Identification of Barriers and Facilitators for Education of Nurses in Care of Sick and At-Risk Newborn Babies in India

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EXECUTIVE SUMMARY

Background:

The newborn period is an especially vulnerable period in one's life in terms of increased mortality and potential for other long-term consequences. Infant survival has been identified as one of the millennium development goals, and despite some improvements (IMR 47, NMR 33, Early NMR 25 /1000 LB SRS 2010) the MDG 4 goal of a reduction IMR 27 per 1000 will not be achieved in India, based on current projections.

Nursing care has been correlated with a significant improvement in newborn care in developed counties. Specifically, skilled nursing care has been associated with improved mortality and morbidity in sick and at-risk newborns.

To this end, funds were successfully obtained from an Indo-Shastri Institute Grant and partnered support from the World Health Organization (WHO) SEARO Collaborating Centre, New Delhi. These funds provided the opportunity for an interprofessional team of nurse and physician clinical investigators from Canada and India to conduct focus group interviews among nurses and other healthcare providers with diverse educational background, providing care to newborns with varied levels of acuity across several geographical areas in India (see Appendix A for Details of Team Composition).

Purpose:

The aim of this project was to gain information to guide and optimize the education and clinical practice of nurses and teams caring for sick or at-risk newborns in India.

Design:

A qualitative descriptive study, using a focus group discussion (FGD) design.

Sample and Methods:

Nurses and newborn care providers from 3 geographical areas were asked to take part in the study. This created a representative group of care providers that crossed community, Level 1, 2 and 3 neonatal care areas of the participating hospitals or Health Centers. Sites were invited to take part by the investigating team (non-random sample) based on past affiliations and prior expressed interest to participate. Participants were informed of the study and made aware that their involvement was voluntary. Nurses and physicians were eligible if they had provided care for sick or at-risk newborns for a minimum of 1 year, spoke Hindi or English, volunteered to participate without specific remuneration and provided informed consent.

Each focus group lasted approximately 2 hours and generally included five to six nurses and one to two physicians providing newborn care. While at least two nurses, one being local, and one physician lead the FGD (see Appendix B for Interview Guide).

Analysis:

Descriptive statistics were used to summarize participants' demographics. English study materials were translated using forward and backward techniques to Hindi and used interchangeably with English as needed based on participant language preference. Focus groups were conducted in both English and Hindi using a bilingual translator. Data from the focus groups were translated into English and transcribed verbatim. Preliminary aggregate findings are reported in this document. More detailed analysis using qualitative methodology was used to generate concepts and themes related to barriers, facilitators, and needs.

Results:

Demographics:

One hundred and one (101) individuals attended one of the twelve focus group discussions (FGD). The majority of participants were female (97/101) and most of the female participants were nurses (82/97). Of the remaining female participants (n=15), 10 were Auxiliary Nurse Midwives (ANM), 3 were physicians and 2 self-identified as "other" (administration or accredited social health activist [ASHA]). Mean age of the participants was 33.6 (22 to 56) years (see Appendix C for List of Participating Sites).

Summary of Focus Groups:

Nurses identified several areas of learning needs including resuscitation, immediate stabilization of sick newborns, ongoing clinical care and correct use and maintenance of equipment. Additionally, the majority of the nurses voiced the need for an evidence-based and consistent orientation to newborn care as this was not a core competency in their general nursing education and also a need for specific unit based orientation. There appeared to be consensus that:

Education should be **uniform, structured, accessible, easy to translate and practical.**

Educational materials and visual aids that augment educational instruction should be *readily available* in the work setting. Education needs to be *competency-based,* include *evaluation* and be *ongoing*. Joint *interprofessional educational opportunities* and efforts to enhance communication and *working together as a team* both formally and informally will enhance learning, team function and needs to be implemented for improved outcomes.

System and administrative factors directly influence learning and practice change.

There is a need to identify persons (preferably nurses) to *coordinate* educational opportunities at *pre-service, in-service and ongoing basis*. *Less movement of nurses* among various clinical settings with an increase in permanent jobs would significantly contribute to *higher skill and competency* of nursing staff and lead to a more *streamlined cost effective management of resources* and *improved outcomes*. Specifically, through

maintenance of qualified staff, a decrease in the quantity of repeated initial orientation would result, creating a local pool for educational offerings and more in-depth skill development. Lastly, incorporating learning opportunities that are *easily accessible and financially feasible* is essential to the successful implementation and practice uptake of educational preparation of nurses (e.g. have opportunities to attend as part of work hours with clinical coverage of patients provided, local opportunities, and financial assistance).

Recommendations:

1. There is a need for identification and evaluation of existing resources.

2. Standardized orientation curriculum for those who care for sick and at-risk newborns with content that is care area specific.

3. Implementation of learner-based continuing educational opportunities.

4. Ongoing competency-based evaluative education programs.

5. Incorporation of mechanisms for sustainability in training programs.

Next Steps:

1. Using expert consensus led by nursing leaders in India with input from medical and international participation:

   All existing newborn care education resources being utilized should be reviewed in a timely manner with respect to:

   a) Current evidence-based quality of material.
   b) Mode of delivery including cost analysis and benefit.
   c) Creation of a standardized orientation package based on nursing competencies required to care for ill and at-risk newborns at each level of care (community, Level 1, 2 and 3).
   d) Priority given to nurses providing care in Level 1-2 neonatal care areas as they were identified as having the least amount of structure with the highest number of caseloads and potential impact.

   Neonatal nursing competencies should be added to the existing healthcare regulations for newborn care as part of hospital accreditation or medical standards.

2. Provision of resuscitation education programs applicable to level of care area to all nurses providing initial care to sick or at-risk newborns needs priority attention. Education programs should include:

   a) Skill acquisition
   b) Consolidation of learning
   c) Practical hands on practice and utilization

Logical choices can be Helping Babies Breathe, a modified or full Neonatal Resuscitation Program (NRP) workshop. Strong consideration should be given to addition of content related to early newborn stabilization, Essentials in Newborn Care, WHO –SEARO standard treatment protocols for sick newborn at small hospitals, modified ACoRN or STABLE programs.

3. Existing online medical training programs may be easily adapted to deliver timely ongoing nursing education. Use of novel e-Health technologies may best meet the high educational demands in the timeliest manner. However, nurses clearly identified that computer and Internet access is a concern. Thus if online education is instituted, provision of internet resources and accessibility would need to accompany the education program. Phone applications may be a feasible alternative.

4. Create opportunity for ongoing and evaluative education as part of work expectations that are easily accessible as part of work environment and in units, preferably locally where possible.

5. Coordinate a regionalized Centre of Excellence approach (train-the trainer) with designated central and local nursing positions responsible for education.

6. Establish strong collaboration among key stakeholders to coordinate efforts.

7. Create an identity for nurses caring for neonates through recognition of experience, expertise and local champions in addition to the development of a certification program. This will not be possible or sustainable without some system related supports.

   a) Creation of Centers of Nursing Excellence with a focus on nursing scholarship, leadership, maternal and newborn care, and education.
   b) Certification or other recognition of experienced neonatal nurses.
   c) Equitable and consistent remuneration for neonatal nurses.
   d) Consolidated efforts to maintain neonatal nurses with less movement throughout hospital.
   e) Coordinated efforts of government, regulatory bodies, institutions and Indian Medical Association to help raise public awareness regarding the importance of the role of nursing to improve neonatal care and patient outcomes. This would be best achieved via media, written information sheets and posters placed in highly visible care areas and community centers.

Stakeholder Meeting:

At the completion of the Focus Group interviews, a stakeholder workshop "For Sharing Training Needs of Neonatal Nursing Professional in India" was organized by the WHO Collaborating Centre for Training and Research for Newborn Care, All Indian Institute for Medical Sciences, New Delhi, in partnership with the Indian Association of Neonatal Nurses and the Indo-Canadian Shastri Institute. The workshop was held on January 29 and 30, 2013. The first day of the workshop provided an opportunity to engage nurse leaders and educators from multiple centers and states throughout India. Focus group interviews and discussion related to improving training for nurses caring for sick and at-risk newborns in India were conducted. The focus of the second day was to provide an opportunity for additional stakeholders to come together to brainstorm possible solutions and recommendations for action (see Appendix D for Detailed Program). Forty-eight participants attended including nursing and medical leaders encompassing various areas of expertise (education, clinical and research), members from nursing regulatory bodies, administrators and representatives from agency members that have demonstrated considerable prior interest in improving newborn outcomes and the promotion of care giver education and skill development (see Appendix E for Participant List).

In summary, information was shared regarding the need to improve education and training for neonatal nurses. Examples of the ongoing regional and local programs were given and preliminary results of the findings of the focus group interviews were presented. Discussion was enhanced using an expert panel format.

Consensus recommendations included:
1. The creation of a uniform structured, standardized competency-based learning orientation tool kit for SCNU level should be developed.
2. Evaluative performance standards are needed and the creation of practical skills labs for teaching NRP, Helping Babies Breath, and care for sick newborn are required.
3. Support for identified nurse leaders to provide education and to oversee sustainable group of skilled trainers is necessary.
4. Use of IT (Telemedicine) as a mode of delivery should be explored for sustainability and quality improvement for knowledge uptake and training needs.
5. Creation of state resource Centres of Excellence (e.g. Tamil Nadu) should be included in each state project implementation plan.
6. The development of a pool of skilled certified neonatal nurses should be investigated.
7. The utilization of Neonatal Nurse Practitioners for manning small hospitals in the country should be evaluated.
8. To enhance nursing training, partnership with IANN, private sector should to be further explored.
9. Creation of Level II Special Care Neonatal Units (SCNU) in Districts as well as Newborn stabilization units at local villages, 24 x 7 Centres, by the Government of India is laudable. However, to ensure optimal newborn outcomes, sufficient numbers of skilled nursing manpower must be available to man these facilities.

Future Collaboration:

This study provides the foundation for a process that will enhance the current professional collaboration among nurses in India and Canada. Firstly, the current focus on education will be enhanced to include program evaluation (research). Secondly, the nucleus of the present collaborators is expected to grow with anticipated success of this project and be expanded to include at least some other personnel who will be brought into the process. The participating experts expressed their commitment to network and collaborate as a consortium on neonatal-perinatal health to catalyze sustainable improvement in newborn health and nursing education in India.

PRINCIPAL REPORT

Purpose:

To gain information to guide and optimize the education and clinical practice of nurses and teams caring for sick or at-risk newborns in India.

In order to ensure the creation of a successful and sustainable program focused attention was given to context, barriers/facilitators, knowledge translation (KT) strategies (e.g. optimal delivery of education), and identification & inclusion of key stakeholders.

Background:

The future of all nations lies in its children and youth. A "good start" in this world is essential for future well-being and anticipated contributions to all societies. The newborn period is an especially vulnerable period in one's life in terms of increased mortality and other consequences, which may have adverse effects for many years. Infant survival has been identified as one of the millennium development goals, which will not be achieved in India, based on current projections.

As part of improved care and outcome for new mothers and their babies, the government of India has implemented the Jananani Suraksha Yojana (JSY) to encourage mothers to deliver in health centres. It is vital that these health centres have appropriately trained personnel who can use their capabilities to benefit both mothers and babies. When birth occurs, it is essential that centres have appropriate personnel who can assist with the care of identified at-risk or sick newborns. This involves nursing as well as medicine.

The long-term goals of this project are to have a positive impact on outcome of term and preterm newborn babies in India and perhaps Canada. The focus will be assessment and care provided by nurses who are "at the bedside" throughout the day for babies requiring specialized care after birth and who contribute significantly to preventative and basic newborn care. This will build on and enhance future educational activities, which have included nurses in other areas of the world. Several of the key contributors indicated above have experience in developing, testing and implementing educational tools/ programs including Helping Babies Breathe, Acute Care of at-Risk Newborns and Practical Procedures in the Newborn Nursery, WHO–SEARO standard treatment protocols for management of sick newborns in small hospitals. In addition, several educational tools for Newborn Care have been developed and disseminated throughout the world using an e-platform. "Born too soon" is an initiative undertaken by multiple international partners (WHO, UNICEF, Gates, USAID, SNL, MCHIP and others) and will require implementation of clinical and effective education programs to decrease neonatal mortality.

Even though educational programs related to nursing care of the newborn are available in India, knowledge and skill translation has not been optimal and thus have not significantly impacted outcomes. The challenge has been due to a paucity of trainers

and health care providers to enable these programs to be accessed and then implemented in a manner which can translate into improved care and outcomes for newborn babies (and families).

Nurses caring for newborn babies in both India and Canada are primarily women, while physicians have a greater mixture of men and women. In both countries, gender may play a role in professional interactions. As care is provided together by physicians and nurses and the outcome dependent on their joint professional actions, the joint nursing-physician nature of this program provided an example of the importance of interprofessional practice. In addition to the actual provision of clinical care, this will extend to education and research with anticipated benefit for future newborn babies and their families.

Objectives:

- Identification of barriers and facilitation techniques for nurses to access information related to early resuscitation, essential newborn care, identification of the sick newborn and on-going professional development to improve care and outcome of sick newborn babies.

- Determination of factors that may contribute to more frequent and effective use of knowledge and skills of nurses caring for newborn babies.

- Identification of administrative issues, which facilitate continuing professional development of nurses.

- Development of recommendations for hospitals and teaching institutions, which will include strategies for translation of these knowledge and skills into improved care and outcome.

- Enhancement of Indo-Canadian collaboration within nursing and among nurses and physicians caring for newborn babies as a prelude to future academic activities.

Team:

The interprofessional team of investigators have previous experience with newborn care, provision of educational support and the majority have worked together previously in some way on prior India-Canadian initiatives aimed at enhancing nurse-physician collaborative teams, and educational opportunities focused on improving outcomes for sick and at-risk newborns nationally and internationally (see Appendix A for Details of Team Composition).

Sample:

The study sample was a convenience sample of primarily nurses and some physicians and administrators from newborn or neonatal care areas of each of the participating hospitals chosen by the investigating team (non-random sample). It was not possible to pre-determine a specific sample size. However, it was essential that the sample be representative of the areas under question. Therefore, the plan was to conduct focus groups with participants from up to six district hospitals and up to nine Level 2 NICUs. District hospitals and the hospitals with Level 2 NICUs would be from Delhi and the surrounding area as determined by the study partners at All India Institute of Medical Sciences (AIIMS) who obtained hospital permission for Focus Group Discussion to occur. Nine to twelve focus groups were planned. Approximately 105 care providers (90 nurses) from 8-10 nurseries were anticipated to participate.

Nurses were eligible if they had worked in the area of newborn care for a minimum of one year and volunteered to participate without specific remuneration (tea and snacks were generally provided). Nurses were excluded if they had not provided patient care to newborns or if there were more volunteers than needed from one hospital (names of participants would be randomly chosen in this case). The participating physicians were generally the local attending physician providing newborn care in that area or designate. The project had ethical review and approval at Dalhousie University and the All India Institute of Medical Sciences.

Methods and Design:

Using a qualitative descriptive design, focus group discussion (FDG) were utilized to generate information regarding educational preparation and potential learning needs as well as the most appropriate ways to deliver effective education opportunities to enable uptake of practice change and implementation.

Questions for the focus group discussions were developed through expert consensus via electronic communication (e-mail and Skype) among the nursing participants indicated in the proposal with the assistance of the physician co-investigators.

Following ethical approval and informed consent, information was obtained through audio taped Focus Group Discussions with nurses, administrators and physicians working in four district hospitals and four hospitals with Level 2 NICU capabilities. Focus groups were conducted within the various health care facilities in a private room arranged by local collaborators.

Participants were provided with standardized information about the conduct of the study and security of responses. Participants were asked to read and review the information requesting them to voluntarily participate in focus group sessions consisting of 6-8 care providers lasting no longer than two hours in duration. Participants were asked to introduce themselves and provide responses to open ended questions. Information sheets and consent forms were provided in both Hindi and English.

Focus Groups were co-facilitated by an Indian and a Canadian nurse who led the discussion and captured the comments in a written format. The primary language used was English; however, translation into Hindi was provided by a co-investigator or designate and was available during all focus groups.

Sessions were audiotaped to ensure the most accurate data collection and to diminish loss of content. Audiotape also provided an opportunity, during later data analysis, for the investigators to clarify potential misinterpretation of the responses, which was not always possible with written notes alone. Additionally, one of the co-investigators was tasked with note taking during the focus group to ensure that an accurate summary of the content could be provided to the participants if clarification was required during the focus group (see Appendix B for Interview Guide).

Results

Participating sites:

Twelve focus group interviews occurred between January 21- January 29, 2013 in 3 areas in India - 4 near Shivpuri (including Chharch and Bhani), 5 in Delhi (Hindu Rao, Lady Hardinge and AIIMS hospitals) and 3 in Chandigarh (including Panchkula, and Government Medical Hospital (see Appendix C for Participating Sites).

Participant demographics:

One hundred and one (101) individuals attended one of the twelve focus group discussions (FGD). The majority of participants were female (97/101) and most of the female participants were nurses (82/97). Of the remaining female participants (n=15), 10 were Auxiliary Nurse Midwives (ANM), 3 were physicians and 2 self-identified as "other" (administration or accredited social health activist [ASHA]).

Most (49/82) of the nurses had completed General Nurse Midwife (GNM) training; 20/82 had completed Bachelor's level (BSN) education and 13/82 nurses had completed Master's (MSN) educational preparation.

Eighty-five of 101 participants (84.2%) identified 'clinical' as their primary area of practice. Only 3.9% (4/101) of the participants indicated their primary area of practice was 'education' and 11 of 101 (10.9%) participants identified 'administration' as their primary area of practice.

One of the participants had been caring for newborns less than one year (which was clarified following completion of the focus group); many participants had 1-5 years experience (n=44/101) or more than ten years experience (n=41/101 in their professional group. Only 6 of 101 (5.9%) participants were relative novices, most participants (59/101) had 1-5 years experience in caring for sick or at-risk newborns, fourteen had 6-10 years experience and approximately 20% of the participants (21/101) had more than 10 years experience, caring for sick or at-risk newborns. Of note, all but one of the ANM/ASHA's had cared for sick or at-risk newborns exclusively since completing their educational preparation. This was not the case for the nurses with BSN or MSN preparation - most of these participants had not exclusively worked with sick or at-risk newborns since completion of their educational preparation.

Over eighty-nine percent of the participants had some experience with Level 2 or 3 facilities. Of the 36 nurses who worked in Level 2 facilities, 30 had completed GNM preparation; five had completed BSN preparation and one had MSN preparation. The nurses who worked in Level 3 centers had a variety of educational preparation -17 of 45 participants had GNM training; 16 of 45 were BSN prepared and 12 of 45 were MSN prepared. The highest levels of educational preparation were found in the Focus Groups that consisted of 'Nursing Leaders'.

The age of the participants ranged from 22 to 56 years of age with an average age of 33.6 years (based on 94 respondents).

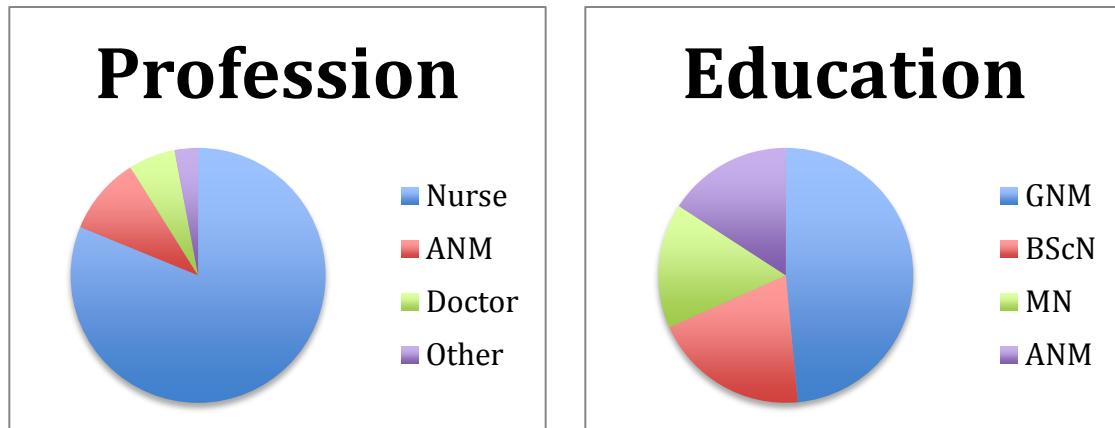**Figure 1 - Demographics by Profession and Education**
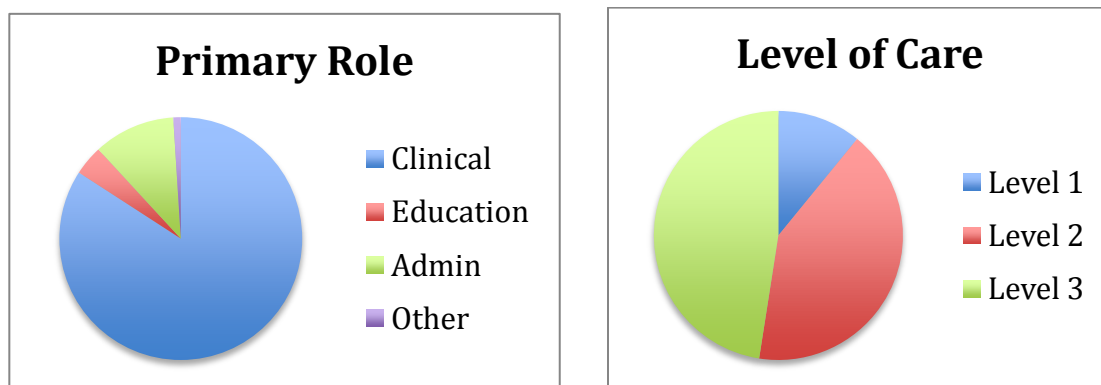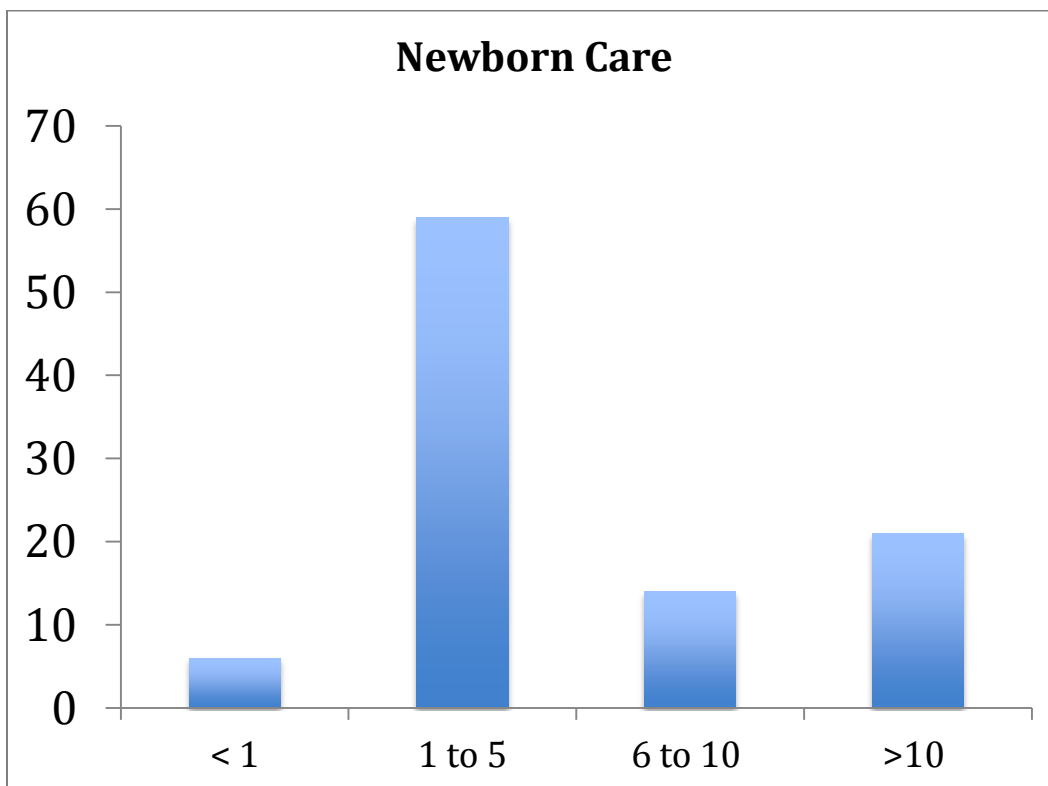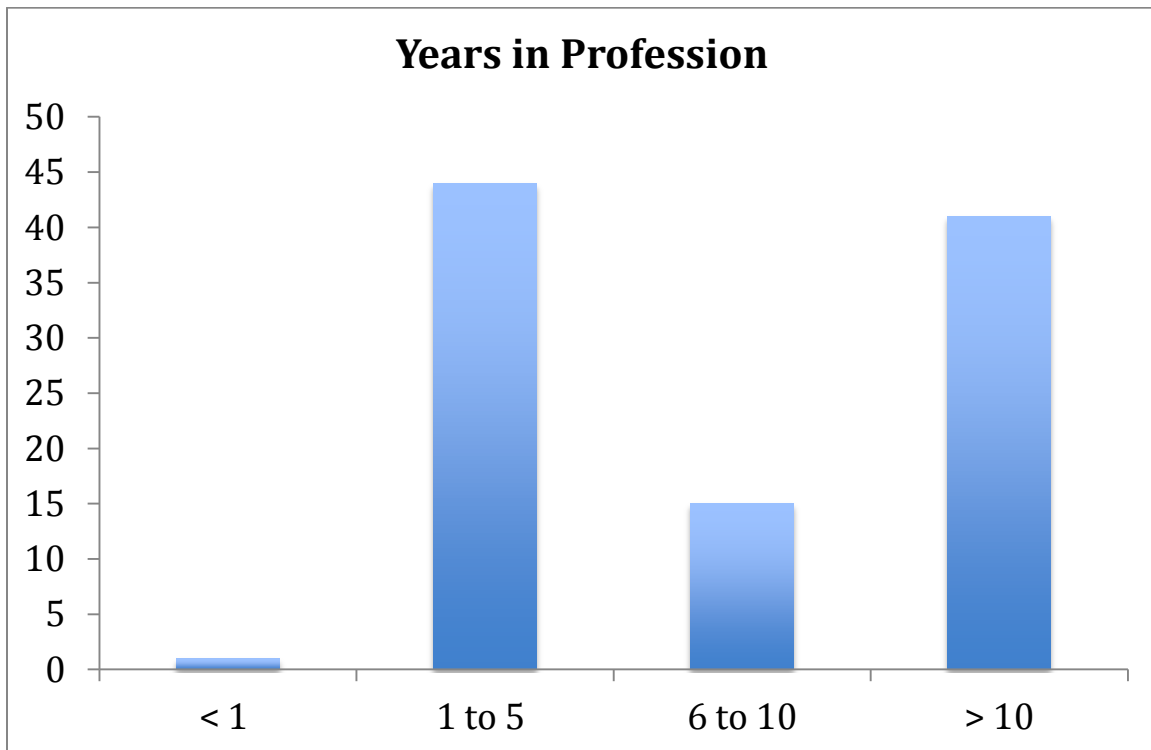

Figure 2 – Primary role and level of care area

Figure 3 - Years of experience

Detailed Focus Group Aggregate Reponses (Categorized by primary level of patient acuity):

1. **PERCEIVED CHALLENGES**

   Level 1:

   Resources:

   - Power primarily solar-driven which is not powerful enough to run in the night – unable to use warmer.
   - Oxygen not always available.
   - Language barrier for ANMs.

   Manpower:

   - Staff shortage – only one nurse on at any time.

   Systems:

   - Transport over long distances without trained personnel to care for babies and mothers.
   - Cultural issues with female infants such as abandonment.

   Level 2:

   Resources:

   - Consistent shortage of medications and equipment.
   - Overcapacity – too many patients, too few beds.
   - Limited internet access or even if present, not consistently available for nurses use.
   - Many with very little to no ongoing training.
   - Limited or no access to 'dummies' for training or maintenance of skills.
   - Limited or no access to the availability of resource books/manuals in unit/hospital.

   Manpower:

   Staffing Patterns:

   - Staffing shortage was a common theme. Busy workloads were cited as an obstacle to ongoing education; no staff to cover those attending in-services, and if internet was available, nurses would be unlikely to have time to use it given heavy workloads.

- Mentorship was also seen as an obstacle – staff felt that there were not enough proficient providers to either perform skills or mentor them to be able to safely perform skills.
- Movement of staff – a nurse may be moved from one area to another, at times with little advanced notice.
- The need to cover more than one geographical area in the hospital at a time meant the nurses had to leave patients with no available health care personnel.

Systems:

Cultural:

- Language barriers with mothers may impede maternal teaching especially around breastfeeding and newborn care.
- Cultural practices hard to change

Educational:

- Structured entry education universally consisted of observer orientation. Most were "buddied" with a senior nurse and asked to observe her care. They felt that with this method of orientation it was difficult to become competent, as they were not allowed to demonstrate the skills in the presence of a skilled user.
- No consistent ongoing structured education was reported. Many nurses felt that this void in educational preparation led to first responders being ill-prepared in skills such as resuscitation, and knowledge such as recognition of a sick newborn which led to a lack of anticipation of risk factors and need for early referral.
- Evidenced- based current information was not readily available in the form of written policies or procedures.
- Sustainability of new knowledge was also seen as problematic given there was a lack of written learning packages to acquire the skill, written protocols to confirm their skills, and follow-up evaluation to determine if a standard of care was maintained.
- Inconsistency of teaching available between units within the same hospital – the NICU nurses were frustrated that the staff on the postnatal ward were not properly trained to care for the normal newborn. Their actions or inactions would sometimes cause a baby to be admitted to NICU (e.g with hypothermia or hypoglycemia).

Level 3:

Resources:

- Limited equipment and overcapacity.

Manpower:

Staffing Patterns:

- As with Level 2 nurses, staffing shortage was a common theme. Busy workloads was cited as an obstacle to ongoing education including no one to cover to be able to attend inservices and if internet was available, nurses would be unlikely to have time to use it given heavy workloads. Unique to Level 3 nursing concerns was the limitation of manpower at times led to lack of adherence to standards of practice (e.g. if 2 nurses were needed for a sterile procedure but no one available to help, the procedure was carried out with one nurse and standard of care may not be maintained).
- Heavy workloads meant no time to devote to learning.
- Mentorship was also seen as an obstacle – staff felt that there were not enough proficient providers to either perform skills or mentor them to be able to safely perform skills.
- Movement of staff – a nurse may be moved from one area to another, at times with no advanced notice. Some Level 3 nurses described themselves as being more generalists than specialists.

Systems:

- Cultural considerations and parental motivation when caring for female infants and during long hospitalization for moms was not available for kangaroo mother care (KMC).
- Maintenance of equipment was a frequently heard theme – technical personal were not readily available to problem solve technical issues so nurses spend a good part of their time troubleshooting equipment issues.
- Nurses felt they are asked to follow orders and were not given the opportunity to understand the reason for or to be able to appreciate the outcome desired.
- Inconsistent follow-up for competencies – new nurses were often shown skills by senior nurse/doctor yet they were unable to be sure that this skill was demonstrated correctly and there is no opportunity for observation by someone with experience for a new nurse to know if she performs a skill correctly.
- Lack of clear job description, therefore uncertain what is their job and when they should delegate to others.
- Lots of traveling for observational 'orientation' sessions – nurses who live close to Delhi travel to Chandigargh for educational opportunities, while nurses from Chandigargh travel to Delhi for similar opportunities.
- Interpersonal skills between nurses and other healthcare providers were seen as an area of concern. In particular, communication between professions was seen as a priority area in need of improvement.

Nurse Leader Group:

- No recognition of neonatal specialty – even highly educated neonatal nurses may not be posted in their area of specialty.
- No Indian specific protocols–foreign books hard to correlate with Indian culture.
- Unfavourable attitude towards protocols- inconsistency of information.
- Lack of role identity.
- Heavy workload - no time committed for education.
- No extra incentives for "hard work" done.
- Lack of supervision of competency-based care.
- Difficult to retain staff.
- Significant variation between facilities.
- Lack of team approach – "ego gap" between physicians and nurses.
- Lack of initial orientation to new area.
- When recruited – not necessarily for a specific area- limited interest in the area based on need of hospital with decisions made by administration.
- No structured orientation – "a lot of guessing" required to determine role.
- Fear of doctors and senior nurses was reported and concern regarding consequences of actions. "Scolding" was a notion mentioned more than once.
- Lack of mentorship – e.g. with new equipment, training is not necessarily given- learning often is through trial and error.
- No accreditation program to ensure universality of nursing knowledge and skills.

2. **LEARNING NEEDS**

Level 1:

Clinical skills and basic newborn management:

- Initial resuscitation and stabilization "Some knowledge of initial resuscitation but don't know what to do if baby doesn't respond"
- Jaundice
- Sepsis/pneumonia
- Anticipating and treating problems (i.e. medications)
- Breastfeeding issues – problem solving and improving BF
- Hypothermia
- Supplemental oxygen indications and use
- What to do with a crying baby
- Insertion of orogastric (OG) tube
- Low birth weight- care before and after discharge
- Care of mother intrapartum and postpartum problem
- ASHA – requires instruction to help ANW
- Prenatal care and postpartum care
- Identify risk factors in baby for early referral

IDENTIFICATION OF BARRIERS AND FACILITATORS FOR EDUCATION OF NURSES IN CARE OF SICK AND AT-RISK NEWBORN BABIES IN INDIA

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Level 2:

- Training for new equipment e.g. CPAP unit company representative trains only those on unit; others have to use new equipment without training and also try to assist others.
- No QI /competency systems in place
- Steps to stabilize newborn beyond initial resuscitation
- Preceptorship needed – staff are required to perform procedures without supervision
- Assistance with changing old habits
- Clinical skills and basic management:
  - Hypothermia
  - Steps to stabilize newborn beyond initial resuscitation
  - Prematurity
  - Feeding (formula and breastfeeding counseling)
  - Understanding KMC and feeding babies – babies become hypothermic and then are unable to feed
  - What to feed baby when failure to thrive

Level 3:

Clinical skills and basic management:

- Developmental care – (understanding of what developmental care means) - told not to touch the babies but then cannot give care
- IV fluid calculations
- Ventilators – setup, maintenance of equipment, caring for the ventilated baby
- Management and care of all equipment
- Management of central lines
- Breastfeeding
- Intubation
- Medication – dose calculation
- Hypothermia
- Total Parenteral Nutrition (TPN)
- Infection control practices
- Seizures
- Necrotizing Entercolitis (NEC)
- Hypoglycemia
- General assessment
- Difficult feeding issues
- Surgical problems
- Knowledge of disease process and management – want to know why the doctor orders certain treatments rather than just receive the order
- Care of the VLBW infant

- Bag and mask resuscitation
- Assisting with procedures
- Some feel they don't know what they need to know
- Medical procedures –nurses are often the ones mentoring the new residents in procedures that they themselves have never done e.g. intubation, central line placement

Nurse Leader Group:

- Assessment and handling of babies
- Prioritizing needs – Immediate action
- Competency-based skills – breastfeeding, neurodevelopmental care, infection control, hygienic practices,
- Linking with mother – counseling, discharge planning
- Hypothermia
- Surgical post-op
- Non-invasive ventilation
- Drug fluid calculations
- IV administration
- Resuscitation, Identification of sick neonate,
- Few accreditation program to ensure universality of nursing knowledge and skills
- A practical curriculum for all (including physicians) for baby care is needed
- Skill training labs
- There is need to know "why", not just "what"

3. PERCEIVED CURRENT EDUCATIONAL OPPORTUNITIES:

Level 1:

Initial orientation:

- 7 day training including practical, lectures and demonstrations
- 21 days Skilled Birth Attendant course buddied with physicians
- 15 days in Special care neonatal unit by some ANM/ASHA's

Ongoing Education:

- Level 1 to go once a year to Level 2 to see more patients and gain improved knowledge and refresher.

2 hours 1/month Doctor; 2 hours/6 months

- (They complete questions /form, and will also be observed if delivery occurs- no simulated skill competency)
- Modules available on computer (not online) – KMC, breastfeeding and handwashing

Level 2:

Initial orientation:

- Some had no initial training when starting in the NICU
- Some had 4-5 days of observership with senior nurse in unit
- Some had 15 day observership at larger tertiary care center
- Senior nurses train and mentor new nurses

Ongoing Education:

- Doctors teach nurses informally when they are on the unit
- Protocol books are only available on some units
- Senior nurses demonstrate new skills

Level 3:

Initial orientation – consistent with most units:

- After one week of observation from a senior nurse, they are on their own – no chance to demonstrate skill and get feedback on performance.
- Basic skills learned in nursing school

Ongoing education – inconsistently reported between different units and a wide variety of ongoing educational opportunities reported. These included:

- Breastfeeding and KMC sessions once a year
- Some reported most ongoing education provided from doctors – neonatologist, fellow, senior resident on duty
- Some have protocol books readily available on units
- Learn from each other and mentor each other
- Neonatal books- some are available on the unit
- Neofax on one unit but kept in MD's room
- Yearly NRP recertification
- Present babies in their care at bedside rounds - nurses ask the doctors questions
- Conferences – some have attended conferences and registration was fully paid
- Computer study material loaded on unit computer – however, nurses have little access to this.
- Library in hospital

- Google search – one nurse said she did a Google search at home on ROP
- Only one hospital supported some nurses to get more education – paid leave
- One hospital also had weekly sessions (offered 4 times and taught by nurses on infection control, breastfeeding, KMC, oxygen therapy)
- Resource books were available for nurses who took the SNBC course, but this resource was not available on the unit for those who did not

Nurse Leader Group:

- Pre-service- 20 hours neonatal/ pediatric care
- Post service – Facilitated-based care – 2 weeks hands-on/observership (not hands on)
- Refresher – 5 day yearly include group/video/skill demonstration

Recognize that ongoing education varies widely:

- Some provide workshops
- One unit provides yearly refresher courses in NRP, protocol modules (breastfeeding, kangaroo care), and preterm care
- Most felt that education was offered during rounds but this was not reported by most of the nurses
- One private hospital held courses on alternate Sundays - 15 modules, including skills- found increase satisfaction in working in neonatal unit with retention of staff (not currently in government hospitals).

4. IDENTIFIED SOLUTIONS

Overall, there is a great need that all nurses providing initial and ongoing care to neonates require a structured and consistent orientation program that provides essential knowledge and skill to ensure that at least a minimum level of competency-based care is provided to all at-risk and sick newborns.

Additionally competency-based orientation is required based on the ongoing level of acuity and care provided.

The following are potential solutions identified by focus group participants across level of care areas.

Level 1:

- Initial and ongoing training at least once/ year – hands on practical with evaluation
- Updated nursing manual
- More updated programs on the computer – newborn care, how to keep baby warm, sick newborn care

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- Maternal education to help change old habits- village health team educator both pre and post partum.

Level 2:

- Monthly discussions regarding evaluation and use of a new piece of equipment and also indications for its use
- Weekly education sessions
- Antenatal preparation, training newborn staff
- Practical sessions are the best way to learn
- Written Guideline need to be readily available on the unit
- New guidelines to be developed when new knowledge obtained
- Classes for parents
- Regional education to outlying centers so babies are transferred sooner
- Standardization of level of entry knowledge
- Standardization of continuing education
- One on one teaching including demonstrations
- Internet available on unit
- Improved systems to for preventative maintenance of equipment.
- When equipment doesn't work, alternatives are needed- e.g. a trouble shooting guide
- Ongoing education during duty hours

Level 3:

- One hour education sessions once a week
- See one, do one, teach one method needed for new procedures and equipment – then ongoing evaluation of competencies
- Orientation from sister in charge
- Classroom and demonstration stations are required
- Super user – send one nurse to learn procedure/equipment and they would be responsible to teach others
- Regularly scheduled education with a fixed date and time
- Time during duty hours to attend classes with extra staff to cover duties
- Feedback and evaluation required to ensure learning has occurred
- Access to mannequins to practice NRP
- Review of skills once/year (NRP)
- Ongoing weekly teaching sessions for 6 weeks including IV insertion, resuscitation, asepsis, central lines, breastfeeding, exchange transfusion, intubation, oxygen therapy, ventilator settings
- Frequent seminars
- Panel discussions with doctors and nurses
- Workshops
- Live demonstrations on basic procedures

- Admitting baby demonstration
- Accessibility of booklets, pamphlets, CD/DVD (direct visualization), computer in unit
- Master rotation plan based on individual preferences
- Biomedical engineers readily available to fix equipment
- Increase staffing
- Periodic update of procedure manuals based on best evidence
- Recognition - Appreciation certificates
- Decrease ego gap between nurses and doctors
- New staff to be assigned to morning duty – more nurses on therefore easier to supervise
- Update nursing procedures to include who is responsible for duties
- Posters on unit with algorithm to guide practice on common problems
- Standardized nursing orientation and ongoing education
- Protocols on troubleshooting equipment failure when the technician not available
- Protocols on troubleshooting common problems – e.g.- IV pump not working and blood spoiling.
- Each nurse develops one area of expertise – she would be responsible to protocol development and maintenance, and be the resource person for this procedure.
- Fixed times for in-services
- Feedback/evaluation to see that learning has occurred
- Flowcharts posted on unit
- Competency-based education
- Improve relationship between nurses and doctors – reducing the ego gap
- Incentive to attend workshops- time off and travel expenses paid
  - In return, the nurse would be expected to teach others

Nurse Leader Group:

- Need to elevate role of nurses – promotion of nurse leaders and increased utilization of nurse as educators and change agents.
- Good teachers = good clinicians
- Regionalization – trained personal to train others with ongoing competencies
- Improve communication between education and clinical and administration
- Clinical supervision- priority of teachers time and feedback
- Informal and formal teaching
- Need for written policies
- Educated trainer to train nurses
- Integration of all levels of care for nurses who care for babies
- Policy makers to consult nurses re: nursing issues
- Important to deal with rotation of staff
- Knowledge translation- need for continuing education and practice

- Need for nurse educators
- Need for performance appraisals
- Center of excellence in each state
- Interpretation of primary, secondary and tertiary care nursing duties
- Need to prepare competency checklist with supervisor
- If nurses attend a conference, the expectation should be to bring knowledge back and be resource for the unit

5. **Who nurses feel can help?**

Level 1:

- Experienced nurses and doctors to teach knowledge. They also need educators to be present at deliveries to evaluate and give advice
- Co-worker sharing of problems and solutions – learn from each other
- Hands-on experience at a Level 2 or 3 SCNU once a year

Level 2:

- Experienced nurses and doctors were identified as valuable resources.
- During time in higher acuity centers for training, concerns were raised regarding the ability of educators to have dedicated time to teach rather than merely when clinical needs allowed it.
- Co-worker sharing of problems and solutions during informal opportunities in a multidisciplinary team environment – learn from each other
- Improved nurse-physician working relationships enhanced learning.

Level 3:

- Experienced nurses and doctors to teach pathophysiology and disease process/ medical condition
- Nursing senior staff if related to nursing knowledge
- Co-worker sharing – learn from each other, informal round teaching and effective and collegial nurse-physician relationships significantly impact desire for and uptake of learning.

Summary of Focus Groups

Nurses identified several areas of learning needs including resuscitation, immediate stabilization of sick newborns, ongoing clinical care and correct use and maintenance of equipment. Additionally, the majority of the nurses voiced the need for an evidence-based and consistent orientation to newborn care as this was not a core competency in their general nursing education; also, a need for specific unit based orientation. There appeared to be consensus that:

Education should be **uniform, structured, accessible, easy to translate and practical.**

Educational materials and visual aids that augment educational instruction should be *readily available* in the work setting. Education needs to be *competency-based,* include *evaluation* and be *ongoing*. Joint *interprofessional educational opportunities* and efforts to enhance communication and *working together as a team* both formally and informally will enhance learning, team function and needs to be implemented for improved outcomes.

System and administrative factors directly influence learning and practice change.

There is a need to identify persons (preferably nurses) to *coordinate* educational opportunities at *pre-service, in-service and ongoing basis*. *Less movement of nurses* among various clinical settings with an increase in permanent jobs would significantly contribute to a *higher skill and competency* of nursing staff and lead to a more *streamlined cost effective management of resources* and *improved outcomes*. Specifically, through *maintenance of qualified staff*, a decrease in the quantity of repeated initial orientation would result, creating a local pool for educational offerings and more in-depth skill development. Lastly, incorporating learning opportunities that are *easily accessible and financially feasible* is essential to the successful implementation and practice uptake of educational preparation of nurses (e.g. have opportunities to attend as part of work hours with clinical coverage of patients provided, local opportunities, and financial assistance).

Recommendations and Initial Next Steps

1. **Goal - Identification and evaluation of existing resources.**

   Action: Using expert consensus led by nursing leaders with input from medical and international interprofessional participation, all existing available resources being utilized should be reviewed in a timely manner with respect to:

   a) Current evidenced-based quality of educational material
   b) Mode of delivery including cost analysis and benefit.

2. **Goal -Standardized orientation curriculum for the care of sick and at-risk newborns that is care area specific.**

   Action: Using National expert consensus led by nursing leaders with medical participation and international interprofessional participation, a standardized orientation program based on essential neonatal nursing competencies required for nurses to care for sick and at-risk newborns at each level of care (community, Level 1, 2 and 3) including preparation of a standardized training package will be created.

   The curriculum should include content, length, and method of implementation and evaluation processes to ensure skill acquisition utilizing existing resources.
   Given that Level 1-2 neonatal care areas were identified as having the least amount of structure with the highest amount of caseload and that this information would also be useful for initial staged training for nurses subsequently providing Level 3 care, priority should given to target the Level 1-2 nurses.

   In addition, to assist with program initiation and institutional support, identified neonatal nursing competencies should be added to the existing medical regulations for newborn care as part of hospital accreditation or medical standards.

3. **Goal: Institute learner-based continuing educational opportunities**

   Action: Priority should be given to the provision of resuscitation and initial stabilization programs applicable to specific level of care area to all nurses providing initial care to sick or at-risk newborns. Education programs should include:

   a) Skill acquisition
   b) Consolidation of learning
   c) Practical hands on utilization
   d) Maintenance of skill

   Logical choices include Helping Babies Breathe, a modified or full Neonatal Resuscitation Program (NRP). Strong consideration should be given to include accompanying early newborn stabilization with Essential in Newborn Care, WHO-SEARO standard treatment protocols for management of sick newborn at small hospitals, Modified ACoRN or STABLE.

   Existing online medical training programs may be easily adapted to deliver timely ongoing nursing education. However, nurses clearly identified that computer and Internet access is a considerable issue, thus if instituted, provision of these resources would need to accompany the education program. Phone application may be a feasible alternative.

4. <u>Ongoing competency-based evaluative education programs</u>

Action: Create opportunity for ongoing and evaluative education as part of work expectations that are easily accessible as part of work environment and locally where possible. This should include ensuring competency of new newborn care nurses, education to facilitate competency for all new procedures and periodic reviews with personnel to maintain and enhance contributions to improve care and outcome for babies and families as part of an ongoing quality improvement program. The creation of a nursing educator network to identify and share challenges and to troubleshoot solutions should be strongly considered.

5. <u>Incorporate mechanisms for sustainability in training programs</u>

Action: Coordinate a regionalized approach and Centre of Nursing Excellence (train-the trainer) with designated central and local nursing positions responsible for education.

Establish strong collaboration among key stakeholders to coordinate efforts.

Create an identity for nurses caring for neonates - certification or other recognition of experienced nurses. This will not be possible or sustainable without some system related supports.

a) Equitable and consistent remuneration for neonatal nurses.
b) Consolidated efforts to maintain neonatal nurses with less movement throughout hospitals.
c) Coordinated efforts of Government, regulatory bodies, institutions and Indian Medical Association to help raise public awareness regarding the importance of the role of nursing to improve neonatal care and patient outcomes. This would be best-achieved via Media and written information sheets, posters etc, that are highly visible in care areas.

Stakeholder Meeting

At the completion of the Focus Group interviews, a stakeholder workshop "For Sharing Training Needs of Neonatal Nursing Professional in India" was organized by the WHO Collaborating Centre for Training and Research for Newborn Care, All Indian Institute for Medical Sciences, New Delhi, in partnership with the Indian Association of Neonatal Nurses and the Indo-Canadian Shastri Institute. The workshop was held on January 29 and 30, 2013. The first day of the workshop provided an opportunity to engage nurse leaders and educators from multiple centers and states throughout India. Focus group interviews and discussion related to improving training for nurses caring for sick and at-risk newborns in India were conducted. The focus of the second day was to provide an opportunity for additional stakeholders to come together to brainstorm possible solutions and recommendations for action (see Appendix D for Detailed Program). Forty-eight participants attended including nursing and medical leaders encompassing various areas of expertise (education, clinical and research), members from nursing regulatory bodies, administrators and representatives from agency members that have demonstrated considerable prior interest in improving newborn outcomes and the promotion of care giver education and skill development (see Appendix E for Stakeholder Meeting Participant List).

In summary, information was shared regarding the need to improve education and training for neonatal nurses. Examples of the ongoing regional and local programs were given and preliminary results of the findings of the focus group interviews were presented. Discussion was enhanced using an expert panel format.

Consensus Recommendations included:

1. The creation of a uniform structured, standardized competency-based learning orientation tool kit for SCNU level should be developed.
2. Evaluative performance standards are needed and the creation of practical skills lab for teaching NRP, Helping Babies Breath, and care for sick newborn are required.
3. Support for identified leaders to provide education and to oversee sustainable group of skilled trainers is necessary.
4. Use of IT (Telemedicine) as a mode of delivery should be explored for sustainability and quality improvement for knowledge uptake and training needs.
5. Creation of state resource Centres of Excellence (e.g. Tamil Nadu) should be included in each state project implementation plan.
6. The development of a pool of skilled certified neonatal nurses should be investigated.
7. The utilization of Neonatal Nurse Practitioners for manning small hospitals in the country should be evaluated.
8. To enhance nursing training, partnership with IANN, private sector should to be further explored.
9. Creation of Level II Special Care Neonatal Units (SCNU) in Districts as well as Newborn stabilization units at local villages, 24 x 7 Centres, by the Government of India is laudable. However, to ensure optimal newborn outcomes, sufficient numbers of skilled nursing manpower must be available to man these facilities.

Future Collaboration

This study provides the foundation for a process that will enhance the current professional collaboration among nurses in India and Canada. Firstly, the current focus on education will be enhanced to include program evaluation (research). Secondly, the nucleus of the present collaborators is expected to grow with anticipated success of this project and be expanded to include at least some other personnel who will be brought into the process. It is also expected that this project will enhance collaboration between physicians and nurses in both India and Canada as concepts of a multidisciplinary team move from clinical care to education and research.

Acknowledgements

Appendices

Appendix A- Details of Team Composition and Contribution

__*Marsha Campbell-Yeo*__ is a PhD prepared professor, neonatal nurse practitioner, and clinician scientist. She has a strong background in the conduct of neonatal outcome related research and knowledge utilization strategies. She has co-led and overseen all aspects of the study. She actively participated in data collection as a focus group leader and overseen rotating responsibilities of other focus group facilitators. She is responsible for the raw data, the analysis and dissemination of the data.

__*Ashok Deorari*__ is a neonatologist and the Co PI on this study and has co-led all aspects of this study including conception, design and implementation of the project. He has a long standing track record of promoting improved health for newborns in India and has strong ties with other health care leaders, advocates, government and funding agencies with a similar vision across the country, Asia and World wide. He also has access to all data and is closely involved with generation and dissemination of results.

__*Douglas McMillan*__ is a neonatologist with international expertise and experience in the promotion of improved newborn care and education. He was closely involved with all aspects of the study including the conception, design, implementation, and dissemination of findings. He actively participated in the focus group data collection, rotating as a support to the primary Focus group leader and as a note taker.

__*Nalini Singhal*__ is a neonatologist with extensive international affiliations related to neonatal training programs. She was closely involved with the conception, design, and implementation of the study. She actively participated in the focus group data collection, rotating as a support to the primary Focus group leader, or group translator, and as a note taker. She has access to the aggregate data and is closely involved with generation and dissemination of results. She will not retain raw data in her centre.

__*Manju Vatsa*__ is a PhD prepared nurse and director of the Principal College of Nursing, AIIMS, New Delhi, India. She was involved with the conception, design and implementation of the project. She is a nursing leader with strong nursing collaborations at all levels. She has access to aggregate data and is involved with generation and dissemination of results.

__*Debbie Aylward*__ is a Masters prepared nurse with expertise as an academic consultant and educator in newborn care. She participated with some aspects of the study design and actively participate in the focus group data collection, rotating as a group leader, support to the primary Focus group leader or note taker. She is involved with data the generation and dissemination of study results.

**Jeanne Scotland** is a Masters prepared neonatal nurse practitioner, with prior experience related to international teaching in India. She participated with some aspects of the study design and actively participated in the focus group data collection, rotating as a group leader, support to the primary focus group leader or note taker. She is involved with data the generation and dissemination of study results.

**Praveen Kumar** is a neonatologist with prior experience with Indian and Canadian collaborative projects to improve newborn care delivery. He has contributed to the study design and facilitated collaborations. He is involved with interpretation and dissemination of study findings.

**Meena Joshi** and _**Geetanjli Kalyan**_ are nurses with strong neonatal education and were actively involved with the collection of data during focus groups. They acted as co-leads and translators for the focus group. Both significantly contributed to and facilitated culturally sensitive collaborations. They are involved with interpretation and dissemination of study findings.

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Appendix B – Sample Focus Group Interview Guide

- Can you describe challenges you experience when providing care to sick newborns?

- When you think about your own learning needs, what are the top 3 that you believe are most important?

- When you consider learning needs in your workplace (unit as a whole), what do you believe are most important?

- Can you describe what education was available for you as you entered the NICU and what ongoing education is available? For example, a scheduled orientation and ongoing professional development scheduled on a regular basis. Are these educational opportunities paid for as part of your position or volunteer time?

- Can you describe or give examples of the educational opportunities offered at your institution after you started working there. Are these opportunities generally for nurses alone or in a multidisciplinary team environment?

- There are many types of information that we need to care for ill and at-risk newborns. When you are seeking different types of information where do you look?

- Is there a certain person (people) that you can go to within your hospital to help you find information?

- Can you describe one or two barriers that you feel make it difficult to meet these priorities and one or two facilitators that you believe are the best format (mechanisms) to assist learning needs?

- Can you describe how physicians and administration support the need for continuing professional development in your unit? How could his be improved?

- If you could change one thing in order to improve your ability to provide care, what would it be?

Appendix C – Participating Sites

Date	FGD site	Participants from	Numbers
22-01-13	Shivpuri , MP FGD 1 and 2	Shivpuri SCNU Guna SCNU Morena SCNU	6 3 3
23-1-13	Chaarch , Shivpuri Distr FGD 3 Jhiri Shivpuri Dist FGD 4		14
24-01-13	Hindu Rao Hospital , Delhi FGD 5 Kalawati Saran Childrens ,Delhi FGD 6	Level 2 NICU Level 2 – 3	15
28-01-13	Pachkula Haryana SCNU FGD7 ,8, and 9 GMH Chandigarh PGI Chandigarh	SCNU Level 2 – 3 Level 3	27
29-01-13	Nursing Leaders India FGD 10, 11 And AIIMS NICU FGD 12	Level 2– 3 Level 3	33

Appendix D - Stakeholder Program – January 30, 2013

Program

Time	Events/Topics	Chairperson/Faculty
09:00-09:15 am	**Registration**	Dr. Manju Vatsa
09:30-11:15 am	*Experiences in India – Training of Nurses*	Dr. Neena Raina, WHO-SEARO & Dr. A.K. Deorari
	Indian Association of Neonatal Nursing	Dr. Jyoti Sarin
	• East Meets West • JHPIEGO	Ms. Anne de Bernes Dr. Rashmi Asif

	• State initiatives
	  o West Bengal
	  o Andhra Pradesh
	  o Tamil Nadu
		Ms. Parul Datta
		Dr. Anupama
		Dr. Kumutha

	• WHO-Collaborating Centre, AIIMS initiatives	Dr. Anu Thukral
11:15-11:30 am	**Tea Break**	
11:30-12:15 pm	*Training Needs of Nurses in SCNU's:*	Dr. Harish Chelani and Dr. Manju Vatsa
	Findings of FGD- M.P/Haryana/Delhi	Dr. Marsha Campbell Dr. Doug McMillan
	Discussion	
12:15-01:30 pm	*Round Table discussion:* *Role of Nurses in SCNU's: Way forward*	Chair: Dr. Ajay Khera, MoH Facilitated by Dr. Prakin Suchaxaya, WHO-SEARO and Prof. Vinod Paul
	Overview & Objectives -10 min	Dr. Prakin Suchaxaya
	Panel	Participating Experts

Appendix E – Stakeholder Meeting Participant List

Sl.No.	Name & Address	Sl.No.	Name & Address
1.	Dr. Doug McMillan Division of Neonatal-Perinatal Medicine IWK Health Centre 5850/5980 University Avenue P.O. Box 9700 Halifax, NS B3K 6R8	2.	Dr. Nalini Singhal Professor University of Calgary Neonatologist Alberta Children's Hospital 2888 Shaganappi Trail NW Calgary, Alberta, Canada T3B6A8
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5.	Ms. Deborah Aylward RN School of Nursing Faculty of Health Sciences University of Ottawa, Ottawa Canada	6.	Ms. Allison Zimmerman East Meets West Foundation Delhi Office
7.	Ms. Anne de Bernes India Country Director East Meets West Foundation Chennai, Tamil Nadu	8.	Dr. Manju Vatsa, PhD. Principal College of Nursing AIIMS, New Delhi – 29
9.	Dr. Jyoti Sarin Hon. Secretary, IANN Principal, MM College of Nursing Mullana Ambala Haryana – 133203	10.	Mrs. Parul Datta Senior Sister Tutor Department of Neonatology IPGME & R, SSKM Hospital 244, A.J.C. Bose Road Kolkata – 700 020

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