DEVELOPMENT OF A SELF LEARNING MODULE FOR PERINATAL RNS ON VAGINAL EXAMS IN LABOUR.

by © Pamela Chappell A Practicum Report submitted

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Abstract

Background: The Maternal/Child unit at Cumberland Regional Health Care Centre has recently undergone changes in policy and staff which has identified an educational need for RNs on the unit. Currently the unit does not have formal education on vaginal exams and it is the expectation that RNs will become confident in learning this skill during their preceptored six week orientation to the unit. **Purpose**: The purpose of this practicum was to develop a self-learning module aimed at increasing perinatal RNs knowledge and understanding of vaginal exams during labor as well as increase proficiency in the skill. **Methods:** Three methodologies were used in this practicum. A review of the literature, consultations with key stake holders and review of other similar/relevant educational materials was completed. **Results:** The self-learning module created was composed of four units which included explanations of key terms essential in vaginal exams and an algorithm for clinical decision making. **Conclusion**: The goal of the practicum was to increase the perinatal RNs knowledge and understanding and proficiency of vaginal exams in labour. The module was not piloted during the practicum, and therefore could not be evaluated. Future steps for this module would therefore be to pilot and evaluate the effectiveness of the developed module in achieving the proposed goal.

Keywords: vaginal exams, self-learning module, perinatal RNs, education

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Development of a Self-Learning Module for Perinatal RNs on Vaginal Exams in Labour.

The College of Registered Nurses of Nova Scotia (CRNNS) identifies that the entry-level competencies, reflecting the knowledge, skill, and judgment required of entry-level registered nurses (RNs), are that of generalists (CRNNS, 2013). All RNs in Nova Scotia are accountable to attain these required entry-level competencies within their nursing education. In addition, each year RNs must complete education and attain new competencies to meet the needs of their specific area of practice and patient population (CRNNS). These new competencies are known as post entry-level competencies, a reflection that the knowledge and skills must be learned after completing entry-level education (College of Registered Nurses Nova Scotia, 2012).

For perinatal RNs, the skill of performing vaginal exams on women in labour is considered a post-entry level competency and requires RNs to obtain theory based education. In addition, RNs obtain hands on experience allowing the addition of the skill to their scope of practice (K. Crowe, personal communication, 2014). Vaginal exams are the primary assessment tool used by perinatal RNs when caring for women during the intrapartum period.

For this practicum, I was approached by the team lead of the Maternal/Child unit at the Cumberland Regional Health Care Centre to create a formal education module on vaginal exams in labour, in order to meet the educational requirement of vaginal exams as a post entry-level competency. Alternately, the new induction of labour policy being implemented on the unit expects all perinatal RNs to complete education on vaginal

exams. In particular, the policy enforces this education because of the impact vaginal exam have on patient care. Specifically, vaginal exams are used to determine the method for induction of labour. The request to develop formal education on vaginal exams is fulfilled by the development of a self-learning module.

Background

The setting for this practicum took place on the Maternal/Child Unit at the Cumberland Regional Health Care Centre (CRHCC) in Amherst, Nova Scotia. The eight-bed unit has, on average, 200 births per year. As a rural hospital setting, the unit does not have in house family practitioners or obstetricians. Therefore, labouring women are assessed initially by the perinatal RNs who will subsequently care for them in labour. Following the initial assessment by RNs, which may or may not include a vaginal exam, contact is made with the on call physicians, via by telephone or face to face. The physicians then visit and assess the laboring women when in hospital and at different points during their labour, making clinical decisions during the labour based on the communicated assessments completed by RNs.

The unit is staffed with two RNs and one licensed practical nurse (LPN) per shift. On call family physicians and on call obstetricians currently care for antepartum, labouring and postpartum patients. The perinatal RNs are responsible for the triaging of pregnant women after 20 weeks gestation and communicating their assessments to appropriate physicians.

This infers that the RNs on the maternal child unit must be confident in their knowledge and understanding of the role of vaginal exams, as well as being proficient and confident in the skill.

Rationale

Further rationale for the need for education on vaginal exams is related to orientation of new RNs. Since the year 2012, the Maternal/Child unit has seen an influx of new graduate RNs hired to the unit to replace those senior RNs retiring. When new RNs are hired to the Maternal/Child unit at CRHCC, they are paired with preceptors. Preceptors have the responsibility to orientate and teach the skill of performing vaginal exams as well as orientation to the entire unit. The large orientation that once was 12 weeks is now condensed to 6 weeks. The orientation includes learning to care for pregnant and labouring women as well as pediatric patients, surgical patients and patients with a variety of medical conditions. As such, the orientation period creates a steep learning curve for new RNs with the primary focus being the care and management of labouring women and their families.

As a preceptor, I encounter the challenge of orientating new RNs to the unit and witness them trying to grapple the immensity of the orientation. Other skills such as fetal heart monitoring, supportive care in labour, and neonatal resuscitation all have educational resources to support preceptors and new RNs in learning and understanding these skills. Unfortunately, no formal educational materials exist that address the performance and understanding of vaginal exams. Therefore, the responsibility of learning this skill falls to preceptors and learners. This practicum, has therefore provided

perinatal RNs with a resource that can assist in learning this skill and in turn, aid with clinical decision making.

Goals and Objectives

The overall goal of this practicum was to increase RNs knowledge and understanding of the importance of the role of vaginal exams in labour as well as increase proficiency in the skill. By learning and understanding the value of vaginal exams during labour as a tool for assessment, RNs can more consistently provide and maintain a high level of evidenced based care to labouring women.

The practicum objectives addressed in this practicum were:

1) A literature review was completed exploring the educational needs of RNs for performing vaginal exams on women in labour, inclusive of analysis of other organizations' modules on performing vaginal exams.
2) Consultations with key stakeholders were conducted. Nurses, physicians, and managers on the unit were consulted in order to guide content and provide ongoing feedback as the module was developed.
3) A self -learning module for perinatal RNs on vaginal exams in labour was developed and informed by review of the literature, consultation with colleagues and review of other maternity units' modules.
4) The advanced practice nursing competencies were demonstrated in the development of this module.

Overview of the Methodologies

The practicum involved three different methodologies reflecting the objectives for the practicum. The three methodologies used in the practicum were, a review of the literature, a consultation with key stakeholders and the development of the self-learning modules. Each are summarized in the following report.

Summary of the Literature

Literature Review Methodology

Literature for the review was obtained from CINAHL, PubMed, and the Cochrane Library. Literature was also reviewed from driving forces in the area of perinatal care including the Society of Obstetricians and Gynecologists of Canada and maternal child nursing textbooks. Searches were limited to include articles and texts from the year 2005 to present. All articles and texts were limited to the English language. Four major themes were examined within the literature. The four themes were, post entry level education for RNs, the importance of vaginal exams in labour, the use and value of self-learning modules as a form of education for RNs and the use of algorithms in health care. Also included within the literature review was the literature on the conceptual framework that guided the creation of the module. A review of other institutional resources related to vaginal exams was also conducted. The complete literature review can be found in Appendix A.

Theme One: RNs Education

RNs education begins in the classroom setting, but graduating from nursing school and passing the written licensure exam does not signify the end of RNs learning. RNs are required to ensure continuing competence, upholding both the standards of care and the code of ethics to which they ascribe to. The Code of Ethics (Canadian Nurses Association, 2008), supports the need for continuing education as the societal changes occurring in the world require RNs to be equipped to care for patients with increasingly complex needs (CNA). Specifically, the Code of Ethics and the Standards of Care support education as a means for novice RNs to progress to expert RNs by obtaining and pursuing further education, in both formal and informal settings, and thus responding to the changes in technology, systems, and theories to meet the complex needs of patients (Canadian Nurses Association, 2007). Continuing education allows RNs to develop skills and knowledge to integrate into their clinical judgement and further increase competence in their clinical decision making ability (CNA).

Barriers in pursuing continuing nursing education. From the literature it has emerged that, although there a need for continuing education and there is support for continued education, barriers exist, especially for rural nurses. Rural nurses, such as those nurses at the Cumberland Regional Health Care Centre, encounter a lack of availability and accessibility of education, time constraints with work schedules and lack of financial support (Penz, D'Arcy, Stewart Kosteniuk, Morgan & Smith , 2007; Jukkala, Henly, & Lindeke , 2008). The aforementioned barriers also factor into rural nurses' decisions to leave one institution for another. Rural RNs move to other institutions where financial

support and flexibility with work schedules to obtain education is well established. (Lalonde, McGillis Hall, Price, Andrews, Harris, & MacDonald-Rencz, 2013). In an attempt to address barriers, the Canadian Nurses Association (2004) asserts that educational opportunities be flexible in terms of mode of delivery and advocates for employers to support nurses in pursuing continuing education.

Education needs of perinatal RNs. The literature also supports the need for specialized education for specialty areas of nursing. For perinatal RNs, specifically in rural areas, the Society of Obstetricians and Gynecologists of Canada (SOGC) (2012) acknowledges that rural maternity care, such as what occurs at the Cumberland Regional Health Care Centre, is often led by family physicians, nurses and midwives. In order to sustain low volume maternity units, such as in rural settings, interprofessional respect, and service models that support collaborative approaches to care and the opportunities for continued education need to be in place (Medves & Davies, 2005). In some rural settings, a model of care entitled nurse managed labour (Simpson, 2005), draws similarities to the CRHCC. The model reflects a facility in which RNs roles are almost entirely autonomous and communication with physicians is usually done by telephone as they are offsite (Simpson). In this type of model, RNs in hospital make many clinical decisions and are providers of the majority of bedside care. RNs that work in this type of model must be confident in their knowledge of labour and delivery yet be aware of their limitations related to labour and delivery. This is significant because the care and assessments completed by RNs are driving forces in clinical care planning (James, Simpson & Knox, 2003).

Adverse outcomes. Another factor influencing the need for perinatal RNs to have education on vaginal exams is the incidence of adverse patient outcomes in the field of obstetrics. According to the Canadian Institute of Health Information (CIHI), the most common adverse events that occur in Canada are related to medications, infections and obstetrical traumas during childbirth (2007).

Education Specific to Vaginal Exams. There was limited literature pertaining to education of perinatal RNs on vaginal exams. In general, the importance of vaginal exams and education on vaginal exams is supported in the literature. Instruments and technology such as external electrodes and internal electrodes have sought noninvasive ways to determine cervical dilatation, but none have garnered acceptance in the world of obstetrical care (Nizard, Haberman, Paltielei, Gonen, Ohel, Nicholson & Ville, 2009). In turn, the technologies have not been able to gather as much information about labour as compared to what is derived during vaginal exams. Therefore the standard of practice for assessment for labour and its progression remains vaginal examinations (Baskett, Calder & Arukumaran, 2014). The literature recommended the integration of ongoing training and education be provided to all practitioners, especially those staff new to labour and delivery (Nizard et.al).

Theme Two: Vaginal Exams in Labour

Vaginal exams are the primary tool used to assess labour and validate the progression in labour. The literature review included establishing the definition of labour. Definitions of labour included various combinations of the following, regular painful contractions, cervical dilatation of three to four centimeters, and, rupture of the

membranes and full effacement of the cervix (Baskett, 2004; Stalhammar & Bostrom, 2008; O'Driscolll, Foley & MacDonald, 1984). Active labour is defined as dilation of the cervix at 3-4 cm, effacement, and regular painful contractions five minutes apart or less (National Institute for Health and Clinical Excellence, 2007; Perinatal Services BC, 2011; Reproductive Care Program of Nova Scotia, 2010 ; World Health Organization, 2008). This definition is used in the module.

Progression in Labour. Vaginal exams are also used to determine progress or non-progress in labour. One way this can be done is by use of partography and assessing for dilatation of the cervix within a defined timeframe (Stalhammar & Bostrom, 2008). In cases of non-progressive labour it is important to first determine the cause and make necessary adjustments in an attempt to correct such things that could be interfering with labour progress (Baskett, Calder & Arulkumaran, 2014).

Frequency of vaginal exams in labour. Performing vaginal exams, once active labour is established, are recommended to be done every three to four hours in a normal low risk labour, Exceptions to this recommendation occur when clinical situations dictate exams should be performed earlier, such as when fetal distress is noted or when labour is not progressing (Baskett, Calder, & Arulkumaran, 2014; World Health Organization, 1996). Still, the literature suggests that more research be done in the area of active management of the first stage of labour. For example, clear determinants for what is meant by prolonged labour are needed (Amorim, 2009).

Risks and benefits of using vaginal exams. The literature also examined the risks and benefits of vaginal exams to women in labour**.** The use of routine vaginal exams was also found not to improve outcomes of labour for either women or neonates in a Cochrane review (Downe, Gyte, Dahlen & Singata, 2012). Future research should include the examination of the effectiveness of using vaginal exams in conjunction with other tools (Downe, Gyte, Dahlen & Singata).

Another risk related to the use of vaginal exams identified in the literature is the increased risk of infection. Borders, Lawton and Martin (2012) carried out a study with a sample of 205 women and found an increase in chorioamnionitis in women who had more than 7 vaginal exams in labour. Cahill, Duffy, Odibo, Roehl, Zhao and Macones (2012), in a larger study of 2, 395 women found no significant association between number of vaginal exams and risk of fever. Acknowledging that there are risks with performing vaginal exams only further supports the need to educate perinatal RNs. RNs must not only know how to perform the exams but also but also understand that the examinations must be performed correctly and only when appropriate.

Vaginal exams in high risk labour. Literature also addressed the value of vaginal exams in certain obstetrical emergencies such as, cord prolapses, breech presentations or other malpresentations that interfere with the progression of labour and eventually vaginal delivery (Baskett, 2004; Perinatal Services British Columbia, 2011). Vaginal exams assist skilled practitioners to diagnose such emergencies and as a result, decrease both maternal and fetal morbidity and mortality. These examples demonstrate further, the need for RNs to be educated and skilled in performing vaginal exams.

Theme Three: Self –learning modules

For this practicum, the education developed is in the form of a self-learning module. The literature examined the advantages and disadvantages of self-learning modules, as well as, the role of self-learning modules in educating nurses.

Within the health care world, there is increased demands placed on nurses to provide the best care to more complex patient care needs (Canadian Nurses Association, 2008). For this reason RNs must be educated in their patient care needs. However, the opportunities for all nurses to take lecture based classes, or courses to ensure exposure to the most up to date information are not always possible (Zadvinskis, 2008; Schmidt & Fisher, 1992). As new evidence is discovered each day, dissemination of information in traditional forms such as classroom lectures would never ensure that all nurses could obtain the information in a timely manner. One such avenue that does permit RNs to procure essential education on specific skills is through self-learning modules. Self-study is one effective education avenue used to educate and be effective in the nursing profession (Murad, Coto-Yglesias, Varkey, Prokop & Murad, 2010).

Effective development of self-learning modules is founded by the elements it is composed of including appropriate media, content and format (Schmidt & Fisher, 1992; Clifford, Goldschmidt, O'Connor, 2007). In an effort to address the various learning styles, incorporation of diagrams, pictures and case studies has shown to be an effective design choice in self-leaning modules (Schmidt & Fisher; Clifford et al.). Content of self-learning modules should be distributed into sections, creating steps of learning, limiting one page to one concept (Schmidt & Fisher).

Strengths self-learning modules. The success of self-learning stems from learners being responsible for their own learning, where learners work at their own pace to achieve specific learning objectives, usually set out by instructors. Formats of self-learning include activities that are specifically designed to meet objectives, and do so in small steps (Morrison, Ross, Kalman & Kemp, 2011). Strengths of self –learning programs include, compliments different types of learners, promotes self –reliance, more time for instructors to spend with learners, cost effective, and information is consistent eliminating the variation of information that can be typical of lecture or classroom environment (Morrison, Ross, Kalman & Kemp). Nurses are often working long hours and self-learning modules acknowledge that people concentrate best at various times, and provide an avenue for nurses to complete learning that is self-paced (Carcich & Rafti, 2007).

Another advantage of self-learning modules is the development of the competency and/or feedback tools. Written feedback as well as verbal feedback on a continuous and longitudinal basis shows the learners their progress and areas to improve upon (Embo, Driessen, Valcke & Van Der Vleuten, 2010).

The advantages of self-learning modules to nursing was also in the literature. A summary table of several studies demonstrating the advantages of self-learning modules is included in the literature review as Appendix A1. Self-study modules are not only used to introduce a new concept to nurses, but also to improve their current practice, by presenting the newest and current evidence supporting practice (Koeber, 2009).

Learning Modules for RNs on Vaginal Exams. Literature support was limited on the types of education that RNs receive on performing and understanding vaginal exams in labour. No studies could be found regarding the use of self-learning modules on teaching vaginal exams to perinatal RNs. There also was no literature found on any forms of teaching vaginal exams to RNs. Kraynek (2012) described a new program in which obstetrical residents would teach RNs how to perform vaginal exams using simulation with cervical models.

Overall, there was a lack of literature related education materials used to teach RNs how to perform vaginal exams in labour. This demonstrated a need to develop materials due to the importance of vaginal exams in caring for women in labour.

Theme 4: Algorithms in health care.

Literature on the use of algorithms was another theme reviewed. The use of algorithms is prominent at the CRHCC. Examples of algorithms used on the maternal child unit are, Neonatal Resuscitation Program, Group B Streptococcus Chemoprophylaxis and WinRho Program protocols.

Advantages and disadvantages of algorithms. The use of algorithms are often used as a teaching format to introduce and educate learners the steps to complex procedures. Advantages of algorithms include, helping learners spot most relevant information in a clinical situation, saving learners time in remembering and understanding complex situations and reduces one on one instruction for teaching problem solving (Billings & Halstead, 2012). Algorithms also improve the clinical decision making in novice nurses, allowing them to be proactive versus reactive in complex clinical situations (Billings &

Halstead). Knowing when to do certain assessments only allows RNs to provide better, safe and ethical care for the patients.

Algorithms are very time consuming to design and require very precise and accurate steps to ensure a task is completed. Also, in some cases, learners do not have experience with algorithms and time can be lost in explaining to learners how to use the algorithm (Billings & Halstead)

Value of algorithms to health care. Algorithms improve patient care. Algorithms used in clinical decision making have increased the amount of skin to skin done with neonates (Brenneman & Price, 2014) and improved wound care when basing dressing changes on an algorithm related to type of exudate (Gove, Hampton, Smith, Hedger & Topley, 2014).

Summary of Vaginal Exam Learning Modules and Policies

Other resources used by hospitals to educate RNs on vaginal exams in Canada were reviewed. Four resources were reviewed. The resources came from, the Isaak Walton Killam Children's Hospital in Halifax, Nova Scotia, the Prince County Hospital in Summerside, the Champlain Regional Maternal Program and the Perinatal Services of British Columbia decision support tool. A summary table constructed identified the strengths and weaknesses of each source and the overall impression in detail (Appendix A2).

Of the four sources reviewed, each identified the indications and contraindications for vaginal exams and, the equipment to be used during vaginal exams. The majority, included illustrations, as well as what should be included in documentation of vaginal exams. Weaknesses of the sources included the lack of definitions for labour and specific

objectives related to correct performance of vaginal exams. Comparison of the resources was limited as only one source was an actual self-learning module. In summation, the review of other modules demonstrated that the lack of module sources is an indication for the need to develop such resources which can support the educational needs of perinatal RNs in understanding and performing vaginal exams in labour.

Orientation Programs of Perinatal RNs across Canada.

Perinatal RNs across Canada are educated in various ways for the purposes of orientation. Some examples include obtaining certificates in perinatal speciality from the British Columbia Institute of Technology. There are also educational courses involving the care and management of high risk labours. An interesting component of these certificate programs as well other orientation programs across Canada, is the fact that these programs enlist not just practical experience education to orientate and demonstrate competency, but also provide the RNs the opportunities to obtain classroom time for the theory on the fundamentals of perinatal care.

Conceptual Frameworks

Three supporting theories were used as the framework for the development of the project. Literature support was conducted on each of the three theories. Literature on Knowles theory of Adults was explored as types of learners the modules is intended for is adult learners. The next theory examined was Kolb's inventory of learning styles which identified the certain design elements of module that would support the different styles of learning common among adults. Finally, the project would also need a framework to support the order of the materials, or how the units should progress and flow logically.

For this purpose, Benner's theory of novice to expert was used. A summary of the literature for these theories follows, and a complete report can be found in the literature review (Appendix A)

Knowles Theory of Adult Learners. Malcolm Knowles, a pioneer in adult learning theory, identified six principles of adult learners (Lieb, 1991; Morrison, Ross, Kalman & Kemp, 2011; Russell, 2006). First, adults are autonomous and self-directed and assume responsibility for their own learning and are facilitated to reach personal goals. Adult learners also carry with them a foundation of life experience and knowledge, connecting current learning with the underpinnings of their knowledge base. Knowles theory states that adults are goal orientated. Adults are focused on applying their learning to their work and learning must therefore have value to them. Adult learners therefore choose education or projects that are reflective of their own interests. Finally, adult learners require respect. This implies educators and learners are equals, and that each can call upon their knowledge and experiences to offer opinions on the learning environment or project (Lieb; Morrison, Ross, Kalman & Kemp; Russell).

Kolb's inventory of learning styles. Adult learners also learn by various avenues or styles. Learning styles are best defined as the characteristics that indicate how learners interacts with the learning environment, as well as how they perceive and respond to it (Registered Nurses Professional Development Centre (RNPDC), 2007). Within the development of the practicum project, knowledge of learning styles is used to design the module so that it would facilitate optimal understanding and learning of vaginal exams.

Kolb's inventory of different learning styles is the theory used for the practicum and informing the development of the module. Four learning styles compose this theory and include: assimilators, divergers, convergers and accommodators. According to Kolb, learners have a tendency to use all four all styles but usually prefer and learn best from one style (RNPDC, 2007).

Assimilators learn best by analyzing theories and concepts. This type of learning style is attributed to best learn through activities such as reflective exercises and brainstorming. It is recommended that information is best delivered in a detailed, systematic manner at a slow unhurried pace to accommodate the assimilator learning style (RNPDC).

Divergers, or pragmatists, are characterized by their ability to problem solve (RNPDC, 2007). They are objective learners who enjoy being independent and in control, learning best in small groups or one on one sessions.

Convergers or theorists are acknowledged for strong planning abilities (RNPDC, 2007). Convergers strongly respect experts and prefer accurate and organized delivery of information, so as to allow them to understand about the subject being learned (RNPDC).

Activists or accommodators are best described as the style where learners like doing things and enjoy new experiences. These types of learners often possess leadership skills, adapt well to change, and encourage others to get involved in projects (RNPDC). Projects or presentations, especially in group situations, are cited as the preferred learning format. It is the application of the knowledge that permits accommodators to fully understand the subject they are learning about (RNPDC).

Benner's Theory of Clinical Competence: novice to expert. New learners, over time follow a trajectory from novice to expert nurses. Benner's theory of clinical competence: novice to expert (Benner, 1982) is used for the development of the material and design of the self-learning project to address the process of progression from novice to expert nurses. There are five stages of experience that RNs can transition through as they acquire and learn new skills. However, only the first two apply to the project development.

Benner (1982) describes stage one as novice. Novices have no experience in the environment they perform in and need guidance due to a lack of confidence and knowledge. Novices require teaching and rules to follow in doing a task or skill in the unfamiliar situations.

As nurses gain experience, they enter into stage two: advanced beginner (Benner, 1982). At this point nurses are now able to demonstrate performance of a skill at an acceptable level. The stage is characterized by nurses applying their experience in real life scenarios towards guiding their current practice. There is still some support required from mentors or preceptors for cues, especially when in an unfamiliar situations (Benner).

The final stages of Benner' theory are competent, proficient and expert (Benner, 1982). According to Benner, these stages are achieved after several years in the same job. In the competence stage, nurses have become more efficient and organized in the manner in which they perform and apply the skill. This efficiency and organization is

achieved through careful and deliberate planning. In the competent stage, no supportive cues are needed, as nurses have mastered how to cope in real life situations (Benner).

In summary, all three theories were used to inform the design of the module. Knowles theory of adult learners is addressed in several ways. The self-learning module is designed to facilitate RNs taking responsibility for their own learning at their own pace. The self-learning module focuses on a key assessment tool used by perinatal RNs, vaginal exams, which correlates with the principle of making learning applicable to their life. Furthermore the information contained in the module is useful to RNs, as it promotes the goal of providing better care to their patients, by enhancing their knowledge on vaginal exams in labour. Overall, the self-learning module on vaginal exams for perinatal RNs reflects the principles of adult learning as it applies to the RNs work and supports their goals of better and safer care.

Kolb's Theory is used predominately in the design choices for the module. An example of how styles are addressed in the module, is the use of decision tree, case study, and learning activities. As an example, the decision tree or algorithm presents information in a systematic order. The case study that accompanies the decision tree addresses the assimilators need to have organization and reflection. All design choices from learning activities to the algorithms complimented a learning style mentioned in Kolb's Theory.

Finally, Benner's theory (1982) of clinical competence was addressed in the module design by the flow of how the information was presented. Establishing the definitions of the key terms involved with vaginal exams first allows the rules and

guidelines needed in Benner's novice stage to be addressed. The learning activities and algorithm both allow the application of the knowledge. These design elements addresses learners at the advanced beginner stage.

Overall, all three theories were used to inform the development of this project and the actual information and material contained in the manual was informed by the consultations, the literature review and the review of other agency models.

Summary of Consultations

For the practicum, eight face to face consultations were conducted with key stakeholders at the Cumberland Regional Health Care Setting. A complete report of the consultations can be found in Appendix B. Consultants for the practicum included, two senior perinatal RNs and two novice perinatal RNs, the unit manager, the unit team lead (RN), one obstetrician and one physician. Ethics approval was not required for the consultation as indicated by completion of the Health Research Ethics Authority Screening Tool (Appendix B2). The purpose of the consultation was to establish support and identify content for the module. Four questions were asked during the interview process. The questions can be located in Appendix B1. The consultations informed the body of content used in the module and design elements.

Content Themes

Common themes for content included components assessed for during vaginal exams, indications and contraindications, and what to do if an abnormal finding was assessed. Components of vaginal exams, more specifically, included definitions and explanations about, cervical dilation, effacement, fetal station, cervical position, fetal

presentation and cervical consistency. Novice nurses also felt it was necessary to have definitions of labour which included defining the different stages and phases.

Design Themes

From the consultations emerged expert opinions about design choices for the module. Consultants were in agreement that easy to read flow charts should be included in the module. Specifically, it was determined that a module that provided step by step instructions through a vaginal exam and another module unit that would address a "decision path" related to when to perform a vaginal exam were needed. Use of case scenarios and hands on learning activities and practice with models were two other design themes that emerged. One unique design idea from a senior nurse, which was not common among the groups, was to include a section that highlighted tips from the experienced or expert professionals.

Feedback tools, as a design choice, were also discussed with the consultants. Along with the hands on practice activities and case scenarios, the use of validation or verification checklists also was recommended from the consultants.

Development of Module

For this practicum, the project portion focused on the development of a self-learning module. Four units of the module were completed.

Each of the first three units are designed in the same manner. Each unit contains a list of learning objectives after completion of each section of the unit. Key terms are defined, and pictures/illustrations are included to support and supplement the definitions. A helpful tips section, with expert advice on each topic of a unit, is also included. Each

unit concludes with learning activities and case scenarios for RNs to practice what was learned in the unit. The actual module can be found in Appendix C.

Unit one defines labour inclusive of the phases and stages of labour. As vaginal exams are the main tool for assessing labour, having an understanding of what is labour is considered an important topic to first understand. The unit also provides information on how RNs can assess contractions using abdominal palpation.

Unit two focuses on the changes that occur to the cervix during labour and how these changes are assessed when performing a vaginal exam. The unit is divided into five sections. The first section focuses on the anatomy of the cervix. The subsequent sections of the unit focus on the changes that occur to the cervix during labour. The components of cervical change defined in the module are dilation, effacement, consistency, and position. Pictures and diagrams are included to support the descriptions given for cervical anatomy, dilation, effacement, and position sections. The helpful tips sections included information on how to troubleshoot when assessing for these changes. Information is also provided that addresses cervical changes that deviate from the defined normal, and descriptions were given that described what to do in such situations. Each section concludes with learning activities for learners to practice with a preceptors.

Unit Three focuses on assessing the fetus during labour, using both abdominal palpation (Leopold's Maneuvers) and vaginal exams as tools for assessment. The unit begins with an explanation of Leopold's Maneuvers, and a learning activity to practice the skill with preceptors or other RNs. Leopold's maneuvers are included in the module

as additional tool to use for assessing the fetus in labour. Leopold's maneuvers also can and should be used for verification of vaginal exam findings.

Further sections of the unit three include: fetal lie, fetal presentation, fetal position, engagement and station. Each section also has helpful tips that address both, what RNs may palpate during Leopold's maneuvers and vaginal exams. One or two learning activities are included for each component that learners can complete with preceptors for practical hands on learning. The activities as also provide an opportunities for preceptors to assess the learners' knowledge and understanding of the information in the module.

Unit Four is a decision support tree, designed to help RNs determine when to perform a vaginal exam in a defined clinical scenario. This decision tree focuses on the identified problem of suspected spontaneous rupture of membranes. The algorithm uses a colour coded legend that defines the steps in the clinical decision making process RNs use when rupture of membranes is suspected. Each step is numbered and corresponds with the rationale for the steps in the decision making process. The objective of the tree being over time, learners will refer to the algorithm only as a resource therefore, advancing from a novice stage to an expert over time.

For a practical application of the decision tree, the unit includes a case scenario for learners to review with their preceptors. This allows learner RNs to apply the knowledge gleaned from the decision tree to a clinical real life scenario. It also allows preceptors to assess and evaluate the learners knowledge and understanding of the decision making process.

Advanced Nursing Practice Competencies

Four areas of competency are defined in the Advanced Nursing Practice a National Framework document published by the Canadian Nurse Association in 2008. The four areas of competency are, clinical competency, research competency, leadership competency and consultation and collaboration competency. Advanced practice nurses use their knowledge, theory and research in conjunction with their experience to better themselves, the profession and address the more complex needs of the public by striving for the highest standard of care (CNA, 2008). I have demonstrated competency in all four areas during this practicum.

Clinical Competency

Demonstration of this competency requires the nurse to work in partnership with the patient and other team members, to provide comprehensive care in a holistic and integrated approach (CNA, 2008). Advanced practice nursing, as a foundation for this competency, requires specialty in a certain area.

My practicum focuses on the education of perinatal RNs, specifically, their knowledge, understanding and proficiency in vaginal exams in labour. Within the practicum, I used literature, consultations and supporting conceptual theories to develop a self- learning module for nurses learning the skill of vaginal exams. The goal of the module is to support perinatal RNs clinical decision-making skills in performing vaginal exams. The development of the module creates a new standard of education required for perinatal RNs to learn, achieve and maintain competency in the skill of vaginal exams. The module will assist perinatal RNs in understanding the role of vaginal exams in labour

as a key assessment tool used in the speciality of perinatal care. The understanding and knowledge acquired by completing the module should improve their clinical decision making and therefore enable RNs to provide highest standard of nursing care.

Research Competency

Competency in research requires the demonstration of the generation, synthesis and usage of research evidence (CNA, 2008). Literature was used to support and provide evidenced based material for module content. A review of other agencies self-learning modules helped synthesize the evidence based content for the module. The research based module demonstrates promotion of evidence based practice by the CRHCC Maternal/Child unit by using the literature and reviews to identify and procure the design and content of the module. Future steps for the modules will include further research by evaluating the modules' effectiveness in improving both clinical decision making and communicating of assessments between RNs and physicians.

Leadership Competency

The demonstration of this competency requires RNs to be agents of change. Advanced practice RNs serve to improve the delivery of care and find innovative ways to improve their organizations for the benefit of both the public and policy (CNA, 2008). The identification of the need for a vaginal exam self-learning module, illustrates a gap in current practice. Furthermore, the development of the module articulates a vision for a decision-making tool to support perinatal RNs to better understand the role of vaginal exams in labour. Additionally, the development of the module addresses how to appropriately use the exam as a means of assessing women in labour. Developing the

module can help meet the needs of both the public and policy as it standardizes nursing practice and ensures evidenced based nursing care is implemented for care of women during labor and birth. The module also provides the resource to support continued education and competency of perinatal RNs practicing on the unit. The development of this module also supports a change in practice by standardizing the use and communication of findings related to vaginal exams as an assessment tool by new RNs coming to unit which will in turn improve clinical decisions made for plans of care for women in labour.

Consultation and Collaboration Competency:

The CNA defines these two competencies as one competency. An advanced practice nurse must demonstrate an ability to both consult and collaborate with other team members in the health community. Communication with members of the health care team is a key component in addressing this competency. Working as a member of a team and asking for others input as well as adding my own input into a project demonstrates this competency (CNA, 2008).

Through the development of this module, I worked with the experts from the Maternal/Child department at the Cumberland Regional Health Care Centre. This team consists of different disciplines including physicians, manager, and nurses that added their knowledge to the development of the module in both design and content. The review of other institutions modules and orientation programs demonstrates further consultation and collaboration. Consultation and collaboration also occurred when procuring the images used in the module. Permissions and copyright approval were

obtained from primary sources through email. All consultations and collaborations provided useful information towards design and content, supporting the development of a quality, evidence-based self-learning module.

Next Steps

At the completion of this practicum, four units of a self -learning module on vaginal exams for perinatal RNs have been developed. The next step is to conduct a review of the module by the key stakeholders who will be using the module, specifically, the RNs of the maternal child unit. Also, as per hospital standards, the education module will need to undergo review by the Maternal/Child Quality Improvement Committee, which includes obstetricians, physicians, nurses, unit manager and adhoc committee members including the hospital educator. In addition, based on feedback, more units will be developed. For example, units on decision trees related to vaginal bleeding and preterm labour, and an algorithm for the steps and equipment involved in vaginal exams will be developed in the next few months. Evaluation tools that assess learners understanding and competency must also be created. Following this, the module will be piloted at the Cumberland Health Care Centre within the next year.

In order to complete these steps, forms of evaluation and feedback tools must be created. A plan for the pilot program and process for evaluation must also be developed. Questions such as, who are the intended RNs to pilot the project?, what number of modules are to be piloted?, what is the time frame for the pilot project?, who will provide feedback on the module when it is piloted?, and what tools must be created for the purposes of evaluating the project?, must be addressed.

The evaluation of the module after piloting, must not only involve evaluation from the learner completing the module, but also evaluation by physicians. Questions to ask the physicians must include are the communication of vaginal exam findings from RNs improved? and, are the RNs providing enough of the details and information from a vaginal exam for a proper clinical decision to be made you, as a physician?

Overall, the next steps for this module need to clearly define a process for piloting and evaluating the project. The process should work towards ascertaining how to implement a project so that RNs knowledge, understanding and proficiency of vaginal exams in labour is increased effectively.

Conclusion

At the end of this practicum, the goals and objectives were met. A literature review has been conducted, consultations with key stakeholders are completed, a self-learning module on vaginal exams has been developed and advanced nursing competencies have been applied during the practicum. I have yet to demonstrate achievement of the goal of the practicum because the project has yet to be piloted and evaluated. However, overall, my knowledge, understanding and proficiency in skill of vaginal exams has improved. Specifically, I am better at assessment of fetal presentation, position, and station. The practicum has also improved my ability to communicate my assessments to physicians, as I am now able to provide assessment information and labour progress in a clear and organized manner using appropriate language.

Informally, I have evaluated the effectiveness of the module. I offered a new RN, whom I had been preceptoring, to use the module as a resource. The new RN, despite

significant amount of hands on practice, voiced she did not feel confident in performing vaginal exams on labouring women. Given the opportunity to read the module, and through discussions she and I have had, the new RN believes the module has been helpful in increasing her confidence. Through our discussions, and during her evaluation process at the end of her orientation, I noted an increase in her knowledge and understanding related to labor assessment. More importantly, the new RN noted improvement in her proficiency.

In conclusion, this practicum demonstrates that there is a process for creating education. Furthermore, the recommendation to produce competent and confident nurses requires educational resources, such as the module creates in this practicum. The future plan to implement the module assists in attaining the goal of increasing perinatal RNs knowledge base regarding vaginal exams. In turn, it allows for the maintenance of evidenced based, safe and ethical care to women during labour.

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Appendix A

The Development of Self-Learning Modules for Vaginal Exams:

A Literature Review

There are many competencies required of perinatal RNs to care for the complex needs of labouring women. One such competency is proficiency in performing vaginal exams as a means of assessing labouring women. At the Cumberland Regional Health Centre in Amherst, Nova Scotia, the majority of vaginal exams are done by perinatal RNs as oppose to the physicians. As there is no current written guideline or policy to guide the perinatal RNs on the performance and understanding of vaginal exams, the potential exists for haphazard and inconsistent nursing care and labour management to be carried out by the perinatal RNs at the CRHCC.

With an influx of new RNs being hired to the unit in the last two years, much of the care and management of laboring women is being carried out by inexperienced RNs who lack expertise in vaginal exams. While new hires are orientated by senior RNs on the floor, who acts as their preceptors, orientation is not just to labour and delivery but to an entire unit which services all types of patients including pediatrics, surgical cases and acute medical cases. The responsibility of the preceptors is an immense undertaking. It is also a lot for the new RNs to take in as they learn the function of the unit and the skills needed to care for the patient population, including performing vaginal exams in a time span of only six weeks. This particular skill takes time and experience, beyond that found in an orientation period, for new RNs to become both competent and proficient in. As a

result, nursing skills such as the vaginal exams become the primary skill of focus for all new RNs orientating to the labour and delivery area.

Perinatal RNs are often times the primary care givers for women in labour, therefore being able to assess accurately the progression of labour will assist the health care team to identify and establish a plan of care for each patient. The proposed practicum will provide perinatal RNs with an education module that will standardize the approach to performing vaginal exams. The self-learning module will be evidence based and will assist perinatal RNs with their clinical decision making, as well as increasing their knowledge of vaginal exams and proficiency in the skill.

The following review of literature establishes support for the proposed development of a self-learning module for perinatal RNs in performing and understanding vaginal exams at the Cumberland Regional Health Care Centre by, examining the use of self-learning modules as an education modality for RNs. The literature review focuses on four themes: RN Post entry level education, the importance of vaginal exams in labour, self -learning modules and the use of algorithms in health care.

Also included within this report is a review of other agencies modules to examine content ideas for the module, as well as a review of other agencies perinatal orientation programs. The review also includes literature on the conceptual framework for module development.

Literature searches were completed using PubMed, CINAHL and Google scholar databases. In addition, literature from the driving forces of perinatal including, Society of

Obstetricians and Gynecologists of Canada and maternal child nursing texts were reviewed. Key search terms included: vaginal examinations, education, self-learning, communication, labour, obstetrics, nurses and physicians. The review of other sources required modules and policies to be obtained from other agencies by contacting the agencies themselves as well as using the search engine Google.

Theme One: RN Post entry level education

Registered nurses (RNs) receive their professional education by various ways, including diploma programs, a four- year undergraduate degrees or a combination of both. RNs who complete their undergraduate education and pass their national licensing exams, then enter the working world to care for the health of others. New RNs have many opportunities to work in different areas of health care from the moment they start their careers. While the most obvious career trajectory is to start as frontline health care worker caring for patients at the bedside, opportunities for research exist as well. The National Institute of Health (NIH) (2014) provides internship opportunities for new RNs to partake in clinical research opportunities, therefore allowing RNs to work towards bettering the way care is provided. Regardless of where a RN decides to work, there is a need for RNs to continue updating their education. To become a nurse means the individual is not only committing to providing the best care for patients, but there is also a commitment to lifelong learning. This is such a vital part of the nursing profession that each year RNS are asked to verify that they are actively participating in competency building. In Nova Scotia, in order to obtain a license to practice, RNs must complete a

competency tool called building your profile (College of Registered Nurses Nova Scotia, 2014).

As members of a professional body, all RNs ascribe to a code of ethics and follow a set of standards for care. Within Canada, the Canadian Nurses Association (CNA) (2008), provides all RNs with a code of ethics and a framework of practice. The code of ethics asserts that the world is consistently undergoing societal change, which in turn impacts nursing practice. In the most recent version of the code of ethics, the CNA (2008) identified a large list of challenges and opportunities that will impact specifically on future of nursing practice. Included in this list, though not an exhaustive one, is the projected increase in the complexity of patient care needs because of chronic illness, which will require well -functioning collaborative teams of health care providers to provide better and safer care. The code of ethics, as a guide for RNs ethical practice, calls upon RNs to be accountable for patient care by consistently updating their knowledge of how to meet the care needs of patients. RNs must be accountable to their scope of practice and be fit for practice. By this, the code encourages all RNs to seek out knowledge and information when their competence is challenged (CNA).

While the code of ethics, provides nurses with the guiding principles of how to practice and provide ethical care, the standards for nursing practice exist to direct and regulate professional nursing practice as a whole. The standards lay the legal and professional framework for nursing practice by identifying achievable and attainable levels of performance in practice expected of RNs as well as establishing the benchmarks for all nursing practice to be measured against (College of Registered Nurses of Nova

Scotia (CRNNS), 2012). The standards act as a guide to the knowledge, skill, and judgment required of the nurse to practice both professionally and safely (CRNNS). Within the framework for RNs practice, is the element of continued competence and development of expertise (CNA, 2007). The Canadian Nurse' Association (2007) asserts that undergraduate education prepares RNs as generalists within the health care world. Progression from novice RN to expert RN requires further education, inclusive of both informal and formal learning, that will enable RNs to grow in response to the changes in technology, systems and theories, along with the changes in patient and care needs (CNA). A commitment to lifelong learning ensures that RNs will continue to provide care that is evidence based with the insurance that better, safe and ethical care will be provided for patients. It also allows RNs to acquire and assume different roles during their career (CNA).

The Canadian Nurses Association' (CNA) (2004) position statement on continued competence of Canadian RNs emphasizes the importance of lifelong learning and its importance to continued competence. Continued education allows RNs to develop the skills and knowledge to integrate into their judgment and personal attributes, in addition to practicing safely and ethically. As a self-regulated body, it is the nurses' individual responsibility to seek out opportunities to increase their knowledge through continued education and ensure he/she is practicing competently. Regulatory bodies, professional ethics and standards, along with employers and educators and governments commit to supporting the nurses' endeavors for continued competence by the provision of education

opportunities as well funding to create the programs as well as sponsoring nurses to attend the programs (CNA, 2004).

In most cases, further education is required to practice on certain units based on the needs and types of patients being cared for. As an example, perinatal RNs need to have increased knowledge in the care of labouring patients, and in particular, how to complete assessments of labouring patients. Establishment and progression of labour is routinely diagnosed by vaginal exams. Therefore, it is necessary to ensure perinatal RNs are educated in performing these exams and have a solid understanding of the value of the information derived from an exams so the safest and most effective care can be provided.

Barriers in pursuing continuing nursing education

It has been widely acknowledged that nurses require further education after they have entered the profession. In fact, it is one of the strongest recurring themes in discussion with nurses across the country (Canadian Nurse Advisory Committee, 2002). Rural nurses, such as those at the Cumberland Regional Health Care Centre, identify certain obstacles in pursing education in general. Jackal, Henly, & Lindeke (2008), identified barriers to education for rural nurses as accessibility and availability while Penz, D'Arcy, Stewart Kosteniuk, Morgan & Smith (2007) revealed other barriers including, time constraints related to work schedule and financial constraints specific to the workplace. Another constraint, identified by Jukkala et al. (2008) was that nurses felt education was more focused on the urban center environment, isolating a need to have

the education adapted to the rural setting in order to be more relevant and applicable for RNs in rural environments as well as a need to have more programs at the rural settings.

Lalonde, McGillis Hall, Price, Andrews, Harris, and MacDonald-Rencz (2013) examined how educational opportunities for nurses impacted on their decisions to move within the country. Two major themes emerged from their research in terms of barriers, support for and access to continuing education. As a whole, Canadian nurses, in the study, felt largely unsupported in their pursuance of continuing education in terms of both financial support and flexibility in their work schedule. This led nurses to be pulled to other facilities and locations where their pursuance of education would be supported in terms of financial and time expenses. Nurses felt a need to balance personal and professional lives, and to pursue further education without the compensation for their time and expenses did not lend itself to achieving such a balance (Lalonde et al., 2013).

Motivation of nurses to partake in further education has been diminished when support is not available. Hughes (2005) found that nurses who work shift work valued their days off to spend time with family, and were largely unmotivated to do educational work as a result of fatigue induced by shift work. Hughes indicated that nurses want to have opportunities to have time away from the workplace setting to update knowledge and skills, but to do this, these same nurses need to be replaced at the workplace in order to maintain quality care to patients. Arguably, a long projected nursing shortage makes filling vacancies to permit this to occur, a less achievable goal. In an attempt to address such barriers, the CNA (2004) asserts that educational opportunities be flexible in terms

of mode of delivery as well as advocating for employers to support nurses in pursuing continuing education.

Specialized education and certification

The Canadian Nurses Associations (2009) identifies that many RNs are pursuing higher education levels such as advancing from the diploma program to the baccalaureate degree, and there has been an increase in the number of RNs pursing masters and doctorate programs. Technology has been a major contributing factor for the increasing enrollment number in educational institutions. These institutions have responded to nurses' needs and desires to partake in further education by adapting the programs to have increased accessibility using distance education (CNA, 2009). Opportunities for nurses to obtain specialized education in their fields are also available via distance programs. These programs allow nurses to advance beyond an entry level generalist into an expert in their field of nursing.

For perinatal nurses, such educational opportunities exist in the Canadian Nurses Association Perinatal Nursing Certification or the British Columbia Institute of Technology Perinatal Course. These programs facilitate the necessary education needed by perinatal RNs to become experts in in the field of perinatal nursing.

Cary (2001) explored the characteristics of certified nurses in North America. The majority of the certified aggregate worked as nurses in large urban centers, with a reported three percent working in rural settings. Furthermore, those nurses that actually pursued a certification had on average two degrees, an indication of a preexisting self-

motivation to increase knowledge. Certified nurses reported an increase in their confidence, competence, credibility, and a greater sense of autonomy. Certified nurses also felt the certification enhanced their overall practice in terms of better collaboration with health care professionals and a perception of higher patient satisfaction (Cary).

The value of such certification, is based on the perception of the nurses themselves. Niebuhr and Biel (2007) asserted that the attributes identified by certified nurses as positive, were reciprocated by non-certified nurses and nurse managers as well. This same study examined barriers and challenges to certification, and the surveyed population identified cost, institutional support and reward as the biggest barriers. While some facilities offered incentives or recognition for certification, it more commonly occurred that this was not the case (Niebuhr & Biel). Interestingly, these barriers are similar to those found in the literature regarding nurses pursuing any form of continuing education. There was a lack of literature support referring to the specific value of perinatal certification, though this is not an indication that there a need does not exist for perinatal RNs to have specialized education.

Why is there a need for educating perinatal RNs?

The Society of Obstetricians and Gynecologists of Canada (SOGC) (2012) acknowledge that rural maternity care, such as the case at the Cumberland Regional Health Care Centre, is often led by family physicians, nurses and midwives. Essential to the long term sustainability of low volume maternity units, as is common in rural settings, is interprofessional respect, and service models that support collaborative approaches to care and the opportunities for continued education (Medves & Davies, 2005). RNs

working within these rural maternity units are the epitome of multi specialists as the care needs of women during labour and birth require complex knowledge and skills with high level of responsibility with less resources. This is especially true in low volume units where nurses may be the only care provider in hospital who can evaluate and assess for normal progression in labour (SOGC). This type of model is called a nurse managed labour, reflects a facility in which the RN role is almost entirely autonomous and communication with the physician is usually by telephone as they are offsite (Simpson, 2005). In this type of model, the nurse in hospital makes many clinical decisions and is the provider of the majority of bedside care (Simpson). It was reported, that nurses enjoyed the autonomy offered by this model as it gave them pride in themselves and their profession (James, Simpson & Knox, 2003). However, the nurses also acknowledged that this type of model requires the physicians to have trust and respect in the nurses' abilities, and sometimes there can be professional and personal consequences such as being asked to work beyond their comfort area or scope (James et al.). Nurses that work in this type of model have to be confident in their knowledge of labour and delivery as well as their limitations, because with the autonomy comes power (James et al. 2003). Though the model suggests that RNs have to have a lot of knowledge and expertise in labour and delivery, the most important element is the communication that must and should occur between physician and nurse regarding assessments and plans of care (Simpson; James et al.).

Adverse patient outcomes

Another factor influencing the need for RNs to have education is based on safety concerns and the incidence of adverse patient outcomes in the field of obstetrics. According to the Canadian Institute of Health Information (CIHI), the most common adverse events that occur in Canada are related to medications, infections and obstetrical traumas during childbirth (CIHI, 2007). The traumas that occur to the neonate in childbirth occurred in 7 per 1000 births during the 2003 to 2006 (CIHI). Obstetrical trauma, relating to trauma of the maternal pelvic area, occurred in 47.3 per 1000 deliveries (CIHI). In both cases the recommendation to avoid such traumas is linked to adhering to the guidelines provided by governing bodies in the world of obstetrics, specifically the Society of Obstetricians and Gynecologists of Canada (CIHI). The incidence of traumas in childbirth to both mother or neonate, are indicative of the need to carefully monitor labour and evaluate risk levels so as to provide the best possible outcomes. In nurse-managed labours, much of the assessments are completed by the nurses, so nurses must be well educated in best practices in perinatal nursing. It is also essential that communication between nurses and physicians be thorough in order to decrease the risk of traumas.

Why Perinatal RNs need education on vaginal exams?

Perinatal RNs require education on many facets of care when dealing with the labouring women. One of the most necessary skills used is the vaginal exam because it can provide so much information with regards to the establishment and progression of labour. Instruments and technology such as external electrodes and internal electrodes have sought ways to determine cervical dilatation non-invasively, but none have garnered

acceptance in the world of obstetrics care (Nizard, Haberman, Paltielei, Gonen, Ohel, Nicholson & Ville, 2009). Until such time that non-invasive technologies gain acceptance to the world of obstetrics care in gathering the same key information that is derived vaginal exams, the standard of assessing for labour and its progression will be the use digital vaginal examinations (Baskett, Calder & Arukumaran, 2014). While a vaginal exam is a subjective assessment tool, as evidenced by the differences of assessed cervical dilatation that can occur between practitioners, it is the principal assessment tool used by RNs and other health care professionals to determine whether a woman's labour is established and progress is occurring (Nizard et al., 2009). Nizard et.al recommended the integration of ongoing training and education be provided to all practitioners, especially those junior staff new to labour and delivery, as well as new to performing vaginal exams as a strategy to continue to improve care in labour and delivery.

When assessing if women are in labour, as a rule, the vaginal exam is the most important observation (Baskett, Calder & Arulkumaran, 2014). The exam itself is uncomfortable physically, carries the risk of transmission of infection, and places women in a position of vulnerability (Baskett, Calder & Arulkumaran). For these reasons, there is an onus placed upon practitioners to perform the exam skillfully, appropriately and respectfully (Baskett, Calder & Arulkumaran). A vaginal exam involves the practitioner inserting two fingers, usually the index and middle fingers, into the vaginal opening of the patient. The practitioner than uses their fingers to feel and assess for factors which include: presentation of the fetus, cervical effacement and dilatation, station and position of the fetal head, status of the amniotic membranes or subsequently the color of amniotic

fluid (Baskett, Calder & Arulkumaran).Though common in most current practices, examinations should not be done simply to assess for cervical dilatation. The reasoning this is most likely occurring in current practice is because cervical dilatation alone is often the most sought after piece of information in the determination of whether a woman is in active labour (Baskett, Calder & Arulkumaran). In doing the exam to assess only one factor is a missed opportunity to obtain pertinent and useful information such as fetal position, fetal station, effacement and consistency of the cervix, all factors pertinent to monitoring the progression of labour and information that will assist with the subsequent management of the labour (Baskett, Calder & Arulkumaran, 2007).

Theme Two: The importance of Vaginal Exams in Labour

Defining Labour

The acknowledgement of labour and its subsequent progress are crucial components in the world of perinatal health care, and therefore criteria must be established to define labour or what is meant by the term (Baskett, 2004). However, this is problematic as many definitions exist through the literature. Definitions can include various combinations including regular painful contractions, cervical dilatation of three to four centimeters, and spontaneous rupture of the membranes and full effacement of the cervix (Baskett, 2004; Stalhammar & Bostrom, 2008; O'Driscolll, Foley & MacDonald, 1984). Common among most of the definitions was the rupture of amniotic membranes as a clear indicator of labour, although it is not a condition for a diagnosis of labour to be established (Baskett). Most definitions refer to the presence of regular painful contractions with a dilatation of three to four centimeters of the cervix, but others say

labour can be diagnosed with just some effacement of the cervix and contractions (Baskett; Salhammar & Bostrom; O'Driscolll, Foley & MacDonald).

Problems occur when health care professionals, such as RNs attempt to distinguish between early, active and false labour. Women are not homogenous in the manner in which they present in labour, making it difficult for RNs to determine a proper plan of care especially when women are not in observable labour. Interventions such as fetal heart monitoring and monitoring the laboring women vital signs including pain control may be inappropriate when true labour is not distinguished. When trying to decipher the puzzle between early labour and false labour, Baskett (2004) advocated for a period of observation of the women for four to six hours as it is sufficient time to reassess the woman by vaginal exam and note changes in dilatation, presence of bloody show and/or the progressiveness of more painful regular contractions. In most cases, women who are two to three centimeters dilated, with progressive regular painful contractions, bloody show and/or rupture of the membranes can be determined to be in labour (Baskett).

The various definitions of labour that exist in the literature make it a difficult task to settle on one defined definition of labour as a whole. It is there more conducive to look at the stages of labour and the definition of active labour. In the literature, active labour is defined most commonly as dilation of the cervix at 3-4 cm dilated, effacement, and regular painful contractions five minutes apart or less (National Institute for Health and Clinical Excellence, 2007; Perinatal Services BC, 2011; Reproductive Care Program of Nova Scotia, 2010 ; World Health Organization, 2008). This definition of active labour,

due to its consensus in the literature, will be used as the definition for the proposed project.

Progression in Labour.

Stalhammar and Bostrom (2008) advocated for the development and use of policies for labour management to assess labour progression. The use of policies would define how caregivers should manage labour and includes a specific cervical dilatation to use as a guideline. One way this is done is by use of partography and assessing for dilatation within a defined timeframe to ensure progression of labour (Stalhammar & Bostrom). Partography or the partogram is a tool used in labour, and provides a pictorial overview of labour progression, inclusive of the information garnered from performing vaginal exams (Downe, Gyte, Dahlen & Singata, 2013). The name Friedman is most often associated with partography, as his research established normative values for cervical dilatation progress in different types of labour, from latent to active, in both nulliparous and multiparous women (Baskett, 2004; Baskett, Calder, Arulkumaran, 2007). Recent efforts have been made to construct and update partographs that are simpler and easy to use. Orji (2008) used one such tool, designed by the World Health Organization, in a study assessing the progress of nulliparous and multiparous womens' labour. The partograph included use of a graphing line once active labour was established at a measure of at least four centimeters cervical dilation. An alert line of progress indicated to care providers the need to consider appropriate actions when labour was not progressing as it should per the partograph. When timely progress of cervical dilatation does not take place, diagnosis of labour dystocia occurs, and as such associated actions

such as augmentation, instrumental delivery and caesarean section can transpire (Baskett). Diagnosing non-progressive labour, should not be tied to use of partography, but more practically the expectation of 0.5 to 1 centimeter an hour progress in cervical dilatation during labour (Baskett). In cases of non-progressive labour it is important to first determine the cause and take corrective action from there before using more invasive measures such as caesarean sections (Baskett, Calder & Arulkumaran). Much information regarding the factors that can precede a diagnosis of non-progressive labour can be derived from the information gathered from the vaginal exam. The diagnosis of non-progressive labour is derived from failure of progress in cervical dilatation to occur, which can only be assessed by vaginal exam (Baskett).

Frequency of vaginal exams in labour

The performance of vaginal exams, once active labour is established, is recommended to be done every three to four hours in a normal low risk labour, unless the clinical situation dictates it should be performed earlier such as in a case of fetal distress or non-progressing labour (Baskett, Calder, & Arulkumaran, 2007; World Health Organization, 1996). The recommendation for a time line in performing vaginal exams allows health care professionals to actively manage the labour and ensure progression is occurring and thereby ensures the labour is not prolonged or protracted and proper interventions can be implemented (Baskett, Calder, & Arulkumaran ; World Health Organization). The timeline of every four hours to perform vaginal exams is also derived from the use of the partograph and its imposed alert line. However, evidence suggests that more research needs to be done in the area of active management of the first stage of

labour and establish clear determinants for what is meant by prolonged labour (Amorim, 2009).

Risks and Benefits of using vaginal exams.

Use of routine vaginal exams was also found not to improve outcomes of labour for either women or neonates in a Cochrane review (Downe, Gyte, Dahlen & Singata, 2012). However, the studies included in the review were using small sample sizes, limiting the generalizability of the findings. As a result, it was suggested that the focus a future research include examining the effectiveness and use of vaginal exams compared to or in conjunction with other aspects of assessing labour (Downe, Gyte, Dahlen & Singata).

On average women had four vaginal exams in labour (Borders, Lawton & Martin, 2008). Studies have been used to examine the risk of infection related to vaginal exams in labour. Borders, Lawton and Martin carried out a study with a sample of 205 women and found an increase in chorioamnionitis in women who had more than 7 vaginal exams in labour. Cahill, Duffy, Odibo, Roehl, Zhao and Macones (2012), in a larger study of 2395 women found no significant association between number of vaginal exams and risk of fever. Acknowledging that there are risks with performing vaginal exams only further supports the need to educate perinatal RNs. RNs must know how to perform the exams as well as understand the value of the exam to the plan of care for labouring women and perform them appropriately.

Vaginal Exams in High Risk Labours.

Within the world of obstetrics the vaginal exam is important to prevent or detect emergency situations. Obstetrical emergencies can include cord prolapse, breech presentation or other malpresentations that can interfere with the progression of labour and spontaneous vaginal delivery (Baskett, 2004; Perinatal Services British Columbia, 2011).

A skilled practitioner in vaginal exams can diagnose a malpresentation by determination of the presenting part. Malpresentations such as face or brow presentations are usually incompatible with vaginal delivery (Baskett). Cord prolapse, is an obstetrical emergency that occurs when amniotic membranes rupture and the cord falls below the presenting part. A cardinal sign of cord prolapse is fetal bradycardia (Wong, Perry, Hockenberry, Lowdermilk &Wilson 2006). In any case, when fetal bradycardia occurs a vaginal exam should be performed immediately to assess the reason for bradycardia such as when a prolapse is suspected (Baskett, 2004; Perinatal Services British Columbia, 2011; Wong et al.). In the case of the prolapsed cord, the presenting part needs to be elevated in order to eliminate the possibility of the presenting part from placing pressure on the prolapsed cord. This is accomplished through vaginal exam and using the fingers to elevate the head as well as complementary interventions such as knee chest positing of the mother and placing the bed in Trendelenburg position (Baskett; Perinatal Services British Columbia; Wong et al.).

The above examples of obstetrical emergencies illustrate the need for skill in vaginal exams. Where RNs are the primary care provider that is available immediately to

the labouring women, it further demonstrates the RNs need to have education and be skilled in vaginal exams so proper and immediate interventions can be taken in the case of an obstetrical emergency.

Theme Three: Self –learning modules

As continued competence is an essential component of good care and subsequent better patient outcomes (CNA, 2004), how is specialized education obtained? The world of health care today, places increased demands on nurses to provide the best care to more complex patient care needs, but this does not always include an opportunity for all nurses to take lecture based classes, or courses to ensure the most up to date information is obtained (Zadvinskis, 2008; Schmidt & Fisher, 1992). As new evidence is discovered each day, disseminating information in traditional forms such as classroom lectures would never ensure that all nurses can obtain the information in a timely manner. One such avenue that would allow RNs to procure essential education on specific skills is by self-learning modules.

The use of self-learning modules is not a new concept. In an age where nursing is facing a long predicted shortage accompanied with the increasing demands of complex patients who have diverse care needs, it becomes imperative that those providing care must be supported and provided with proper education to address these care needs (Canadian Nurses Association, 2008). Self-study has become one effective education avenue used address the need and has been shown to be effective in the nursing profession (Murad, Coto-Yglesias, Varkey, Prokop & Murad, 2010).

Self –learning modules are supported by the type of learning referred to as individualized learning or self-learning (Morrison, Ross, Kalman & Kemp, 2011). The use and development of self-learning modules arose due to the demands placed on nurse educators (Schmidt & Fisher, 1992). Facing decreased resources yet an increased demand for education, nurse educators had to devise a plan in which nurses could learn and gain knowledge, but not in lecture or classroom, which would take nurses off the units (Schmidt & Fisher, 1992).

Effective development of self-learning modules is founded by the elements it is composed of including appropriate media, content and format (Schmidt & Fisher, 1992; Clifford, Goldschmidt, O'Connor, 2007). In effort to address the various learning styles, incorporation of diagrams, pictures and case studies has been shown to be an effective design choice in self-leaning modules (Schmidt & Fisher; Clifford et al.). Suggested format designs for nurses include identifying a purpose, learning objectives, glossary of terms, summaries and posttests (Clifford et al.). Content of self-learning modules should be distributed into sections, creating steps of learning, limiting one page to one concept (Schmidt & Fisher). Use of case studies assimilate the information just read, and examinations test knowledge. Both are valid tools to use in a self-learning module for feedback (Schmidt & Fisher).

Strengths self-learning modules

Despite the various names for this format of learning, the principles underlying are similar. The success of self-learning stems from learners being responsible for their own learning, where the learners work at their own pace to achieve specific learning

objectives, usually set out by an instructor (Morrison, Ross, Kalman & Kemp, 2011). Formats of self-learning usually include activities that are specifically designed to meet objectives, and do so in small steps. The instructor thus becomes the resource for assistance if required by the learner, rather than the source of all information (Morrison, Ross, Kalman & Kemp). Strengths of self –learning programs include compliments different types of learners, promotes self –reliance which may permeate beyond the instruction into other facets of work and life, more time for the instructor to spend with learners, cost effective and information is consistent (Morrison, Ross, Kalman & Kemp). Self-learning modules are self-contained guides that take learners through a step by step process to meeting educational objectives (Schmidt & Fisher, 1992). Nurses are often working long hours and self-learning modules acknowledge that each person concentrates best at various times, and provide an avenue for the individual nurse to complete learning that is self-paced (Carcich & Rafti, 2007). In some cases, self-learning modules can be complimented with lectures, discussion, and simulation so the nurse can further individualize their program (VanWynen, 1997).

Another advantage of self-learning modules are the development of the competency and/or feedback tools. A study of the effect of feedback tools on self-directed learning for midwifery students demonstrated that feedback was valued. Written feedback, as well as verbal feedback on a continuous and longitudinal basis showed the learners their progress and areas to improve on. The inclusion of an assessment checklist helped the students ascertain what they needed to do to achieve their outcomes. Overall

the value of feedback tools was positively favored to be integrated into the self-directed learning (Embo, Driessen, Valcke & Van Der Vleuten, 2010).

The advantages of self-learning modules to nursing has also seen in the literature. Self-study modules are not only used to introduce a new concept to nurses, but also to improve their current practice, by presenting the newest and most up to date evidence around a practice. An example of this was a self-study module involving wound care documentation. The module sought to correct inappropriate wound care documentation by nurses, which was posing the potential for inconsistent wound care. Following the dissemination of the self-study module, the nurses provided mostly positive feedback, including an increased confidence in their ability to document wound care (Koeber, 2009). Further details of this study are located in Appendix A1.

Nurses desire to be up to date in practice, but job demands and life in general often interfere with one's ability to seek out their own learning or attending conferences. Perioperative nurses in Louisiana were self-professed ill prepared to respond to bioterrorist attacks, but following the reading a self-study manual on bioterrorism, their self-rated preparedness scores increased (Thomas, 2008). Even in cases where nurses already had education on bioterrorism in another format, their self-perceived preparedness for responding to an attack increased by a factor of thirty percent (Thomas). Additional details of this study can be found in the attached table located in appendix A1.

Limitations of Self Learning Modules

Limitations of self-learning modules include, less interaction between learner and instructor, learning can become boring because of its single path design, self-paced may be problematic for some learners as it means the development of new skills to create their own deadlines and avoid the pitfalls associated with procrastination. In the planning of an education course, there is sometimes the need to involve others. This is a limitation because ascertaining cooperation of multitude of supports may be difficult due to time restraints, availability as well as whether there is interest in the project to actually invest support. Finally, the initial cost for development, in terms of time for preparation of a module, may exceed that of individual lecture presentations (Morrison, Ross, Kalman & Kemp, 2011). Self-learning modules are not always the preferred mode learning in nursing. Carcich & Rafti (2007) hypothesized that experienced nurses would prefer the use of self-learning modules over traditional lecture. Their hypothesis, despite being supported by literature, discovered experienced nurses involved in the study preferred the lecture environment as it provided opportunities to discuss and interact with colleagues. The study was limited by a small sample size and the topic of the module. The self-learning module did not set to increase the individuals' knowledge on a skill or practice, but rather introduce information about the hospital. It was acknowledged by the investigators that socialization is an important aspect in orientation, as new hires want to feel welcomed. By use of the self-learning module, individuals may have felt isolated and ostracized, and could not foster a sense of belonging into the facility when using self-

learning module. The results of this study could not be generalized to a larger body due to these limitations (Carcich & Rafti).

Neonatal nurses and maternal child nurses were asked to identify their preference for learning format in a recent study (Pilcher, 2013). Though a small sample size of only 318 nurses responded, the majority preferred lecture style with self-study coming third. Indicating a favor towards lecture was not without limitations. Researchers only posed the question as to which format the nurses enjoyed the most rather than asking which format they felt they gained the most knowledge from. The study did not measure the effectiveness of the learning modality but rather just the nurses' preference. Furthermore, it was felt that the individual nurses biases would have influenced their response, as the most common form of education they were accustomed to be lecture (Pilcher).

Learning modules for RNs on Vaginal Exams

Literature support was limited for what types of education professionals receive on performing and understanding vaginal exams in labour, especially the education of nurses. One study, involving health care professionals in the field of obstetrics, found the use of vaginal models to teach assessment of cervical dilatation. Hard and soft models were used. A hard model involved baked clay formed to the shape of a cervix at dilations of up to six centimeters. Soft models used foam molded to cervical shapes covered by gloves. Use of hard models seemed to produce more accuracy in cervical dilatation, but use of soft models was advocated as it would increase accuracy in the actual working environment. The participants, overall, had lower accuracy on the softer models,

however it was the nurse cohort that had the greatest accuracy on this model at a dilation of five centimeters or less (Huhn & Brost, 2004).

No studies could be found regarding the use of self-learning modules on teaching vaginal exams to perinatal RNs. There also was no literature found on any forms of teaching vaginal exams to RNs. Kraynek (2012) published about a new program proposed in teaching hospital in which residents would teach RNs how to perform vaginal exams using simulation with cervical models. The programs objective was to increase communication between disciplines by the sharing of knowledge. The programs' success or outcomes has not been published in the literature. Further details of the above mentioned literature can be found in Appendix A.

The lack of literature around what education materials are being used to educate RNs on performing vaginal exams in labour further demonstrates a need to develop materials due to the importance of the vaginal exam in caring for women in labour.

Algorithms in Health Care

The use of algorithms on the maternal/child unit at the Cumberland Regional Health Care Centre is prominent and RNs are familiar with how to use them. Examples of algorithms used on the unit are: Neonatal Resuscitation Program, Group B Streptococcus Chemoprophylaxis and WinRho Program protocols. Algorithms, as a teaching tool, were examined in the literature for possible consideration to be included in the self-learning module.

Advantages and disadvantages of algorithms.

The use of algorithm is often as a teaching format to introduce and educate learners the steps for complex procedures. Advantages of algorithms include: helping learners spot most relevant information in a clinical situation, saving learners time in remembering and understanding complex situations and they can reduces one on one instruction for teaching problem solving (Billings & Halstead ,2012). Algorithms also have been shown to improve the clinical decision making in novice nurses, allowing them to be proactive vs. reactive in complex clinical situations (Billings & Halstead, 2012).

Disadvantages of Algorithms.

While the advantages of algorithms are numerous, from the literature also emerges disadvantages. Billings and Halstead (2012) account that to ensure the improved clinical care seen with the algorithm, the disadvantages related to design of the algorithm must be surmounted. Algorithms are very time consuming to design and require very precise and accurate steps to ensure a task is completed accurately. Also, in some cases, the learner does not have experience with algorithms and time can be lost in explaining to the learner how to use the algorithm itself.

Value of algorithms to health care.

Despite the disadvantages of designing algorithms, from the literature emerges support that, overall, algorithms improve patient care. Examples include use of algorithms lead to an increased amount of skin to skin done with neonates (Brenneman & Price, 2014). Improved wound care by nurses was demonstrated when basing dressing changes on an algorithm related to type of exudate (Gove, Hampton, Smith, Hedger & Topley, 2014).

Review of Vaginal Exam Learning Modules, Policies and Programs

Due to lack of literature support surrounding what is used in teaching RNs about vaginal exams in labour, and what should be included in self-learning module to meet the education and competency needs of perinatal RNs in performing vaginal exams in labour, a review of other agencies modules was undertaken (Appendix B). E-mails were sent to five agencies in the Maritime Provinces. Responses were received from three, the Isaak Walton Killam Children's Hospital (IWK) in Halifax, Nova Scotia, the Prince County Hospital in Summerside, Prince Edward Island and the Aberdeen Hospital in New Glasgow, Nova Scotia. The latter reported using the module as supplied by the IWK. Prince County had no module but provided their policy on vaginal exams. An internet search revealed no other well defined modules, such as supplied by the IWK. The Champlain Regional Maternal Program had a guideline for vaginal exams and the Perinatal Services of British Columbia had a decision support tool, of which the portion involving intrapartum care and vaginal exams was used for this review. A summary table was constructed to identify the strengths and weaknesses of each source and the overall impression in detail (Appendix A2).

The IWK self-learning module, as the only true self learning module, gave the overall impression that it would be the most beneficial to RNs even though it meant RNs having to reference other sources. One specific strength of the module was its inclusion of guidelines and policies as a quick reference tool. This would permit the RNs who complete it to have something to quick to reference other than the entire module. This is especially helpful for RNs because one of the modules weaknesses is that the chapters

were not identified well, in terms of content. Other weaknesses included: no definition of the terms labour or distinctions of different types of labour and that the module was not self-contained, and required learners to subsidize their learning by seeking out other texts.

The Prince County document was a policy and procedure as opposed to a module. One of the strengths of this format was it was brief and to the point, meaning it would not take RNs much time to review, but this would also be a weakness because it does not add to the RNs understanding of the importance of performing vaginal exam but only the how to perform the exam.

The Champlain Newborn Regional Program again is not a module but a policy and procedure. This resource is more elaborate than the Prince County policy and procedure. The strength of this program is the details included important information of how the examiner should communicate with the laboring women and included pictures and explanations of important aspects obtained from the exam including fetal position and station. One of the weaknesses is the emphasis on following documentation guidelines. Unfortunately the program only refers to documentation policy, it does not include the actual policy.

The final document reviewed was produced by the Perinatal Services of British Columbia. The document was cited as a support tool for registered nurses in managing labour in the absence of a primary maternal care provider. The large document provided information on a multitude of obstetrical issues that can arise during the course of a woman's labour. For the purposes of the review, only the portion referring the progression and dystocia of labour was reviewed. One of the strengths of this document

was the inclusion of easy to follow flow charts as well as indicators for when the RN should alert the primary care provider if problems arise in the labour progression. The weakness is that it is a large document, and contains very little about vaginal exams and more about obstetrical complications.

Overall, each source was consistent in indicating in some way the indications and contraindications for vaginal exams as well as the equipment to be used. Illustrations were included in the majority of the sources, as well as what should be included in documentation or reference is made to refer to documentation standards. Weaknesses of the sources included the lack of definitions of labour and objectives to be met in performing vaginal exams properly. Another limitation was that proper comparison of sources was limited, as only one source was an actual self-learning module. In summation, the lack of module sources is indicative of the need to develop such sources to support the educational needs of perinatal RNs in understanding and performing vaginal exams in labour.

Education Orientation Programs for Perinatal RNs across Canada

In addition to the review of educational resources on vaginal exams, e-mails were also sent out to agencies across Canada examining they types of orientation and education programs available to perinatal RNs.

In Newfoundland, orientation includes both theoretical classroom time and hands on practice. During the orientation, the skill of performing and understanding the role of the vaginal exam is both learned and practiced (C. Bessel, personal communication, 2014) A learning package on vaginal exams is used in Western health but, due to time

constraints, was not readily available to be reviewed (B. Crummey, personal communication, 2014).

In Fraser Health (British Columbia) RNs generally learn the theory of vaginal exams when acquiring their perinatal nursing certificate specialty program at the British Columbia Institute of technology (BCIT). New graduates also learn about vaginal exams throughout their clinicals, practicing vaginal exams, which are rechecked by their clinical preceptor for accuracy.

The BCIT Perinatal certificate program is used by hospitals throughout the greater Vancouver area. The program is composed of both theory course and practicum. Once completion of the program is achieved, RNs return to hospital and receive an additional 12 preceptored shift where consolidation of fundamental skills will occur. This last preceptorship is led by a hospital educator and the goal is for the RN to manage independently the care of a low risk laboring woman. In terms of validation of competency, the assumption is that knowledge & understanding of vaginal exams has been assessed while attending BCIT. The focus is for the hospital, is therefore, to provide the opportunity to consolidate the RNs knowledge and practice (I. Bariabeu, personal communication, 2014; D. Grunert, personal communication, 2014).

Other orientation programs and resources used across Canada include: Association of Women's Health, Obstetric and Newborn Nurses Perinatal Orientation Program used in Cape Breton Nova Scotia and the Maternal Newborn Orientation Modules available online for the Reproductive Care Program of Nova Scotia. Programs such as More-OB, Advanced Life Support in Obstetrics (ALSO) and Advanced Labour

and Risk Management (ALARM) are available to nurses to learn about high risk pregnancies and deliveries, and do not cover skills fundamental to perinatal RNs such as the vaginal exam.

Across Canada, support and resources for learning fundamentals about perinatal nursing is instituted in more formal education avenues, which include both theory based and practice based learning. The Cumberland Regional Health Care Centre does not have such programs, further supporting the need to develop resources such as self-learning modules to educate perinatal RNs.

Conceptual Framework

The design of a self-learning module for perinatal RNs on vaginal exams is supported by using principles and concepts from theories, making up the conceptual framework for the project. These three theories are: Knowles Theory of Adult Learning, Kolb's Inventory of Learning Styles and Benner's Theory of Clinical Competence: Novice to Expert.

RNs as Adult learners: Knowles Theory of Adult Learner

In the development of educational materials it is essential to design in a method that can address certain types of learners. A lecture/discussion design can induce passive learners, and information may be presented differently based on the audience it is presented to and the questions asked (Morrison, Ross, Kalman & Kemp, 2011). Self-learning modules promote active learners, as learners can learn at their own pace and be independent in their learning (Morrison, Ross, Kalman & Kemp).

RNs are adult learners, and as such have been discovered to ascribe to certain characteristics. Malcolm Knowles, a pioneer in adult learning theory, identified six principles of adult learners (Lieb, 1991; Morrison, Ross, Kalman & Kemp, 2011; Russell, 2006). First, adults are autonomous and self-directed and as such learn better when facilitated through the learning process. As self-directed learners, adults assume responsibility for their own learning and are facilitated to reach personal goals. The second founding principle is that adult learners are not a blank slate, but rather carry with them a foundation of life experience and knowledge. As such they connect current learning with the underpinnings of their knowledge base. The third principle of Knowles theory is that adults are goal orientated. In enrolling in any education or learning environment, adults have a set goal in mind. Educators can facilitate the goal orientation by having clear objectives of the program itself. Objectives also become an important part of the fourth principle, in that adults are relevancy orientated. This means adults are focused on applying their learning to their work. The learning must therefore have value to them. Adult learners therefore choose education or projects that are reflective of their own interests. In choosing something that is reflective of their own interest, it demonstrates the fifth principle Knowles Theory that adults are practical beings. Knowledge for the sake of knowledge is not the focus of adults. Knowledge must be useful to adults. The sixth and final principle of Knowles adult learning theory, is adult learners require respect. This implies that educator and learner are equals, and that each can call upon their knowledge and experience to offer opinions on the learning environment or project (Lieb; Morrison, Ross, Kalman & Kemp; Russell,).

Self-directed learning can accommodate all of the principles of adult learners identified by Knowles (Russell, 2006). Knowles, connected his theory of andragogy with self-directed learning though did not specifically assert that the concepts are mutually exclusive to adult learners (Russell). Russell depicts androgynous learners as those that can learn more and learn better than those learners who seek the passive pedagogical avenues. In taking the initiative to pursue learning, the learning itself is more purposeful and the learner is internally motivated. As a result, Russell identifies that the learner has a tendency to retain the knowledge longer and consequently make better use of the knowledge.

As the proposed module is being developed for adult learners, the self-learning module can facilitate learning by using those key principles of adult learning. Perinatal RNs, by following their standards and code of ethics, have made a commitment to provide the best and safest care possible to patients. The self-learning module facilitates the RNs in allowing them to take responsibility for their own learning at their own pace. The self-learning module focuses on vaginal exams which correlates with the principle that it be applicable to their life. Furthermore the information will be useful as it will facilitate the RNs goal of providing better care to their patients, by enhancing their knowledge on vaginal exams in labour. Overall, a self-learning module on vaginal exams for perinatal RNs is reflective of the principles of adult learning as it is can be applied to the RNs work and support their goals of better and safer care.

Learning styles

Knowles theory is well known for the principles of adult learners, as it describes attributes of adult learners. In conjunction with this is that adult learners also learn by various avenues or styles. Learning styles are best defined as the characteristics that are an indication of how the learner interacts with the learning environment, as well as how they perceive and respond to it (Registered Nurses Professional Development Centre, 2007).

The Registered Nurses Professional Development Centre (RNPDC) (2007) introduced learning styles as part of its preceptor development training. Referring to Kolb's inventory of different learning styles, four styles were identified: assimilators, divergers, convergers and accommodators. By acknowledging the different styles of learners, educators can design learning environments and materials that are the conducive to all types of learners. Learners have a tendency to use all four all styles but usually prefer and learn best from one style (RNPDC). The RNPDC has distinguished how each style of learning has implications for preceptors including preferred methods of learning, common traits and description each style that can be used and adapted into the preceptors method of teaching.

The RNPDC (2007) identified assimilators, to be perceived as slow learners or even disinterested, when in actuality they have a strong desire to learn the why about subjects. It is suggested that assimilators learn best by analyzing theories and concepts. This type of learning style is attributed to best learn through activities such as reflective exercises and brainstorming. It is recommended that information is best delivered in

detailed, systematic manner at a slow unhurried pace to accommodate the assimilator learning style (RNPDC).

Divergers, or pragmatists, were characterized by their ability to problem solve (RNPDC, 2007). It is implied that they are objective learners who enjoy being independent and in control. The RNPDC suggested divergers learn best in small groups or one on one sessions that involve interactivity as they are quick thinkers who focus on details of learning the how of a subject.

Convergers or theorists are acknowledged for strong planning abilities (RNPDC, 2007). These types of learners are precise, careful and work independently, learning best in environments such as lectures, workshops and conferences (RNPDC). It is suggested that convergers strongly respect experts and prefer accurate and organized delivery of information, so as to allow them to understand about the subject being learned (RNPDC). The learning preference of this style is with real scenario application. It is also essential to acknowledge that these learners need time to assimilate to knowledge until they feel prepared (RNPDC).

The final style of Kolb's inventory, identified by the RNPDC (2007), is the activist or accommodator. It is best described as the style that likes doing things and enjoy new experiences. It is suggested that these types of learners often possess leadership skills, adapt well to change and encourage others to get involved in projects (RNPDC). Projects or presentations, especially in group situations, is cited as the preferred learning format. It is advised that users of this style can be impatient as they want to apply knowledge as soon as possible. It is often the application of the knowledge

that permits those that ascribe to this style to fully understand the subject they are learning about (RNPDC).

By understanding that adults learn differently and by different avenues, allows programs and education materials to be designed to incorporate all styles so that the knowledge can be gained. Educational materials are developed to expand and enhance learners' knowledge, therefore implicating and assuring that different learning styles are addressed is an essential component in ensuring that knowledge is gained. This is true of the proposed self-learning module on vaginal exam as well. The module will attend to the different learning styles in the following ways. For the assimilators, who prefer an unhurried pace, which can be achieved by the module which can be completed at the learners own pace.

Divergers enjoy being independent and in control which, again is accommodated by the self-learning module because the learner is in charge of their own learning. Furthermore the feedback and interaction with another nurse facilitates the divergers' penchant for one on one interaction.

Convergers prefer the real life scenario application which can be accommodated by the proposed feedback tool and the application of scenarios and use of cervical models. Accommodator will also be served by the use and application of scenarios and feedback tools, to facilitate their partiality to apply knowledge as soon as it is learned.

Overall, self-learning modules are one type of education material that can be designed to address many learning styles as well as be an effective learning tool for adult learners (Morrison, Ross, Kalman & Kemp, 2011; RNPDC, 2007).

Benner's Theory of Clinical Competence: novice to expert

As the specific goal of this project is educating perinatal RNs on the understanding and performance of vaginal exams in labour. It is necessary to guide the learner in the trajectory from novice to expert, as a specific concern is new RNs requiring the knowledge on vaginal exams in order to practice safely and ethically and provide the best care possible to women in labour. A nursing theory involving the acquisition of skills from novice stage to expert stage was introduced by Benner in 1982. As a theory, Benner identified five stages of experience that a nurse can transition through as they acquire and learn new skills (Benner, 1982).

Stage one is novice. A novice has no experience in the environment in which they need perform. As a novice, guidance is required due to a lack of confidence and knowledge. In this stage the novice will be taught rules to follow in doing a task or skill in the unfamiliar situations. The rules cannot be the only form of guidance because, at the novice stage, the nurse has no concept of when the rules apply, as there are exceptions in real life application. For this reason, novice nurses are paired with another at a more advanced stage who can provide more guidance in regards to the application of rules. Guidance should be in place for a period of time (Benner, 1982). For new perinatal RNs, this could be reflected in their first day on a unit and a woman presents for a labour assessment. The proposed self-learning module will have provided the novice nurse on how to perform a vaginal exam assessment and has identified when it is applicable to do so. However, further guidance will come from their preceptor in terms of the accuracy of the assessment, by verifying their findings. The RN preceptor will act as a guide for the

new RN to refer to and learn from during the training period about many aspects in labour and delivery. Guidance would be directed from their preceptor, and would continue over a period of orientation for several months.

As the nurses gains experience they enter into stage two as an advanced beginner (Benner, 1982). At this point the nurse is now able to demonstrating performance of a skill at an acceptable level. The stage is characterized by the nurse applying their experience in real life scenarios towards guiding their current practice. There is still some support required from mentors or preceptors for cues, especially when the in an unfamiliar situation (Benner). In applying this situation to the perinatal RN, it would be the nurse doing more labour assessments and vaginal exams on their own, with the occasional one needing verification. It would also mean the use of the combining the knowledge learned within the self- learning module and their experience to develop principles for their own practice.

The final stages of Benner' theory are competent, proficient and expert (Benner, 1982). These stages are achieved after several years in the same job. In competence stage, the nurse has become more efficient and organized in the manner in which they perform and apply the skill. This efficiency and organization is achieved through careful and deliberate planning, and so flexibility and speed are not limited at this stage. No supportive cues are needed, as the nurse has mastered how to cope in real life situations (Benner).

The proficient nurse, unlike the competent nurse, has the ability to see the situation as a whole and perform accordingly (Benner, 1982). It is about seeing the long

term goals of a situation and acting accordingly based on experience. The proficient nurse is able to acknowledge deviations from the normal in a situation, and change their plan accordingly (Benner).

The expert is a nurse who is no longer reliant on rules, guidelines or principles in order to perform a skill (Benner, 1982). Their ability to perform has become fluid and intuitive to any given situation. The expert nurse can analyze a situation, see the holistic picture and perform in a highly proficient manner based on lots of experience (Benner).

Referring to the last three stages of Benner's model, are stages that will can be achieved by the proposed self-learning module. The perinatal RN with use of the module and mentor inclusive of constructive feedback tools, will reach stage two as an advanced beginner and over time achieved expert status in competence.

Conclusion

Why use self-learning modules for perinatal RNs?

Education for perinatal RNs in understanding and performing vaginal exams in labour is supported in the literature, if not only, because the information derived from performing a vaginal exam is crucial to the assessment of labour and its progression. In rural areas of the world, such as in Nova Scotia, many labour units, including the CRHCC, use a model of nurse managed labour. This model requires units to have highly educated and skilled RNs who can assess and care for laboring women. Finding and pursuing education in these areas therefore becomes a necessity to perinatal RNs to obtaining and understating the skills involved in working in this field of health care.

This literature review focused on finding support for the development of a self-learning module on the understanding and performing of vaginal exams in labour for perinatal RNs at the Cumberland Regional Health Care Centre. Literature searches of various combinations of terms led to very few recent articles in all areas inclusive. This is most likely due to the fact that research has been exhausted on the topic such as with adult learning and self-learning modules or, the opposite that not much research has been conducted in the area, such as with educating perinatal nurses specifically on vaginal exams. It is acknowledged the lack of recent literature support is a limitation of this literature review.

Despite the lack of literature support for the use of self –learning modules in teaching perinatal vaginal exams in labour, the design of self-learning modules is most appropriate for the proposed project. The literature has established that self-learning modules are based on the principles of adult learning, the targeted audience for this project. As well, self-learning modules have the ability to compliment different learning styles by using different design elements including feedback and competency tools.

While the literature has not brought forth any specific support for perinatal nurses, it has shown improvement in nurses learning in other areas. Based on the aforementioned support, a self-learning module can be concluded as an appropriate choice of educating perinatal RNs on the performing and understanding of vaginal exams in labour.

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Appendix A1

Summary Literature Tables

Author/Date	Study Design/ Sampling/Setting Characteristics	Variables and Measures/ Reliability/ Validity	Relevant Outcomes	Limitations
Thomas, J. (2008)	• Survey Project of Perioperative RNs • Questionnaire (9 questions) • Sample: Random sample of RNS registered for AORN Congress • Size:290, men and women perioperative RNs	• Type of education RNs received on bioterrorism and rate it • Level of perceived preparedness post education via self-study • Awareness of proper protective gear for dealing with six main biological agents	• 57% said no bioterrorism training available • 25.7% had self-study education before current model • Pre education preparedness rated average 3/10 and post 6.5/10 for those with no previous education • Increased levels of preparedness from 4.8/10 to 7.3 with those who had some education before • Also gaps in knowledge in gloving procedure with bio agents	• Small study size • Limited details of results described only limited general findings • No details about self-perceived levels of preparedness associated with each education technique for comparison • No details regarding validity and reliability • Or statistics for significance of findings.
Koerber, K. (2009)	• Designed self-study modules for online use on wound care documentation and an in-service class on same • Survey of Likert design evaluated perceived effectiveness of the module • Sample: 20 RNs	• Focus of the project was on the design of the self-study modules • In-service was to introduce the self-study module and answer questions before it was completed. • A questionnaire was provided following completion of the module assessing the RNs perceived knowledge level on wound care and if it improved.	• Most positive responses • 15 RNs responded out of 20 • All 15 plotted they agreed or strongly (4:11) agreed that they learned one new thing during the in-service. • All agreed or strongly agreed (5:10) that they felt more confident in wound care documentation. • 14 nurses agreed or strongly agree that the modules were beneficial to staff units on unit (13:1). One nurse was unsure.	• Small sample size • Limited generalizability as was focused on wound care documentation for that facility and their perceived knowledge. • No statistical significance of findings. • Comments section was reported as positive but no information as to what comments said, or themes identified.

Author/Date	Study Design/ Sampling/Setting Characteristics	Variables and Measures/ Reliability/ Validity	Relevant Outcomes	Limitations
Huhn, K. A. & Brost, B. C. (2004).	• Simulation study- each participant had 20 seconds to determine the cervical dilation of based on 12 hard and soft cervical models. • Study participants- 12 residents, 10 nurses, and 8 obstetric/maternal fetal-medicine providers • Obstetrics-gynecology residents: 4 first-year, 4 second-year, 2 third-year, and 2 fourth-year • Labor and delivery nurses ranged from 1 to 26 years • obstetricians/maternal fetal-medicine subspecialists expertise from 2 to 22 years • Total of 360 simulations exams completed	• Cervix were assessed in a sequence soft model first than the hard model • Each participant would list what they felt the dilation was and then their list were compiled based on model type and profession • No findings were discarded based on illegible writing	• Participants more accurate on the hard model. • 19% correct using the soft models. • 54% correct on hard models. Percent correct progressively decreased as dilatation increased. . • In effacement 49% correct for soft versus 58% correct for hard. • Nurses were more correct on soft model attributed to their experience.	• No limitations actually discussed by authors. • Due to the sequential progression from the soft to the hard model, increased accuracy might be attributed to the participants becoming more familiar. • Limited information on the method of data collection. • Models were created by hand. • No comparable studies, in past studies done only using rigid models • Only used dilation up to 6 cm.
Kraynek, M. C. (2012).	• Proposed project • Involves physicians and residents teaching vaginal exams to RNs. • Based on a need seen by nurse managers to have RNs be more active in the management of labour • Pre-post effective surveys will be used	• Project uses simulation • Feedback tool to be completed by the instructor. • RNs to watch instructional video, look at model then practice on models. • To validate the education use of surveys pre and post education. • Will also be studying how patient outcomes are effected by the change of practice	• Outcomes unknown- No further literature on the project outcomes	• No outcomes published. • Not an actual study, proposed project for change in practice only.

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Appendix A2
Review of Sources

Source Name	Key Features	Strengths	Limitations	Overall Impression
IWK Vaginal Exam Learning Module (2007)	• Introduction- How certification works • Learning Objectives • Nursing Responsibilities • Procedure/Equipment • Documentation • Case Studies • Tests • Validation checklists	• Use of flowcharts to identify how to proceed through certification • Clearly identified objectives • Use of pictures depicting elements of exam including fetal position, dilatation • Case studies help assimilate all information • Includes policy/guidelines for quick reference	• Need to search out other text to subsidize the module • No definition of labour-though key to the exam is the determination of active labour • Poor identification of chapters	• Would be beneficial if module was self-contained with all education material included.
Prince County (PEI) Vaginal Examination Policy (2006)	• Is a policy and procedure not a module • Includes indications and contraindications • Rationale for points of the procedure • Equipment lists • Illustrations for dilatation, station and presentation	• Brief and to the point • Does include rationale for each point of the procedure • Use of illustrations	• Not a module • No indication of how RNs are certified to do the procedure or need to be • No definition of labour and or its progression • Rationale is limited –No references just key basic points.	• Manager indicated in e-mail this was all that was available in terms of support/education of vaginal examinations • Informal teaching of vaginal exams is done in orientation. No formal learning module is used.
Source	**Key Features**	**Strengths**	**Limitations**	**Overall Impression**

Champlain Maternal Newborn Regional Program (2011)	• Part of a larger module for perinatal nurses. • Provides indications/contraindications for vaginal exams in labour • Equipment and Supplies • Procedure • Includes Alerts • Includes illustrations of fetal position and descent	• Includes information re: proper communication with the women and the importance of relaxation • Illustrations clear • Explanations of what to do in cases of rupture of membranes during exam • Includes definitions of important aspects in the procedure including station, position and effacement • Provides an appendix clearly depicting fetal position	• Describes procedure only. • Limited information only on information derived from vaginal exam • No testing/feedback avenue • Refers to alternate source with regards to proper documentation. • No identification of objectives.	• Good guideline and explanation of the vaginal examination procedure.
Perinatal Services BC: Guidelines for Registered Nurses Core Competencies and Decision Support Tool: Management of Labour in an Institutional setting if the primary maternal care provider is absent (2011)	• Education/Information on a multitude of obstetrics issues such as fetal surveillance, evaluation of labour, birth and obstetric emergencies. • For this review referred to the support tool: Evaluation of Progress of Labour/Dystocia	• Clearly defined support tool. • Definitions of labour • Identifies interventions and when to alert primary care provider • Use of flow charts • Includes what documentation needed • Includes what important information is derived from	• Not directly about vaginal examinations • Guideline vs. education module. • Limited information on the vaginal examine procedure	• Very good for defining labour, its progress and what to do should dystocia occur.

		performing a vaginal exam.		

References:

Champlain Maternal Newborn Regional Program (2011). Perinatal Nursing Procedure: Vaginal Examination. Retrieved from www.cmnrp.ca

Isaak Walton Killam Hospital. (2007). Self-learning Module on Vaginal Examinations. Halifax, Nova Scotia: IWK Children's Hospital.

Perinatal Services British Columbia. (2011). Guidelines for registered nurses: Core Competencies and Decision Support Tool: Management of Labour in an Institutional setting if the primary maternal care provider is absent. Retrieved from http://www.perinatalservicesbc.ca/NR/rdonlyres/578B4507-3801-4553-8D88-7BEE61D1C7FD/0/CoreCompMngmentofLabourWholeDocument.pdf

Prince County Hospital (2006). Nursing Policy and Procedures: Vaginal Examination

Appendix B

Consultation Report for Development of a

Self-Learning Module on Vaginal Exams in Labour

Consultations were conducted with the medical experts working on the maternal/child unit at the Cumberland Regional Health Care Centre as part of the development of a self-learning module for perinatal RNs on vaginal exams in labour. The objectives of the consultation were:

1) To establish support for the proposed for a self-learning module for perinatal RNs in performing vaginal exams.

2) To enhance the self- learning module by identifying content for the proposed module based on expert opinion.

Consultation Methodology

Setting

The setting of the consultations, for the majority, took place on the Maternal/Child unit at the Cumberland Regional Health Care Centre (CRHCC), with one consultation interview taking place at Amherst Medical Associates. The Maternal/Child unit. The consultations took place in the staff room located on the unit.

Amherst Medical Associates is a local physicians' office in which four local family physicians' work, and one specialist. Two of the local family physicians at this office currently offer their services to the maternity population of Cumberland County. The interview took place in the board room located at the office.

Consultants

Eight consultations were undertaken involving two novice nurses, two senior nurses, the team lead of the unit, the nurse manager of the unit, a family physician and an obstetrician. Both novice nurses completed their undergraduate programs in 2013. Both have limited labour and delivery experience other than placements completed during obstetrical rotations in nursing school. Each novice nurse completed a 4 month orientation to the unit which included working with a senior nurse preceptor.

The 2 senior nurses consulted have worked as RNs for approximately 25 years and both graduated from diploma nursing programs. Each have at least 10 years' experience working in labour and delivery and both have worked as a senior nurse preceptor for the past 7 years.

The team lead of the unit has been in her current position for approximately four years, after working on the unit for over 20 years. Her duties are to oversee the running of the unit and the prenatal clinic, as well as ensure current practice on the unit is upheld to the standards of care. She is also a certified lactation consultant.

The unit manager has worked at the Cumberland Regional Health Care Centre since 2007. She is manager of the maternal/child unit, the surgical unit, the day surgery unit and the operating room. She has both a Bachelor' and Master's degree in nursing. She has spent the majority of her 20 year nursing career in education, before moving to administration. She openly admits that her maternity experience is limited.

Two physicians were consulted, one family practice and one obstetrician. The family practice physician, as part of family practice group of three physicians, cares for

the low risk pregnancies and births at the CRHCC. The group does approximately half of the deliveries per year. The obstetrician provides care for mainly high risk pregnancies and births, as well as, serves as a consultant for the family practice physicians group. Both the family physician and obstetrician have worked at CRHCC since the year 2011.

Data Collection

Data was collected via interviews, limited to 30 minutes. All interviews were done individually and in person by the project developer, on a convenience basis. In all cases, the consultants were working the day their consultations were conducted, as time permitted to do so. A script (Appendix B1) was used to guide the interview, however was adjusted based on the consultants' responses and the need for clarification by the interviewer. During the interview, detailed notes of the consultants' responses were taken. All responses were repeated back to the consultant during the interview to ensure their responses were accurate.

Data Analysis

All responses from the consultations were transcribed from detailed notes into a single document having been organized by question, and further by type of consultant. Responses were then analyzed for common themes between similar types of consultants and then, for commonality of themes across groups. Outlier responses not fitting any theme were identified as well.

Ethical Considerations

The development of a self-learning module for perinatal RNs on vaginal exams in labour did not require review by the Health Research Ethics Review Board, as indicated by completion of the checklist found in appendix B2. In dealing with human subjects as consultants, ethical consideration is of prime importance to the project developer.

In conjunction with interviews, invitation letters were distributed letters (Appendix B3). The content of the letter informed the consultants that they had the right to refuse to participate and they had the right to refuse to answer any questions asked. A guarantee of privacy and confidentiality was provided by describing all responses are placed in a locked cupboard. The letter was read aloud prior to the consultations. Opportunities were provided for consultants to ask questions during the consultation process. The consultants were informed that their input will be used within the in development and content of a published self-learning module on vaginal exams in labour and will be available on the Maternal/Child unit at the CRHCC. Contact information was provided for both the project developer and her supervisor.

Another ethical consideration was the potential for bias. The sample was a convenience sample and all consultants worked with the project developer. This lent itself to the possibility that consultants' responses could be impacted in a positive direction to please the developer. The developer was conscious of this potential bias and encouraged the consultants to answer honestly. It was further enforced that the purpose of asking them to participate in the consultation was based on their expertise and experience on the subject in order to develop a module, so all answers were valued.

Results

Four questions were asked during the interview process (Appendix B1). Responses were clarified as necessary by using open-ended questions. Identification of common themes between groups were pertinent to the project developer, as these responses identified content ideas for the module. These themes also helped identify the rationales for supporting education for RNs on vaginal exams in labour.

Firstly, all consultants felt a self-learning module on vaginal exams would be beneficial to the unit. Reasons identified included, establishing rules and guidelines for practice of vaginal exams in labour, having a resource available to teach new nurses about vaginal exams in labour, and completed education verifies competency and understanding of the skill. The theme common across the groups was the benefit of self-learning modules as a verification of RNs competency and understanding of vaginal exams in labour. All consultants identified the vaginal exam as a skill used as an assessment tool on labouring women.

The second question examined what value the module would have to perinatal practice at CRHCC. Theme analysis revealed similar themes to those that emerged in the first question. Themes included: value related to teaching, and value towards the consistency of communication between care providers in using correct language related to vaginal exams. Nursing consultants believed perinatal practice at CRHCC needed a resource tool for vaginal exams as the unit currently has none, and the learning of vaginal exams is currently completed by the one on one instruction that occurs between preceptor and newly hired RNs.

Physicians felt the module was important to communication between care providers. They believed that that a module would establish consistent language of terms related to vaginal exams, and would provide consistency in the manner in which vaginal exam were performed, as well as how assessment findings were communicated. Consistent communication and language, physicians believed, would, in turn, lead to better patient care based on better clinical decision making.

The third question had common themes between all groups of experts working with direct patient care. Unfortunately, the nurse unit manager, due to limited experience in labour and delivery, believed she could not add to what should be included in the content of the module, and deferred this question to the expert nurses and physicians.

Common themes for content included, defining the components of vaginal exams, identifying the indications and contraindications for vaginal exams, and how to troubleshoot during a vaginal exam. The components of vaginal exams, included definitions and explanations of, cervical dilation, effacement, fetal station, cervical position, fetal presentation and cervical consistency, as well as, definitions of labour-inclusive of different stages of latent, early, and active.

Another theme for content was design choices for module. The design choices included use of flow charts, visual aids, and charts with tips from the experts describing ways to troubleshoot during an exam if experiencing difficulties in assessing certain components. Other design choices, specific from nursing responses, included use of scenarios, case studies and hands on practice activities for application of knowledge to real life situations.

The fourth question addressed forms of feedback to acknowledge that the module was completed with satisfaction. Themes common across all groups included, use written exams and validation charts for a defined number of vaginal exams verified by another RN or physician. Concerning the validation of vaginal exams, common responses across the physician and nursing experts, included, having a defined number of vaginal exams should have to be double-checked with new employees and a set number for senior nurses per year. Similar to this response, was that verifications should occur at different dilations, and at different stages of labour. Alternatively, a skills checklist should accompany hands on practice activities, to ensure the learner understands the skill before practicing it on actual patients.

By and large, the consultants were thorough with their responses. It was noted that the responses among members of the same group were often similar. Common themes between groups were greater when examining responses related to content for the module itself.

Discussion

Overall, the responses provided are important in the development of a self-learning module on vaginal exams in labour. Senior nurses and novices nurses alike found value in a module, though from different perspectives. Interestingly, the themes were reflective of stages of competence, as identified by Benner (1982).

Benner (1982) identified that in the novice stage; nurses are relatively inexperienced and need continuous feedback. In the advanced beginner stage, there is a tendency towards focusing on the rules and guidelines for practice. Within their

responses, the novice nurses focused on establishing guidelines and policies that will increase consistency in nursing practice on the unit. .When comparison was made to a senior nurses responses, it emerged that senior nurses are in the proficient and expert stages of Benner's theory. In the proficient stage, nurses are able to visualize the long-term goals of a situation and act accordingly based on experience. A proficient nurse is able to acknowledge deviations from the normal in a situation, and change their plan accordingly. As experts, the senior nurse would possess an ability to perform based on intuition to any given situation, lessening the need for rules and guidelines. The expert nurse can analyze a situation, see the holistic picture and perform in a highly proficient manner based on lots of experience (Benner, 1982).

An emphasis of models and visual aids as a design choice for the module corresponded with adult learning theories and the need to accommodate different types of learners. Visual aids can serve as feedback tools to a learner, meeting the needs of accommodators, divergers and convergers, as identified in Kolb's inventory of learners (Registered Nurses Professional Development Centre, 2007).

The development of the self- learning module on vaginal exams can use the responses to the questions asked, and the connection made to Benner's theory and Kolb's inventory of leaners towards creating a module that can accommodate the needs and ideas from the consultants, as well as encompass different methods to meet the needs of adult learners. In meeting these needs, the module can continue to pursue the goal of enhancing the perinatal RNs knowledge and understanding of vaginal exams in labour.

Conclusion

The objectives of this consultation were two fold. One was to establish support for the development of a self-learning module on vaginal exams and two, to identify content for a module on self-learning on vaginal exams based on expert opinion.

During the eight consultations that were conducted, support was established for the module. All consultants felt a module on perinatal RNs on vaginal exams was necessary for the RNs at the Cumberland Regional Health Care Centre.

Furthermore, the responses to questions regarding content were helpful in establishing the learning needs of the perinatal RNs at the CRHCC. This included wanting definitions on components of vaginal exams including dilation, fetal station, and effacement. In addition, the consultations provided information what should be required to receive acknowledgement that the module was completed for verification of competency. Feedback tools such as written exams and competency checklists were identified as the forms of acknowledgements desired by the consultants. All this information was valuable to the module development.

Overall, the consultations have met the objectives identified: support for the module was well established and content for the module was identified.

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Appendix B1

Questionnaire for Consultation

I wish to thank you for your willingness to participate in this project. I am seeking your expert opinions and encourage you to be open and honest. The objectives of this are:

3) To establish support for the proposed for a self-learning module for perinatal RNs in performing vaginal exams.

4) To enhance the self- learning module by identifying content needs for the proposed module.

By meeting these objectives it is beneficial to the whole team at the CRHCC, inclusive of the RNs, the physicians and, most importantly, the patients.

1. Do you think there is a need for a module on performing vaginal exams?

2. What value does such a module as have to perinatal practice?

3. What type of information do you think is needed in this module?

4. What would you want to be included in a self-learning module on performing vaginal exams as a means of acknowledging success full completion? I.e. feedback tools

Appendix B 2
Health Research Ethics Authority Screening Tool

	Question	Yes	No
1.	Is the project funded by, or being submitted to, a research funding agency for a research grant or award that requires research ethics review	❒	■
2.	Are there any local policies which require this project to undergo review by a Research Ethics Board?	❒	■
	IF YES to either of the above, the project should be submitted to a Research Ethics Board. **IF NO** to both questions, continue to complete the checklist.	❒	■
3.	Is the primary purpose of the project to contribute to the growing body of knowledge regarding health and/or health systems that are generally accessible through academic literature?	■	❒
4.	Is the project designed to answer a specific research question or to test an explicit hypothesis?	❒	■
5.	Does the project involve a comparison of multiple sites, control sites, and/or control groups?	❒	■
6.	Is the project design and methodology adequate to support generalizations that go beyond the particular population the sample is being drawn from?	■	❒
7.	Does the project impose any additional burdens on participants beyond what would be expected through a typically expected course of care or role expectations?	❒	■
LINE A: SUBTOTAL Questions 3 through 7 = (Count the # of Yes responses)		2	5
8.	Are many of the participants in the project also likely to be among those who might potentially benefit from the result of the project as it proceeds?	■	❒
9.	Is the project intended to define a best practice within your organization or practice?	■	❒
10.	Would the project still be done at your site, even if there were no opportunity to publish the results or if the results might not be applicable anywhere else?	■	❒
11.	Does the statement of purpose of the project refer explicitly to the features of a particular program, Organization, or region, rather than using more general terminology such as rural vs. urban populations?	❒	■
12.	Is the current project part of a continuous process of gathering or monitoring data within an organization?	❒	■
LINE B: SUBTOTAL Questions 8 through 12 = (Count the # of Yes responses)		3	2

	SUMMARY **See Interpretation Below**	5	7

Interpretation:

- If the sum of Line A is greater than Line B, the most probable purpose is **research**. The project should be submitted to an REB.
- If the sum of Line B is greater than Line A, the most probable purpose is **quality/evaluation**. Proceed with locally relevant process for ethics review (may not necessarily involve an REB).
- If the sums are equal, seek a second opinion to further explore whether the project should be classified as Research or as Quality and Evaluation.

These guidelines are used at Memorial University of Newfoundland and were adapted from ALBERTA RESEARCH ETHICS COMMUNITY CONSENSUS INITIATIVE (ARECCI). Further information can be found at: http://www.hrea.ca/Ethics-Review-Required.aspx.

Appendix B3
Letter of Invitation to Participate

Dear Potential Consultant,

You are invited to participate as a consultant with regards to the development of a self-learning module for perinatal RNs in performing vaginal exams in labour and delivery. The specific purpose of this module is to provide perinatal RNs with a standardized approach to performing vaginal exams that is evidence based and to assist them in clinical decision making. This project is being developed for the Cumberland Regional Health Care Maternal/Child unit. It also is the practicum project in partial fulfilment of the project developers Masters in nursing program at Memorial University of Newfoundland. To learn more about your role in the development of this module, please read the following information.

There is currently no written guideline or policy that guides the perinatal RNs on the performance and understanding of vaginal exams. As a result, there is a lack of standardized guidelines which results in haphazard and inconsistent nursing care and labor management by perinatal RNs at the CRHCC. In conjunction with evidence from recent literature, I am seeking your expert input with regards to support for a standardized approach in performing vaginal exams and your opinion in regards to what should be included in such a module.

Your participation as a consultant is entirely voluntary. You may withdraw your involvement without penalty by simply refusing to respond to the questions provided to you. If you decide to participate, you are free to refuse to answer any questions that you so choose.

You may benefit from participation as a consultant on the development of this module knowing that you have contributed information of value towards the standard of care offered by the perinatal RNs at the Cumberland Regional Health Care Centre. There is no physical risk involved in your participation. The major inconvenience will be the time it takes to complete the interview. There is no cost for participating in the study and no compensation will be made.

All information will be kept in a secure locked location and data will be retained until publication and then destroyed. All information will be seen by the developer of this module as well as her supervisor, Paula Kelly.

Please feel free to ask any questions you may have about this project or your rights as a consultant. You may contact Pamela Chappell, Principal Project Developer at (902) 660-2101. I may also be reached by e-mail at pam.chappell@cha.nshealth.ca. Paula Kelly, supervisor of the practicum at Memorial University of Newfoundland, can be contacted via e-mail paulak@mun.ca.

A copy of this letter of invitation is provided for you to keep for your record. Your involvement in the interview will be taken as an indication that you have read this letter and have consented to participate as a consultant.

Sincerely, Pamela Chappell BScN

Appendix C:

Self- Learning Module for RNs

Vaginal Exams in Labour

By © Pamela Chappell

May 2015

Table of Contents

Introduction

Why do I need to complete this education?

The College of Registered Nurses of Nova Scotia (CRNNS) has identified the entry level competencies, that reflect the knowledge, skill, and judgment required of entry-level RNs, is that of generalists. All RNs in Nova Scotia are ultimately accountable to attain these required entry level competencies within their nursing education, in addition, to each year, completing education and attaining new competencies to meet the needs of their specific area of practice and/or patient population

"In other words all practising registered nurses are expected to maintain their competencies, assess their continuing level of competence and develop learning plans/activities to attain any additionally required competencies" (CRNNS 2013).

Perinatal RNs and Vaginal exams

Once you have been hired to work on the Maternal/Child unit as a perinatal RN, you will acquire an increased knowledge base related to the care of labouring women, and in particular, how to complete assessments of laboring women. These specialized skills will require further education, and some of which should be attained within the six to eight weeks of orientation offered.

As a perinatal nurse working in the unit, it is critical that you are able to accurately assess women's progression of labour. Your assessments will assist the health care team to identify and establish a plan of care for each patient. One of the more prominent assessment tools, used to establish and determine progression in labour, is the vaginal exam.

What does this module provide?

This self-learning module has been developed for both experienced and inexperienced RNs to enhance their knowledge and education related to performing vaginal exams as an assessment tool when caring for women in labour. The module also provides learners with a standardized approach in the performance of this assessment tool to ensure accurate evaluation of women's labour progress and consistency of care.

****The module may be used as a reference tool at any time during your care of labouring women. ****

The module is divided into **four** separate units.

Unit One provides information about labour, particularly the stages and phases of labour. The helpful tips section about the physical and psychological signs women exhibit in labour, will help you in assessing women's progress in labour. The skill of abdominal palpation, as a means of assessing contractions in labour, is included in this unit as well.

Unit Two provides information about the cervix. Learners will learn about the anatomy of the cervix as well as the changes the cervix undergoes during the process of labour. These changes include: dilation, effacement, consistency and position. The helpful tips section increases knowledge and understanding in assessing for these changes when performing vaginal exams. A learning activity can be completed with assistance of your preceptor or experienced RN.

Unit Three provides information about the fetus. This unit introduces Leopold's maneuvers as well as the terms: fetal lie, fetal presentation, fetal position, engagement and station. The helpful tips section increases knowledge and understanding in assessing the fetus using both Leopold's maneuvers and vaginal exams. A learning activity or activities can be completed with assistance of your preceptor or experienced RN.

Unit Four is a decision support tree for suspected spontaneous rupture of membranes. The algorithm is a clinical decision tool, to be used to decide when or when you should not do a vaginal exam when rupture of membranes is suspected. A legend accompanying the decision tree, provides the rational for the steps in the algorithm. A case study can be completed with assistance of your preceptor or experienced RN.

Instructions

This self-learning module is designed for you to complete at your own pace. It is strongly recommended that you read and partake in all learning activities outlined throughout the Units.

Once all Units have been completed, a mandatory multiple choice exam and competency assessment tool must be submitted to Karen Crowe, RN Maternal/Child Team Lead (Office located on the Maternal/Child Unit.)

Always refer to the policy and procedures of your unit in conjunction with this module to ensure that the safest and most effective care is being provided.

Unit 1: Labour

Section 1:
Labour: Defined

Learning Objectives

Upon completion of Unit 1, you will be able to:

- Describe the four stages of labour and their accompanying phases.
- Describe some of the physiologic and psychological signs that are experienced by women during labour.
- Discuss when hospital admission in women who may be in labour.
- Discuss the role of the epidural and its impact on labour
- Discuss non-pharmacological/supportive measures and their impact on women in labour.

The vaginal exam is an integral part of defining labour. Therefore, it is important to understand what labour is, and how to identify it, before performing vaginal exams on pregnant women.

Labour, by definition**,** is the normal physiological process which involves the progressive dilation of the cervix, as a result of regular uterine contractions, ending in the vaginal delivery of a fetus (Davidson, London, & Ladewig, 2012).

The Phases and Stages of Labour

The process of labour is divided into both stages and phases. There are four stages of labour and three phases (Ward & Hisley, 2009). The vaginal exam is performed in both the first and second stages of labour.

The **first stage of labour** is divided into three phases: latent, active and transitional. The first stage commences with the onset of regular painful contractions and involves dilation and effacement of the cervix to full dilation or 10 cm.
The **second stage of labour** is from full dilation of the cervix until delivery of the fetus.
The **third stage of labour** is from birth of the fetus until delivery of the placenta.
The **fourth stage of labour** is the immediate recovery period following delivery of the placenta until about 2 hours postpartum (Ward & Hisley, 2009).

There are three phases within the first stage. ***Latent phase*** is dilation of the cervix up until 3 to 4 cm. The onset of labour is often hard to define as the contractions are usually mild but often not at regular intervals (Ward & Hisley, 2009). The start of latent phase is confirmed once contractions occur at regular intervals, but may remain mild in intensity. The latent phase ends when the cervix dilation is 3 to 4 cm. The duration of this stage

varies, and can last as long as 10 to 14 hours (Ward & Hisley). In primiparous women, the latent phase of labour has an average duration of 8.6 hours. In multiparous women, the phase averages 5.3 hours in duration (Cunningham, Leveno, Bloom, Hauth, Rouse, & Spong, 2010).

The ***active phase*** of labour is dilation of the cervix from 3 to 4 cm to about 7 cm dilation, in the presence of regular moderate to strong intensity contractions. During this phase, the contractions occur at a frequency of every three to five minutes and have a duration about 60 s (Cunningham, Leveno, Bloom, Hauth, Rouse, & Spong, 2010). Nulliparous women progress through this stage, generally, at a rate of 1 cm an hour, whereas multiparous women progress at a rate of 1.5 cm an hour (Ward & Hisley, 2009).

The ***transitional phase*** involves dilation of the cervix from 7 to 8 cm to 10 cm (full dilation).Contractions occur every 2-3 min and last as long as 90 s or longer in duration. Women, generally, progress through this stage more rapidly. Primiparous women are usually in this phase for 2 to 3 hours. Multiparous women spend 1- 1.5 hours or less in this phase. (Ward & Hisley, 2009).

Active labour (inclusive of the active and transitional phases) is defined as dilation of the cervix at 3 to 4 cm, with effacement, and regular painful contractions 5 min apart or less, lasting at least a minute in duration (National Institute for Health and Clinical Excellence, 2007; Perinatal Services BC, 2011; Reproductive Care Program of Nova Scotia, 2010; World Health Organization, 2008).

The **second stage of labour** commences once a woman have reached 10cm or full dilation, where the cervix is no longer palpable, and ends with the birth of the fetus. This stage involves the woman actively bearing down or pushing when she experiences a contraction. The combination of uterine contractions, along with the woman's pushing efforts, leads to birth of the fetus via vaginal canal (Ward & Hisley, 2009). Duration of this phase is dependent on several factors including parity, analgesia, power of the contractions, power of the pushing efforts and support for the patient. On average, primiparous women push for 1 to 2 hours. Multiparous women, in contrast, can give birth within a few minutes of reaching full dilation (Ward & Hisley).

Labour and Hospital Admission

At this agency, admission to the labour and delivery unit occurs when women are in *active labour*. It is not uncommon for women to assume the signs and symptoms of latent phase of labour are an indicator that they should proceed to the hospital (Society of Obstetricians and Gynecologist of Canada (SOGC), 2013). Common protocol, however, includes avoiding admission to the labour and delivery unit until active labour is established. The focus should be on establishing a plan that meets women's' needs during the latent phase of labour, including pain management and supportive measures (SOGC, 2013).

At this agency, women who arrive on the unit are initially triaged and assessed by an RN. If women are found to be in the latent phase, a period of observation for 2 to 3 hours in hospital may be offered. This period of observation is often done for women who do not live in close proximity to the hospital and who are experiencing contractions that are mild and irregular. After 2 to 3 hours, RNs reassess women for signs of progressing labour such as changes in the dilation or effacement of the cervix, or an increase in the frequency and strength of the contractions. If no signs of progression, women are sent home with instructions to return when signs of progression in labour occur. The unit telephone number is also provided to women so they can call with questions.

Delaying admission of women until they are active labour is supported by literature. Early admission in the latent phase is linked to the increased incidence of obstetrical interventions such as oxytocin infusions and instrumental deliveries as well as increased incidence of caesarean section (Neal, Lamp, Buck, Lowe, Gillespie & Ryan, 2014). In lieu of admitting women early in the latent phase of labour, a period of observation is recommended to establish active labour which, in turn, will decrease the incidence of obstetrical interventions (Neal et al.).

Supportive Care in Labour

One of the greatest coping strategies for women in labour, is to have the presence of individuals for continuous emotional support (Society of Obstetricians and Gynecologists of Canada (SOGC), 2013). One on one intrapartum support, offered to women in labour, has been correlated with more successful vaginal deliveries, less use of analgesia and greater satisfaction with the birth experience. In addition, women are less likely to have an instrumental vaginal delivery, regional analgesia and/or a baby with a low 5 minute Apgar score (SOGC).

Pain Management in Labour

Women in labour experience various degrees of pain. The tolerance of pain is unique to each labouring woman and the strategies used to cope with the pain vary as well (Society of Obstetricians and Gynecologists of Canada (SOGC), 2013).

Pain management in labour includes both non-pharmacological and pharmacological measures (Society of Obstetricians and Gynecologists of Canada (SOGC), 2013). Prenatal education on both forms of pain management is important. The goal of pain management is to enhance comfort and reduce apprehension of the labour experience in all labouring women (SOGC).

Non-pharmacological pain management techniques are numerous and can include: massage, music, hypnosis, immersion in water, ambulation, frequent position change, biofeedback and many more (Society of Obstetricians and Gynecologists of Canada

(SOGC), 2013). Pharmacological pain management in labour options at this agency include: nitrous oxide, intravenous narcotics (Fentanyl) and epidural analgesia.

Please review the *Pain Management in Labour* policy found in the Labour and Delivery Manuals located in each labour and delivery room and assessment room for further details.

Helpful Hints about:
Labour: Physical Signs and Pain Management

- ***The latent phase***: Women may describe a dull backache, or lower abdominal cramps (such as those experienced during menstruation), when contractions begin. They often describe these contractions as coming and going, at various frequencies, durations and intensities. They may describe loss of the vaginal discharge, which can be thick and mucous with blood tinges. This is, often, the mucous plug. Women are generally uncomfortable, but can still be up walking and can often talk through some or all of the cramping/contractions.
- ***The active phase:*** Women are more uncomfortable. Women will concentrate and will focus on their breathing when contractions occur. Generally, the contractions are coming at regular frequencies and palpate moderate to strong. Usually, women are not able to carry on a conversation and talking stops when contractions occur. Some women express their needs directly such as: "rub my back" or "push on my hips". Nausea with vomiting occurs often in this phase. Analgesia tends to be requested, and epidurals are often initiated in this phase.
- ***The transitional phase***: During transition phase, women are intensely focused and concentrate solely on coping with each contraction. Contractions are now strong and occur every 1 to 2 min and are lasting a minute or longer. Women may experience the *Ferguson reflex*, the involuntarily bearing down to push. Other physical signs of this phase include: involuntary shaking or uncontrollable shivering. During this phase it is not uncommon to hear women saying "I can't do this anymore".
- Multiparous women can progress through the active phase of labour at greater than 1 cm an hour. Women generally know their bodies well and are aware of the changes that occur as labour progresses. RNs should pay close attention to what women are doing and saying. Often when they say, "I have to push", delivery is imminent.
- Epidurals administered for pain relief during labor often mask/hide some of the physical signs of the transitional phase of labor. It is imperative that RNs pay close attention to what women are saying about what they are feeling, as the smallest change noted by women can be a sign of major progression. Vaginal exams may be done more often to assess changes in the cervix and/or fetal descent.
- The use of epidural analgesia during active stage of labor has been shown to be associated with increased fetal malposition, the use of oxytocin and instruments for delivery (Anim-Somuah, Smyth & Jones, 2011). Despite this association, epidural analgesia has become the mainstay in labour pain pharmacological management, especially in tertiary care facilities (Reproductive Care Program of Nova Scotia, 2012).

Unit 1: Section 2
Abdominal Palpation

Learning Objectives

Upon completion of the unit, you will be able to:

- Describe the role of abdominal palpation in assessing contractions in labour.

In unit 1, you learned about the stages and phases of labour. This unit gives a brief overview of the importance of abdominal palpation as a means of assessment of contractions in labour. The procedure of abdominal palpation is noninvasive, and should be performed to assess for the presence, duration, frequency and strength (intensity) of contractions.

Abdominal palpation of contractions involves RNs placing both hands on the woman's abdomen, specifically at the top of the fundus where contractions begin. Leaving their hands in the same place, gentle pressure is applied to the woman's abdomen for the duration of a contraction. This is done in conjunction with when the woman states she is experiencing a contraction. It is also done conjunction with the electronic fetal monitor as per unit policy, if the woman is being monitored in this manner. During a contraction, the abdomen should become firm and return to a softer tone once the contraction dissipates. Intensity of contractions can be determined by whether there is the ability to indent the abdomen with the fingertips at the peak of the contraction. The firmer the abdomen is at the peak of contractions, the stronger the contractions are. For comparison a strong contraction would feel like the forehead. A mild contraction, would feel like the nose and a moderate contraction, would feel like the chin. Several contractions need to be assessed with palpation to accurately determine the frequency, duration, and intensity (Ward & Hisley, 2009).

Frequency of contractions are measured from the beginning of one contraction to the beginning of the next contraction (Ward & Hisley, 2009).

Duration of the contractions are measured based on when the abdomen starts to firm at the beginning of one contraction to when the abdomen returns to its resting tone again (soft) at the end of that same contraction (Ward & Hisley, 2009).

Conclusion

You have now completed Unit 1: Labour Defined. After reading this unit, you should have a better understanding of how labour is defined including the four stages and phases of labour and the physiological and psychological signs of each stage. Finally you should have a beginning understanding of the role abdominal palpation plays in relation to assessment of contractions during labour.

Unit 2: The Cervix

Section 2.1: The anatomy of the cervix

Learning Objectives

Upon completion of Unit 2 Section 1, you will be able to:

- Describe the anatomy of the cervix.
- Locate the cervix on a picture of the female anatomy.
- Describe changes the cervix undergoes during labour, in general terms.

Prior to learning the components assessed for in a vaginal exam, the female reproductive system should be reviewed. The location and anatomy of the cervix should be the focus of the review, as this is the anatomical feature assessed during a vaginal exam.

The cervix consists of mostly fibrous connective and elastic tissue. The elasticity of the cervix gives it the ability to stretch and open during labour so it will accommodate the passage of a fetus out of the uterus (Ward & Hisley, 2009).

The cervix is long and tube like with two openings. The internal os is the opening between the uterine cavity to the vagina (endocervical canal). The external os is the portion or opening of the cervix between the endocervix and the vagina (Ward & Hisley, 2009) (See Figure 1).

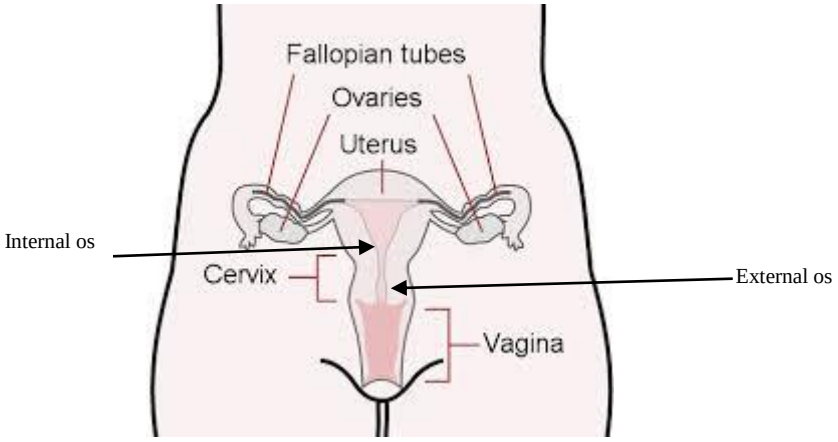

Figure 1. The female reproductive system. Adapted from "Schematic drawing of female reproductive organs, frontal view", by Centre for Disease Control and Prevention, 2007, http://commons.wikimedia.org/wiki/File:Scheme_female_reproductive_system-en.svg.

The position of the cervix is posterior in the vagina and is thick and long in non-labouring women. The presenting part of the fetus, such as the fetal head, is located at the cervical opening. In labour, the combination of uterine contractions and the presenting part applying downward pressure will cause changes in the cervix including dilation and effacement. (See Figure 2).

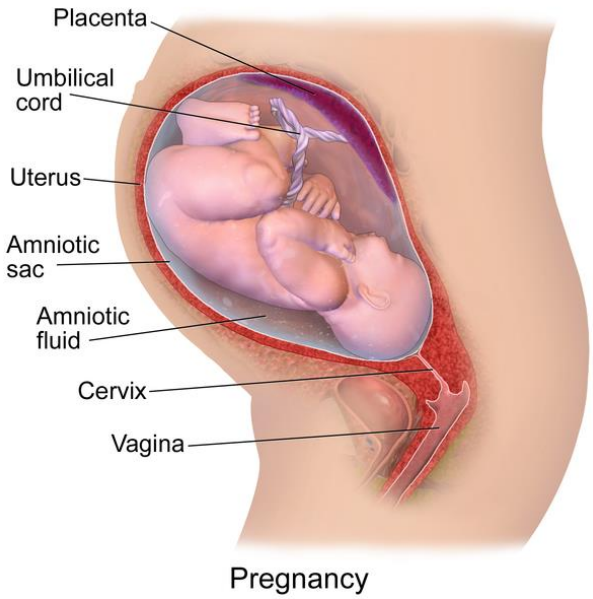

Figure 2. The female anatomy of the pregnant woman. From "Blausen gallery 2014" by Blausen.com staff, 2014, Wikiversity Journal of Medicine, http://commons.wikimedia.org/wiki/File:Blausen_0747_Pregnancy.png. DOI:10.15347/wjm/2014.010.

Section 2.2
Cervical Dilation

Learning Objectives

Upon completion of Unit 2 Section 2, you will be able to:

- Define cervical dilation.
- Describe how dilation is assessed for by the RN during a vaginal exam.
- Describe and discuss helpful tips for assessing cervical dilation during a vaginal exam.

Cervical dilation is defined as the opening up or widening of both the cervical internal and external os. Dilation occurs with the onset of regular uterine contractions during labour. Cervical dilation starts at 1 cm and, with progression of labour, ends at 10 cm dilation. Full dilation or 10 cm marks the end of the first stage of labour, and commencement of second stage (Ward & Hisley, 2009).

Cervical dilation is assessed by the RN placing the index and middle fingers of his/her dominant hand into the vaginal opening and locating the cervix. The fingers are inserted into the opening of the cervix, and the distance between the index and middle fingers (the diameter of the opening) is measured in centimeters. At full dilation, no cervix is palpated and only the presenting part is felt by the examiners' fingers.

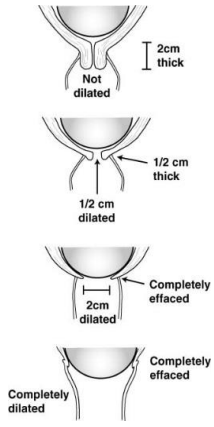

Figure 3. Dilation of the Cervix during Labour. The cervix is opening over time as labour progresses. The top frame demonstrates a presenting part applied to cervix that is not dilated. The next frame shows dilation of the cervix at 0.5 cm. The third frame shows the cervix at 2cm dilated and the last frame demonstrates 10cm dilated with presenting part in vaginal canal. At this point the RN will only palpate the presenting part as is demonstrated here.

Figure 3 from “Effacement1”, by Brookside Associates, 2014, *Military Obstetrics and Gynecology*, http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/LaborandDelivery/labor.htm#Labor. Copyright 2014 by Brookside Associates. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

Labour and delivery units have tools to help RNs determine dilation. One such tool is the dilation chart (See Figure 5). This tool is most commonly used as a guide for the RN to verify or to estimate the cervical dilation during the vaginal exam. Most RNs place their fingers on the board following a vaginal exam (after removing their gloves☺!!), and compare what was measured internally to the corresponding dilation circle on the chart.

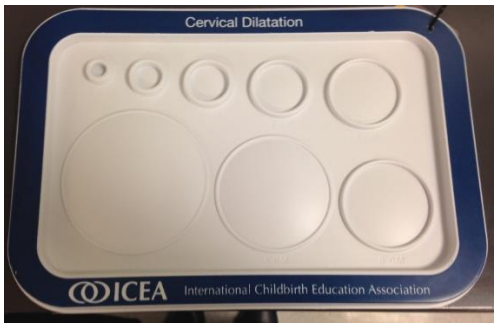

Figure 5. Unit Dilation Chart[Original Digital Photograph]. A chart like this is located in each of the delivery suites at the current agency. By Pamela Chappell, 2014.

Helpful Hints about:
Cervical Dilation

- Always refer to the dilation chart (See Figure 5) to double check findings. Even the most seasoned of RNs uses the chart!
- When searching for the cervix, enter the vaginal opening with the middle and index fingers and gently proceed to posterior aspect of the vagina. Once fingers are posterior, slowly move fingers forward toward the anterior portion of the vagina until cervical os is palpated.
- Dilation of the cervix is measured by the distance between your middle and index fingers when inside the cervical os.
- The opening measured for dilation is of the cervical opening that is closest to the presenting part of the fetus.
- When women are in early labor (first stage- latent phase), the cervix is generally located posterior and not always obvious to locate when the vaginal exam is commenced.
- In early stages of labour (latent phase of labour), a cervix may be thick, and practitioners have described it feeling similar to a "funnel". One end of the "funnel"(external os) may be starting to open while at the other end of the funnel (internal os) very little, if any dilation is occurring.
- As the presenting part descends into pelvis (in active and transitional phases of labour), it tends to become easier to assess cervix dilation because the cervix usually becomes well applied to the presenting part.
- A cervix may not dilate symmetrically. In this case, the cervix may not be found in the midline of the vagina, but located off to the left or right side of the vagina. This finding is generally associated with the way in the fetal head is presenting and positioned in the maternal pelvis.
- Sometimes there can be minor differences in dilation assessments between RNs. Vaginal exams are subjective, and one RN may assess a cervix at 3cm dilated, and another RN may assess cervix at 2.5cm.
- If uncertain of what is being felt when assessing for dilation, always get another RN or physician to double check your assessment.

Learning Activity:
Cervical Dilation

Equipment: Vaginal Models located on unit
Gloves (non sterile)
Lubricant

Activity: Working with a partner or preceptor perform the following:

1. Begin with placing the models in order, and assess each for the dilation
2. When comfortable with the first activity, have the partner randomize the order of models and then assess each for dilation.

Section 2.3
Cervical Effacement

Upon completion of Unit 2 Section 3, you will be able to:

- Define and describe cervical effacement.
- Define how cervical effacement is communicated.
- Describe how effacement is assessed for by the RN during a vaginal exam.
- Describe and discuss helpful information on how to assess cervical effacement during a vaginal exam.

Cervical effacement refers to the shortening or thinning of the cervix during labour (Ward & Hisley, 2009). When not in labour or not pregnant, the cervix is generally 2 to 3 cm in length. In labour, the muscles of upper uterine segment shorten and thicken and the lower segment of the uterus (cervical portion) becomes more passive and muscle fibers lengthen. With each contraction, longitudinal traction is exerted on the cervix, causing effacement. As labour progresses, the internal os shortens as it is drawn up around the presenting part of the fetus into the uterine side walls (Davidson, London & Ladewig, 2012). . Full effacement is when the cervix thickness is barely palpable against the presenting part (Kennedy, Ruth & Martin, 2009).

Effacement is reported in terms of percentages, from zero to 100. A cervix that is 50 % effaced is equated to a cervix that is 1 cm long. A cervix that is 100% effaced is barely palpable, equivalent to the thinness of tissue paper (Kennedy, Ruth & Martin, 2009). Effacement is also reported as a measured length of the cervix in centimeters (Simkin, & Ancheta, 2011).

In primiparous women, effacement usually occurs before dilation. In multiparous women dilation and effacement can occur together or at different rates, usually dilation occurs before effacement. (Kennedy, Ruth & Martin, 2009).

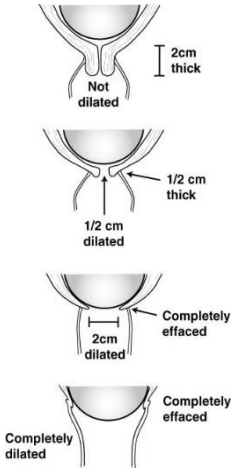

Figure 6. Effacement of the cervix during labour. In the top frame of the image the cervix is 2 cm in length. A cervix that is not effaced is usually 2-3cm thick and so the cervix would be 0% effaced. In the second frame, the cervix is noted ½ cm long, which will equate to 75% effaced. In the third and fourth frames, the cervix is completely effaced and can be represented as 100% effaced. From "Effacement1", by Brookside Associates, 2014, *Military Obstetrics and Gynecology*, http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/LaborandDelivery/labor.htm#Labor. Copyright 2014 by Brookside Associates. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

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Helpful Hints about:
Cervical Effacement

- Effacement usually occurs before dilation, in most first time pregnancies. Subsequent pregnancies dilation and effacement may occur simultaneously, but not always.
- Effacement can be reported in percentages or as a measure of length (thickness) in centimeters.
- Communicating effacement in centimeters as opposed to percentages is recommended at this agency as physicians and RNs consider centimeters to be a more objective measurement.
- Using the index finger measure down from the tip of the finger 2-3 cm. This is usually the length of the distal portion of a finger. When doing the vaginal exam, compare the length of the cervix against this portion of the finger. This will allow an objective measurement of effacement.
- A fully effaced cervix can often be referred to as paper thin and may be difficult to assess when the fetal head descends and becomes well applied to the cervix!
- Doing a vaginal exam when the patient is not having a contraction may make it easier to feel a fully effaced cervix as the presenting part is not applying as much pressure on the cervix.
- If uncertain of what you are feeling in terms of effacement, have your exam double checked by another RN or physician.

Learning Activity
Cervical Effacement

Equipment: Vaginal Models located on unit
Gloves (non sterile)
Lubricant

Activity: Working with a partner or preceptor perform the following:

1) Begin with placing the models in order, and assess each for the effacement.
2) When comfortable with the first activity, have the partner randomize the order of models and then assess each for effacement.
3) Become comfortable with communicating the amount of effacement in percentages and centimeters.

Section 2.4
Cervical Consistency

Upon completion of Unit 2 Section 4, you will be able to:

- Define cervical consistency.
- Describe the various types of cervical consistency.
- Define the term Bishop Score.
- Describe the role of cervical consistency in the Bishop Score.

Cervical consistency is known as the softening of the cervix. The cervix, starting in the latent phases of labour, changes in consistency from feeling firm/rigid to soft/stretchy. The softening of the cervix can also be referred to as cervical ripening (Ward & Hisley, 2009).

Helpful Hints about:
Cervical Consistency

- When feeling for the consistency of cervix, think about the following practical examples. A hard unripe cervix, feels similar to the skin of a forehead, or the tip of a nose. A hard cervix is stiff, and has no elasticity. A cervix that is ripe, feels soft similar to the inside of one's cheek, and stretchy comparable to an elastic band.
- Cervical consistency is an important component assessed for when considering induction of labour. It is one of five components involved in the Bishop Score.
- When in doubt of what is felt during a vaginal exam in terms of consistency, verify your findings with another RN or physician.

What is the Bishop Score?

A rating system, known as the Bishop score, is often used to determine the level of cervical inducability. The rating system assesses 5 components: dilation, effacement, station, consistency and position of the cervix. A score is given for each element, with the highest score total score being 13. The value for each determinant can be 0, 1, 2 or 3. A pre-induction total score of > 6 has been shown to predict a successful vaginal delivery. If the score is < 6, it represents an unfavourable cervix for induction that requires ripening using various mechanical and/or pharmacological methods. Amniotomy and oxytocin should not be used on an unfavorable cervix (Society of Obstetricians and Gynecologists, 2013).

Learning Activity-
Cervical Consistency

Equipment: Gloves

Activity: This exercise should provide you with a better understanding of what an unripened cervix and a ripened cervix feels like.

1. Donning a pair of gloves feel your forehead, nose and chin.
2. Compare how each feels to the other.
3. Then feel the inside of your cheek, compare how this feels in relation to your forehead, nose and chin.

Section 2.5
Position of the Cervix

Upon completion of Unit 2 Section 5, you will be able to:

- Define cervical position.
- Describe the locations of the cervix during labour.
- Describe how to position women during a vaginal exam to best assess the cervix.
- Describe ways to troubleshoot, during a vaginal exam, if you are unable to locate the cervix.

The ***position of the cervix*** refers to the location of the cervix in maternal vagina. As labour progresses, the cervix moves forward from the posterior to the anterior portion of the vagina facing the vaginal opening (Warren and Arulkumaran, 2009).

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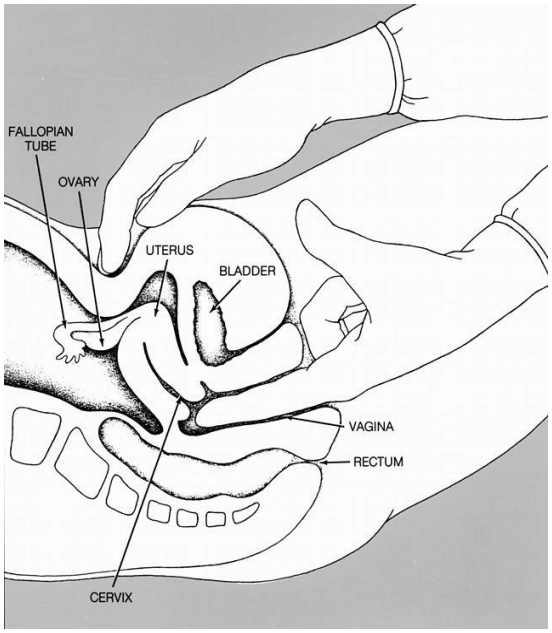

Figure 7. Position of the cervix. The image demonstrates a practitioner completing a pelvic exam on a non-pregnant woman. The fingers are inserted deep into vaginal canal to palpate the cervix. This cervix would be considered positioned posterior in the vagina. From "Pelvic Exam Illustration" by National Cancer Institute, 2001, https://visuals.nci.nih.gov/details.cfm?imageid=1786

Helpful Hints about:
Cervical Position

- For most women vaginal exams can be very uncomfortable. Keeping this in mind, if the cervix is posterior and locating it requires "walking or crawling" of the fingers in the vagina and along the posterior portion of the presenting part, the vaginal exam will be even more uncomfortable for her.
- Often the best position for a woman to be in during a vaginal exam is supine with a wedge under her left side to ensure she does not experience supine hypotension. However, monitor closely and if she does demonstrate signs of this condition, turn her to either her left or right side until her blood pressure recovers.
- If a woman is unable to tolerate a supine position during a vaginal exam, consider performing the exam with her in a side lying position.
- Suggesting the woman place her fists just under her hips prior to the vaginal exam can also be helpful in assessing a posterior cervix. This position tilts the pelvis forward, and therefore makes accessing a posterior cervix easier.
- When a woman is in active labour, the presenting part should be engaged and easily palpated with your fingers. However, the cervix maybe still located in the posterior portion of the vagina. If this is the case, it might require one to walk/crawl the fingers gently along the back of the presenting part, into the posterior portion of the vagina until the cervical os is reached.
- If the presenting part is not well engaged or well applied to the cervix locating its position may be difficult.
- The position of the cervix in the vagina can be influenced by the position of the baby. As an example, a baby in occiput transverse position, the cervix may be located to the left or right of the presenting part in the vagina. This is due to the direction of the pressure exerted on the cervix from the resulting occiput transverse position.

Learning Activity
Position of the Cervix

Equipment: Gloves (Sterile)
Lubricant

Activity: With a preceptor or another RN:

1. Prepare to perform a vaginal exam on those women presenting to the unit in suspected active labour who can have a vaginal exam and consent to having an exam performed on them.
2. Prior to performing the vaginal exam, discuss with the preceptor and woman the position she will be placed in order to assess a cervix, particularly when it may be posterior.
3. Ask the preceptor to assess the woman first, explaining where the cervix is positioned.
4. Perform a vaginal exam, using the information from the preceptor, to palpate the cervix.
5. Describe and discuss the position of the cervix with the preceptor.

Conclusion

You have now completed reading Unit 2: The Cervix. After reading this unit, you should have a better understanding of the physiological changes that occur to the cervix during labour. You also should be able to define the following terms: cervical dilation, cervical effacement, cervical consistency and cervical position. You should have gained an understanding of how to assess these components during a vaginal exam based on the helpful tips sections included.

Unit 3: The Passenger

Section 3.1
Leopold's Maneuvers

Learning Objectives

- Describe the steps in completing Leopold Maneuvers.
- Discuss when Leopold's Maneuvers should be used.
- List the various components assessed for when using Leopold's Maneuvers.

Prior to performing a vaginal exam, Leopold's maneuvers should be performed in order to determine information about fetal lie, presentation, position and engagement.

Leopold's maneuvers consist of four separate movements of abdominal palpation done using a systematic method of approach (See Figure 8). Performing Leopold's maneuvers allows the examiner to assess for the lie, presentation, position, and engagement of the fetus (Ward & Hisley, 2009). These terms will be explained and explored in further detail later in the module. Following the performance of Leopold's maneuvers by the examiner, a vaginal exam may be done to verify the information found using the maneuvers. The findings are important to the examiner because the maneuvers provide data related to fetal position, lie and presentation in combination with assessment of the maternal pelvis. This fetal/maternal assessment provides valuable details that are helpful when planning care for the labouring mother.

As with vaginal exams, learning Leopold's maneuvers take time and practice in order to become confident and proficient in performing the skill

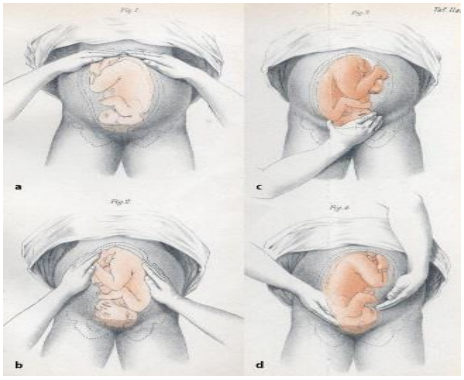

Figure 8. Four cardinal Movements of Leopold's Maneuvers. From Leopold maneuvers [Digital Image of Original] by Christian Gerhard Leopold , 1894, in Die Leitung der regelmäßigen Geburt nur durch äußere Untersuchung. Arch Gynäkol 45: 337–368. Retrieved from http://commons.wikimedia.org/wiki/File:Handgriffe.JPG

For instructions on how to complete these maneuvers please refer to:

Wong, D.L. Perry, S.E. & Hockenberry, M.J. (2002). *Maternal child nursing care* (2nd Ed.). St. Louis: Mosby

Or

The Canadian Perinatal Programs Coalition (2009). *Fundamentals of Fetal Health Surveillance: A self learning manual*. Vancouver: British Columbia Perinatal Health Program

If these texts are unavailable, find an alternate unit text for maternal child nursing or check with your manager for further information.

Learning Activity- Leopold's maneuvers

Equipment: Baby doll (Baby Nita)
Pillow in pillowcase
Maternal child Text with instructions for Leopold maneuvers

Activity: Working with a partner or preceptor and using the textbook perform the following:

1. Have your partner place the baby model into the pillow case with the pillow.
2. Have your partner lie on the bed and place the pillow under his/her shirt with the pillow side up.
3. Follow the steps for the maneuvers in the textbook, and palpate the baby through the pillow on the partners' abdomen.
4. Partner can vary the direction of the baby in the pillow case, and the maneuvers repeated to determine the presentation, lie, and position of Baby Nita.

Section 3.2:
Fetal Lie

Learning Objectives

Upon completion of Unit 3 Section 2, you will be able to:

- Define the term fetal lie.
- Describe the location of the fetal spine in relation to the maternal spine.
- Describe presentations that are commonly associated with the various fetal lies.

Fetal lie is the relationship of the long axis or spinal column of the fetus compared to the long axis, or spine the mother (Davidson, London & Ladewig, 2012). Longitudinal lie (vertical) occurs when the spine of the fetus and spine of the mother are parallel to each other. The fetus is in longitudinal lie, in both cephalic and breech presentations (See Figure 10 and Figure 11). A transverse (horizontal) lie (See Figure 9) occurs when the fetal spine is at a right angle to the woman's spine, and is associated with the shoulder presentation (Davidson, London & Ladewig). Fetal lie can be determined by use of Leopold's maneuvers.

Figure 9. Transverse Lie of the Fetus. From "Transverse Lie", by Brookside Associates, 2014, *Military Obstetrics and Gynecology*, http://www.brooksidepress.org/Products/Military_OBGYN/Home.htm. Copyright 2014 by Brookside Associates. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

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Figure 10. Cephalic Presentation in Longitudinal Lie [Digital Image of Original]. From "Vertex presentation, occiput anterio", by W. Smellie, 1792 in Plate 14, from *A Set of Anatomical Tables with Explanation.* Retrieved from http://commons.wikimedia.org/wiki/File:Cephalicpre.JPG.

Figure 11. Breech Presentation in Longitudinal Lie [Digital Image]. From "Vertex presentation, occiput anterio" by W. Smellie, 1792 in Plate 14, from *A Set of Anatomical Tables with Explanation.* Retrieved from http://commons.wikimedia.org/wiki/File:Breechpre.jpg

Learning Activity
Fetal Lie

Equipment: Baby doll (Baby Nita)
Pillow in pillowcase
Maternal child Text with instructions for Leopold maneuvers

Activity: Working with a partner or preceptor and using the textbook perform the following:

1. Have your partner place the baby model into the pillow case with the pillow
2. Partner then lies on the bed and places the pillow under his/her shirt with the pillow side up.
3. Follow the steps for the maneuvers in the textbook, and palpate the baby through the pillow on the partners' abdomen.
4. Partner can vary the direction of the baby in pillowcase from transverse and longitudinal lies.
5. Describe the differences felt between the different lies and discuss with partner.

Section 3.3:
Fetal Presentation

Learning Objectives

Upon completion of Unit 3 Section 3, you will be able to

- Define the term fetal presentation.
- Describe the three main fetal presentations: cephalic, breech, and shoulder.
- Discuss the fetal landmarks palpated during Leopold's maneuvers to determine fetal presentation.
- Discuss the fetal landmarks palpated during vaginal exams to determine fetal presentation.
- Describe the four variations of the cephalic presentation: vertex, military, brow, and face.
- Describe the three variations of the breech presentation: frank, complete and incomplete
- Discuss helpful tips that will aid RNs in assessing fetal presentation during vaginal exams.

During a vaginal exam, the fingers will come in contact with the presenting part of the fetus. The specific part that is first palpated, if the cervix is open enough to do so during a vaginal exam, determines the ***fetal presentation*** (Scott-Ricci & Kyle, 2009). The three main fetal presentations are: cephalic (head), breech (buttocks) and shoulder (Davidson, London & Ladewig, 2012).

Landmarks during Leopold's' Maneuvers: Fetal Presentation

The first and third Leopold's maneuvers are used to determine presentation. The first maneuver palpates for what part of the fetus is in the fundal region of the uterus (Leifer, 2014). In cephalic presentation, the buttocks should be palpated in the fundal region. It generally feels like a round object that is soft with irregular contours (Leifer). In breech presentation, the hard round head with smooth contours will be palpated in the fundal region. If a shoulder presentation, no object will be located in the fundal region (Leifer).

Landmarks during Vaginal exams: Fetal Presentation

Cephalic presentation (longitudinal lie) means the fetal head is palpated when a vaginal exam is performed. In a breech presentation (longitudinal lie), it is common to feel the sacrum as the presenting part. In a shoulder presentation (transverse lie) the scapula of the fetus is felt during vaginal exam (Davidson, London & Ladewig, 2012).

The Cephalic Presentation

The cephalic presentation is the most common fetal presentation. It is further classified into four variations based on the degree of flexion or extension of the fetal head in the pelvis. This is known as *fetal attitude* (Davidson, London & Ladewig, 2012).

Fetal attitude is assessed during the 4th Leopold's maneuver. Flexion is determined when the hard round head is palpated on the opposite side of where the fetal back is palpated. If extended, the hard round head will be palpated on the same side as the fetal back (Leifer, 2014)

Vertex presentation.

Vertex presentation (see Figure 12) is the most common cephalic presentation. The occiput of the fetal head enters the pelvis first. In this presentation, the fetal head is completely flexed with the chin touching the chest (Davidson, London & Ladewig, 2012). This is the ideal presentation because it allows the smallest diameter (9.5 cm) of the head to present into the pelvis (Ward & Hisley, 2009)

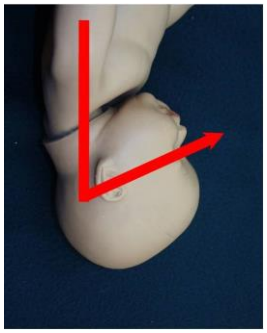


Figure 12. Vertex Presentation. From "Flexed Head", by Brookside Associates, 2007, http://www.brooksidepress.org/Products/Obstetric_and_Newborn_Care_1/lesson_10_Section_1.htm. Copyright 2007 by Brookside Associates. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

Sinciput Presentation /Military Presentation.
In the military presentation (see Figure 13), the fetal head is partially flexed toward the chest. As a result, the top of the head is the presenting part entering the pelvis (Davidson, London & Ladewig, 2012). The occipitofrontal diameter of the head presents into the pelvis measuring 11.75 cm (Ward & Hisley, 2009).

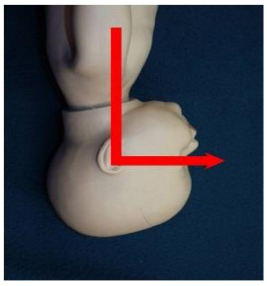


Figure 13. Military Presentation. From "Neutral Position Head", by Brookside Associates, 2007, http://www.brooksidepress.org/Products/Obstetric_and_Newborn_Care_1/lesson_10_Section_1.htm. Copyright 2007 by Brookside Associates. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

Brow Presentation.
In the brow presentation (see Figure 14), the fetal head is partially extended, allowing the largest diameter of the head (the anteroposterior diameter), to pass through the maternal pelvis. The diameter is 13.5 cm (Ward & Hisley, 2009). This presentation is associated with prolonged labours. During vaginal exam, the ridge of the fetal eyebrows are palpated.

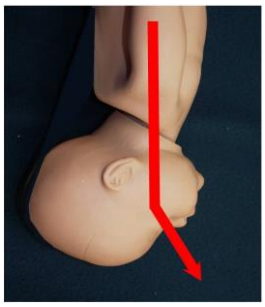


Figure 14. Vertex Presentation. From "Deflexed Head", by Brookside Associates, 2007, http://www.brooksidepress.org/Products/Obstetric_and_Newborn_Care_1/lesson_10_Section_1.htm. Copyright 2007 by Brookside Associates. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

Face Presentation.
In a face presentation (see Figure 15), the fetal head is hyperextended. The mentum or chin is generally palpated in this presentation. The submentobregmatic diameter (9.5cm) enters the pelvis first (Ward & Hisley, 2009). Despite the smaller diameter entering the pelvis, face presentations require caution, if the fetus will birth vaginally, as damage to the fetal eyes and face can occur. Face presentations are associated with prolonged labour. Once face presentation is confirmed, caesarean section may be considered for mode of delivery, due to the risk of damage to the fetus if delivered vaginally.

Figure 15. Face Presentation [Original Photograph] by Pamela Chappell, 2014.

The Breech Presentation
A breech presentation is defined as when the buttocks of the fetus enters the maternal pelvis prior to the head (Davidson, London & Ladewig, 2012). There are three variations of breech presentations.

Frank Breech
In the frank breech presentation (see Figure 16), the buttocks is the presenting part in the pelvis with the hips flexed and the knees are extended so the legs are up over the chest (SOGC, 2013).

Figure 16. Frank Breech Presentation. From "Frank Breech", 2014, by Brookside Associates, Military Obstetrics and Gynecology, http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/AbnormalLandD/AbnormalPresentation.htm. Copyright 2014 by Brookside Associates. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

Complete Breech.
In a complete breech presentation (see Figure 17), the fetal hips and knees are flexed and a foot or both feet can be adjacent or just below the buttocks (SOGC, 2013).

Figure 17. Complete Breech Presentation. From "Frank Breech", by Brookside Associates, 2014, *Military Obstetrics and Gynecology*, http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/AbnormalLandD/AbnormalPresentation.htm. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

Footling Breech.
A footling breech (see Figure 18) is when one or both hips are extended allowing the fetus' feet or knees to present into the pelvis. This is also called as an incomplete breech (SOGC, 2013).

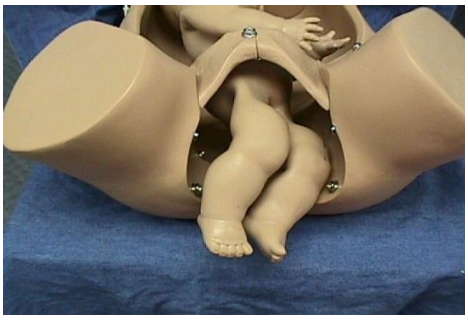


Figure 18. Footling Breech Presentation. From "Footling Breech (Incomplete)", 2014, by Brookside Associates, *Military Obstetrics and Gynecology*, http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/AbnormalLandD/Breech.htm. Copyright 2014 by Brookside Associates. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

Breech presentations, based on specific criteria, can delivered vaginally as is the case at this agency. However, vaginal breech deliveries are performed by an obstetrician and at his/her discretion. Vaginal breech deliveries are considered high risk births and must be properly supported by appropriate staff. That is, ensure a family physician, a respiratory technician and neonatal resuscitation trained nurses are in attendance, in addition to having the operating staff including the anesthetist and nurses on standby. It is appropriate to notify these staff as soon as a breech presentation is known and vaginal birth delivery is to take place. When the woman is commencing pushing these staff should be in attendance and available.

Obstetricians generally perform an *external cephalic version* to place the fetus in the proper position (breech to cephalic), before labour starts. Review the agency policy on external cephalic version for further information as well as Vaginal Breech Delivery Guideline (SOGC, 2009) for specific criteria. These documents can both be found in the Labour and Delivery Manuals located, at this agency, in each delivery room and the assessment room.

The Shoulder Presentation

A shoulder presentation (see Figure 19), due to its transverse lie may be harder to distinguish during a vaginal exam, as the presenting part may not be in the pelvis or be located high in the pelvis. The landmark is the acromion process of the scapula, however, it is often the absence of a presenting part that can confirm a shoulder presentation (Davidson, London & Ladewig, 2012). In some cases the arm or hand may descend into the pelvis. The shoulder presentation is not compatible with a vaginal delivery.

Figure 19. Shoulder presentation. From "Shoulder Presentation" by W. Smellie, 1792, in Plate 32, from *A Set of Anatomical Tables with Explanation.* Retrieved from http://commons.wikimedia.org/wiki/File:Smellie_32.jpg

****Remember Leopold's' Maneuvers are and should be used to determine presentation prior to vaginal exams. ****

Helpful Hints about
Fetal Presentation

- Leopold's maneuvers, should always be done prior to the vaginal exam as to assess fetal lie, presentation, and position.
- Remember, it could be that the fetus is not in longitudinal lie but transverse lie, so, no presenting part will be engaged in the pelvis. This is important to know, as this lie is incompatible with vaginal delivery.
- If the presenting part of the fetus is not palpable during a vaginal exam, do not be too forceful or aggressive trying to locate it. There is a risk of rupturing the amniotic fluid sac/membranes causing a possible umbilical cord prolapse.
- The cephalic/ vertex presentation is generally easiest presentation to feel during vaginal exam because the fetal head feels hard, firm and smooth.
- A face presentation will feel soft and irregular during a vaginal exam. The examiner might feel the fetal orbital ridges and may slip a finger into the fetal mouth, which could trigger the fetal sucking reflex.
- If fetus is in breech presentation, the fetal buttocks feels soft and irregular to the examiner's fingers during a vaginal exam.
- The sacrum, felt first in a breech presentation, may be palpated as a hard mass with irregular soft areas with the fetal anus in close proximity. To help clarify the breech presentation, the examiner may gently slip one fingertip into the fetal anus. When examiner's gloved finger is removed from vagina, meconium is generally present on the glove.
- Presentations other than cephalic require confirmation with a physician, and can be verified with ultrasound.
- If you are ever unsure or in doubt of what you are palpating for presentation during Leopold's maneuvers or during a vaginal exam, always ask for help.

Learning Activity
Fetal Presentation

Activity 1:
Equipment: Sterile glove and lubricant for vaginal exam
With preceptor or another practitioner and a pregnant woman requiring vaginal examination who is a willing participant:
Note: Always perform this assessment with your preceptor or an experienced RN until you become comfortable with completing the activity on your own.

1. Practice all 4 Leopold's maneuvers on the woman, paying particular attention to determining fetal presentation.
2. Perform a vaginal exam on the woman. Compare your findings from the internal exam with those deduced by Leopold's maneuvers.

Activity 2:
Equipment: Model Pelvis and Model Baby (Baby Nita)
With a preceptor or another practitioner use the pelvic and baby models to perform the following:

1. Have a partner place Baby Nita in the three main presentations in the pelvic model.
2. Complete a vaginal exam on the pelvic model with the babe in each presentation.
3. Assess what the fingers are touching during a vaginal exam in the different presentations
4. Once you are comfortable with the first three steps, have your partner place the model baby in the different presentations as well as variations, and blindfolded or with closed eyes, perform a vaginal exam and determine the presentation.

Section 3.4
Fetal Position

Learning Objectives

Completion of Unit 3 Section 4, you will be able to:

- Define the term fetal position.
- Describe and understand fetal position using acronyms.
- Discuss and describe the fetal landmarks used to determine fetal position during Leopold's maneuvers.
- Discuss and describe the fetal landmarks used to determine fetal position during vaginal exams.
- Describe the various fetal positions for cephalic presentation and the fetal skull landmarks used to determine the fetal positions during vaginal exams.

The location of the presenting part in the maternal pelvis is known as ***fetal position*** (Davidson, London & Ladewig, 2012). The maternal pelvis is divided into 4 quadrants (See Figure 20). The four quadrants are: left and right posterior; right and left anterior. These four quadrants are used as points of reference when describing the position of fetus (Ward & Hisley, 2009).

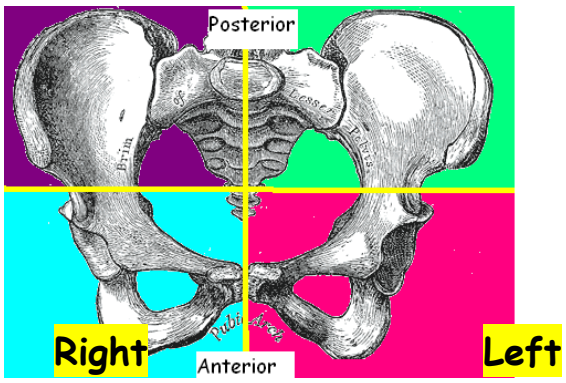


Figure 20. Four Quadrants of the Female Pelvis [Modified Digital Image of Original]. From "Female Pelvis" by Henry Gray, 1918, http://commons.wikimedia.org/wiki/File:Gray242.png

Communicating Position

Ward & Hisley, (2009) describe the use of **three letter acronyms** to designate and communicate the position of the fetus in relation to the maternal pelvis.

The **first letter** relates to the location of the fetal presenting part, either the right (R) or left (L) side of the maternal pelvis.

The **second letter** represents the fetal part presenting first to the pelvis, known as the presenting part: occiput (O) (vertex presentation), mentum (M) (face presentation), sacrum (S) (breech presentation), or scapula (Sc) (shoulder presentation).

The **third letter** represents where the presenting part is located in the maternal pelvis, either anterior or posterior in the pelvis. The letters "A" represent anterior, "P" posterior, and transverse (middle) "T".

The Fetal Skull

In a cephalic presentation, the anterior and posterior fontanelles, as well as the sagittal suture are used commonly as landmarks on the fetal head to determine fetal position (See Figure 21). However, the accuracy of determining fetal position by means of vaginal exam alone is not well documented in the literature (Simkin & Ancheta, 2011). Thus determining fetal position should also be done in combination with Leopold's' maneuvers (Simkin & Ancheta).

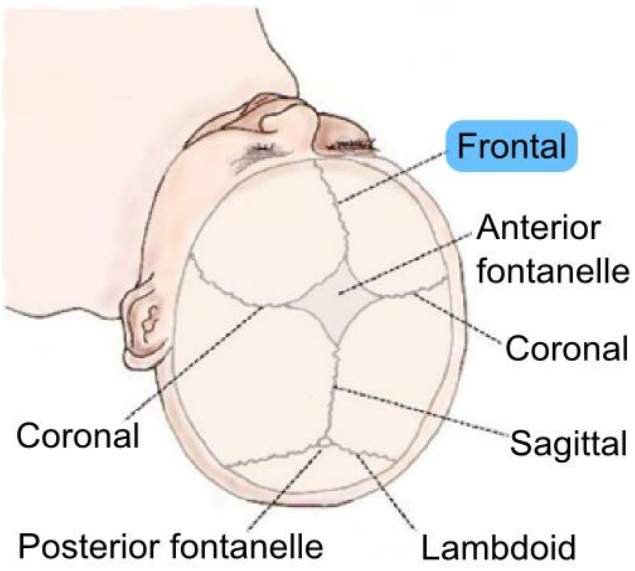


Figure 21. Anatomy of the fetal head. From "Cranial sutures shown from top of head" by Xxjames, 2010, http://commons.wikimedia.org/wiki/File:Sutures_from_top.png

Determining Position during Vaginal Exam

The Occiput Anterior Position

The ***occiput anterior (OA***) position is the most common position for the fetus in cephalic presentation. The OA position (left or right), involves the fetal head fully flexed, allowing the smallest biparietal diameter (9.5 cm) to pass through the largest diameter of maternal pelvis (Ward & Hisley, 2009).

In direct OA position (see Figure 22), the sagittal suture is in the midline of the maternal pelvis. The posterior fontanelle is used as the landmark to determine the fetal position. It will be located in the anterior midline of the maternal pelvis when fetus is in direct OA position. The posterior fontanelle palpates as a small triangle with three suture lines running from it.

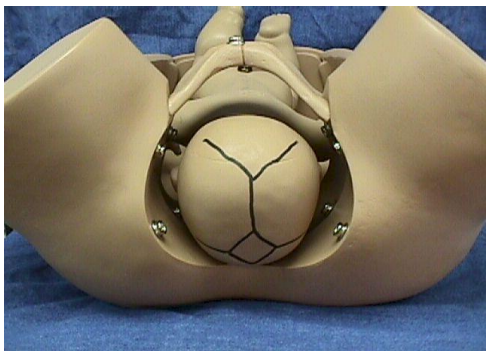


Figure 22. Direct Occiput Anterior Position. From "Direct Occiput Anterior (OA)", 2014, by Brookside Associates http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/AbnormalLandD/fetal_position.htm. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

Variations of the OA position are noted as right occiput anterior (ROA) and left occiput anterior (LOA). In these cases, the OA position is determined by the examiners fingers palpating for the posterior fontanelle and locating it in either the right or left anterior quadrant of the maternal pelvis. The fetal occiput is also located in these quadrants.

For example, in ROA position (See Figure 23), the occiput and the posterior fontanelle are located in the right anterior quadrant of the maternal pelvis.

Figure 23. Right Occiput Anterior position. From "Right Occiput Anterior (ROA)", 2014, by Brookside Associates http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/AbnormalLandD/fetal_position.htm. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

The Occiput Posterior

In direct ***occiput posterior (OP)*** position (see Figure 24), the anterior fontanelle is used as the landmark. In direct OP position, the anterior fontanelle resembles a diamond shape when palpated in the midline of anterior region of the maternal pelvis with four suture lines running from it (Simkin & Ancheta, 2011).

Figure 24. Direct Occiput Posterior Position. From "Direct Occiput Posterior (OP)", 2014, by Brookside Associates http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/AbnormalLandD/fetal_position.htm. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

Variations of the occiput posterior position, similar to the OA position, are described as left occiput posterior (LOP or right occiput posterior (ROP). In the case of LOP (See Figure 25), the occiput is felt in the left posterior quadrant of the maternal pelvis. Using the anterior fontanelle as a landmark for determining position, be aware that it will be felt in the opposite quadrant of where the occiput is located. In LOP position, the occiput is felt in the left posterior quadrant of the maternal pelvis and the anterior fontanelle is located in the right anterior quadrant of the maternal pelvis.

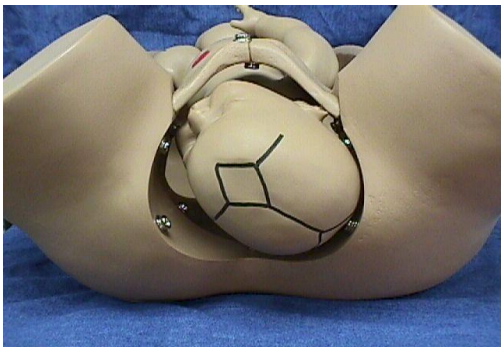


Figure 25. Left Occiput Posterior Position. From "Left Occiput Posterior (LOP)", by Brookside Associates, 2014, *Military Obstetrics and Gynecology*, http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/AbnormalLandD/fetal_position.htm. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

The Occiput Transverse

In the occiput transverse position, the occiput is palpated in the midline of the horizontal plane of the maternal pelvis (Davidson, London & Ladewig, 2012). The occiput transverse (OT) position is verified by palpating the sagittal suture, which will run horizontally in the maternal pelvis. The occiput transverse position will be either right or left, depending on where the occiput is in the maternal pelvis. This can be verified by palpating for the fontanelles (anterior and posterior). As an example, in left occiput transverse (LOT) (see Figure 26), the posterior fontanelle is palpated within the left side, and the anterior fontanelle is palpated within the right side of the maternal pelvis.

Figure 26. Left Occiput Transverse position. From "Left Occiput Transverse (LOT)", by Brookside Associates, 2014, *Military Obstetrics and Gynecology*, http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/AbnormalLandD/fetal_position.htm. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

Synclitism and Asynclitism

As the fetal head enters the pelvic inlet or true pelvis, it may enter at an angle whereby the parietal bone enters first. This is known as asynclitism. (Simkin & Ancheta, 2011). As labour progresses, the angle of the head should correct itself so the occiput descends properly into the maternal pelvis. When this occurs, it is known as synclitism (Simkin & Ancheta)

However, it is important to note that asyclitism of the fetal head does not always correct itself. This asynclitism can be the cause of labour dystocia, as descent of the head is prolonged. Asynclitism also makes it difficult to assess the fetal position accurately and makes feeling for the fetal landmarks challenging (Simkin & Ancheta, 2011). In asynclitism, the sagittal suture can be felt just below the pubic arch or may not palpated be at all during a vaginal exam. Additionally, when the fetal head feels like it is a tight fit in the front, sitting against the symphysis pubis, and it feels like there is more space in the posterior pelvis, the head is most likely asynclitic (Simkin & Ancheta)

Helpful Hints about:
Fetal Position

- Using Leopold's maneuvers prior to a vaginal exam will assist in identifying both presenting part and position.
- Ask the attending physician or another skilled RN to describe what the position that is felt, during their assessment when they perform a both Leopold's maneuvers and vaginal exam. Compare the described findings during your next assessment.
- The sagittal suture line and the anterior and posterior fontanelles on the fetal head are used as landmarks for determining fetal position during vaginal exams.
- Occiput anterior is the most common fetal position. Once comfortable in identifying OA during vaginal exams, other positions other than occiput anterior may become easier to identify.
- The OP position is also associated with a persistent anterior lip of cervix, often located over a small portion of the fetal presenting part during 1st stage of labor.
- A cervix that is palpated off to the side or not in the midline of the maternal vagina, generally coincides with a presenting part that is asynclitic.
- The position of the fetal presenting part is not stationary in the pelvis, and changes during labour to fit through the maternal pelvis for delivery. This changing of position is facilitated by the power of the contractions and maternal pushing efforts.
- When patients have epidurals during labor, performing a vaginal exam on her tends not to be as uncomfortable. Therefore, take the time to determine fetal position, palpating the landmarks of the fetal head.
- An irregular contraction pattern such as coupling , tripling or, contractions that are experienced mainly in the woman's back, may be associated with a malpositioned presenting part, such as the OP position.
- Moulding of the fetal head can make determining position difficult, as the bones have overlapped to a degree making the landmarks more difficult to palpate.
- If you cannot feel a presenting part during the vaginal exam to determine position or ask for help.

Learning activity
Fetal Position

Equipment: Gloves
Pelvic Model
Fetal Model Head with palpable suture lines (Baby Nita).

Activity: Working with a partner or preceptor perform the following:

1) Begin with placing the fetal head in the different cephalic positions, and examining with your eyes where the sutures and fontanelles are located in relation to the maternal pelvis.
2) Pretend as of you are doing a vaginal exam on the pelvis. Have your partner place the fetal head, in the various positions (OA, OP & OT) in the model pelvis.
3) As you palpate the head (with your eyes open), feel and look for where the landmark sutures and fontanelles in the different positions.
4) When comfortable with the first activity, have the partner place the model head in the different positions and assess position with your eyes closed.

Section 3.5
Engagement

Learning Objectives

Upon completion of Unit 3 Section 5, you will be able to

- Define engagement of the presenting part
- Describe how engagement of the presenting part is assessed

Engagement is defined as when the widest diameter of the presenting part of the fetus has passed through the pelvic inlet. In cephalic presentation, the biparietal diameter is the largest part of the head (Ward & Hisley, 2009).

Leopold's maneuvers, specifically the third maneuver (the pelvic grip), are used to determine engagement (Ward & Hisley, 2009). During vaginal exam, engagement is assessed by the examiner's fingers pushing upward on the presenting part. If engaged, the presenting part should not move upwards in the pelvis away from the cervix during a vaginal exam. If the presenting part does move away from the cervix, this finding is noted as a ballotable presenting part (Davidson, London & Ladewig, 2012).

Helpful Hints about:
Engagement

- In primiparous women, engagement of the fetus generally happens approximately 2 weeks before the estimated due date, around 38 weeks gestation.
- In multiparous women, the fetal head does not become engaged, generally, until the onset of labour.
- Engagement is less likely to occur before labour in multiparous women because the uterine and abdominal muscles are more lax.
- Even though engagement occurs and can confirm the adequacy of the maternal pelvic inlet, it does not indicate that the maternal pelvis is suitable to accommodate a vaginal delivery.

Learning activity
Fetal Engagement
Activity : Please see learning activity for Fetal Station, Section 3.6

Section 3.6
Station

Learning Objectives

Upon completion of Unit 3 Section 6, you will be able to

- Define fetal station.
- Discuss the landmarks of the maternal pelvis felt during vaginal exams that determine station.
- Describe and discuss helpful tips RNs can use when assessing fetal station.

Station is the level of the presenting part in relation to the maternal ischial spines (Davidson, London & Ladewig, 2012). The ischial spines (see Figure 27) are used as the landmark for station because it represents the narrowest diameter of the maternal pelvis that the fetus must pass through (Davidson, London & Ladewig). Visualization of zero station requires drawing an imaginary line at the level of the ischial spines (Davidson, London & Ladewig).

Figure 27. Location of the Ischial spines in the pelvis. From "Prominence of the Spines", by Brookside Associates, 2014, *Military Obstetrics and Gynecology*, http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/AbnormalLandD/fetopelvic_disproportion.htm. Copyright 2014 by Brookside Associates. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

When the presenting part is above the imaginary line station is noted by minus (-) station. When presenting part has passed below the spines, station is noted as a plus (+) station (Ward & Hisley, 2009). If the presenting part is located at 1 cm above the spines, it is communicated as -1 station (see Figure 28).

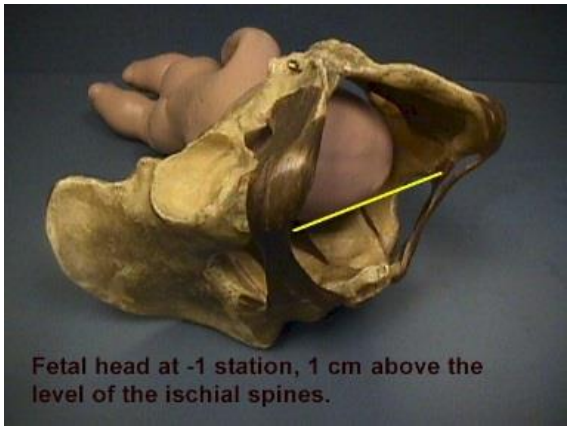


Figure 28. Minus 1 (-1) station. From "Station", by Brookside Associates, 2014, *Military Obstetrics and Gynecology*, http://www.brooksidepress.org/Products/Military_OBGYN/Textbook/LaborandDelivery/labor.htm. Copyright 2014 by Brookside Associates. Reprinted with permission courtesy of Mike Hughey, MD, Brookside Associates, LLC.

An indicator of progress in labour is that the presenting part continues to descend in the maternal pelvis. When the birth is imminent, the presenting part is at + 4 or 5 station (Davidson, London & Ladewig, 2012). Physical signs that birth is imminent may include: a bulging perineum with labial separation, and the woman experiencing an uncontrollable urge to push. In some cases, the head may be visible protruding through the labia, also known as crowning (Ward & Hisley, 2009).

Helpful Hints about:
Fetal Station

- Always use Leopold's maneuvers, prior to checking for station via the vaginal exam, to assess that the fetal head is engaged.
- Sometimes it is difficult to determine the exact station of the presenting part because women cannot tolerate the exam long enough for the examiner to locate the maternal ischial spines.
- If women cannot tolerate the vaginal exam long enough to locate ischial spines, the examiner can quickly take note how far the fingers were inserted into the vagina to palpate the bony prominence of the presenting part. If the entire fingers were inserted into the vagina, and the examiner is unable to reach the presenting part easily, station is often referred to as, -3 or greater.
- When performing a vaginal exam, the ischial spines can be located on the side walls of the vagina, approximately at the 4 and 8 o'clock positions. Some are easily palpated, others are not. Ischial spines feel like dull bumps, others may palpate more prominent...
- If the amniotic membranes are intact, and the presenting part cannot be felt, proceed with caution as the risk of causing a rupture of membranes could precipitate an umbilical cord prolapse.
- In order for the head to descend into the maternal pelvis, adequate contractions are required. If labour is in the latent phase, and contractions are not established, descent may be slow.
- Descent of the fetal head in primiparous women is often gradual, and the head is, usually, at 0 station by full dilation.
- It is not uncommon for descent of fetal head in multiparous women to occur rapidly during the active and transitional phases in the first stage of labour. Often the head can be ballotable in the latent phase of labour.
- Do not confuse caput on the fetal head for descent especially during 2nd stage and maternal pushing! Caput is the spongy edematous swelling that occurs in the skin over the scalp as a result of the pressure of the maternal soft tissues on the fetal head. Moulding is the overlapping of the bones of the fetal head to accommodate the delivery process through the birth canal. When assessing station, feel for the rigid, hard presenting part of the fetal head, not the spongy caput.
- When the station of the presenting part does not change, despite the presence of strong, regular contractions, it can indicate a problem with the relationship between the maternal pelvis and the fetus.
- If unsure of your assessment of station, as always, ask for help.

Learning activity
Fetal Engagement and Station

Equipment: Gloves
Pelvic Model
Fetal Model Head

Activity: Working with a partner or preceptor perform the following:

1) Begin with your partner placing the fetal head in the pelvic inlet.
2) Palpate the ischial spines on the pelvic model. Visualize the imaginary line as station zero at the level of the spines
3) Next, feel the presenting part of the model fetal head with your fingers, and determine how far up past the ischial spines the examiner's fingers must reach until the fetal head is just at the pelvic inlet.
4) Have the partner place the fetal head lower into the pelvis, simulating both minus (-) and plus (+) stations. Note with each station, how far the fingers are reaching up into the pelvis.
5) When comfortable with the first activity, have the partner place the model fetal head in the different stations and assess station with eyes closed.

Conclusion

You have now completed reading Unit 3: The Passenger. After reading this unit, you should have be able to define the following terms: fetal lie, position, presentation, engagement and station. You should have gained an understanding of how to assess these components using both Leopold's maneuvers and vaginal exam based on the content of the unit, inclusive of the helpful tips sections.

Unit 4:
Decision Support Tree
for
Spontaneous Rupture of Membranes (SROM)

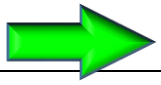
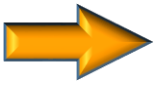
This algorithm is designed to assist RNs with clinical decision making related to the performance of vaginal exams on women with suspected Spontaneous Rupture of Membranes (SROM).

Instructions

The decision tree is designed to help RNs make quick decisions by proceeding through a sequence of steps. However, knowledge and understanding of the steps is important. Therefore, accompanying the decision tree is a legend to explain the reasons behind the nursing actions and interventions. Each step in the decision tree is numbered, and these numbers correspond with rationale in the legend. As a new learner to vaginal exams, understanding the importance in doing each step, as well as what meaning it has to the entire clinical picture, increases clinical decision making capacity. The decision tree is to be used as a quick reference tool to decide when to proceed with a vaginal exam when caring for a woman with suspected SROM.

Arrows direct the RN to the various steps in the sequence of the decision tree. Answers to the assessment questions, will determine the next step the RN will proceed to. In some cases, the arrow may refer to a step that includes referral to another decision tree, such as suspected preterm labour.

Colour Code

Colour	Meaning
	The blue box represents each step that involves assessment by the RN.
	The pink box indicates interventions to be done prior to proceeding with a vaginal exam.
	Green arrows and green boxes represent proceed to the next step. **GREEN MEANS GO!!**
	**ORANGE** indicates proceed with caution and the necessity of completing an intervention prior to completing a vaginal exam. **ORANGE Indicates PROCEED WITH CAUTION.**
	**RED** signifies **STOP, DO NOT PERFROM VAGINAL EXAM.**
	The **YELLOW STAR** is a reminder that the algorithm is a guideline only and that collaboration with the physician ? &/or other HCPS (RN)is always the gold standard.

Suspected Spontaneous Rupture of Membranes

ALWAYS CONSULT WITH PHYSCIAN OR ANOTHER RN, IF UNCERTAIN WHETHER OR NOT TO PROCEED WITH A VAGINAL EXAM

1. **Initial Assessment**
   Patient History (Including time and amount of ROM)
   Maternal Vital Signs
   Fetal Position Using Leopold's Maneuvers
   Detailed History of Events (including color, amount and odour of fluid)
   Fetal Heart Assessment

2. **Fluid Meconium Stained (Green/Yellow)** | **Fluid Clear** | **Fluid Red (Blood)** → **YES** → **PLEASE SEE ALGORITHM FOR VAGINAL BLEEDING**

3. Term gestation? > 37 weeks → **NO** → **PLEASE SEE ALGORITHM FOR PRETERM LABOUR**

4. Normal Fetal Heart Assessment
   As per SOGC guidelines → **NO** → **Consult with physician with atypical and abnormal tracings**
   Vaginal exam may be required to rule out cord prolapse or internal fetal monitoring may be required

5. **Is this active labour?**
   Is the patient having regular, painful contractions that are at least 5 minutes apart and lasting 60 seconds or longer? → **NO** → **Do not proceed with Vaginal Exam**
   Please see "What to do next?"

6. Group B Strep Negative
   Group B Strep + &/or Unknown*

7. **Proceed with Vaginal Exam**

   Delay Vaginal Exam
   Until antibiotics initiated
   Proceed with Vaginal Exam if patient:
   Requires analgesia
   Delivery is imminent

8. **What to do next?**

   Always call the physician with findings of your assessment.
   If the vaginal exam is not done, based on the use of the decision tool, await further instructions from physician

   For confirmation of rupture of membranes
   - Consider testing fluid sample with Nitrazine swab prior to calling physician.
   - If unable to test fluid sample, await instructions from the physician. Prepare patient for possibility of a sterile speculum exam by the physician to confirm rupture.
   - Following confirmation of rupture, initiate antibiotics as needed in view of positive GBS cultures.

Legend

The numbers correspond with the steps in the above tree and are explained in the legend below. Details and rationale are provided for each step to increase your understanding of performing vaginal exams when spontaneous rupture of membranes is suspected.

1. **Initial assessment.** The patient arrives to the unit with possible rupture of membranes. Patient history is obtained by completing the Maternal Assessment Form (RCP, 2012) using both subjective and objective data as well as the prenatal record (Cumberland Health Authority, 2008). Initial assessment of pregnant women includes maternal vital signs (blood pressure, temperature, pulse and respirations), obtaining a urine sample and obtaining a current history of their pregnancy and the events that have brought them to hospital. Current history of events, in this scenario, should include time of the rupture of membranes, colour, odour and amount of fluid. Assessment of fetal heart should be done via the appropriate method, either intermittent auscultation or continuous electronic fetal monitoring. Guidelines for appropriate fetal health monitoring can be found in the Labour and Delivery Manuals located in each of the delivery rooms and the assessment room at the agency. Guidelines are structured as per the Society of Obstetricians and Gynecologists of Canada recommendations. In addition to fetal heart assessment, assessment of contractions should be conducted by abdominal palpation alone or in conjunction with electronic monitoring, if applicable.

2. **Color of Fluid?** An accurate history of the time of suspected rupture of membranes, the color and amount are critical to the data collected as it will determine further interventions needed in the plan of care during labour (Davidson, London, & Ladewig, 2012). Fluid often falls under the categories of clear, meconium stained or red (blood). Clear fluid is the expectation of a normal pregnancy without complications. Meconium stained fluid can be a sign that a fetus is stressed as a result of fetal hypoxia. The stress causes the fetus to have a bowel movement in utero. It also occurs in post-date gestations. Meconium stained fluid is often green or yellow in color, with the possibility of particulate matter (Society of Obstetricians and Gynecologists of Canada, 2013). If blood is suspected, the cause or origin of the bleeding needs to be determined. When red fluid is present (blood) please refer to the Algorithm on vaginal bleeding.

3. **Term gestation?** Agency policy states that those patients less than 36 weeks gestation should be transferred to a tertiary care facility where proper resources are in place, including a neonatal intensive care unit. If delivery is imminent, and safe transfer cannot be arranged prior to delivery, the patient may be delivered at this agency.

   Please refer to the **ALGORITHM FOR PRETERM LABOUR** in cases of gestational age less than 37 weeks.

4. **Fetal Health Surveillance:** In cases where the fetal heart assessment is abnormal or atypical, it becomes necessary to assess for possible causes, and use appropriate corrective resuscitative measures (SOGC, 2013). If intermittent auscultation reveals an abnormal finding, such as decelerations in the fetal heart rate, electronic monitoring should be applied as indicated. If an atypical or abnormal tracings are present, a vaginal exam can become necessary to assess for causes of the fetal distress seen in these specific tracings. (Canadian Perinatal Programs Coalition, 2009). Please review guidelines for fetal heart monitoring in the Labour and Delivery Manual located in each of the delivery rooms and assessment room at the agency.

5. **Is this active labour?** Is the patient experiencing regular painful contractions less than five minutes apart, lasting at least a minute. Is the patient displaying physical signs of active labour such as: the inability to talk during contractions, moaning and frequent position changes for comfort. Review Unit 1: Labour Defined.
   Not in active labour? Do not proceed with vaginal exam. Rupture of membranes is not an indication that a patient is in active labour. Rupture of membranes occurring prior to the regular contractions is known as prelabour rupture of membranes (PROM) (SOGC, 2013). If the patient is not in active labour, no vaginal exam should be completed. PROM is a contraindication to performing vaginal exams at the current agency.

6. **Group B streptococcal status**. Women should be screened for group B streptococcal (GBS) disease at 35 to 37 weeks' gestation by recto-vaginal swab. (SOGC, 2012). GBS status is found on the prenatal record and if not check the Electronic Medical Record (GBS) of the patient used at this agency. Group B streptococcal infection represents a significant cause of neonatal morbidity and mortality (SOGC, 2012). Management of Group Strepptococcal infections is supported by the current guidelines issued by the SOGC (2012), The Prevention of Early-Onset Neonatal Group B Streptococcal Disease. This guideline can be located and reviewed on the SOGC website as well as in the medication administration record book at the current agency.

7. **Vaginal Exam**: With a positive Group B status delay the vaginal exam, IF POSSIBLE, until IV antibiotics are administered as per SOGC guidelines in order to decrease risk of transmission of infection to fetus/baby (SOGC, 2013). Perform vaginal exam if birth is imminent, the mother requires analgesia, and/or the fetal heart assessment shows signs of fetal distress. Vaginal exams in patients who are Group B Strep negative are appropriate for RNs to perform if the patient is in *active labour*. Review Unit 1: Labour Defined – Active Labour.

8. **What to do next:** When SROM is suspected but the patient is not in labour, the RN must either assess fluid with nitrazine swab (Amniostick) and/ or prepare the patient for sterile speculum exam. The sterile speculum, done by the physician, allows for examination of the fluid in the vagina. A sample of fluid is obtained on a glass slide to test for positive ferning under microscope. Positive fern test confirms the spontaneous rupture of membranes. Following confirmation of SROM, refer to the step 5 on Group B Strep. Current practice at the agency is to delay performance of vaginal exam until consultation has been done with the attending physician or when active labour has been established.

   Communicating to the Physician: When calling the physician with the findings of your assessment, utilize the Maternal Assessment Form as well as the steps of this decision tree, as a guide for what information you should be relaying to the physician. The physician is reliant on this information to make clinical decisions. If you have not done a vaginal exam, the reasoning for this should be evident in the report given to the physician.

Case Study

Instructions

The following case study is designed to be discussed with your preceptor or another RN. With each paragraph, more information is provided to the clinical scenario. DO NOT READ AHEAD. Utilize the "Decision Tree for Suspected Rupture of Membranes" to discuss and decide which steps you will take in making a decision to perform a vaginal exam on this patient, based on the information provided to you.

Scenario

You are the RN assigned to Labour and Delivery today. Z.Z. arrives on the unit. She is a 33 year old, G3P1, who is 39 weeks gestation. Her past history is significant for a wisdom tooth extraction. She has no known allergies. Her past obstetrical history is significant for a spontaneous vaginal delivery 2 years ago without complications. Her current obstetrical history is only significant for a positive GBS culture done two week ago. Z.Z. states her reason for coming today is, she believes, her water broke at home about an hour ago. She describes the loss of fluid as "enough to fill an ice cream bucket" and that she "is stilling soaking through pads". She describes the fluid as "clear with some white flecks in it".

Describe and discuss your initial assessment.

Z.Z. appears uncomfortable, and she tells you that prior to the rupture of her membranes, she was experiencing contractions about every five minutes, and they were lasting about a minute. She says she was not finding them too uncomfortable at first, but since the water broke, she rates her pain with contractions at a 6/10.

Based on the above information, describe your next steps are in deciding whether a vaginal exam can or needs to be done.

You note that she does not have any risk factors and so you check the fetal heart with a Doppler after a contraction. You assess the fetal heart rate to be 152 bpm. You palpate her abdomen when she is having a contraction. The abdomen becomes firm with the contraction so that you can barely indent it with your fingers. Z.Z. is concentrating on her breathing during the pain and has expressed interest in getting an epidural.
What are your next steps?

You have determined that, based on your assessments, Z.Z. is in most likely in active labour as she is experiencing regular strong contractions. The FHR is normal. Is it appropriate to proceed with a vaginal exam now? Why or Why not?

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