up test done after 3 months. This phase lasted for 3 months from May 2022 to July 2022.

To evaluate the program's effect on nurses' knowledge, the Neonatal Skin Condition Score (NSCS) was compared before, immediately post program implementation, and three months later.

C. Administrative design:

Before initiating any stage, an official letter from dean of the Faculty of Nursing was sent to health insurance authority about the selected area of the study to notify the

director of the hospital and the head of NICU in Port Said governorate to conduct the study after explanation of the aim of the study.

Ethical Consideration

After explanation of the study aim to the health insurance authority, approval was obtained to facilitate collaboration of hospital directors in the study. Likewise, each participant's approval was obtained after clarification of the aim and data gathering procedure details to be aware of the significance of her contribution. Also, a concise and full explanation of the study was provided to NICU nurses to reassure them that any data obtained would be kept private and used only for the study's objectives.

The subjects could not be harmed by the study procedures. Professional assistance and counseling were given where required. The studied nurses were informed that their contribution was completely voluntary, also their ability to discontinue at any phase without clarification was assured.

D.Statistical design :

The gathered data was organized, coded, and analyzed using the following statistical methods as percentage, mean, standard deviation, (SD) correlation (r), chi-square (X2), percentage error (P value), and significance of findings at P less than 0.05.

RESULTS:

Table (1): clarifies that, 52.9% of the studied nurses aged between 30 to less than 35 years with a mean 30.9±4.7, 65.7% of them had one to less than five years' experience in NICU and 50% of them were graduated from technical nursing institutes. In addition, 38.6% of the studied nurses attend previous training courses regarding neonatal skin care, and 55.6% of them trained once, and 45.7% reported that there were no standard guidelines about neonatal skin care in their NICU to follow it.

Table (2): clarifies that, there was a highly significant difference in relation to the studied nurses' knowledge regarding definition, stages, intrinsic, and extrinsic risk factors of neonatal skin breakdown in NICU pre / immediately post, and follow up phase of program implementation. As regards the studied nurses' knowledge about definition of the skin breakdown, it was found that, 15.7 %, 90% & 68.6% of them defined completely skin breakdown as a "change to intact skin" including inflammation without overlying tissue loss, disruption of one or more layers of the skin, tears , abrasion of the skin, and mild to extensive wounds pre /immediately post & follow up phase of educational program respectively.

In addition, 21.4% of the studied nurses were replied correctly that stages of skin break down divided into four stages compared to 100%&62.9% of them replied correctly four stages immediate post program and after 3 months of program implementation respectively. Although, one third of the studied nurses (30%) were replied correctly that stage1 of skin breakdown, in which the skin is erythematous and the epidermis is still intact compared to all of them immediate post program and 67.1% of them in follow up phase after 3 months of program implementation.

Concerning the studied nurses' knowledge about intrinsic risk factors of skin breakdown in NICU, it was clear that, 18.6% of them reported all intrinsic risk factors of skin breakdown as gestational age less than 37 weeks, immobility, malnutrition, sepsis, and birth weight preprogram and the percent improved immediate post program to 87.1 %. While 65.7% of them reported all intrinsic risk factors of skin breakdown in the follow up phase after 3 months of program implementation. As for nurses' knowledge about extrinsic risk factors of skin breakdown in NICU, it was found that, 37.1%, 91.4% & 71.4% of them stated all extrinsic risk factors which included adhesive tape, dehydration, nasogastric tube, excessive alcohol, mechanical ventilators, improper diaper care, intravenous lines, phototherapy, blood sample, skin infection, trauma, exposure to sharp instruments, didn't change position, and vomiting pre / immediate post & follow up phase of educational program respectively.

Table (3): illuminates that, there was a highly significant difference in relation to the studied nurses' knowledge regarding skin assessment tool used in the NICU, and frequency of assessing neonatal skin pre / immediately post, and after three months of program implementation. As for the studied nurses' knowledge about assessing of the neonatal skin, all of them answered yes in all phases of program. In relation to nurses' knowledge about skin assessment tool used in the NICU, none of the studied nurses reported correctly pre program, while all of them reported correctly as NSCS used for assessment immediately post program, while majority of them (84.3 %) used it in in the follow up phase. In addition, it was noticed that, minority of the studied nurses(8.6%) know frequency of assessing neonatal skin on admission, every shift ,and discharge preprogram compared to 90% of them immediately post program and 84.3% of them during follow up phase. Also this table reveals that, all the studied nurses reported that availability of repositioning schedule in NICU preprogram, post - program and in the follow up phase of program implementation. As regard to the studied nurses' knowledge

about frequency of the repositioning neonate, it was noticed that, all them stated the correct frequency of the repositioning neonate every 2hr, preprogram immediately post program and in the follow up phase of program implementation.

Table (4): describes that, there was a significant difference in relation to the studied nurses' knowledge about the degree of PH causing diaper dermatitis between pre / follow up & immediately post / follow up (p= 0.040*& p= 0.019* respectively). It was noticed that, less than one third of the studied nurses(31.4%) reported correctly that alkaline PH causing diaper dermatitis pre program , and the most of them (91.4%) reported alkaline PH immediately post then declined to 58.6 % in follow up phase.

Also, there was statistical significant difference pre / immediately post program and follow up phase of program implementation in relation to the studied nurses' knowledge about risk factors of diaper dermatitis. More than one quarter of them (27.1%) replied correctly both prematurity and use antibiotics as risk factors of DD pre program phase and 100% of them replied correctly immediately post program compared to more than half of them (55.7%) in the follow up phase. In addition, there was a highly significant difference in relation to the studied nurses' knowledge about the frequency of changing diaper between immediately post / follow up (p= 00.001**). it was cleared that, 30% of them replied correctly changing diaper after urination or defecation pre program compared to 100% of them immediate post program and 80 % of them during follow up phase replied correctly changing diaper after urination or defecation.

On other hands, there was statistical significant difference pre / immediately post program and follow up phase of program implementation in relation to the studied nurses' knowledge about the importance of using skin barrier with every diaper change. It was found that, 52.9%,100%, &80% of them reported correctly yes 'using of skin barrier with every diaper change is important' pre program, immediately post program and follow up phase of program implementation. Concerning type of skin barrier used with every diaper change, all the studied nurses stated correctly that zinc oxide as skin barrier pre program, immediate post program, and the follow up phase. As shown in table, nearly one quarter of them (24.3%) reported all preventive measures for DD pre program compared to 84.3% of them immediate post program, while less than three fifth of them (65.7%) reported all preventive measures for DD in the follow up phase.

Table (5): clarifies that, there was statistical significant difference pre / immediate post program and follow up after 3 months of program implementation in relation to the studied nurses' knowledge regarding type of adhesive tape used for securing cannula, preventive measures for extravasation injuries, and nursing intervention when extravasation occurs. Less than one fifth of the studied nurses (31.4%) replied correctly that transparent adhesive tape used for securing cannula pre program compared to all of them immediate post program and 75.7 % of them replied correctly that transparent adhesive tape used for securing cannula in follow up phase. In addition, more than half of them (55.7%) replied incorrectly that never used adhesive removal pre program compared to none & 15.7 of them replied incorrectly during immediate post and follow up phase respectively.

As regards to knowledge of the studied nurses about extravasation that minority of them (10%) stated the correct definition of extravasation as leakage of a vesicant solution into surrounding tissue pre program, While all of them stated correct definition immediate post program and slightly decline was found at the follow up phase and became 75.7%. In relation to the studied nurses' knowledge about preventive measures for extravasation injuries, it was clear that, 30% of them reported all preventive measures pre program, and the percent improved immediate post program to 90 %. While 71.4% of them reported all preventive measures for extravasation injuries in the follow up phase. Concerning nursing intervention when extravasation occurs, all the studied nurses reported stop infusion pre program, while 92.9 % &55.7 % of them reported all nursing intervention immediate post program and the follow up phase respectively.

Figure (1), illustrates that, only 24.3 % of the studied nurses had satisfactory total knowledge level regarding prevention of skin breakdown pre-program implementation which improved to be 92.9% and 80% , immediately post program, and 3 months later respectively.

Table (6): clarifies that, there was statistically significant relation between the studied nurses' age and their total score of knowledge in pre intervention phase and between nurses' academic qualifications and their total score of knowledge throughout the program phases (post and follow up phases).

Table (7): describes neonatal skin condition that was improved throughout the program phases**.** As regarding skin dryness, it was clear that, 50 % of the studied

neonates suffered from dryness of skin preprogram implementation compared to 14% of them post program and 24 % of them at follow up phase. Concerning erythema, only 6% of the studied neonates who didn't suffer from erythema pre program compared to 68 % of the studied neonates post program, and 52% at the follow up phase. Generally, in relation to skin breakdown, 56% of the studied neonates were suffered from skin breakdown preprogram, compared to 14% and 18% in post program implementation and follow up phase respectively.

Table (1): Distribution of the studied nurses according to their characteristics (n= 70).

Nurses' characteristics	N	%
Age/years:		
20 -< 25	10	14.3
25-<30	14	20.0
30 -< 35	37	52.9
≥ 35	9	12.9
$\overline{X}$ ±SD	30.9±4.7	
Experience / years in NICU:		
1-< 5	46	65.7
5-< 10	14	20.0
≥ 10	10	14.3
$\overline{X}$ ±SD	4.9±3.9	
Academic qualifications:		
Bachelor of nursing science	28	40.0
Technical Institute of nursing	35	50.0
Diploma of secondary nursing schools	7	10.0
Attendance of previous training courses about neonatal skin care:		
Yes	27	38.6
No	43	61.4
Number of training courses (n=27);		
One	15	55.6
Twice	7	25.9
Three	5	18.5
$\overline{X}$ ±SD1.65±.79		
Availability of standard guidelines about prevention of skin breakdown in NICU;		
Yes	16	22.9
No	32	45.7
Don't known	22	31.4

Table (2): Percentage distribution of the studied nurses' knowledge related to definition, stages, risk factors of neonatal skin breakdown throughout the program phases (n=70).

Items	Time of program						Test of significance		
	Pre		Immediately Post		Follow up				
	n	%	n	%	n	%	P1	P2	P3
Definition of the skin breakdown*:									
Disruption of one or more layers of the skin	23	32.9	5	7.1	10	14.3	χ^2= 15.91 P ≤ 0.001**	χ^2= 7.12 P = 0.03*	χ^2= 3.05 P = 0.071
Tears , abrasion of the skin	9	12.9	3	4.3	7	10.0			
Mild to extensive wounds	25	35.7	6	8.6	12	17.1			
Inflammation without overlying tissue loss	5	7.1	4	5.7	6	8.6			
All of above	11	**15.7**	63	**90.0**	48	**68.6**			
Didn't know	17	24.3	0	0.0	0	0.0			
Stages of skin break down divided into :							χ2= 13.02 P = 0.041*	χ2= 12.26 P = 0.047*	χ2= .867 P = 0.389
Two stages	14	20.0	0	0.0	5	7.1			
Three stage	29	41.4	0	0.0	13	18.6			
Four stage	15	**21.4**	70	**100.0**	44	**62.9**			
Didn't know	12	17.1	0	0.0	8	11.4			
In which stage of skin breakdown the skin is erythematous and the epidermis is still intact							χ^2= 18.44 P ≤ 0.001**	χ^2= 41.49 P ≤ 0.001**	χ^2= 4.56 P = 0.062
Stage 1	21	**30.0**	70	**100.0**	47	**67.1**			
Stage 2	24	34.3	0	0.0	13	18.6			
Stage 3	7	10.0	0	0.0	0	0.0			
Didn't know	18	25.7	0	0.0	10	14.3			
Intrinsic risk factors of skin breakdown in NICU*:							χ^2= 10.90 P ≤ 0.001**	χ^2= 7.84 P = 0.031*	χ^2= 6.19 P = 0.042*
Gestational age less than 37 weeks	39	55.7	9	12.9	13	18.6			
Immobility	30	42.9	5	7.1	12	17.1			
Malnutrition	10	14.3	6	8.6	17	24.3			
Sepsis	32	45.7	6	8.6	9	12.9			
Birth weight	22	31.4	8	11.4	12	17.1			
All of above	13	**18.6**	61	**87.1**	46	**65.7**			
Extrinsic risk factors of skin breakdown in NICU*:							χ^2= 17.21 P ≤ 0.001**	χ^2= 14.10 P ≤ 0.001**	χ^2= 13.17 P = 0.002*
Adhesive tape	43	**61.4**	9	12.9	18	25.7			
Dehydration	17	24.3	4	5.7	4	5.7			
Nasogastric tube	38	**54.3**	6	8.6	13	18.6			
Excessive alcohol	21	30.0	6	8.6	4	5.7			
Mechanical ventilators	34	**48.6**	5	7.1	8	11.4			
Didn't do diaper care	29	41.4	4	5.7	7	10.0			
Intravenous lines	33	**47.1**	10	14.3	8	11.4			
Phototherapy	36	**51.4**	3	5.7	12	17.1			
Blood sample	25	35.7	6	8.6	17	24.3			
Skin infection	32	45.7	6	8.6	12	17.1			
Trauma	22	31.4	8	11.4	4	5.7			
Exposure to sharp instruments	17	24.3	0	0.0	6	8.6			
Didn't change position	15	21.4	5	7.1	6	8.6			
Vomiting	17	24.3	0	0.0	11	15.7			
All the above	26	**37.1**	64	**91.4**	50	**71.4**			

*** More than one answer**

P1: comparison between pre & immediate post

P2: comparison between pre & follow up after 3 months

P3: comparison between immediate post & follow up after 3 months

(*) Statistically significant at P< 0.05 (**) Highly statistical significance at P< 0.001.

Table (3): Percentage distribution of the studied nurses' knowledge related to neonatal skin assessment and repositioning schedule in NICU throughout the program phases (n=70).

Items	Time of program						Test of significance		
	Pre		Immediately Post		Follow up				
	n	%	n	%	n	%	P1	P2	P3
Assessing of the neonatal skin is important:									
Yes	70	**100.0**	70	**100.0**	70	**100.0**	-----	------	------
No	0	0.0	0	0.0	0	0.0			
Skin assessment tool used in the NICU:								χ^2= 18.26	χ^2= 13.77
Braden Q	70	100.0	0	0.0	12	17.1		P ≤	P ≤
Neonatal Skin Condition Score (NSCS)	0	**0.0**	70	**100.0**	58	**82.9**		0.001**	0.001**
Frequency of assessing neonatal skin:									
Only on admission	0	0.0	0.0	0.0	0	0.0	χ^2=	χ^2= 12.10	χ^2= 41.4
Every shift only	46	65.7	7	10.0	11	15.7	15.73		
Every 4 hours	2	2.9	0	0.0	0	0.0		P ≤	P ≤
Once per day	16	22.9	0	0.0	0	0.0	P ≤	0.001**	0.001**
Only on discharge	0	0.0	0	0.0	0	0.0	0.001**		
On admission, every shift ,and discharge	6	**8.6**	63	**90.0**	59	**84.3**			
Availability of repositioning schedule in NICU:									
Yes	70	**100.0**	70	**100.0**	70	**100.0**	-------	--------	--------
No	0	0.0	0	0.0	0	0.0			
Frequency of the repositioning neonate:									
Didn't change position	0	0.0	0	0.0	0	0.0			
Once / shift	0	0.0	0	0.0	0	0.0	---------	---------	---------
Every one hour	0	0.0	0	0.0	0	0.0			
Every 2 – 4 hours	70	**100.0**	70	**100.0**	70	**100.0**			
Every 6 hours	0	0.0	0	0.0	0	0.0			
Every 12 hours	0	0.0	0	0.0	0	0.0			

P1: comparison between pre & immediate post
P2: comparison between pre & follow up after 3 months
P3: comparison between immediate post & follow up after 3 months
(*) Statistically significant at P< 0.05 (**) Highly statistical significance at P< 0.001.

Table (4): Percentage distribution of the studied nurses' knowledge related to prevention of diaper dermatitis (DD) throughout the program phases(n=70).

Items	Time of program						Test of significance		
	Pre								
	n	%	n	%	n	%	P1	P2	P3
The degree of PH causing diaper dermatitis:							χ^2= .885	χ^2= 6.08	χ^2= 9.41
Acidic	31	44.3	6	8.6	26	37.1	P = 0.379	P = 0.040*	P = 0.019*
Alkaline	22	**31.4**	64	**91.4**	41	**58.6**			
Neutral	0	0.0	0	0.0	0	0.0			
Don't known	17	24.3	0	0.0	3	4.3			
Risk factors of diaper dermatitis (DD):							χ^2= 13.11	χ^2= 4.05	χ^2= 7.29
Prematurity	22	31.4	0	0.0	7	10.0	P ≤ 0.001**	P = 0.050*	P = 0.031*
Antibiotic use	29	41.4	0	0.0	24	34.3			
Mature Skin	0	0.0	0	0.0	0	0.0			
Prematurity and use antibiotics	19	**27.1**	70	**100**	39	**55.7**			
Frequency of changing diaper:							χ^2= 1.44	χ^2= 1.61	χ^2= 31.11
- Twice/ day	1	1.4	0	0.0	0	0.0	P = 0.695	P = 0.655	P ≤ 0.001**
- After defecation only	46	65.7	0	0.0	14	20.0			
- **After urination or defecation**	21	**30.0**	70	**100.0**	56	80.0			
- After every urination only	2	2.9	0	0.0	0	0.0			
Using of skin barrier with every diaper change is important?							χ^2= 7.84	χ^2= 19.62	χ^2= 6.15
- **Yes**	37	**52.9**	70	**100.0**	56	**80.0**	P = 0.033*	P ≤ 0.001**	P = 0.045*
- No	33	47.1	0	0.00	14	20.0			
Type of skin barrier used with every diaper change:	**(n=37)**		**(n=70)**		**(n=56)**				
- **Zinc oxide**	37	**100.0**	70	**100.0**	56	**100.0**			
- Powder	0	0.0	0	0.0	0	0.0	-------	------	-------
- Oil	0	0.0	0	0.0	0	0.0			
Preventive measures for diaper dermatitis(DD)*:									
- Cleanse diaper area gently with warm water	36	51.4	2	2.9	21	30.0			
- Frequent diaper change	43	61.4	10	14.3	25	35.7			
- Selection suitable diaper number	22	31.4	5	7.1	7	10.0			
- Maintenance of a dry skin surface	12	17.1	5	7.1	15	21.4	χ2= .264 P = 0.607	χ2= 11.71 P = 0.001**	χ2= .025 P = 0.874
- Use a barrier cream such as zinc oxide	6	8.6	8	11.4	22	31.4			
- Expose diaper area a few minutes for air	5	7.1	3	4.3	13	18.6			
- **All of above**	17	**24.3**	59	**84.3**	46	**65.7**			

*** More than one answer**

Table (5): Percentage distribution of the studied nurses' knowledge related to preventive measures of extravasation injuries throughout the program phases (n=70).

Items	Time of program						Test of significance		
	Pre		Immediately Post		Follow				
	N	%	n	%	n	%	P1	P2	P3
Type of adhesive tape used for securing cannula :							χ^2= 12.27	χ^2= 10.29	χ^2= 4.70
- **Transparent tape**	22	**31.4**	70	**100.0**	53	**75.7**	P ≤ 0.001**	P = 0.001**	P = 0.050*
- Surgical tape	48	68.6	0	0.0	17	24.3			
You must use Adhesive removal ?							χ^2= .409	χ^2= .612	χ^2= .325
- Never	39	55.7	0	0.0	11	15.7			
- **Some times**	23	32.9	63	90.0	53	75.7	P = .815	P = .962	P = .850
- Always	8	11.4	7	10.0	6	17.1			
Definition of extravasation:							χ^2= 32.6	χ^2= 5.38	χ^2= .351
- leakage of a vesicant solution injected IM into surrounding tissue.	0	0.00	0	0.00	0	0.00	P = 0.002*	P = .250	P = .726
- leakage of non-vesicant solution into the surrounding tissue.	52	74.3	0	0.00	12	17.1			
- **leakage of a vesicant solution into surrounding tissue**	7	**10.0**	70	**100.0**	53	**75.7**			
- Didn't known	11	15.7	0	0.00	5	7.1			
Preventive measures for extravasation injuries*:							χ^2= 12.07	χ^2= 4.37	χ^2= 4.12
- Assessing the catheter hourly site for swelling or redness	37	52.9	3	4.3	6	8.6	P ≤ 0.001**	P = 0.047*	P = 0.049*
- Selecting the suitable vein and the smallest gauze.	44	62.9	3	4.3	7	10.0			
- Avoid bone prominence (flexion areas)	35	50.0	2	2.9	7	10.0			
- Use transparent adhesive tape for securing	16	22.9	4	5.7	9	12.9			
- Dilute vesicant medications appropriately	18	25.7	3	4.3	5	7.1			
- Flushing cannula before and after infusion with 0.9% sodium chloride solution	23	32.9	6	8.6	9	12.9			
- **All of above**	21	**30.0**	63	**90.0**	50	**71.4**			
Nursing intervention when extravasation occurs*:							χ^2= 29.95	χ^2= 9.31	χ^2= 5.72
- Stop infusion immediately	70	100.0	5	7.1	31	44.3	P ≤ 0.001**	P ≤ 0.001**	P ≤ 0.037*
- Leave the cannula in place and aspirate drug	0	0.00	2	2.9	15	21.4			
- Elevate the limb to minimize swelling	0	0.00	3	4.3	11	15.9			
- Notify the physician	23	32.9	5	7.1	20	28.6			
- **All of above**	0	**0.00**	65	**92.9**	39	**55.7**			

*** More than one answer**

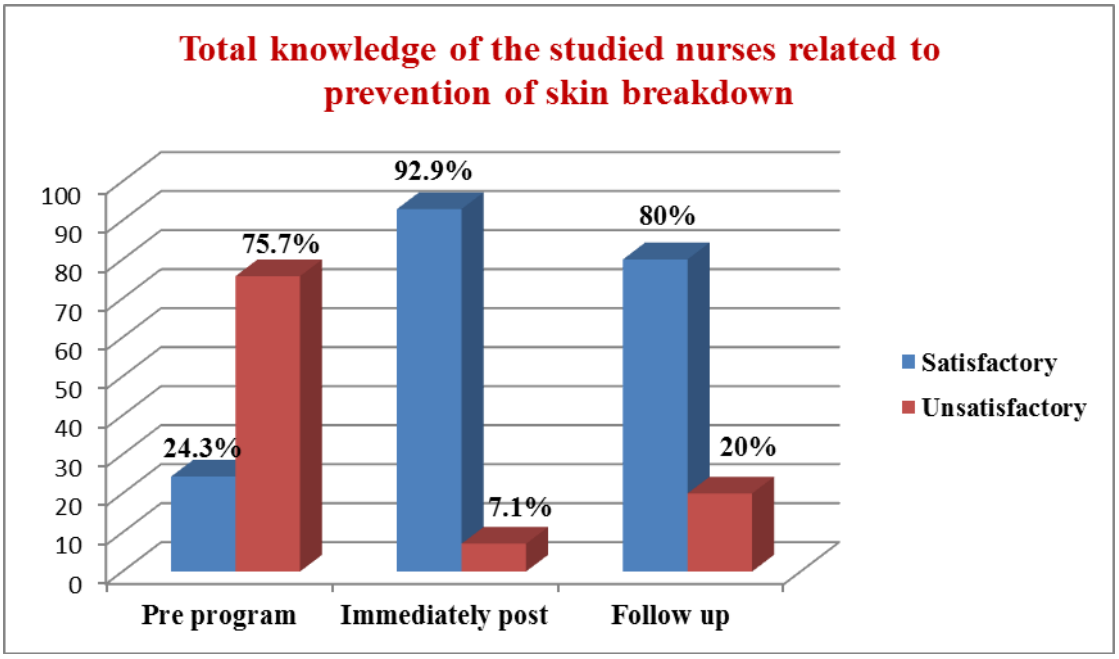

Figure (1): Total knowledge levels of the studied nurses related to prevention of skin .(breakdown in NICU throughout the program phases (n=70)

Table (6): Relation between characteristics of the studied nurses and their total score of knowledge related to prevention of skin breakdown in NICU throughout program phases (n=70)

Nurses' characteristics	Pre		X^2	Sig	Immediately post		X^2	Sig	Follow up		X^2	Sig
	Satisfactory	Unsatisfactory			Satisfactory	Unsatisfactory			Satisfactory	Unsatisfactory		
	N(%)	N(%)			N(%)	N(%)			N(%)	N(%)		
Age (years):												
20 <25	3 (30.0)	7(70.0)	9.16	**.043***	10(100.0)	0(0.0)	2.21	.530	9(90.0)	1(10.0)	5.35	.148
25 <30	2 (14.3)	12(85.7)			13(92.9)	1(7.1)			12(85.7)	2(14.3)		
30 <35	12 (32.4)	25(67.6)			33(89.2)	4(10.8)			26(70.3)	11(29.7)		
≥ 35	0 (0.0)	9(100.0)			9(100.0)	0(0.0)			9(100.0)	0(0.0)		
Academic qualifications												
- Diploma of nursing schools	1(43.3)	6(85.7)			7(100.0)	0(0.0)			7(100.0)	0(0.0)	21.8	**.003***
-Technical institute of nursing	8(22.9)	27(77.1)	1.73	.629	32(91.4)	3(8.6)	16.46	**.008***	28(80.0)	7(20.0)		
-Bachelor of nursing science	8(28.6)	20(71.4)			26(92.9)	2(7.1)			21(75.0)	7(25.0)		
Experience / years:												
1< 5	10(21.7)	36(78.3)	4.12	.248	42(91.3)	4(8.7)	2.92	.404	37(80.4)	9(19.6)	4.98	.173
5 < 10	6(42.9)	8(57.1)			14(100.0)	0(0.0)			11(78.6)	3(21.4)		
≥ 10	1(10.0)	9(90.0)			9(90.0)	1(10.0)			8(80.0)	2(20.0)		
Training courses:			2.14	.143			1.04	.307			.965	.326
Yes	4(14.8)	23(85.2)			24(88.9)	3(11.1)			20(74.1)	7(25.9)		
No	13(30.2)	30(69.8)			41(95.3)	2(4.7)			36(83.7)	7(16.3)		

Table (7): Comparison of neonatal skin condition throughout the program phases (n=50).

Neonatal skin condition	Pre		Immediately Post		Follow	
	n	%	n	%	n	%
Dryness						
Normal	17	34.0	40	80.0	33	66.0
Dry skin	25	**50.0**	7	**14.0**	12	**24.0**
Skin very dry. craking	8	16.0	3	6.0	5	10.0
Erythema						
No evident	3	**6.0**	34	**68.0**	26	**52.0**
Visible- <50	42	84.0	16	32.0	23	46.0
Visible->50	5	10.0	0	0.0	1	2.0
Breakdown						
No evident	21	42.0	43	86.0	41	82.0
Small	28	**56.0**	7	**14.0**	9	**18.0**
Extensive	1	2.0	0	0.0	0	0.0

Discussion:

Regarding the studied nurses' total knowledge, the present study revealed that, there was an improvement in total knowledge of studied nurses regarding prevention of skin breakdown immediately post and three months later comparing with pre program implementation with statistical significant differences between nurses' knowledge pre & immediate post (p1), pre & follow up phase (p2) ($p \leq 0.001$**), and between immediate post and follow up phase (p3) of program implementation phase, ($P \leq 0.021$*).The current study result showed that, only less than one quarter of the studied nurses had satisfactory total knowledge score regarding prevention of skin breakdown pre program. This result might be attributed to the fact that, more than three fifths of the studied nurses didn't receive of the studied nurses didn't received training courses about prevention of skin breakdown. In addition, more than two fifth of them hadn't standard guidelines about neonatal skin care in NICU.

After program implementation, most of the studied nurses had an improvement in their level of knowledge immediately post program implementation related to the effectiveness of program implementation and their observable desire to learn. Therefore, more emphasis should be directed toward neonatal skin care to increase the nurses awareness about their role in prevention of skin breakdown. During follow-up phase, there was a minor decline in the nurses' knowledge; this is a common problem because knowledge is easily forgotten without ongoing training and education.

This is confirmed by Carol (2009), who stated that training program are crucial for enhancing nurses' knowledge and expertise as well as the standard of care given to neonates. So, attending training courses in NICU is essential for pediatric nurses to provide qualified nursing care.These findings were in agreement with that of Abd-

Elrazek (2020), who declared that there were highly statistically significant differences between nurses' knowledge of skin breakdown before and after program implementation, which highlights on the positive effect of intervention program on nurses' knowledge.

As regards the studied nurses' knowledge about definition of the skin breakdown, it was found that a few of them defined the skin breakdown completely pre program implementation as an inflammation without overlying tissue loss, disruption of one or more layers of the skin, tears, abrasion of the skin, and mild to extensive wounds pre program implementation. This is expected because skin breakdown is unfamiliar terminology for nurses, and there is no terminology guideline in the NICU, so it was difficult for nurses to define it correctly. But after program implementation, most of the studied nurses became aware with the complete definition of the skin breakdown compared to more than three fifths of them who defined the skin breakdown completely three months later. This result was in agreement with Said, Mohamed, and Draz (2019), who found that more than half of the studied nurses had good knowledge about definition of skin breakdown after program implementation compared to less than one quarter pre-program with a statistically significant difference between the two phases.

The result of the present study revealed that, there was a significant difference in relation to the studied nurses' knowledge regarding stages of skin breakdown pre / immediately post, and follow up phase of program implementation. More than one fifth of them were replied correctly that the stages of skin break down divided into four stages before program implementation compared to all of them immediately post program and near three third of them replied correctly that the stages of skin break down divided into four stages in follow up phase. This result was in accordance with Diab (2015), who found that, there was a difference in nurses' knowledge about degree of skin breakdown before and after intervention. The mean was low before and increased after intervention.

This study represented that more than half of them reported that gestational age less than 37 weeks was the main intrinsic risk factor for skin breakdown in neonates' pre program implementation. It may be attributed to the fact that the most neonates admitted to NICU were premature and more skin breakdown condition associated with prematurity. Most of them mentioned all intrinsic risk factors such as gestational age less than 37 weeks, immobility, malnutrition, sepsis, and birth weight immediately post program implementation, while more than three fifths of them reported all intrinsic risk factors of skin breakdown three months later. This result was in agreement with

Mohamed, Newton, and Lau (2014) whose found that, the majority of nurses knew that the causes of skin breakdown may related to prematurity rather than any other causes.

As for nurses' knowledge about extrinsic risk factors of skin breakdown in NICU, it was noticed that the main extrinsic risk factors of skin breakdown were the use of adhesive tape for fixing vein access devices or pulse oximeter probes and thermal sensors and for fixing the endotracheal tube in neonates, followed by nasogastric tube and phototherapy, as mentioned by more than half of them. In addition, nearly half of them mentioned mechanical ventilators and intravenous lines in pre program implementation. Actually, skin breakdown is more closely associated with these factors. Also, less than two fifths of them stated all extrinsic risk factors in pre program implementation compared with the most of them immediately post program, and nearly three quarters of them stated all extrinsic risk factors three months later. This was expected since a large percentage of the studied nurses have five to ten years of experience, and the extrinsic factors are observable factors that cause skin breakdown, especially adhesive tape.

These results were in agreement with August, New, Ray, and Kandasamy, (2018) whose mentioned that, skin breakdown are caused by different factors. One of the most common skin breakdown in NICU is the use of adhesives for fixing vein access devices or pulse oximeter probes and thermal sensors for fixing the endotracheal tube in neonates. In addition, Abkenar, Mojen, Shakeri, and Varzeshnejad (2020) added that, care equipment and neonatal conditions, including neonates' weight and age, clinical status, and underlying diseases, were found to be effective in skin breakdown . Another study by Cho et al. (2019); pointed to the leakage of serum and drugs into the subcutaneous layer of skin as a causative agent of skin breakdown. As for nurses' answer about assessing of the neonatal skin pre, immediately post program implementation and 3months later, it found that all of them answered 'yes'. This was expected since assessing skin is a part of nursing documentation required in neonatal file and the nurse should filed it. This finding contradicted with Mohamed, El Dakhakhny, Bassam, and El Sayed (2019) whose found that, skin was assessed only by 68.2% of the studied nurses and nearly one third of the studied nurses didn't assess.

According to Esmaeilzadeh (2022), healthcare team members should pay special attentions in preventing and managing skin breakdown and the “ABCDE” approach can be a useful guide. ‘A’ is derived from the word ‘Air’, which means that the diaper area must be kept open as possible to allow the neonate’s skin to come in contact with air. ‘B’ in this approach is derived from the word “barrier”, which means that protective creams

are used in the diaper area to prevent dermatitis. 'C' is derived from the word 'Cleansing', which means that each time the diaper is replaced, skin of diaper area should be washed with water slowly and without causing harm to the skin. 'D' is derived from the word "diaper", which means that the high-quality diaper type is used and is changed as much as possible. 'E' is based on the word 'Education', which means that caregivers receive sufficient education regarding skin care

The current study result showed that, nearly one quarter of the studied nurses reported all preventive methods for DD, which were cleanse diaper area gently with warm water, frequent diaper change, selection suitable diaper number, maintenance of a dry skin surface, use a barrier cream such as zinc oxide, and expose diaper area a few minutes for air pre program compared to the majority of them immediately post program implementation, while less than three fifth of them reported all preventive methods for DD three months later .

Regarding the knowledge of the studied nurses about extravasation that minority of them stated the correct definition of extravasation pre program implementation compared to all of them stated correct definition immediately post program implementation and slightly decline was found three months later with statistical significantly. It may be due to extravasation is not a familiar term for nurses and they did not attain enough knowledge regarding to extravasation during years of education. This result was similar to Ibrahem, Rashad, and Selim (2021), whose found that, highly statistically significant differences. Whereas, the majority of the studied nurses had satisfactory knowledge about definition of extravasation post program compared to pre program implementation. Moreover, the present study result is in agreement with Sisan, Rayan, Elmorsy, Elyan, and Salahat, (2018) whose concluded that less than one quarter of the nurses were able to identify the correct definition of the term extravasation.

In relation to nurses' knowledge about preventive methods for extravasation injuries, it was clear that, less than one third of the studied nurses reported all preventive as assessing the catheter hourly site for swelling or redness, selecting the suitable vein and the smallest gauze , use transparent adhesive tape for securing, dilute vesicant medications appropriately, and flushing cannula before and after infusion with 0.9% sodium chloride solution pre program compared with the majority of them immediately post program. This may be due to the fact that lack of regular education courses, inadequate of continuous evaluation and an absence incorporation of extravasation

injuries course in a nursing curriculum of the nursing program in nursing schools, institutes and faulty. This is an area of concern that needs further attention given.

This interpretation is supported by Kahraman et al. (2020) who reported that, extravasation injuries can be easily prevented by nurses because they are first one who can easily notice and detect these events through vigilant monitoring. It was proved that continual educational programs help maintaining sustainability and standardization of care provided to preterm infants, improve nurses' knowledge about extravasation, and significantly reduce its rates as well. Therefore, nurses are in need for in-service education to ensure that the information received about extravasation and all preventive methods up to date and lasting. In the same line, Sisan et al. (2018), whose stated that, all health care facilities should establish policies and procedures for preventing and managing extravasation and increase the knowledge of nurses regarding extravasation because it's essential issues for neonates' especially preterm protection. Also, there was a highly significant difference in relation to the studied nurses' knowledge about the preventive measures for extravasation injuries pre program and immediately post program.

Regarding the relationship between nurses' characteristics and their overall knowledge of preventing skin breakdown, there was statistically significant relation between the studied nurses' age and their total score of knowledge pre intervention, and between nurses' academic qualifications and their total score of knowledge across program phases (post and follow up phases).In actuality, nurses aged between 30 to 35 years old had satisfactory total score of knowledge than others at pre intervention phase. Hence, older nurses are more likely to have more knowledge. It may be attributed to increasing age of nurses make them acquired more experience in dealing with skin breakdown and its prevention, which improving their knowledge. Consistent with the foregoing studied results, Amr et al. (2022) who found that, when the post- and follow-up intervention was implemented, there was a highly statistically significant positive correlation between knowledge scores and nurses' age, educational background, and years of experience (P 0.001).

In respect to efficiency of educational program in preventing skin break down and improving neonatal skin condition. Improvement in neonatal skin condition has been observed. This outcome demonstrates how a preventative program for skin breakdown has an impact. In addition, implementing program about skin breakdown and its

prevention, allow rapid transmission of best practices among nurses, and leading to an improvement in neonatal skin condition

These findings were in the same line with findings of Abd Elrazek (2020), who reported that, the majority of premature infants had small breakdown pre program, less than half had visible erythema, and less than half had visible erythema pre intervention.. Also more than half had no evident erythema and only 43% had visible erythema while the majority of them were free from skin break down on post program implementation.

CONCLUSION:

Based on the findings of the present study, the study concluded that all of the studied nurses had satisfactory total knowledge score about prevention of skin breakdown in immediate post program phase, while reduce in the follow up phase. Eventually, the educational program was effective in nurses' knowledge improvement regarding skin breakdown prevention in NICU. Moreover, after program implementation, neonatal skin condition improved.

RECOMMENDATIONS:

The following suggestions were made:

1. Constant educational programs for nurses about the skin breakdown prevention in NICU according to their requests to improve their knowledge.
2. Focus on the availability of printed recommendations about NICU skin breakdown prevention that are simply illustrated as manual booklets, posters, and brochures to guide nurses' knowledge.

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تأثير برنامج تعليمي عن الوقاية من تحطم الجلد لحديثي الولادة على معلومات ممرضي وحدات العناية المركزة لحديثي الولادة

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الخلاصة

رعاية الاطفال حديثي الولادة من تحطم الجلد اولوية قصوى في رعاية حديثي الولادة ، وذلك من خلال تحديث الإرشادات السريرية للعناية بالجلد ، وتطبيق ممارسات جديدة وتحديث معلومات الممرضين. **هدف الدراسة:** تقييم تأثير برنامج تعليمي عن الوقاية من تحطم الجلد لحديثي الولادة على معلومات ممرضي وحدات العناية المركزة لحديثي الولادة. **التصميم:** تم استخدام بحث شبه تجريبي لمجموعة واحدة (قبل – بعد- متابعة). **مكان الدراسة:** تم تنفيذ الدراسة في وحدات العناية المركزة لحديثي الولادة في مستشفى السلام ومستشفى النسا التخصصي و مستشفى الحياة ومستشفى النصر التخصصي للأطفال التابعين للتأمين الصحي الشامل في محافظة بورسعيد. **عينة البحث**: كل الممرضين الذين يعملون في وحدات العناية المركزة لحديثي الولادة بالمستشفيات السابق ذكرها وعددهم٧٠، بالإضافة الى ٥٠ طفل حديثي الولادة دخلوا اثناء تجمع البيانات. **أدوات جمع البيانات**: : تم استخدام أداتين لجمع البيانات ، **الأولى**: استمارة استبيان لتقييم معلومات التمريض عن الوقاية من تحطم الجلد **والثانية**: مقياس حالة الجلد للطفل حديثي الولادة. **النتائج**: أشارت نتائج الدراسة إلى وجود فروق ذات دلالة إحصائية بين معلومات المرضيين قبل وبعد البرنامج مباشرة و قبل البرنامج والمتابعة و كذلك بعد البرنامج مباشرة والمتابعة. **الخلاصة:** تحسين معلومات الممرضين عن للوقاية من تحطم الجلد وكذلك تقليل تحطم الجلد عند حديثي الولادة. **التوصيات:** توفير برامج تعليمية تدريبية ومستمرة عن الوقاية من تحطم الجلد لممرضي وحدات العناية المركزة لحديثي الولادة.

الكلمات المرشدة: **برنامج تعليمي ـ حديثي الولادة – الوقاية من تحطم الجلد -- معلومات الممرضين**.