

Evidence Based Practice Intervention Effectiveness for Nurses on Integrative Developmental Care of Mothers and their Neonates in Rural Health Settings

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ABSTRACT

Background: Recently health care professionals have diverse levels of evidence based practice (EBP) knowledge and skills, liable on their education, experience, and own interest. However, providing an organization of baseline information on EBP permits nurses educational and incorporation evidence into daily practice which become a must for developmental care of mother and their neonates. **Aim:** Study aimed to evaluate evidence-based practice intervention effectiveness for nurses on integrative developmental care of mothers and their neonates in rural health settings **Subject and Methods:** A quasi-experimental prospective with pre- post-test, and comparative research design was used, study setting was in 1-Health Insurance Hospital affiliated to the General Insurance Sector, 2- Fayoum General Hospital affiliated to Ministry of Health belong to Fayoum governorate, Egypt. A non-probability convenience sampling technique was used with a total number of (90n), Data were collected by using two tools, 1-a self-administered questionnaire sheet to assess EBP knowledge of nurses regarding integrative developmental care (IDC) for mothers and their neonates, 2-performance observational checklist for neonatal developmental clinical care guidelines to assess nurses' performance regarding IDC for neonates. **Results:** The study results showed that, a highly significant difference ($P < 0.001$) related to EBP developing nurses' skills in both hospitals, a highly statistically significance difference ($P = < 0.001$) in both hospitals related to nurses satisfactory knowledge pre and post intervention regarding integrative developmental care of mothers and their neonates, also a highly statistically significance difference ($P = < 0.001$) related to nurses' performance (pre and post intervention) regarding integrative developmental care (IDC) of neonates in both hospitals were found. **Conclusion:** The present study had accepted the research hypothesis by evidence that, EBP intervention program on IDC of mothers and their neonates had a positive effect on nurses and improve their knowledge and practices in rural health settings. Also, a high significant difference related to developing nurses' skills and their age, education, experience, position, and Attending relevant work shop. **Recommendation:** It is recommended that, EBP training program should be implemented to all managerial categories to get their commitment for improve practices, and staff nurses educate about developmental care should be conducted.

Keywords: Integrative developmental care, Evidence Based Practice, rural health setting.

Introduction:

Rural healthcare settings are facing different challenges by the rural population as demographically distinct. Meanwhile, for the provision of care nurses are fronting large patients' numbers who's affected by regional customs and community practices. Therefore, cultural health as variances in traditions, customs, and belief, value of the family and community besides healthcare values employ a more significant influence in rural nursing practice. However, to achieve health equity and improved health and quality of life for all people; rural nurses must have skills and expertise to meet their needs. Currently, health care organizations are affected by on-going changes that raise challenges for all health care specialists, including nurse managers whose respond to the demands established by governmental institutions. Nurse managers serve as models of change for nurses and other support staff. They can use their critical thinking and clinical knowledge and methods of performance improvement to enhance adoption of EBP through providing resources and support for the work and reveling success with recognition of unit staff. Nurses must be able to see a clear link between research finding and implications for practice. (Warshawsky, et al., 2013; Gunawan & Aunguroch, 2017, Trus, 2019).

To achieve health equity and promote health and quality of life for all people rural nurses should have abilities and expertise to meet the needs of rural populations. One of these is translating evidence into practice to improve outcomes and quality of life for mothers and their neonates, productivity and reduce healthcare costs. Therefore, EBP health care is becoming a priority for all health center care providers, and an approach of care which integrates the best available research evidence with clinical expertise and patient values. (Athina, et al, 2017) It involves translating evidence into practice, also known as knowledge translation, and ensuring that „stakeholders (health practitioners, patients, family and caregivers) are aware of and use research evidence to inform their health and healthcare decision-making (Ranita & Firzada, 2016).

Maternal mortality and morbidity and perinatal mortality are major public health problems. It has long been recognized that majority of perinatal deaths have intrapartum origin and result as a consequence of interventions carried out around the time of delivery. So, evidence-based maternity care uses the best research finding on the safety and specific practices efficiently to help maternity care decisions and to facilitate optimal outcomes in mothers and their newborns. Despite of pioneered trial related to evidence-based practice, which result in a wealth of

clear guidance for evidence-based maternity care, there remain a widespread and continuing insufficient use of beneficial practices, overuse of harmful or ineffective practices, and uncertainty about effects of inadequately assessed practices. **(Horton & Levin, 2016).**

A set of EBP that contribute to the physiologic stabilization of the mother and their neonate during labor includes; perineal care, supportive care, using comfortable position for delivery, encourage mother for moving during first and second stage of labor, early ambulation after birth, delayed cord clamping, skin-to-skin contact for at least an hour, newborn assessments on the maternal abdomen, and the early initiation of breastfeeding. However, the early minutes after birth are a very vulnerable time for both mother and newborn. The provided care during this time is critical to ensure not only their immediate survival but also to improve their longer-term health and nutrition. Though, evidence-based strategy would inform planning of maternal, newborn health and survival **(Karsten, et al., 2015, Dabral, et al., 2018).**

Mothers and their neonates are at highest risk of death during labor, childbirth and in the first week after birth. Despite of the notable accomplishments to improve maternal and neonatal survival, still 800 women and 7700 newborns die every day due to complications during pregnancy, child birth, and in the postnatal period.

Therefore, newborn deaths now account for 44% of total children death less than 5 globally. However, the newborn deaths main causes are preterm birth complication (35%), intrapartum conditions (24%), and infections (20%). Nearly 80% of newborn deaths occur among babies with weigh less than 2500g at birth, especially those born preterm due to inadequate care **(Lawn, et al., 2016).** Additionally, worldwide, Preterm birth affects approximately 11% of births **(Vogel, et al., 2018).** According to **(world data atlas Egypt health, 2018)** neonatal mortality rate of Egypt was 11.2 deaths per 1,000 live births and 38% and the leading causes of neonatal deaths are preterm birth.

The newborn infant in the neonatal intensive care unit (NICU) gets care with highly advanced medical technology, but the incidence of disability and neurodevelopmental problems among survivors remains high and problematic especially in preterm neonates **(Leslie & Raylene, 2016).** Therefore, Preterm neonates are a particularly vulnerable population who require advanced medical intervention and highly professional nursing to survive. However, care of those neonates may require special equipment, invasive procedure, constant need for light, presence of ambient noise and excessive manipulation **(Carey, 2018).** The Neonatal Integrative Developmental Care (NIDC) strategies utilizes a holistic approach in describing seven neuroprotective core

measures enhancing neuroplasticity for family-centered developmental care of premature neonate to support optimal synaptic neural connections, promote normal development, and prevent disabilities. However, the identified seven core measures in the neonatal (IDC) includes; healing environment, partnering with families, positioning & handling, safeguarding sleep, minimizing stress and pain, protecting skin and optimizing nutrition (**Macho., 2018**).

Consequently, according to **Tripi, et al., (2017)** who stated that, synactive theory of development provides a conceptual framework to organize the neurobehavioral capabilities in the early development of the fetus, newborn and young infant. So, applying early IDC program on newborn immediately after birth will support the newborns' stabilization and organization of the autonomic, motor, and state systems at each level of maturation and minimizing stressful events.

Nurses are the primary caregivers in the NICU; they remain a key position to influence the environment of the developing neonate. Therefore, for the implementation of (NIDC) be successful, all NICU staff must have knowledge and professional practices to effectively implement this care so, it is crucial to design and offer attractive and effective training programs which can not only standardize (NIDC) approaches to neonatal care among all staff, but also

improve infant and family outcomes (**Leslie, et al 2015**). Meanwhile, the merger of the EBP framework with an active-learning approach would support educational intervention development that intended to prompt the change of practice and meet the desired outcomes of IDC on mothers and their neonates.

Magnitude of the Study:

Mothers and their neonates are at highest risk of death during labor, childbirth and in the first week after birth. Worldwide, Preterm birth affects approximately 11% of births (**Vogel., et al 2018**). Neonatal mortality rate of Egypt was 11.2 deaths per 1,000 live births and 38% leading causes of neonatal death are Preterm birth according to **world data atlas Egypt health, (2018)**. In **El- Fayoum General Hospital (2019)** the rate of preterm neonate in NICU was 82.7% of the total number of admissions. In rural health setting nurses providing clinical services in a variety of roles and in collaboration with other health professionals this permits nurses to have a proactive role. In attempt to help and introduce evidence -based approach to clinical practice which encourages nurses to provide quality of services and obtain updated for patient care. According to (**Tripi, et al., 2017**) who suggested that, applying early IDC program on newborn immediately after birth will support the newborns' stabilization and organization of the autonomic, motor, and state systems at each level

of maturation and minimizing stressful events. Therefore, the researchers adopted this approach and applying an IDC educational program for nurses on mothers and their newborn to estimate the effectiveness of the program and testing the approaching.

Aim of the study:

The present study aimed to evaluate evidence-based practice intervention effectiveness for nurses on integrative developmental care of mothers and their neonates in rural health settings through:

1. Assessing nurses' knowledge related to IDC of mothers and their neonates.
2. Designing and implementing EBP educational program for nurses on IDC.
3. Evaluate the effect of EBP intervention program on nurses' knowledge and performance regarding developmental care practices.

Research hypothesis:

Nursing staff who will receive educational program related to IDC of mothers and their neonates' will improve their knowledge and practices after intervention than before in rural health settings.

Conceptual Framework:

The conceptual framework of this study was chosen to combine between two theories are 1- Rural

nursing theory (RNT), a descriptive middle range theory, which includes three statements are (a) a rural person's definition of health, (b) rural health seeking behaviors and, (c) the role of rural health care providers including their lack of anonymity and greater role diffusion than providers in more urban areas. (Long & Weinert, 2006) Role diffusion may also contribute to rural nurses' attitudes and beliefs towards EBP. Rural nurses often have to work with what is available and may not be as easily influenced by what research or evidence supports or does not support because of decreased exposure to research due to limited resources, professional isolation from access to colleagues with research backgrounds, and lack of administrative support for staff involvement in research (Olade, 2004, Scharff, 2006). 2- Synactive Theory as a theoretical foundation for developmental care which identifies five separate but interdependent subsystems (autonomic, motor, state, attention-interaction, and self-regulation) within the infant; these subsystems are in constant interaction with each other, the environment and caregivers. Through recognizable approach and avoidance behaviors occurring in these subsystems, infants continually communicate their level of stress and stability in relation to what is happening to and around them. So, applying early IDC program on neonates immediately after birth will support neonates' stabilization and organization of the autonomic, motor, and state systems at each level of

maturation and minimizing stressful events (Kenner, 2014, Tripl, et al., 2017).

Operational definition:

Neonatal

Integrative Developmental Care Model is a framework that guides clinical practice in many neonatal intensive care units (NICUs) which combines evidence-based best practices with seven core neuroprotective measures, and use to guide efforts to facilitate the physiological and developmental needs of each newborn. Seven essential measures are addressed: healing environment, partnering with families, positioning and handling, minimizing stress and pain, safeguarding sleep, protecting skin, and optimizing nutrition (Khawash, & Banerjee, 2018).

Subjects and Methods:

Research design:

A quasi-experimental prospective with pre- post-test, comparative research design was used to achieve the aims of this study.

Research settings:

The present study was conducted in department and operation of obstetrics and neonatal Intensive Care Unit (NICU) of two hospitals are 1- Health Insurance Hospital affiliated to the General Insurance Sector, 2- Fayoum General Hospital affiliated to Ministry of Health belong to Fayoum governorate, Egypt, both of them includes multi-specialty departments as (Emergency, medical radiology,

oncology, neurology, internal medicine, cardiac, obstetric, surgical, urology department as well as intensive care units, operating theater, medical and surgical floors. These settings were selected due to the high flow and low financial cost.

Sample: A non-probability convenience sampling technique was used with a total number of nurse's sample size (90n) was collected from two hospitals and distributed as (18) of staff nurses working in obstetrics department at Health Insurance Hospital and (22) staff nurses working in obstetrics department at Fayoum General Hospital. a sample of (18) nursing staff working in Neonatal Intensive Care Unit (NICU) at Health Insurance Hospital and (32) nursing staff working in (NICU) at Fayoum General Hospital.

Tools of data collection:

Two tools were applied to gather the necessary data and consumed around six months. Tool I: A structured self-administrative questionnaire was constructed by the researchers based on a review of literature of Al Hadid, & etal, (2011) & American Association of Colleges of Nursing [AACN]., (2014), to assess EBP knowledge of nurses regarding IDC of mothers and their neonates in rural health settings. The questionnaire included four sections. **Section 1:** Included data related to sociodemographic characteristics of nurses such as: (age, degree of qualification, residence, years of experience, training courses etc...). **Section 2:** Which includes 10 questions about nurses' knowledge regarding organization commitment

related to EBP such as (presence of library, internet connections, continuing education programs, and continuing training units etc...)

Section 3: includes 10 questions about nurses' knowledge related to EBP regarding child birth such as (continuous labour support, perineal massage, delay cord clamping and cutting, maternal position during labour, maternal movement, skin to skin contact of newborn etc...). **Scoring system** for nurses' knowledge was done as follow: response to items is on a three-point Likert scale: "yes," "no," and sometimes in each section were scored 3 to 1 respectively. The scores of each dimension were summed up and then converted into a percent score.

Section 4: A structured interview questionnaire (pre/posttest) was developed in a simple clear Arabic language by the researchers based on literature review guided by (**Northern Neonatal Network Guideline., 2014 & Carey, 2018**) and experts' opinions in light of relevant references to assess nurses' knowledge of developmental care for neonates. includes 30 questions about (Kangaroo Mother Care (KMC), Early initiation of breast feeding, parent involvement, proper handling and positioning, sleep protection, minimize pain/stress, skin care, and early initiate of breast feeding). Scoring system for nurses' knowledge was calculated for each item as follows: correct answer was scored 1 point, while wrong answer was scored zero point. The total score for all questions related to nurses' knowledge was collected as < 60% was considered satisfactory and > 60% was considered unsatisfactory.

Tool II: Performance Observational Check List: It was constructed by the researcher guided by (**Betts et al., 2015 and Carey.,2018**) for neonatal developmental clinical care guidelines to assess nurses' performance of developmental care for neonates. It included the following items: (reduce external stimulus (light, sound, noxious odor), tactile stimulation& minimal handling, kangaroo mother care, postures support/positioning, and breast feeding). Scoring system for nurses' performances through observational checklist were calculated for each item as follows; complete and correct practice was scored one mark, each item not performed or performed incorrectly was given zero. The total scores of related to nurses' practices was collected as <60% was considered satisfactory and > 60% was considered unsatisfactory. It was written in English language.

Tool Validity and Reliability:

Content and face validity were performed by six experts; two professors from the Pediatric Department specialty from Faculty Nursing Ain Shams University, two assistant . professor of administration Department specialty, and two professors from the from maternity Department specialty of Nursing Faculty of nursing Fayoum University, Egypt who reviewed the tools for content accuracy. The developed tools were tested for reliability. The reliability test of translated version was established by using the Cronbach's alpha and Pearson correlation which showed good internal consistency construct validity Cronbach's Alpha

coefficient test = (0.887).

Pilot Study :

A pilot study was conducted before starting data collection, and 10 nurses chosen randomly from previous mentioned settings to estimate the time required for filling in out the tools and checking the clarity, applicability and relevance of the questions. Based on the results of the pilot study, the necessary modifications were done; these nurses' respondents were excluded from the main study sample

Ethical Consideration:

The necessary approval from the administrative authority of the Health Insurance Hospital and Fayoum General Hospital was obtained after issuing an official letter from the Dean of Faculty of Nursing, El-Fayoum University. An informed consent written and verbal to participate in the current study was taken after the purpose of the study was clearly explained to each nurses and mothers. Confidentiality of obtained personal data, the respect of participant's privacy was totally ensured. A summary of the interventions was explained to every nurse and mother who voluntarily agreed to participate in the study and they were informed that they can withdraw from the study at any time without giving any reason.

Field Work:

This study was conducted throughout three phases were : 1- **Preparatory (Program development) phase:** This phase involved a reviewing of literature related to developmental care of mothers and

their neonates in nursing with the aim of acquiring current and recent EBP and knowledge in related to administration, maternity and neonates' principles, were done by using textbooks, periodicals, studies and magazines, and, internet searching nationally and internationally to design data collection tools and program. Data collections tools were developed and translated into Arabic (the self-administered questionnaire), and reviewed by experts in this area. The program content and media, posters, and booklet materials) were prepared by the researchers for nurses under the study based on nurses' learning needs and availability of their time. This program was supplemented using a diversity of teaching methods that included (brain storming technique, group discussion, and clinical training).

Data were collected during the first of May 2018 to the end of October 2018. Before starting the data collection, the approval was obtained and aims of the study were explained to nursing supervisors at both hospitals to gain their support. **2-Implementation phase:** The program was applied for the study subject in the previously mentioned setting. b) The researchers conduct the intervention program after finishing the pre-test in form of questionnaire. c) Group discussion and visual aids such as; posters and pictures were used. d) The collection process starting from 11.00 am to 2.00 p.m. for 3 days' weekly, and it was held in the nursing meeting room to fill in the questionnaire. Each nurse took about 20 minutes to fill in the questionnaire; the researchers took nearby one hour to appraised

developmental care of mothers and their neonate's practices for every nurse by eye observation. f) The duration of each group discussion session ranged between 30-45 minutes) the intervention program was covered the following topics (The Concept & Aims of EBP in Nursing. Recourses & Barriers of EBP in Nursing. Recent Evidence in Maternity Nursing as mother continuous support, mother select position, delayed cutting the umbilical cord, encourage mother to move. Recent evidence in maternity neonatal developmental care as Healing environment, Parent involvement, Kangaroo mother care (KMC), appropriate positioning & handling, safeguard sleep, minimize stress and pain, skin care, and breast feeding). The program composed of 5 separate main sessions (2 theories, and 3 practice sessions) for the nurses. All available nurses were presented as one group according to the accessible time for them.

3-Evaluation phase: Evaluation of the effectiveness of intervention program was done immediately after the intervention program using (post-test), through using the same pre-test tools. Through testing the nurses' knowledge and practice related evidence-based practice on (IDC) of mothers and their neonates in rural health settings

Statistical analysis: *Statistical Design:*

Data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 22.0. Demographic information was summarized using descriptive statistics in the form of frequencies and

percentages. The calculated data was and tabulated using chi square for number and percentage distribution, and Paired t test to examine the overall changes of the pre-test and post-test scores. ANOVA and T- test were used for mean and standard division and comparing the post-test score. Statistical significance was set at $p < 0.05$. Statistical methods were applied (percentage, chi-square (X^2), P value was considered that: non-significant (NS) if $P > 0.05$, Significant (S) if $P < 0.05$, Highly Significant (HS) if $P < 0.01$.

Limitations of the Study:

Irregular attendance of the mothers in NICU which interfere performance of both KMC procedure at least 3time/day and exclusive breast feeding., some prime mothers' fears from touching their premature infant., staff need for a written order of the physician to apply KMC, unavailability of hospital place such as private room to perform KMC. rural cultural traditions prevent mothers to perform KMC in front of male doctor., some recent evidence in rural region existed as social cultural and tradition among population.

Results

Our study has too many results and due to the inability to display all these results, the researchers preferred to present only the significant results. **Table (1):** Distribution of Studied Nurses According to Their Characteristics in Both Hospitals (n= 90)

Items		Groups						Chi-Square	
		Insurance		General		Total		X ²	P-value
		N	%	N	%	N	%		
Age	<30 Years	29	72.50	24	48.00	53	58.89	9.163	0.010*
	30-40 Years	11	27.50	18	36.00	29	32.22		
	>40 Years	0	0.00	8	16.00	8	8.89		
Residence	rural	28	70.00	20	40.00	48	53.33	8.036	0.005*
	Urban	12	30.00	30	60.00	42	46.67		
Educational level	Diploma	20	50.00	23	46.00	43	47.78	13.028	0.005*
	Diploma+ Specialty	5	12.50	0	0.00	5	5.56		
	Technical	12	30.00	27	54.00	39	43.33		
	Bachelor	3	7.50	0	0.00	3	3.33		
Experience	<10 Years	30	75.00	24	48.00	54	60.00	10.095	0.006*
	10-20 Years	2	5.00	15	30.00	17	18.89		
	>20 Years	8	20.00	11	22.00	19	21.11		
Position	Staff nurse	36	90.00	46	92.00	82	91.11	0.110	0.740
	Supervisor nurse	4	10.00	4	8.00	8	8.89		

Table (1) shows distribution of studied nurses according to their characteristics in both hospitals which illustrates that, (58.89%) of them had age <30 Years, as a highly significant difference between two hospitals p >0.010 was found , (53,33%) of studied nurses reside in rural areas, while 46,67% was reside at urban areas with significant difference residence p >0.005, concerning to education, 47,78% had diploma nursing, and only 3,33% had bachelor of nursing with statistical significant differences p >0.005, while 60% of sample had experience less than 10 years, with highly significant differences p >0.006 and non-significant difference related to position p < 0.740.

Table (2): Comparison of Studied Nurses Responses Related to Developing Nurses' Skills Related to EBP Item in Both Hospitals (n= 90)

Item	Hospital					T-Test		
	Insurance H.			General H.			t	P-value
	Mean	±	SD	Mean	±	SD		
Developing nurses' skills related to EBP	21.450	±	1.839	13.020	±	2.437	- 4.520	<0.001*

Table (2): show comparison of studied nurses responses related to developing nurses' skills related to EBP in both hospitals which illustrates a highly significant difference ($P < 0.001$) between two hospitals.

Table (3) Comparison of The Studied Nurses According to their Total Knowledge of Mothers during Delivery in Both Hospitals (pre and post intervention) (n=40)

items	Pre intervention						Post intervention						
	H. insurance		G.hospita l		Total		البنات		العام		Total		
	N	%	N	%	N	%	N	%	N	%	N	%	
Continuous support for the mother during childbirth by accompanying(Husband - a nurse - a relative) during childbirth	Yes	0	0.00	2	46.2	3	25.56	0	0.00	3	78.0	3	43.33
	No	40	100.00	2	48.00	6	71.00	4	100.00	8	16.00	4	53.33
	Sometime	0	0.00	3	6.00	3	3.33	0	0.00	3	6.00	3	3.33
	P-value=<0.001*						X=63.000 P-value=<0.001*						
Using alternative non-therapeutic methods to and relieve childbirth pain	Yes	20	50.00	2	46.00	4	47.78	8	20.00	4	86.00	5	56.67
	No	8	20.00	2	48.00	3	35.56	2	60.00	4	8.00	2	31.11
	Sometime	12	30.00	3	6.00	1	16.67	8	20.00	3	6.00	1	12.22
	P-value 0.002*						X=39.960 P-value=<0.001*						
Perineum massage to minimize the use of an episiotomy	Yes	16	40.00	1	22.00	2	30.00	8	20.00	4	86.00	5	56.67
	No	12	30.00	3	72.00	4	53.33	2	30.00	4	8.00	1	17.78
	Sometime	12	30.00	3	6.00	1	16.67	2	50.00	3	6.00	2	25.56
	P-value <0.001*						X=39.967 P-value<0.001*						
The mother chooses the birth position and is not restricted to the birth position	Yes	14	35.00	1	22.00	2	27.78	6	15.00	4	86.00	4	54.44
	No	21	52.50	3	72.00	5	63.33	8	70.00	4	8.00	3	35.56
	Sometime	5	12.50	3	6.00	8	8.89	6	15.00	3	6.00	9	10.00
	P-value 0.154						X=46.401 P-value<0.001*						
Encouraging the mother to move during early stage of labour	Yes	20	50.00	2	54.00	4	52.22	4	100.00	3	78.00	7	87.78
	No	8	20.00	2	40.00	2	31.11	0	0.00	8	16.00	8	8.89
	Sometime	12	30.00	3	6.00	1	16.67	0	0.00	3	6.00	3	3.33
	P-value = 0.005*						X= 10.025 P-value0.007*						
Delay in cutting the umbilical cord of a newborn	Yes	3	7.50	3	60.00	3	36.67	3	75.00	5	100.00	8	88.89
	NO	14	35.00	2	40.00	3	37.78	-	-	-	-	-	-
	Sometime	23	57.50	0	0.00	2	25.56	1	25.00	0	0.00	1	11.11
	X ² = 45.602 P-value= <0.001*						X=14.063 p-value=<0.001*						

Table (3): Revealed that there was improvement of nurses' knowledge regarding continuous support for the mother during childbirth, using alternative non therapeutic methods, massage of perineum to reduce using of episiotomy, select birth position, encourage mother to move during early stage of labor and delaying cutting umbilical cord after birth with a statistically significance difference $P = < 0.001$ in both hospital.

Table (4) Comparison of the Studied Nurses According to their Satisfactory Knowledge Regarding Integrative Developmental Care of Neonates (pre and post intervention) (n=50)

Knowledge items	Hospitals	Pre		Post		Differences		Paired Test	
		Mean	± SD	Mean	± SD	Mean	SD	t	P-value
Parent involvement	Health insurance	3.850	± 0.700	4.925	± 0.764	-1.075	0.917	-7.417	<0.001*
	General hospital	4.000	± 0.728	5.140	± 0.833	-1.140	1.161	-6.945	<0.001*
T-Test	P-value	0.326		0.210					
Sleep safeguard	Health insurance	3.425	± 0.636	3.850	± 0.362	-0.425	0.594	-4.523	<0.001*
	General hospital	3.280	± 0.671	3.560	± 0.501	-0.280	0.948	-2.087	0.042*
T-Test	P-value	0.300		0.003*					
minimize pain/stress	Health insurance	6.000	± 1.013	7.200	± 0.939	-1.200	1.324	-5.731	<0.001*
	General hospital	6.140	± 0.969	6.980	± 0.892	-0.840	1.167	-5.090	<0.001*
T-Test	P-value	0.506		0.259					
Skin care	Health insurance	7.325	± 0.797	7.300	± 0.758	0.025	1.121	0.141	0.889
	General hospital	7.380	± 0.901	7.560	± 0.644	-0.180	1.207	-1.055	0.297
T-Test	P-value	0.763		0.082*					

Table (4): Revealed that there was improvement of nurses’ knowledge regarding importance of parent involvement in care, sleep protection, minimize pain/stress in post intervention, with a statistically Significance difference $P = <0.001$ in both hospital

Table (5) Comparison of the Studied Nurses' Performance Through Phases of Integrative Developmental Care of Neonates in Both Hospitals (pre and post intervention) n=50

items	Pre intervention							Post intervention					
		Health insurance		General hospital		Total		Health insurance		General hospital		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
1-reduce external stimulus	Not Done	11	61.1	20	62.5	31	62	3	16.7	2	6.3	5	10
	Done	7	38.9	12	37.5	19	38	15	83.3	30	93.7	45	90
	X ² =0.326 P-value =0.568							X ² =2.643 P-value =0.104					
a- Light	Not Done	8	55.5	13	40.7	21	42	3	16.7	10	4.3	13	26
	Done	10	44.5	19	59.3	29	58	15	83.3	22	95.7	37	74
	X ² =1.214 P-value=0.271							X ² =5.011 P-value =0.025*					
b- Noise	Not Done	13	72.2	11	34.4	24	48	2	11.2	3	9.4	6	12
	Done	5	27.8	21	65.6	26	52	16	88.8	29	90.6	44	88
	X ² =2.137 P-value = 0.144							X ² = 1.345 P-value =0.246					
c- Odor	Not Done	14	77.8	9	28.1	23	46	4	22.2	4	12.5	8	16
	Done	4	22.2	23	71.9	27	54	14	77.8	28	87.5	42	84
	X ² = 0.017 P-value =0.897							X ² =6.736 P-value= 0.009*					
2- Tactile stimulation& minimal handling	Not Done	8	44.4	11	34.4	19	38	2	11.1	3	9.4	5	10
	Done	10	55.6	21	65.6	31	62	16	88.9	29	90.6	45	90
	X ² =0.509 P-value=0.476							X ² =0.373 P-value =0.541					
3- reduce pain/stress	Not done	2	11.1	6	18.8	8	16	1	5.5	4	12.5	5	10
	Done	16	88.9	26	81.2	42	84	17	94.5	28	87.5	45	90
	X ² =2.980 P-value=0.084							X ² =0.951 P-value =0.330					
4- Posture support and positioning	Not Done	11	61.1	9	28.1	20	40	5	27.8	7	31.9	10	20
	Done	7	38.9	23	71.9	30	60	13	72.2	25	78.9	40	80
	X ² =3.249 P-value=0.071							X ² =3.206 P-value = 0.073*					
a- Supported prone position	Not Done	10	55.6	7	21.9	17	34	2	11.1	6	18.8	8	16
	Done	8	44.4	25	78.1	33	66	16	88.9	26	81.2	42	84
	X ² =1.918 P-value =0.166							X ² =5.737 P-value= 0.017*					
b- Supported side- lying position	Not Done	33	82.50	42	84.00	75	83.3	4	10.00	15	30.00	19	21.1
	Done	7	17.50	8	16.00	15	16.7	36	90.00	35	70.00	71	78.9
	X ² =0.036 P-value= 0.850							X ² =5.337 P-value =0.021*					
c- Supported Supine position	Not Done	19	47.50	18	36.00	37	41.11	4	10.00	13	26.00	17	18.89
	Done	21	52.50	32	64.00	53	58.89	36	90.00	37	74.00	73	81.11
	X ² =1.214 P-value=0.271							X ² =3.713 P-value =0.054*					
5- Kangaroo care (nurse No=90)	Not Done	19	47.50	18	36.00	37	41.11	4	10.00	13	26.00	17	18.89
	Done	21	52.50	32	64.00	53	58.89	36	90.00	37	74.00	73	81.11
	X ² =1.214 P-value=0.271							X ² =3.713 P-value =0.054*					
6- breast feeding (nurse No=90)	Not Done	19	47.50	18	36.00	37	41.11	4	10.00	13	26.00	17	18.89
	Done	21	52.50	32	64.00	53	58.89	36	90.00	37	74.00	73	81.11
	X ² =1.214 P-value=0.271							X ² =3.713 P-value =0.054*					

*: Statistically significant at p ≤ 0.05

Table (5) shows nurses' performance through phases IDC of neonates in both hospitals pre and post program. It was clear from the table that, nurses have good performance regarding reducing external noise, tactile stimulation & minimal handling, supporting supine position, explained technique of kangaroo care to the mother in delivery room and NICU and explained technique and importance of breast feeding for mothers immediately after the application of the program than before with statistical significant difference ($P \Rightarrow 0.005^*$).

Table (6) Distribution of Satisfactory Practices Score among Studied Nurses According to their Performance Regarding IDC of Neonates in both hospitals (pre and post intervention) n=50

Performance items	Hospitals	Pre			Post			Differences		Paired Test	
		Mean	±	SD	Mean	±	SD	Mean	SD	t	P-value
Reduce External Stimulus (sound-light-odor)	Health insurance	4.700	±	1.604	8.800	±	0.823	-4.100	1.892	-13.706	<0.001*
	General hospital	5.780	±	1.765	7.880	±	1.272	-2.100	2.243	-6.621	<0.001*
T-Test	P-value	0.003*			<0.001*						
Kangaroo mothers care	Health insurance	4.400	±	0.871	5.125	±	0.939	-0.725	1.219	-3.761	0.001*
	General hospital	4.400	±	0.782	4.940	±	1.038	-0.540	1.328	-2.875	0.006*
T-Test	P-value	1.000			0.383						
Posture support and positioning (prone-supine-side lying)	Health insurance	8.150	±	1.001	10.975	±	1.000	-2.825	1.130	-15.815	<0.001*
	General hospital	7.920	±	0.944	10.400	±	1.512	-2.480	1.776	-9.876	<0.001*
T-Test	P-value	0.267			0.041*						
Breast feeding	Health insurance	7.500	±	1.109	8.800	±	0.853	-1.300	1.265	-6.500	<0.001*
	General hospital	7.620	±	0.901	8.600	±	0.904	-0.980	1.204	-5.758	<0.001*
T-Test	P-value	0.573			0.288						
Total	Health insurance	40.650	±	1.955	48.175	±	2.480	-7.525	2.882	-16.513	<0.001*
	General hospital	40.740	±	1.978	47.180	±	3.224	-6.440	2.666	-17.080	<0.001*
T-Test	P-value	0.830			0.112						

Table (6): Revealed that there was improvement of nurses' performance regarding reduce external stimulus, Kangaroo mothers care, Posture support and positioning and in breast feeding in immediate post program intervention than before, with a statistically significance difference ($P = <0.001$) in both hospitals.

Table (7) Relationship between Total Developing Nurses' Skills of the Study Sample Regarding their Sociodemographic Characteristics at General Hospital (n=50).

General hospital		Developing nurses' skills related to EBP			ANOVA or T-Test	
		N	Mean	± SD	F or T	P-value
Age	<30 Years	24	14.167	± 2.078	13.297	<0.001*
	30-40 Years	18	12.833	± 2.256		
	>40 Years	8	10.000	± 0.000		
Education	Diploma	23	11.478	± 1.675	-5.061	<0.001*
	Technical	27	14.333	± 2.219		
Experience	<10 Years	24	14.167	± 2.078	12.104	<0.001*
	10-20 Years	15	13.000	± 2.449		
	>20 Years	11	10.545	± 0.934		
Position	Staff nurse	46	13.283	± 2.363	2.752	0.008*
	Supervisor nurse	4	10.000	± 0.000		
Problem solving participation	Yes	4	14.000	± 0.000	0.836	0.407
	No	46	12.935	± 2.525		
Attending relevant work shop	Yes	4	10.000	± 0.000	-2.752	0.008*
	No	46	13.283	± 2.363		

Table (7) shows relationship between total developing nurses' skills of the general hospital study sample regarding their sociodemographic characteristics, table illustrates that, there is a highly significant difference between developing nurses skills and their age ($p < 0.001$), education ($p < 0.001$), experience ($p < 0.001$), position ($p < 0.008$), and attending relevant work shop $p < 0.008$ while nonsignificant difference related to problem solving participation ($p > 0.407$).

Discussion:

Evidence-based practice requires translating the research findings into useful practices, presenting EBP change, supporting practice change, and bedside staff to apply changes to patient care. But this approach facing several barriers such individual nurse characteristics, organizational characteristics, the nature of research information, and the healthcare environment also, nurses may lack the skill preferring to seek information from a colleague rather than searching articles or look at a textbook. (Gunawan & Aunguroch, 2017, Trus, 2019). The current study was aimed at evaluate EBP intervention effectiveness for nurses on IDC of mothers and their neonates in rural health settings and our study finding indicates that,

Regarding the Characteristics of the study sample, nearly two third of them had age <30 years a highly significant difference between two hospitals $p > 0.001$, and two third of them had experience less than 10 years this finding is supported with Patelarou, et al., 2013; Smith, et al. 2014). According to residence the finding revealed that, above one half of the study sample reside in rural areas with significant difference residence $p > 0.005$, despite of the whole Fayoum region considered as rural area, internally it classified into urban and rural areas

that means there is mixing of rural and urban cultural perceptions which affect the of all nursing activates and practicing. Concerning to educational level nearly four percent had bachelor of nursing with statistically significant differences $p > 0.005$ between hospitals, this finding in contrast with Craig, et al, (2015): who concluded that, level of education is strongly associated with beliefs about EBP and implementation.

Regarding to developing nurses' skills related to EBP in both hospitals, the study finding illustrates a highly significant difference ($P < 0.001$) between two hospitals. Researchers notice that one hospital is giving support through providing staff educational unit, training and resources obtainability while the second due to the high patient flow preferred to

Dalheim, et al (2012) Who studied nurse practitioners" (NPs) perceptions of readiness for evidence-based practice implementation had stated that, Nurses, their colleagues and the organization itself maintain a culture in which busyness is valued and rewarded. In alignment with findings by Ubbink, et al. (2013) and Khammarnia, & et al. (2015), who found that, registered nurse (RNs) in this study reported a lack of human and fiscal resources to

promote a culture that supports EBP.

Regarding the relationship between developing nurses' skills of the general hospital study sample regarding their sociodemographic characteristics, the study finding illustrates that, relationship between developing nurses' skills and their age, education, experience, position, and Attending relevant work shop. These finding is incongruent with **Joan, et al (2016)** who found that, younger RNs with fewer years in practice showed more positive reactions toward EBP and organizational readiness. Positive attitudes toward EBP are associated with nurses with fewer years of experience and with greater knowledge of EBP. Also, these finding alignment with **Dalheim, et al 2012; Patelarou et al., 2013; Smith, et al 2014.**

Evidence-based practice is becoming a priority for all health care sectors and providers. However, the evidence base of nursing and midwifery is still at an early stage of development. Therefore, introducing practices methodical evidence-based care practices requires more than knowledge and beliefs, since changes of behavior, overcoming barriers and filling gaps in the transfer of knowledge are required (**Horton & Levin, 2016**). Our study finding indicates that, Lack of continuous support from the midwives made some woman feel as she is being a piece of merchandise in a „production

line“ waiting to be processed (**Sjöblom, et al, 2015**). Moreover, (**WHO, 2016**) emphasized on the implication of continuous support during childbirth. Regarding to continuous support for the mother during childbirth, which is one of the factors that would effect on emotional status of mother during delivery, the results of this study indicated that a significant difference was put into evidence between pre and post intervention. This result agreed with (**Bohren, et al, 2017**) who found that the continual presence of a support person was reassuring and comforting.

The perineal massage technique (PM) using physiotherapeutic method during active phase of labor, which can lead to muscle dilation and trauma prevention upon vasodilatation and increased blood flow to the perineum. The present study showed that statistical significant difference between pre and post program intervention. This result agreed with. **Shahoei, et al 2017**, who studied the effect of PM during the second stage of labor on the frequency of perineal tears, episiotomy, and perineal pain in nulliparous women, indicating that the antenatal massage could reduce the need for episiotomy, perineal damages, and perineal pain, In similar lines with the results of the present study, (**Najafi , 2019**) who investigated the effect of PM on the reduction of perianal tear rate in Australia, showing that the

frequency of episiotomy was lower in the PM group. In contrary **Vale de, (2016)** who found no significant difference between the intervention and control groups regarding the effect of PM on perineum health which can be attributed to racial differences or differences in the quality and duration of the massage.

Our finding showed that there are statistically significant between pre and post intervention regarding delayed cord clamping (DCC). These data supported by **Taha, et al (2017)** who resulted that, greater values of SpO₂ between newborns subjected to DCC compared to those treated by immediate umbilical cord clamping immediately after the birth. In this context, **Yu L, et al 2019** did not consider the evaluation of SpO₂ and HR in DCC group but considered as primary outcomes mortality, risk of iron-deficiency anemia.

Despite of the continuing exertions to improve the quality of antenatal, intrapartum and postnatal care for mothers and their neonates provided by skilled team such as doctors and nurses in rural Egypt health settings and the great advances in neonatal developmental care offered to high risk infants; variability of in applying EBP in rural health settings remains have negative impacts on maternal and newborn outcomes **Kaphle, et al.,(2013)**. The findings of the present study demonstrate that, the IDC program applied at NICU in General Hospital

and Health Insurance Hospital at Fayoum governorate was effective in improving nurses' knowledge regarding importance of parent involvement in care of their neonate at NICU, sleep safeguard, minimize pain and stress immediately after program than before with a statistically significance difference ($P = <0.001$) in both hospitals. These findings are in harmony with **Altimier, et al (2015)** who emphasized that NICU staffs acquire new knowledge and skills, after implementation of neonatal integrative care program. **Parke, et al (2019)** is in consistent with the present finding who study Factors Influencing Developmental Care Practice Among NICU Nurses found that, professional efficacy had the largest influence on nurse's developmental care practice, followed by perception of developmental care. These findings could be justified by the nurses' knowledge were improved after the program implementation and enhance nurses' knowledge, competency and positive perception regarding neonatal developmental care. So, the nurse manager should ensure supportive environment for nurses perceive and apply developmental care as essential nursing task in their nursing care.

Concerning parent involvement before and after program, a highly statistically significance difference ($P = <0.001$) is found in both hospitals after intervention. This study is consistent with **Weis, et al (2015)**

and **Twohig, et al (2016)**. From the researcher's point of view the hospital leaders should give opportunities for staff to discuss and reflect this aspect on their work. The current study also revealed that a significant change in nurses' knowledge was noted related to sleep safeguard after program than before. These findings are in agreement with **Mahmoodi, et al (2016)**, **Hasanpour, et al (2017)**. From the researcher's point of view it is important to implement long-term training programs in this field.

Regarding nurses' knowledge score of minimize pain and stress, there was a significant improvement change was observed. The findings of present study are supported by **Costa, et al (2017)** & **Elessi, et al (2019)**. From the researcher's point of view NICU clinical practices should include routine assessments of continuous pain in neonate with applying neonatal pain guidelines to ensure that neonates receive adequate pain control from invasive and noninvasive procedures.

Noise can negatively affect the development of neonates' neurobehavioral, and noise reduction is especially important for the development of brain of neonates at high risk. However, planned noise control training for the health professionals who work in NICUs is an effective way of reducing noise. The present study clarifies a significant change regarding nurses' performance reduce environmental noise at NICU after the program

application with ($P=0.025$). These findings are in agreement with **Biabanakigoortani, et al (2016)** who studied effect of peer education on the noise management in Iranian neonatal intensive care unit who mentioned that, the mean score of the staff performance in noise management significantly increased after the intervention, compared to the pre-intervention score. this could be justified by lack of legislation regarding noise in NICU, and lack of supervision. Additionally, **Incekar, & Balci (2017)** who studied the effect of training on noise reduction in neonatal intensive care units reported that, noise significantly decreased after the training provided for healthcare professionals of the NICU within the scope of the study. However, the educational program dramatically improved nurses' performance about reducing the noise which highlights nurses' acceptability in terms of knowledge and practice **Mohammed, et al (2108)**.

Appropriate tactile stimulation is indicated at the same time ensuring minimal and gentle handling **Lucas, (2015)**. As regards tactile stimulation & minimal handling, the findings of present study revealed that significant changes were noted in nurses' performance where the majority of them done performance correctly with statistically significant differences ($P= 0.009$). These findings are in harmony **Pineda, et al (2018)** who studied Enhancing sensory experiences for every preterm

infant in the NICU: an integrative review emphasized that, there are significant differences in sensory exposures, outcomes, dosages and timing of sensory interventions in NICU.

A fundamental nursing skill in the care of preterm neonates is positioning. These are supine, prone, side lying, and head up tilted position. Critically ill neonate is a vulnerable population, which is dependent to the intensive care environment to support physiologic and neurobehavioral development **Aguilar, et al (2019)**. The present study showed a statistically significant difference in nurses' performance regarding supine position where ($P = 0.017$). These findings are in harmony with **Mohammed, et al (2018)** who showed a statistically significant difference in nurses' performance regarding keeping the spine straight, not curved to the right or left, and the back rounded. This finding was in agreement with the result of **Ramya, et al (2015)** who studied effect of nesting on posture discomfort and Physiological Parameters of Low Birth Weight Infants who showed that mean post-test posture score of low birth weight infants in the experimental group was significantly higher than the mean pre-test posture scores. From the researcher's point of view this could be attributed to the impact of program application and keeping a booklet in NICU which reminds nurses for appropriate position.

In order to enhance the quality of kangaroo mother care (KMC) practice, the neonatal & maternal nurses should develop a maxim of continuous learning and self-development. By this way, the professional nurse will become a KMC resource person, knowledgeable in matters pertaining to kangaroo mother care information, practice and implementation, (**Namnabati, et al (2016)**). The findings of the current study reflected that more than two third of nurses' performed kangaroo care immediately after the program with $P = 0.021$ in delivery room and at NICU at both hospitals. These findings are consistent with **Al-Shehriab, & Binmaneeb (2019)** who studied Kangaroo mother care practice, knowledge, and perception among NICU nurses in Riyadh, Saudi Arabia, and reported that approximately two-thirds of nurses encouraging parents in the performance of KMC followed by providing information about KMC. From the researcher's point of view to continue, promote and improve KMC, especially for premature infants, actions should be taken to modify and save appropriate facilities and policies to support nurses for applying evidence-based intervention.

According to **World Health Organization (WHO, 2016)**, nurses are critical to the initiation and promotion of breastfeeding within the first hour of birth as the best recommended practice. Despite strong

evidence for nutritional and immunological benefits of early initiation in reducing neonatal mortality and morbidity. The findings of the present study showed that more than two third of maternal and neonatal nurses explained technique and importance of breast feeding for mothers at delivery room and NICU immediately after program. These results are in agreement with **Phuma, Noman et al., (2018)** it was observed that neonatal nurses and midwives used different approaches to facilitate maternal–newborn bonding responses of mother–newborn interaction involved breastfeeding. In addition to **Sharma, et al., (2018)** who mentioned that, proportion of neonates receiving early breastfeeding within one hour of birth increased from 55% to 95% after program implementation. From the researcher's point of view mothers in rural area had traditional perception about importance of breast feeding especially colostrum for improve their neonates' immunity and protected from disease.

Conclusion:

Based on the study finding it can be concluded that, EBP intervention program on IDC of mothers and their neonates have positive effect on nurses and improve their knowledge and practices in rural health settings. Also, a relation of developing nurses' skills and their age, education, experience, position, and attending relevant work shop, finally the hypothesis of the study is accepted. The need for conducting more

training programs related evidence-based practices to increase awareness and help the implementation of other researches finding.

Recommendations:

Based on the previous findings, the following recommendations are suggested:

- Evidence based practices training program should be implemented to all managerial categories to get their commitment for improve practices.
- Hospital administrators should provide professional nurses with available and required resources to initiates internal evidence-based practices.
- Staff nurses educate about clinical aspect of developmental care for neonatal developmental care should be conducted.
- In-service training program for newly recruited nurses should contains the most recent developmental care interventions for neonates' guidelines to update their knowledge and improve their performance around neonatal developmental care
- Hospital practice guidelines should be reviewed periodically to include recent, acceptable and applicable finding to be enrolled in practices.

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