

Effect of Instructional Sessions on Nurses' and Doctors' Knowledge and Practice regarding Developmental Care in NICU in Abha City

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Abstract

Preterm / low birth weight (LBW) infant is a live born infant delivered before 37 weeks from the first day of last menstrual period (LMP). It represents the highest percentage of high risk group and accounts for the largest number of admissions to neonatal intensive care unit (NICU). Preterm infants can develop a range of problems because their organs are not mature and an unfavorable environment in the neonatal intensive care unit may compound this morbidity. Developmental care (DC) is a non-traditional kind of care and it represents a framework for practice in NICU which optimizes this environment through reducing its stresses, help preterm infants cope better with this environment and has been proposed to ensure healthy outcomes for premature babies. These interventions include reducing noise and light, control of external stimuli, minimal handling, kangaroo care (KC; skin-to-skin contact between an infant and parent), co-bedding, positioning or swaddling, clustering of nursery care activities, and giving longer rest periods. The aim of the current study was to evaluate the effect of instructional sessions on nurses' and doctors' knowledge and practice regarding developmental care in NICU in Abha city. The study was conducted at Neonatal Intensive Care Unit in both Abha General Hospital and Asser Central Hospital, Abha city, Kingdom of Saudi Arabia. The study involved 54 nurses and 12 doctors. A pre - post assessment questionnaire was developed after extensive literature review and validated by the research investigators to measure the knowledge and practice of nurses and doctors before and after the instructional sessions. The study concluded that there was change in nurses and doctors' knowledge about developmental care post instructional session's implementation. Furthermore, nurses' practice regarding developmental care was improved post instructional session's implementation which means that the instructional sessions had an effective role in enhancing both their knowledge and their practice. The study recommended that when designing a new neonatal intensive care unit or refitting an older one with more modern equipment, the infrastructure and design of it must be suitable to facilitate the application of developmental care. Moreover, the economic impact of the implementation and maintenance of developmental care practices should be considered by individual institutions.

Key Words: Developmental care, premature and low birth weight infants, neonatal intensive care unit.

Abbreviations:

DC: Developmental Care

LMP: Last Menstrual Period

LBW: Low Birth Weight

NICU: Neonatal Intensive Care Unit

KC: Kangaroo Care

1. Introduction

Prematurity is a major health problem because it is a leading cause of infant mortality. Preterm birth, defined as childbirth occurring at less than 37 completed weeks or 259 days of gestation, is a major determinant of neonatal mortality and morbidity and has long-term adverse consequences for health (Stacy & et al, 2010). It represents the highest percentage of high risk group and accounts for the largest number of admissions to neonatal intensive care unit (NICU). The true incidence of preterm birth among the developing countries varies from country to another and from one geographic region to another within a country. However, about 7–12 % of deliveries in developing countries are preterm (Gray et al., 2007). Preterm infants are at great risk for medical complications and future developmental disabilities. They can develop a range of problems because their organs are not mature and an unfavorable environment in the neonatal intensive care unit may compound this morbidity. It has been recognized for many years that the environment of neonatal intensive care unit can have an important influence on the development of premature infants (Aita & Sinder, 2003).

Developmental care (DC) was introduced in the mid-1980s to minimize the stress experienced by preterm infants through modification of the environment using such strategies as noise and light reduction and minimal handling. Important development occurs in the fetus throughout the final weeks of pregnancy. For infants born before 35 weeks gestation, this development occurs in the newborn intensive care unit (NICU) where they are handled frequently and endure invasive, stressful procedures. Developmental care reduces stressful stimuli by attempting to imitate the intrauterine environment (Symington & Pinelli, 2004).

It was mentioned by Brenda & Mobolaji ,(2009) & Gouchon, & et al, (2010) that, developmental care is a non-traditional kind of care and it represents a framework for practice in NICU which optimizes this environment through reducing its stresses, help preterm infants cope better with this environment and has been proposed to ensure healthy outcomes for premature babies. These interventions include reducing noise and light, control of external stimuli (vestibular, auditory, visual, tactile), minimal handling, kangaroo care (KC; is skin-to-skin contact between an infant and parent), co-bedding, positioning or swaddling, clustering of nursery care activities, and giving longer rest periods. This approach requires nurses in the NICU to be trained to read the behavioral cues of preterm infants and customize a plan of care for each one so that the interventions will be most effective in promoting each infant's development

The theory behind developmental care is that it optimizes every aspect of the infants' development and minimizes the deleterious effects of being born prematurely (Prentice & Stainton, 2003). The review of the literature proposes that infants who receive developmental care demonstrate improved neurodevelopment outcomes until the age of two and seem less likely to develop long-term disabilities and behavioral problems by 5½ years of age. Parents report lower levels of stress and seem to develop more mutually understanding relationships with their infants if they received developmental care and nurses observe an improvement in the well-being of these infants (Naylor & et al, 2011).

In general, results of numerous studies on developmental care have shown that, it has had a positive influence on a variety of outcomes such as infant's weight, number of mechanical ventilation days, length of hospitalization, incidence of intracranial hemorrhage and an improvement in neonatal neurobehavioral organization as well as long-term improvement of behavior and cognitive development. Moreover, parents report lower levels of stress and seem to develop more mutually understanding relationships with their infants (Wong & Hockenberry, 2008).

All health care professionals in the NICU need to be gentle, considerate and compassionate in the care of preterm infants. Nurses, physicians, parents, and others involved in the care of preterm infants must rely in part on infants' behavior to identify changes in medical condition and responses to care (Levin & et al., 2007). Moreover, Thomas & Forsy, (2007) stated that the nurse acts as a coordinator by combining expertise and providing comprehensive care during the infant's stay in the intensive care nursery. They are responsible for teaching rehabilitative skills and providing counseling for parents .Moreover, neonatal nurses need to be trained to provide individualized developmental supportive care for preterm infant, need to plan and provide care that meets not only the preterm's illness needs but also his/her developmental needs.

2. Research Problem and Significance:

The prevalence of prematurity in Kingdom of Saudi Arabia is about 7-12 % from the total births which account 574000 per year (Ministry of health of KSA, 2011).This is a serious and big problem which leads to increase in mortality and morbidity rate among this group of newborn. So we need a new trends and approaches in caring with premature babies to reduce this mortality rate and improve their outcomes. Since its inception, the developmental care approach has generated numerous studies, focusing mainly on the impact of this approach on premature infants. In general, results have shown that developmental care has had a positive influence on a variety of outcomes such as weight, number days on mechanical ventilation, length of hospitalization, incidence of intracranial hemorrhage and an improvement in neonatal neurobehavioral organization as well as long-term improvement of behavior and cognitive development (Symington & Pinelli, 2009). Because the implementation of a developmental care approach demands that NICU staff acquire new knowledge and skills, it is surprising to note that very little has been published on training programmes and their evaluation. So the main aim of the current study is to evaluate the effect of instructional sessions on nurses' and doctors' knowledge, practice and attitude regarding developmental care in NICU in Abha city.

3. Research Objectives:

1. To assess the level of doctors and nurses' knowledge regarding developmental care.
2. To evaluate doctors and nurses' practice regarding developmental care.
3. Design, implement and evaluate an instructional sessions regarding developmental care.

4. Research Methodology:

4.1. Research Design

The design of this study was a quasi-experimental one group pre-test/post-test design.

4.2. Aim of the study:

The aim of the current study was to evaluate the effect of instructional sessions on nurses' and doctors' knowledge and practice regarding developmental care in NICU in Abha city.

4.3. Setting

The study was conducted at Neonatal Intensive Care Unit in both Abha General Hospital and Asser Central Hospital, Abah city, Kingdom of Saudi Arabia.

4.4. Sample

The study involved 54 nurses and 12 doctors from the above mentioned settings.

4.5. Hypotheses:

- There will be an improvement in the subjects' knowledge regarding developmental care as a result of implementation of the instructional sessions.
- Instructional sessions will have an effective role in improvement of subjects' practice regarding developmental care due to increase their level of knowledge.

4.6. Tools of Data Collection:

A pre - post assessment questionnaire was developed by the research investigators after extensive literature review. The data was collected using the following tools:-

I- A structured Questionnaire Sheet (pre/ post format):

The structured questionnaire sheet was developed by the researchers. The questionnaire was concerned with gathering data related to:

- 1) Characteristics of study subjects including age, educational qualifications, years of experience in neonatal intensive care unit, employment status, and if they attended any training courses regarding developmental care. A self-report questionnaire was used.
- 2) The knowledge of study subjects about the developmental care that should be provided for a premature / low birth weight babies (closed- ended questions).

Scoring system:

Knowledge: A correct response was scored 1 and the incorrect zero. For each area of knowledge, the scores of the items was summed- up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a percent score, and means and standard deviations were computed. Knowledge was considered satisfactory if the percent score was 60% or more and unsatisfactory if less than 60%.

II- Observation Sheet:

It was developed by the researchers and used to observe subjects' practice as regards developmental care measures when caring for a premature baby in NICUs and in case of not doing it identify causes from the given list.

Scoring system:

Practice: The items reported to be done correctly were scored "1" and the items not done or incorrectly done were scored "0". For each area, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a percent score, and means and standard deviations were computed. The practice was considered done if the percent score was 60% or more and not done if less than 60%.

4.7. Procedures:

4.7.1 Preparatory Phase:

- A review of the past and current local and international related literature on the various aspects of the problem using, articles, periodicals, magazines and books was done. This review was helping the research investigators to be acquainted with the actual dimension and magnitude of the study and guide also in developing the study tools.
- The content validity of the questionnaire was established by an expert panel of four neonatal doctors and nurses. The instrument was then pre-tested on a small sample of neonatal doctors and nurses (n=5) not included in the study to ensure clarity of instructions and that items were understandable and worded appropriately. A consent form and a cover letter detailing the study were attached to each questionnaire.
- A written permission (informed consent) to conduct this study was obtained from Medical and Nursing directors in both Asser Central Hospital and Abha General Hospital after clear explanation about the aims and expected outcomes of the study.

- The first session, the study was started by interviewing the subjects at the above mentioned settings and giving them a brief idea about the aim of the study, its components and expected outcomes. Also the subjects were interviewed for socio-demographic characteristics and pre test.
- According to the actual assessment for needs of the study subjects, instructional sessions were designed with the following objectives:

a) General objectives of the instructional sessions:

Improve knowledge and enhancing practice of nurses and doctors regarding developmental care in NICU.

b) Specific:

To this end, the instructional sessions emphasized the acquisition of knowledge about the following issues:

- Define the concept of prematurity (definition, classification, common problems of prematurity).
- Explain the NICU ecology and its impact on the premature.
- Discuss the impacts of traditional care on premature infants in the NICU.
- List the sources of environmental stimulation (visual, auditory, tactile, and inappropriate positioning) and their impact on premature infants;
- Explain the essential role of the nurse and physician in developmental care.
- Demonstrate the different measures of developmental care.

4.7.2. Implementation phase:

- The program consisted of 6 sessions including theory and practice; each session was about one hour and using different teaching strategies as (lecture, group discussion, demonstration and real objects).
- The sessions consisted of formal presentations on the above topics. Other elements of the sessions included informational materials, videos, photograph, quizzes and practice periods supervised by the research investigators.
- The researchers were available two days/ week from 9 am to 2 pm. at the above mentioned settings to supervise the practice of study subjects.
- The consultant of neonatology was available one day / week to give the formal presentation on the above topics.
- The program was implemented according to study subjects' physical, mental readiness and their work load.
- The subjects were motivated and rewarded for their active participation in the sessions throughout study period by promised to give them a certificate for their attendance.

4.7.3. Evaluation phase

The instructional sessions were evaluated after the implementation phase (at the end of six session) using the same pre- format questionnaire.

5. Statistical analysis

The data was revised, coded, tabulated, and presented using descriptive statistics in the form of frequencies and percentage for qualitative variables, and means and standard deviations for quantitative variables. Qualitative variables for nurses were compared using 2-tailed test. In addition, after collecting data from 15 doctors, we examined our data using nonparametric statistics (Wilcoxon Signed-Rank Test) to compare doctors' knowledge and practice related to developmental care Pre/ Post Instructional Sessions Implementation. Correlation is significant at the 0.05 and 0.01 level. Statistical analyses were performed using the SPSS (Version 17.0) software.

6. Results

Frequencies and percentages of the demographic variables will be presented. Percentage distribution of doctors and nurses' knowledge and practice related to developmental care pre/ post instructional sessions implementation. In addition, this section will also discuss any significance found between nurses' knowledge and practice score as regard to their characteristics.

Table (1): Percentage Distribution of Nurses according to their Characteristics.

No. = 54 (100.0%)		
Items	Frequency	%
Age		
From 20 years to less than 25 years	13	24.1
From 25 years to less 30 years	21	38.9
From 30 years and more	20	37.0
X ± SD	3.04 ± .791	
Education		
Bachelor of nursing	33	61.1
Nursing Diploma	21	38.9
Years of experience		
Less than one year	5	9.3
From one year to less than 5 years	27	50.0
From 5 years to less than 10 years	19	35.2
From 10 years and more	3	5.5
X ± SD	2.33 ± .734	
Have you received previous training courses about developmental care?		
yes		
	15	27.8
No	39	72.2

The age of (38.9%) of nurses was ranged from 25 years to less than 30 years, two third of them (61.1%) had bachelor degree of nursing. Half of the studied nurses (50.0%) had one to less than five years of experience in the NICU and the majority of them (72.2%) had not received previous training courses about developmental care for preterm infants in NICU.

Table (2): Percentage Distribution of Nurses' Knowledge and Practice related to Developmental Care Pre/ Post Instructional Sessions Implementation.

No. = 54 (100.0%)				
Items	pre %	post %	X ² test	P- value
Knowledge of nurses regarding developmental care				
Satisfactory	21.0	39.0	12.15	0.000
Unsatisfactory	33.0	15.0		
Nurses' practice of developmental care				
Done	14.0	40.0	4.856	0.03
Not done	25.0	29.0		

Statistically significant at p<0.05

Analysis of data showed a highly statistical significant difference between nurses' knowledge related to developmental care pre and post instructional sessions implementation as revealed by P.<0.000. Also, this table indicates that there was a statistical significant difference between nurses' practice regarding developmental care pre and post instructional sessions implementation as revealed by P.<0.03.

Table (3): Relationship between Nurses' Knowledge and Practice score as regard to their characteristics.

Items	Age	Education	Years of experience	Nurses' practice of developmental care (Practice Score)
Nurse' knowledge regarding developmental care	-.195- * .043	.183 .057	-.185- .055	-.284- ** .003
Nurses' practice of developmental care (Practice Score)	.033 .732	-.151- .118	.204* .034	1 -----

* Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

It is observed from this table that, there was significant difference in the relationship between nurse' knowledge regarding developmental care and both their age and nurses' practice of developmental care. Moreover, there was

significant difference in the relationship between nurse' years of experience and their practice of developmental care.

Table (4): Percentage Distribution of Doctors according to their Characteristics.

No. = 12 (100.0%)		
Items	Frequency	%
Age		
Less than 30 years	1	8.3
From 30 years to less than 35 years	4	33.3
From 35 years to less than 40 years	5	41.7
From 40 years and more	2	16.7
X ± SD	2.67 ±.887	
Education		
Bachelor of medicine	3	25.0
Master	4	33.3
PhD	5	41.7
Position		
Resident	4	33.3
Specialist	6	50.0
Consultant	2	16.7
Years of experience		
Less than one year	1	8.3
From year to less than 5 years	6	50.0
From 5 years to less than 10 years	5	41.7
X ± SD	2.33 ±.651	
Have you received previous training courses about developmental care?		
yes		
	4	33.3
No	8	66.7

The age of (41.7%) of doctors was ranged from 35 years to less than 35 years and they had PhD. The half of the sample was specialist and their years of experience ranged from one year to less than 5 years. In addition, the majority (66.7%) of the studied sample had not received previous training courses about developmental care for preterm infants in NICU.

Table (5): Percentage Distribution of Doctors' Knowledge and Practice related to Developmental Care Pre/ Post Instructional Sessions Implementation.

No. = 54 (100.0%)				
Items	pre %	post %	Z-Test	P- value
Knowledge of doctors regarding developmental care				
Satisfactory	5.0	10.0	-1.897	0.05
Unsatisfactory	7.0	2.0		
Doctors' practice of developmental care				
Done	2.0	4.0	-0.728	0.47
Not done	10.0	8.0		

Wilcoxon Signed Rank -Test (Z-Test)
significant at p<0.05

Statistically

Analysis of data showed a statistical significant difference between doctors' knowledge related to developmental care pre and post instructional sessions implementation as revealed by P. <0.05. Meanwhile there was no statistical significant difference between doctors' practice regarding developmental care pre and post instructional sessions implementation as revealed by P. <0.47.

7. Discussion

Preterm / low birth weight (LBW) infant is a live born infant delivered before 37 weeks from the first day of last menstrual period (LMP).The preterm infant in the neonatal intensive care unit (NICU) is cared for with highly advanced medical technology which resulted in increased survival rates for preterm infants but not in major improvements in morbidity rates or decreased risks of developmental delays, physical disabilities, and behavioral

disorders. Preterm infants can experience a range of problems related to immaturity and to the unfavorable setting of the neonatal intensive care unit (NICU). The infant's sensory experience in the NICU environment, with its exposure to bright lights and high sound levels, and frequent stressful interventions exert harmful effects on the immature brain that alters its subsequent development (Lissauer et al., 2006). In an attempt to address this, developmental care is a safe practice model and it advocates a broad range of interventions designed to minimize the negative impact of such an environment, thereby improving neurodevelopmental outcomes. This includes controlling external stimuli such as sound, light, and activity; encouraging family involvement; and considering appropriate comforting measures. It also advocates an individual approach to care that is dictated by cues from the infant (Altimier, 2011).

Robert & White, (2007) stated that, though the neonatal intensive care unit (NICU) provides the highly specialized care capable of increasing the chances of survival, it does not necessarily offer the ideal environment for the development of the infant. Much has been said about the potentially harmful effects of the NICU environment on the neurodevelopment of the premature. The aim of neonatal intensive care is essentially to preserve life by extending the appropriate medical care in an environment that mimics the womb, providing as much as possible an experience that has been prematurely interrupted. More recent care procedures seek to reduce the discrepancy between womb and NICU environment. Reducing noise and light exposure, restraining unnecessary handling and adopting more restful positioning constitute a series of initiatives aimed at reducing stress for the neonate and improving neurodevelopmental outcome.

Developmental care has garnered much interest among clinicians and researchers in recent years. A review of the literature shows that most research efforts have been concerned with the impact of such care on the health and development of premature infants. Byers & et al,(2006) who studied a convenience sample of 114 premature infants and their parents to evaluate the impact of individualized, developmentally supportive family-centered care on infant physiological variables, growth, behavioral stress cues, return to sleep state, medical and developmental progress, complications, resource utilization, parental perception of the neonatal intensive-care unit experience, and overall parental satisfaction, found that Preterm infants who received developmentally supportive family-centered care demonstrated fewer behavioral stress cues and comparable short-term outcomes and resource utilization than infants who received routine care. Another clinical trial study is (before-after intervention) on a single group, 31 hospitalized premature newborns in NICU of Al-Zahra Hospital in Isfahan, Iran. The researchers found that applying daily silence periods can greatly help to increase oxygen saturation and can improve the growth of premature infants. Therefore, by providing more facilities in clinical environments of NICU, conducting programs to reduce light and noise in these wards would be possible (Taheri & et al, 2010).

To our knowledge, the issue of professional development and training in developmental care has been studied very little. Because professional practices are such a key component of developmental care, it is crucial to design and offer attractive and effective training programmes. The present study is important in how it may help to fill this gap in knowledge and demonstrate the potential benefits of instructional sessions on nurses' and doctors' knowledge and practice regarding developmental care in NICU.

This study aimed at evaluates the impact of instructional sessions on nurses' and doctors' knowledge and practice regarding developmental care in NICU in Abha city. This part discusses the results of the current study comparing with recent literature and other related studies. It also explained to what extent the results of the current study supported or rejected the research hypotheses.

As regard nurses' characteristics, the present study revealed that the age of (38.9%) of nurses was ranged from 25 years to less than 30 years and half of the studied nurses (50.0%) had one to less than five years of experience in the NICU. This result is agree with Tanir, Akhan& Ergöl (2011) who conducted a study on100 nurses working in neonatal intensive care units of four hospitals in Istanbul, Turkey, to define the practices of nurses in an attempt to reduce the stress in neonates caused by environmental factors, found that 50% of the nurses working in NICU are between the ages of 18 and 30, and 51% of the nurses had years of experience in the NICU ranged between 1 to 5 years. This is confirmed by Boxwell, (2000) who mentioned that, nurses working in the NICU should be experienced to be skillful in providing care for those preterm infants.

In relation to the previous training courses about developmental care, more than two third of total sample (nurses and doctors) had not received any training courses about developmental care. This explains why their level of knowledge and practice regarding developmental care was poor before the implementation of the instructional sessions. This supported by Valizadeh & et al., (2013) who conducted a study on 70 nurses working in neonatal intensive care units in Tabriz, Iran to determine the congruence of nurses' activity in four areas of developmental care in order to obtain basic information for authorities to provide a program to achieve related standards in the future, the study revealed that the congruence of nurses' performance with standards of developmental care still requires more efforts. Therefore, it is necessary to train the staff in this regard and prepare them for structural and functional facilities.

The researchers added collaboration and continuing education of the supportive staff in the NICU are vital

in the success of the unit. Infants and their families rely on these professionals for education, help with decision making, and most importantly, quality care. Although there are likely many NICU units with supportive staff that possess these qualities, there is always room for improvement. Staff in the NICU must be observant of any signs that caregivers may demonstrate that indicate they need questions answered or assistance pertaining to their health or the health of their infant. Likewise, it is key that staff members not only support another's decisions, but work together cooperatively to create a first class environment for all who are a part of the NICU. A neonatal intensive care nurse also must keep records of observations and practices in order to provide medical doctors with information to help them decide on clinic decisions about baby's care. They must defend babies' rights and coordinate their practices. They must be able to take decisions about independent nursery and put their decisions into practices and also they must participate in skill improvement practices.

The results indicated that there was a highly statistical significant difference between nurses' knowledge related to developmental care pre and post instructional sessions implementation. This could be attributed to feeling of interest from nurses toward developmental care and favorable attention that nurses gave to the instructional sessions. All nurses volunteered to participate and expressed their satisfaction with the activities. Nurses' acceptance to the sessions about the developmental care as an important nursing care may be the key factor to improve their knowledge. In support to current findings, Aita & Sinder, (2003) who studied the art of developmental care in NICU and Robinson, (2003) who studied the cycled light and growth in NICU, both researchers found that developmental care elicits a high level of interest among health care professionals in the NICU. In addition this finding is concurrent with the results of Milette & et al, (2005) who conducted a quasi-experimental one group pre-test/post-test design. Participants were nurses working in a neonatal intensive care unit and the aim of the was to evaluate the impact of a developmental care training programme on nurses' behaviors and cognitive attributes with regard to the prevention of overstimulation of premature infants and the results of this study showed the potential of such training programmes to help nurses implement developmental care. Moreover, the results of the present study go with the results obtained by EL-Sayed, (2009) who conducted a study to assess the effect of training program for nurses working in the Neonatal Intensive Care Unit about Developmental Supportive Care of Preterm Infants, found that, the majority of nurses had increased their knowledge about developmental care significantly post-program.

Of the current study, there was statistical significant difference in the relationship between nurses' years of experience and practice score, whereas years of experience increased their practice score increased. In addition, there was a statistical significant difference in the relationship between nurses' knowledge and their age; this means that, by increasing the nurses' age, they had satisfactory level of knowledge. In their literature review, Breeding & Turner, (2004) mentioned that with increasing years of experience by working in critical units, the nurse became more skillful based on the knowledge development throughout her work.

Findings of the current study highlighted a statistical significant difference in the relationship between nurses' practice and their level of knowledge pre and post instructional sessions implementation. This means that increase level of nurses' knowledge about developmental care is associated with improvement in their practice. This finding is in contrast with the view of Jones and Sherida, (1999) who mentioned that increases knowledge level does not mean usually increase in performance level. Meanwhile, Robeldo, Wilson and Gray, (1999) stated that bad practice and negative behavior usually more common among those who had poor knowledge. But the researchers suggested that practice is thought to be heavily influenced by the knowledge and attitudes of the studied sample. Meanwhile, increasing concordance by correcting misconceptions about developmental care might increase motivation to practice it and improve skills.

The result of the present study shown that, there was a statistical significant difference between doctors' knowledge related to developmental care pre and post instructional sessions implementation. This means that there is improvement in doctors' knowledge post instructional sessions implementation compared with pre instructional sessions. In addition, there was no statistical significant difference between doctors' practice regarding developmental care pre and post instructional sessions implementation. This finding can be interpreted by the doctors spend little time with the preterm infants and the main responsibilities of them just fall or end when they examine the preterm and describe the medications and give the instructions which the nurses perform it.

8. Conclusion

There was change in nurses and doctors' knowledge about developmental care post instructional session's implementation. Furthermore, nurses' practice regarding developmental care was improved post instructional session's implementation which means that the instructional sessions had an effective role in enhancing both their knowledge and their practice.

9. Recommendations

In the light of findings of the current study, the following recommendations are suggested:

- When designing a new neonatal intensive care unit or refitting an older one with more modern equipment, the infrastructure and design of it must be suitable to facilitate the application of developmental care.
- Neonatal intensive-care unit providers should educate staff and parents about the potential benefits of developmental care measures and consider developing policies and procedures for these measures.
- Most of the research has focused on developmental care as a whole, so future research should focus on the strong scientific evidence for specific components of developmental care.
- All other hospital workers (Ward Clerk, Engineers) or visitors (family visitors or professional) in the nurseries should assist in the provision and maintenance of a developmentally supportive environment.
- The economic impact of the implementation and maintenance of developmental care practices should be considered by individual institutions.

10. Ethical considerations

The research protocol was approved by research ethics committee of King Khalid University by the date (REC # 2013-02-16).

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