Stress and discomfort in the care of preterm infants: A study of the Comfort Scale and the Newborn Individualized Developmental Care and Assessment Program (NIDCAP®) in a Dutch level III NICU

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Developmental care in neonatal intensive care units in the Netherlands and Flanders

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ABSTRACT

Aim To gain insight into the current practice concerning developmental care in Dutch-speaking Neonatal Intensive Care Units (NICU).

Method In 2005 a survey was performed among 19 NICU’s in the Netherlands and Flanders (Belgium). For this survey a questionnaire was designed and used. The questionnaire consisted of five domains: Principles of Care, Concept Clarification, Facilities and Resources, Professionals and Expertise, Research and Future.

Findings The response was 100%. Eighteen out of 19 NICU’s reported the use of developmental care principles. There was an overall consensus on the definition of developmental care. The outline of the concept as well as the availability of facilities and materials showed great diversity. Four NICU’s had caretakers with a high degree of expertise and special training (NIDCAP certified). In 18 out of 19 NICU’s general developmental care education was provided. In five NICU’s developmental care or aspects of developmental care were object of a scientific evaluation.

Conclusion In Dutch speaking NICU’s there is a continuum of developmental care. Developmental care is applied in 3 different ways: 1. individual developmental care initiatives from caretakers; 2. developmental care with the availability of materials, facilities, management support and unit policy for developmental care; 3. developmental care according to NIDCAP principles which is characterized by care that is individualized based on behavioural observation and available know-how.
INTRODUCTION

Developmental care (DC) received a lot of attention being the model of care in Neonatal Intensive Care Units (NICU’s) in a substantial number of countries around the world the last five years. These changes within the nursing profession are due to the changes within, the medical, technological, pharmacological developments and insights within neonatology. These developments have contributed to the decrease in mortality among newborn infants in the NICU (from 30% in the late eighties to 11% in the late nineties). However morbidity rates (40%) did not decrease as a result of these developments.1,2

DC was first introduced halfway through the eighties.3 DC is the umbrella term for the type of care taking in account the environmental aspects of the NICU and the activities of caretakers to reduce the experienced stress by premature or sick newborn infants as much as possible. In contrast to environmental intrauterine circumstances the NICU stay is characterized by a large amount of (potential) adverse circumstances like excessive light and sound and uncomfortable activities with a lot of pain and stress and few moments of rest. These circumstances and routine nursing care causes the newborn infant to spend unnecessary energy and may influence growth and development in a negative way.4-9 Moreover, the brain of the newborn infant which is in a critical phase of development is extremely vulnerable to stress.10,11 Stress, pain and discomfort are known factors influencing medical and developmental outcome of newborn infants.2,14 Therefore it is advisable to prevent or minimize these factors.

Developmental care strategies consist of one or more of the following aspects: decreasing external stimuli (vestibular, auditive, visual, tactile), clustering nursing care activities, positioning (body posture), providing boundaries and limiting environmental space in an attempt to imitate the intrauterine experience, and support the relationship between the newborn infant and his parents.15-19 Next to these general strategies, programs exist for a more individualized approach and care of newborn infants. The Newborn Individualized Developmental Care and Assessment Program (NIDCAP®) of Als3,20 is the most well known. This program uses structured, formalized observations (Naturalistic Observation of Newborn Behavior, NONB3,20) of the newborn infant’s behavior, before, during and after caretaking activities. The infants’ behaviour, described as approach towards or avoidance of stimuli, enables the observer the possibility to assess how the infant strives to cope with the caregiving and the environment and continue his development. These observations provide information concerning the infants’ strengths and weaknesses. Subsequently, based on the observation, recommendations are formulated and given with respect to caregiving and environment to support the individual infants’ development. These recommendations are used by the professional caretakers as well as the parent(s) or other caretakers. The parents have their own, fully integrated, place in the caretaking team and process.
Up to now studies concerning developmental care strategies are not showing consistent results. A recent meta-analysis concluded possible advantages for the preterm infant regarding decrease of chronic lung disease, decrease in incidence of necrotizing enterocolitis and improving outcome on parental stress and perception. Studies showed limited evidence for improvement of behavior and movement up to 5 years of age as well. More research of developmental care strategies remains necessary.

Besides English speaking countries (United States of America, Canada, Great Britain and Australia), France and Sweden both have a long history concerning DC. At the end of the nineties DC became a topic in Dutch speaking NICU’s as well.

After a slow start, gradually DC is far more reaching. Not only are NICU’s interested in DC but also the neonatal units in non teaching and referral hospitals.

As mentioned before DC is an umbrella term for models of care, programs and strategies which have manifested in several ways.

In 2005 the national consultative body of NICU nurse managers (Landelijk Hoofdenoverleg Intensive Care Neonatologie, LHICN), which consists of nurse managers of all, ten Dutch NICU’s, did not have a clear overview of the development of DC. It was decided to perform a nation wide survey, to conclude if new (nation wide) policy concerning organizational changes was necessary.

It appeared that the same need applied to the colleague nurse managers of the Flemish neonatology taskforce in Belgium. It was therefore chosen to perform a uniform survey in the Netherlands as well as Flanders to gain insight into the current state of Developmental Care.

METHODS

In the beginning of 2005 a survey was performed. All NICU’s in the Netherlands and Flanders with Dutch as the official language (N=19) were included. In the Netherlands there are ten NICU’s, one in each of the eight academic centers (Amsterdam [2], Groningen, Leiden, Maastricht, Nijmegen, Rotterdam and Utrecht) and two in regional centers (Veldhoven and Zwolle). Belgium has nine Dutch speaking NICU’s, four in an academic center (Antwerpen, Brussel, Gent and Leuven) and five in regional centers (Antwerpen, Brugge, Genk, Rocourt and Wilrijk).

A specially designed questionnaire was used. The questionnaire existed of 16 questions, mainly dichotomy questions (yes/no) with space for further explanation (13) and some open questions (3). The questionnaire covered the following domains; Principles of Care (4), Concept Clarification (3), Facilities and Resources (3), Professionals and Expertise (4), Research and Future (2).

Content, wording (accuracy and legibility) and format were screened by a developmental care expert (NIDCAP certified) and a scientific researcher.
The questionnaire with an accompanying letter was sent by email to the nurse managers of the NICU’s, requesting them to complete and return the questionnaire within three weeks.

All statistical analysis were performed employing SPSS 11.5.1 software (SPSS, Chicago, IL, USA).

RESULTS

All 19 NICU’s (100%) have completed and returned the questionnaires within the appointed time schedule. The questionnaire was completed by different professionals; nurse manager (7), specialized nurse (5), nurse educators (3), nurse specialist (1), managing nurse (1), quality care nurse (1) and nurse researcher (1). The results present a summary of what respondents stated or reported.

Results questionnaire per domain

Principles of Care

In 1996 DC was first seen in one of the Flemish NICU’s. In 1998 and 1999 two other NICU’s followed. Most of the NICU’s in Flanders (5) reported the gradually introduction of DC and were not able to indicate the exactly moment of time. In 1999 DC was introduced in the Netherlands in two NICU’s. Other NICU’s followed in 2002 (2), 2003 (1) and 2004 (4).

In 2005, 18 out of the 19 NICU’s stated to perform care based on DC. Nine of these NICU’s said to only perform DC partially. In the one NICU that did not use DC principles this was not based on principal choices. Four NICU’s performing DC, had chosen to implement NIDCAP as the model of DC. Five NICU’s made use of parts belonging to NIDCAP. The other nine had given their own interpretation to DC.

Concept Clarification

The NICU’s had different thoughts about DC. All NICU’s said they see the newborn as an unique being indissoluble bounded with his family. The proposed DC definition of Wielenga was fully acknowledged by 18 of the 19 NICU’s, “The individual care, focused on the development of the infant is a way of caretaking directed on comfort, stability, decreasing stress for the newborn and supporting and stimulating the relation of the newborn infant and his parents” (internal publication, 2004). One NICU said that stimulating the relation between parent and infant belongs to another area (Video Interaction Support) and not to DC. In 13 out of 19 NICU’s DC was used in a general way. Six NICU’s made use of behavioural observations to be able to fine-tune DC to the needs of the individual infant. The most frequently behavioural observation was the
Facilities and Resources

The way in which NICU’s outlined DC in their unit and the consisting components were diverse. The NICU’s pointed out that adaptations of the physical environment as well as new unit policies had taken place. In three NICU’s furniture and equipment were adjusted to be able to guarantee DC. Six NICU’s had developed policies regarding DC. Seven NICU’s had extended the possibilities and facilities for parents. Four NICU’s reported hardly anything had been adapted neither regarding the environment nor in unit policy. These units said they would take DC into consideration for future reconstruction plans.

Two of the NICU’s had small individual rooms instead of the traditional large units. All NICU’s had taken a series of actions to abandon unwanted stimuli, coming from light, sound or activities. Mentioned were reducing light by adapting the lightning (14), by using (bed) curtains or incubator covers (19) and/or investing in awareness concerning light, sometimes accompanied with measurements of light (6). As sound reducing actions were mentioned; decreasing sound levels of monitor alarms (12), no longer playing music in the NICU’s (7) and creating awareness through the measurement of sound (6). One of the NICU’s said they prevented unwanted stimuli by the use of background music. Daily visits of doctors had been transferred to a location outside the unit in two NICU’s. One of the NICU’s prevented unpleasant stimuli resulting from activity by using fixed rounds for caretaking, checking vital signs and for sleeping activity. Mostly using the ability of the infant as a starting point for care resulted in the letting go of fixed caretaking schedules and performing routine activities were mentioned in the other 18 NICU’s. Minimize negative stimuli resulting from medical or nursing care activities through containment of the infant by a second caretaker was always the case in two NICU’s. In 16 NICU’s one tried to contain the infant during stressful and painful situations but not during uncomfortable situations. A remark was added; containment only took place when time and space was available. NICU’s indicated containment depended highly on the individual nurse in charge of the infant. One NICU said they never ever contain the infant but they do assist with medical interventions. For containment a second nurse (18) was used, or a trained “container” with a nursing background (1), one of the parents (4) a medical, pedagogical- or civil assistant (3).

NICU’s used special DC materials. In 17 NICU’s materials were used for the support of the body posture such as, rolls (commercial or self made), a beanbag and (gel) cushions. Nests for the preterm infants to limit the environmental space and to support the body posture were used in 16 NICU’s. In 11 NICU’s soft stuffed animals, dolls and cloths were used to shield off the infant or to offer him something to hold on to. All NICU’s used special dummies for preterm infants. Special, smaller good fitting diapers for preterm infants were used in three NICU’s. Three NICU’s indicated to have hardly any DC material available.
Professionals and Expertise

Four out of 19 NICU's had the availability of professionals specially trained in DC. In all cases this was the NIDCAP training. Not only nurses were trained but also physical therapists, psychologists and medical doctors. Eight of the other NICU’s had organized a study day or specific education on DC from a NIDCAP point of view. Professionals used different sources to become informed on DC; clinical lessons (12), information provided by a study group on the unit (13), attending seminars (4), visiting other units (6), gathering articles (6), bedside teaching (4), through the training in neonatal nursing (3) and reflection sessions (1). One NICU said: DC was just a matter of using your common sense and education or training was not performed nor needed. Two NICU’s did not answer the questions on training and information.

Research and Future

Five NICU’s were performing a scientific evaluation of the DC concept or parts of the DC concept. The evaluations took place by nurses often in collaboration with medical doctors, psychologists and physical therapists. These five (Dutch) NICU’s were performing the following studies; two NIDCAP implementation studies, one NIDCAP effect study, one study on a separate component of DC, the so called effect of “hands-on”, and making DC procedures evidence-based.

Two NICU’s preferred to wait for study results of previously mentioned studies before expanding DC activities. Continuation and expansion of implementation was the future plan of 10 NICU’s. Of those 10, five NICU’s would send professionals to special education and training facilities. Also mentioned as plans for the future were adaptation of policies and writing concrete plans for the future (8), starting standardized and individualized observations of behavior (3), architectonic adaptations (4) and establishing (inter)national collaboration (1).

CONCLUSION AND DISCUSSION

This study shows that DC is on the move in Dutch speaking NICU’s. There seems to be a consensus about the definition of the concept of DC as described by Wielenga (internal publication, 2004). The DC concept is broadly accepted; the stage of development and the way it is carried out (general form of DC or the individual geared DC form) are very diverse. It is desirable to use the consensus on the DC definition as the starting point in the process of gearing the DC view and content within the different NICU’s.

At this moment there are a lot of differences in NICU’s working with DC. In the process of implementation roughly three types of DC are distinguishable within a continuum. Two turning points are responsible for this triad (Figure I). At the beginning of this continuum are the NICU’s positioned using some of the principles of DC based on initiatives of
individual professionals. These NICU’s don’t have a policy formulated. In a second group, the first turning point, are the NICU’s where the concept of DC is broadly accepted. DC exists of a set of resources and is part of the unit policy, meaning availability of facilities and support of the organization. The third group of NICU’s, second turning point, have committed themselves to DC according to NIDCAP trying to establish individualization of care based on behavioral observations. This group has a high level of expertise present. Some of the NICU’s pointed out to belong to one of the groups but based on their answers it became obvious that they belonged to another group within the continuum. Some NICU’s talk about working with NIDCAP (9), but only four of them actually use the behavioral observation which is an essential part of NIDCAP and legitimizes the use of the term NIDCAP. What one does or says is not always congruent with reality. It is not clear if this is caused by the way the concept is handled, as a result of confusion concerning the clarification of concept, or just by the wish of a unit to perform NIDCAP while the unit is not yet ready for NIDCAP. The different outlines of the DC concept result in confusion and make it hard for NICU’s to be able to reflect their findings to each other. Mutual comparisons are not possible in this way.

DC in whatever way does not only have consequences for the view and policy on care but also on the care process and the professionals, their expertise and the collaboration with other disciplines and parents. The nursing role changes, the nurses add another dimension to their expertise. DC also leads to changes in the way that NICU’s are traditionally designed and organized. The end point on the DC continuum desired can be decided by each NICU individually.

LIMITATIONS
The disadvantages of questionnaires as used in this study may possibly have lead to sociably desirable answers. A personal interview and visit enables one to verify answers and to be able to ask for more explanation. Commonly, questionnaires are rather superficial and there is always the risk of an incorrect interpretation of the questions. Questionnaires do have some advantages compared to personal interviews, low costs and prevention of interviewers’ bias.

Due to the fact that all Dutch speaking NICU’s were participating in this survey, it was not possible to test the questionnaire and detect shortcomings of the questionnaire before the study. The possibility that respondents of this survey gave a more positive view of the reality of DC activities in their NICU’s can not be excluded.

RECOMMENDATIONS
The first recommendation for the future is to organize a consensus meeting with all Dutch speaking NICU’s to prevent confusion resulting from differences in the outline of the DC concept. It is important for the terminology to be used universal, relating to the outline of the DC concept as well as the description of types of DC and the place within the continuum. It would be of interest to perform this survey again after such a
consensus meeting. It is recommended to include the results of the scientific studies on implementation and effect performed at this moment, as well.

The second recommendation concerns the use of the available expertise and knowledge of NICU’s who are already on the right side of the continuum (Figure 1) by NICU’s still more on the left side of the continuum. A model of site visits could be a way to give recommendations regarding DC policies, practical outline and necessary expertise to develop DC into a higher level, all based on the ambition of the NICU’s being visited.

A third recommendation concerns the localization of DC in Dutch speaking NICU’s compared to developments in foreign speaking NICU’s. Comparison of the current practice in the Netherlands and Flanders with the practice of DC in other countries could make the international position of Dutch speaking NICU’s visible.

The NICU’s participated in this study are all speaking the Dutch language, but it appears these NICU’s do not speak the same language talking about Developmental Care.

**Figure 1** Continuum of Developmental Care

<table>
<thead>
<tr>
<th>Type 1</th>
<th>Type 2</th>
<th>Type 3</th>
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<tbody>
<tr>
<td>Developmental Care based on initiatives of individual professionals</td>
<td>Developmental Care with a package of resources, availability of support and facilities and a unit policy</td>
<td>Developmental Care according to the NIDCAP model: Individualization of care based on behavioural observations and the availability of expertise</td>
</tr>
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NICU in the Netherlands

NICU in Belgium
REFERENCES


