

**MANAGEMENT OF ACUTE GASTROENTERITIS IN YOUNG CHILDREN:
A PROJECT TO INCREASE NURSES' KNOWLEDGE
OF EVIDENCE-BASED GUIDELINES**

BY

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**A Practicum Project
Submitted to the Faculty of Graduate Studies
in Partial Fulfillment of the Requirements
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**Management of Acute Gastroenteritis in Young Children:
A Project to Increase Nurses' Knowledge of Evidence-Based Guidelines**

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Fran Schmidt

**A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University
of Manitoba in partial fulfillment of the requirements of the degree**

of

Master of Nursing

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ABSTRACT

Studies have shown that acute gastroenteritis represents a common yet serious problem for children, as it is the leading cause of childhood mortality worldwide. Essential aims of treatment of viral gastroenteritis are to manage the fluid losses and dehydration that is the principal cause of serious morbidity and mortality. Research findings strongly support that practitioners follow expert recommendations for management of gastroenteritis. Findings suggest that physicians' practices differ importantly from practice guidelines as there is continued under-utilization of oral rehydration therapy (ORT) in treating this population in developed countries. This discrepancy has been repeatedly ascribed to practitioners' lack of knowledge of these guidelines.

The overall purpose of this practicum project was to increase the knowledge of current evidence-based guidelines among nurses' who work with young children in a primary care setting. The specific aims for this project were to: (a) identify nurses' perceptions about barriers to the optimal management of gastroenteritis, (b) determine the nurses' knowledge of the guidelines prior to the intervention, and (c) evaluate the effectiveness of the educational session in improving nurses' knowledge of the guidelines.

The research utilization model used in this project provided the framework, through which research findings were critiqued, implemented, evaluated and disseminated. Using a pretest/posttest design, this project evaluated the effectiveness of a one-hour educational session. Findings demonstrated a statistically significant

increase in nurses' knowledge levels following the intervention. In addition, nurses thought the most common barriers to effective management of gastroenteritis were inadequate parenting skills and parents' lack of understanding of the disease.

This project supported the effectiveness of an educational session directed at increasing nurses' knowledge of guidelines pertaining to the management of gastroenteritis. Additional larger scale studies are needed that are aimed at increasing nurses' knowledge of management guidelines and exploring barriers to the utilization of oral rehydration therapy. Recommendations to promote evidence-based nursing practice were presented.

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Dedication

To all of my nieces and nephews, Erin, Adam, Bobby, Leah, Katrina, and Matthew, whom I especially missed over the past two years. I'm coming home.

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CHAPTER 1: STATEMENT OF THE PROBLEM

Background to the Problem

Gastroenteritis is the leading cause of childhood mortality worldwide (Marby & Santucci, 2000). Worldwide as many as 4,000,000 children per year die as a consequence of gastroenteritis and resulting dehydration, malnutrition, electrolyte abnormalities, shock, and cardiac arrest; all potentially preventable causes (Gastañaduy & Begue, 1999; Northrup & Flanigan, 1994; Nutrition Committee - Canadian Paediatric Society [CPS], 1994). In Canada, between 325 and 425 deaths occur annually (Gastañaduy & Begue, 1999) and about 80% of these children are aged 1 to 12 months (Merrick, Davidson, & Fox, 1996). Acute gastroenteritis is one of the most common illnesses affecting infants and children in Canada and the world (Nutrition Committee - CPS, 1994). Estimates of the overall incidence of acute gastroenteritis range from 1.2 to 2.3 episodes of diarrhea per year for children less than 5 years of age (Burkhart, 1999; Gastañaduy & Begue, 1999; Merrick et al., 1996; Northrup & Flanigan, 1994). These estimates of the incidence of acute gastroenteritis are similar among children in developing or developed countries. In the United States and Canada, gastroenteritis is among the leading causes of hospitalization in young children (To, Feldman, Young, & Maloney, 1996).

Because rotavirus remains the cause of a substantial health burden for children and its equal incidence worldwide, a rotavirus vaccine was developed in the United States in 1998 with recommendations to vaccinate all infants. The vaccine has been

subsequently withdrawn from the market based on reports of intussusception among infants who received the vaccine. Since the withdrawal of this vaccine recommendation, the Advisory Committee on Immunization Practices (ACIP) recommends that educational efforts be directed at parents and health care providers to help parents prevent dehydration and to recognize and immediately seek medical care for severe diarrhea in children (Morbidity and Mortality Weekly Report, 1999b).

Evidence-based recommendations, pertaining to the management of acute viral gastroenteritis in children ages 1 month to 5 years, have been developed by the World Health Organization (WHO), the European Society of Paediatric Gastroenterology and Nutrition (ESPGAN), the American Academy of Pediatrics (AAP) Practice Parameter, the Nutrition Committee - Canadian Paediatric Society and the Children's Hospital Medical Center (CHMC) (see recommendations in the literature review). Oral rehydration therapy (ORT) is the cornerstone of management (AAP, 1996; WHO/CDD, 1990). The effectiveness of ORT was demonstrated as early as the 1960's in major clinical studies undertaken during cholera epidemics in Bangladesh (Mahalanabis & Snyder, 1996; Meyer, 1994).

Study results suggested that some physicians lacked knowledge of current recommendations for ORT and that even when knowledge was good, their practices did not necessarily correlate with these standards (Elliott, Blackhouse, & Leach, 1996; O'Loughlin, Notaras, McCullough, Halliday, & Henry, 1995; Snyder, 1991). A Canadian study conducted at four urban hospitals in 1993 found physicians slow to adopt ORT based on lack of familiarity with guidelines or on entrenched patterns of

practice (Issenman & Leung, 1993). Some work has been done on changing clinical behaviours of physicians, and includes education at the time the guidelines are disseminated, ongoing reinforcement in the form of feedback, and incentives to adhere to the guidelines (Burton & Armstrong, 1997).

At this time, no research was found relative to the management of gastroenteritis and nursing practitioner practices. Despite the widespread agreement among nursing professionals that research findings should guide practice, a large gap exists between theory and practice (Bostrum & Suter, 1993). Research provides the answers to improved patient care, but without the implementation of research into practice, nurses are only partially successful in developing their profession (Gupton, 1994). Baer, Bomber and Nickodemus (1989) noted that few nursing skills and procedures have a research base to guide their implementation or modification in practice. They also noted that instead nurses often relied on tradition and intuition.

The author of this project conducted an informal telephone survey to look at the practices of Community Health Nurses (n = 12) working in remote northern Manitoba nursing stations (see Appendix A). These nurses work in advanced practice nursing roles governed by policies and guidelines established by the Medical Services Branch, Health Canada. Questions in the survey were directed at their knowledge of current treatment strategies for gastroenteritis in children aged 5 years and younger. It was apparent that many of these nurses clung to traditional methods of management including inappropriate clear fluids (n = 7 or 58%), prolongation of refeeding (n = 9 or 75%), and administration of antiemetics (n = 7 or 58%). These practices deviated

significantly from expert recommendations. Also, many of these nurses (n=6 or 50%) were unfamiliar with the current guidelines for the management of gastroenteritis. The author has encountered similar practices during her 10-year history of working in nursing stations in remote northern Manitoba. These findings are consistent with reported data in the literature as physicians sometimes lack this same awareness of current guidelines or they are entrenched in their patterns of practice (Issenman & Leung, 1993).

The author also looked at the Churchill Regional Health Authority, setting for this practicum project, for guidelines specific to the management of gastroenteritis in young children. The only information found, on the wall of the emergency department, was a patient-teaching aid relating to managing diarrhea in children (see Appendix B). This information sheet clearly deviated from the guidelines as it encouraged clear fluids for the first 24 hours, mentioned offering bland foods while avoiding milk products, and lastly, it suggested offering homemade oral rehydration solutions.

In summary, acute gastroenteritis represents a common yet serious problem for children, as it is the leading cause of childhood mortality worldwide. The research strongly supports current evidenced-based guidelines for the management of gastroenteritis in young children. The literature suggests that many health care providers do not follow the recommended procedures for management of this disorder. One commonly cited reason for this discrepancy is lack of knowledge of the guidelines.

Statement of the Problem

Although guidelines for the optimal management of gastroenteritis have been formulated in many developed countries, these have not been adopted universally. The recent literature suggests continued under-utilization of ORT in developed countries (Reis, Goepf, Katz, & Santosham, 1994). Physician practices continue to differ importantly from expert recommendations. This discrepancy has been ascribed to multiple factors and one commonly cited reason in the literature is practitioners' lack of knowledge of the guidelines pertaining to the management of gastroenteritis in young children (Elliott, Blackhouse, & Leach, 1996; Merrick et al., 1996). Based on these research findings, personal experiences and the telephone survey, the author concluded that nurses' practices also tend to deviate from the recommendations. Thus, this practicum project centered on one problem, which is nurses' lack of knowledge of guidelines associated with the management of gastroenteritis in young children.

Purpose of the Study

The overall purpose of this practicum was to increase the nurses' knowledge of current evidence-based guidelines for management of gastroenteritis in young children through an educational intervention. The specific aims for this project were to (a) identify nurses' perceptions of barriers to the optimal management of gastroenteritis, (b) determine the nurses' level of knowledge of the guidelines prior to the intervention, and (c) evaluate the effectiveness of the training session in improving nurses' knowledge of the guidelines.

The long term objectives of the project were to have the nurses transfer the

acquired knowledge to practice thereby increasing the use of ORT in the treatment of acute gastroenteritis, and properly advising parents on the prevention and optimal management of gastroenteritis which will contribute to reducing the incidence of the condition, its mortality and morbidity and related health care costs.

Significance of the Study

This project provided an opportunity to assess nurses' knowledge of current recommendations on the management of gastroenteritis, implement an intervention designed to expand their knowledge base of these guidelines and evaluate the effectiveness of the intervention in achieving this outcome. As stated earlier, most studies addressed physician knowledge and practice patterns in the management of gastroenteritis.

Nurses can anticipate encountering practice guidelines more often, in the future, and are encouraged to participate in the development, dissemination, implementation, and evaluation of practice guidelines pertaining to pediatric primary care or to any setting. Promises of cost savings, improved evidence-based clinical practice, and outcomes monitoring will continue to position practice guidelines as a driving force in American and Canadian health care (Callender, 1999).

This project may have benefited the nursing profession as a whole as it provided an example of utilizing research in practice to change a specific problem, nurses' knowledge of guidelines. Research utilization is the process by which research knowledge is moved into the clinical arena, and it can happen in many different ways including research being used in education (Gennaro, 1994). Educating nurses about

guidelines will enable them to properly advise parents on the prevention and optimal management of gastroenteritis and thereby contribute to improved client outcomes, possibly narrow the gap between research and practice and help nursing develop as a profession.

In addition, this study may shed light on other barriers to optimal management of gastroenteritis. These findings could be useful to future nursing researchers.

Conceptual Framework

Chinn and Kramer (1999) define conceptual framework as "a logical grouping of related concepts or theories, usually created to draw together several different aspects that are relevant to a complex situation such as a practice setting or an educational program" (p. 252). Research utilization models consist of a series of well-developed, logical, and systematic plans for assisting nurses in all types of settings to assimilate the important theoretical developments and findings of clinical nursing research projects into their own practices. Utilization models provide the nursing-research consumer with the tools for closing the research-practice gap at the clinical level. A second use for these models is to provide a method of creating a research climate in the practice setting in which new clinicians participate in both the profits of clinical research (improvement of nursing care) and the generation of research ideas and research questions for future clinical nursing studies (Phillips, 1986).

According to Phillips (1986), there are certain underlying features that all research utilization models share. All utilization models rely on the theoretical base provided by change theory. Planned change processes are deemed an essential

component of the overall research utilization process, since the resulting practice changes require alterations in values, behaviors, roles, and policies that affect the staff members involved in the study and the organization as a whole (Horsley, Crane, Crabtree, & Wood, 1983). All the utilization experts highlight the skills required of nursing-research consumers in (a) critiquing research reports, (b) evaluating their own practice setting to determine the comparability of the clinical setting to the research setting and sample, and (c) determining the feasibility and desirability of using the results of any group of research reports in their own practice setting. A third common characteristic of the various utilization models is that each includes (a) an evaluation component that provides nurse-clinicians with ways to determine if the potential change should or should not be incorporated into nursing practice within a specific setting, and (b) a feedback mechanism for communicating concerns and new areas of inquiry to nurse-researchers. The last feature common to the various utilization models is that each recommends a careful assessment of the existing organization mechanisms that promote and inhibit change and mobilization of the institutional and personnel resources within the organization before change is attempted.

Several models of research utilization have been published. As stated earlier, these models provide a framework for the author, the change agent, to confront the problem identified in her clinical practice through the utilization of current research findings. The research findings strongly support that health care providers adhere to the guidelines for the management of gastroenteritis in young children. The major challenge encountered, as expressed earlier in this chapter, was finding studies

addressing the identified clinical problem or studies involving the implementation and evaluation of an intervention directed at the problem, nurses' lack of knowledge of these guidelines.

This project, which focused on educating nurses to integrate these management guidelines into practice, provided an example of utilizing research to change a specific problem relating to nursing practice. This project and its resulting findings may serve as a framework for other nurses committed to research utilization.

The Dracup-Breu model was chosen as the framework for this practicum project. This model describes six essential steps of the research utilization process as: (a) identify the problem, (b) select appropriate research, (c) establish objectives, (d) analyze the setting and devise a plan, (e) implement the plan, and, (f) evaluate outcomes to provide information for further decision making or possible policy changes (MacLachlan, 1986).

Assumptions

Assumptions refer to basic principles that are believed to be true without proof of verification (Polit & Hungler, 1997). One assumption is that there is something to be learned and gained from every research utilization project. Utilizing research in practice not only benefits patients but it also benefits nurses and the nursing profession. It provides nurses with an opportunity to engage in the process of research utilization. This strengthens nursing as a profession as it narrows the gap between research and practice. "Research utilization rests on the assumption that studies have already linked the process and outcome variables, therein lies the impetus to change

practice, and it is not imperative to measure both" (Janke, Blythe, Campbell, & Carter, 1999, p. 28). Important to note is that the project focused on assessing staff outcomes and not process variables. The process of developing and implementing the research-based intervention, the teaching session, was not evaluated in this project. Instead the evaluation focused on outcomes of the intervention, increasing nurses' knowledge of evidence-based guidelines.

Another assumption was that the author, the change agent, had the qualifications to implement the change in this particular clinical setting. The characteristics of importance were competence in: nursing practice, research related to the topic, communication skills, interpersonal relationships, and the change process.

The author of this project perceived that resistance to change is a natural phenomenon and has developed strategies to deal with it. These strategies were discussed in the Analysis of Setting in Chapter 3. Factors that may have stimulated resistance to the proposed change were a desire to maintain status quo, anxiety related to their knowledge or expertise regarding management of gastroenteritis, cost in terms of time, and physicians' practices, which deviate from guidelines.

The final assumption was that the nurses in the study lacked familiarity with practice guidelines associated with the management of acute gastroenteritis. This belief was based on the author's personal experiences, the telephone survey and studies of physician practices.

Limitations

The proposed study had several limitations, which require acknowledgement.

The top-down approach to change has been utilized in this project. The author, someone outside of the day-to-day working environment of the study participants, has identified the need for change. The normative-re-educative approach, one of the three strategies for change, appears to be the one most likely to achieve real change in nursing practice. This strategy rests upon assumptions that people need to be included in all aspects of the change process and that their actions are directed by a culture which involves open channels of communication in social systems and agreed norms of behaviour (Keyzer & Wright, 1998).

Because of time constraints and limited numbers of study participants, the author decided that a pilot study was not workable and implemented the full-scale version of the major study. The function of the pilot study would be to obtain information for improving the project, assessing its feasibility and pretesting the questionnaire (Polit & Hungler, 1995).

Owing to the isolated setting for the practicum project, the author was restricted to a small convenience sample of nurses to be used as study participants. Small numbers and convenience sampling subject the results to selection bias. The problem of bias is related to the fact that convenience samples tend to be self-selecting; that is, the researcher ends up obtaining data only from the people who volunteer to participate (LoBiondo-Wood & Haber, 1998). Findings may not be generalizable because of the small sample size and, therefore, these nurses may not be representative of the entire population of nurses.

In the interest of time and resources, a pretest-posttest design provided a

method of measuring change in this practicum project. This design has limitations, as it does not allow conclusions to be drawn about why the educational session increased or did not increase nurses' knowledge of guidelines. In an attempt to control for this limitation, and in an ideal setting, the solution would be to use the largest sample of nurses possible and randomly assign them to an experimental group (group that receives the education about gastroenteritis management guidelines) or a control group (group not receiving the educational intervention). Randomized controlled experiments are often considered the ideal of science (Polit & Hungler, 1995).

The findings of this study will be limited by having data collected by the author of this project who may be more subjective and introduce biases and therefore affect the quality of the data. To compensate for this limitation, the training and hiring of assistants to collect data, who would have provided more objective findings, would have been useful in this study.

In addition, the findings of this study will be limited as only one method of evaluating the effect of the planned change was used. To improve the likelihood that findings will be found credible, Denzin (1989) recommends method triangulation, which is the use of multiple methods to address a research problem. A follow-up posttest, chart audit, direct observation or interviewing nurses would be other methods to evaluate the effects of the teaching sessions. These methods are time consuming, but the evaluation using multiple methods would benefit this study as it may provide it with more credible findings.

Definition of Terms

Evidence-Based Guidelines - clinical practice guidelines developed by panels of experts, who come together to review and critique available research evidence on a clinical issue and then translate the findings into recommendations for clinical practice (Callender, 1999).

Advanced Nursing Practice - the application of an expanded range of practical, theoretical, and research-based therapeutics to phenomena experienced by clients within a specialized clinical area of the larger discipline of nursing (Hamric, Spross & Hanson, 1996). May also be defined in terms of one of four-practice roles: clinical nurse specialist (CNS), nurse practitioner (NP), certified nurse-midwife (CNM) and the certified registered nurse anesthetist (CRNA).

Advanced Practice Nursing - advanced practice nursing is to advance nursing practice as nursing (or the nursing profession) is to nursing practice. Nursing and advanced practice nursing are the broader or umbrella terms, describing the fields of occupation (Hamric et al., 1996).

Acute Gastroenteritis - diarrhea disease of rapid onset, with or without accompanying symptoms and signs, such as nausea, vomiting, fever, or abdominal pain (AAP, 1996).

Oral Rehydration Solutions (ORS) - osmotically balanced clear liquids such as Pedialyte, Gastrolyte, Ricelyte, or the W.H.O. rehydration formula.

Oral Rehydration Therapy (ORT) - treatment of fluid and electrolyte losses caused by diarrhea utilizing oral rehydration solutions.

Refeeding - reintroduction of food and liquids immediately after rehydration.

Summary

Studies have shown that acute gastroenteritis represents a common yet a serious problem for children as it is the leading cause of childhood mortality worldwide. Essential aims of treatment of viral gastroenteritis are to manage the fluid losses and dehydration that are the principal cause of serious morbidity and mortality. Research findings strongly support that practitioners follow expert recommendations for management of gastroenteritis. Findings suggest that physicians' practices differ importantly from practice guidelines, as there is continued under-utilization of oral rehydration therapy in treating this population in developed countries. This discrepancy has been repeatedly ascribed to practitioners' lack of knowledge of these guidelines.

However, little research has focused on the knowledge and practices of advanced practice nurses (APNs). The author of this project has identified a need for more studies aimed at identifying and increasing nurses' knowledge of these guidelines. Therefore, the purpose of this practicum project was to increase nurses' knowledge of evidence-based guidelines pertaining to the management of gastroenteritis in young children through the use of an educational intervention. Empowering nurses with ownership of the change, including the knowledge to make this change, is essential. By using this research-based knowledge in practice, nurses will be providing the best possible care to patients and also ensuring that nursing as a profession continues to grow. This research utilization project provided an example of

how nurses may narrow the gap between research and practice. The Dracup-Breu model provided the framework within which to plan, implement, and evaluate the proposed change to practice. The next chapter, review of the literature, provides the evidence-based support for the implementation of this project in the chosen practice setting.

CHAPTER TWO: LITERATURE REVIEW

Introduction

The next step in the utilization process of the Dracup-Breu model was to identify the research base that suggests possible solutions to the nursing problem. This step requires a search of the literature to identify a knowledge base that supports the problem-solving approach (Phillips, 1986). This literature review was intended to provide evidence-based practice regarding the assessment and clinical management of infants and children 5 years and younger with acute gastroenteritis. Topics addressed were: incidence and etiology; health care demands; risk factors for dehydration; home and clinical management; major recommendations for management; current patterns of treatment; evaluation of education programs; and, implications for nursing practice.

Relatively little is known regarding the management of gastroenteritis in Canada and the United States and most of the studies leading to current recommendations have been performed in developing countries. Thus, the author has performed an extensive search of the literature to include studies in developed as well as developing countries.

Incidence and Etiology

Acute gastroenteritis is one of the most common illnesses affecting infants and children in Canada and the world (Nutrition Committee-Canadian Paediatric Society [CPS], 1994). Estimates of the overall incidence of acute gastroenteritis range from

1.3 to 2.3 episodes of diarrhea per year for children less than 5 years of age (Burkhart, 1999; Gastañaduy & Begue, 1999; Merrick et al., 1996; Northrup & Flanigan, 1994; Nutrition Committee-CPS, 1994). Worldwide as many as 4,000,000 children per year die as a consequence of gastroenteritis and resulting dehydration, malnutrition, electrolyte abnormalities, shock, and cardiac arrest; all potentially preventable causes (Gastañaduy & Begue, 1999; Northrup & Flanigan, 1994; Nutrition Committee-CPS, 1994). In developed countries, the morbidity and mortality due to acute gastroenteritis have declined with improved economics and sanitation. In Canada and the United States, between 325 and 425 deaths occur annually (Gastañaduy & Begue, 1999). About 80% of children dying from acute gastroenteritis are aged 1 to 12 months (Merrick et al., 1996). Table 1 below presents a summary of studies performed in developing and developed countries (Gastañaduy & Begue, 1999).

Table 1

Morbidity and mortality of diarrheal diseases in children. Estimates from longitudinal, prospective, community-based studies in developing and developed countries.

	Developing Countries			USA-Canada
	Snyder et al. 1982	WHO-CDD 1990	Bern et al. 1992	Glass et al. 1991
Studies evaluated (no.)	24	276	22	4
Episodes/child/yr (median)	2.2-3.0	3.3	2.6	1.3-2.5
Diarrheal illnesses/yr (millions)	1,000	1,500	1,000	21-37
Diarrheal deaths/yr (no.)	4.6 million	4.0 million	3.3 million	325-425

Prolonged diarrhea and malnutrition are a leading cause of morbidity and mortality in Canadian native populations (Nutrition Committee-CPS, 1994).

Viruses, primarily rotavirus species, are responsible for 70 - 80% of acute infectious diarrhea in developed countries and by far the most important cause of severe dehydrating diarrhea in young children (Burkhart, 1999; Merrick et al., 1996). Rotavirus is highly contagious and most outbreaks in developed countries occur during winter, whereas, in developing countries, outbreaks tend to occur in summer and are of bacterial origin (Stephenson, 1993).

Health Care Demands

In the United States and Canada, gastroenteritis is among the leading causes of hospitalization in young children (To et al., 1996). Treatment from resulting dehydration accounts for an average of 220,000 children younger than 5 years being hospitalized each year with acute gastroenteritis in the United States and Canada (American Academy of Pediatrics [AAP], 1996; Burkhart, 1999; Northrup & Flanigan, 1994; Nutrition Committee-CPS, 1994). This accounts for more than 10% of hospitalizations for this age group (AAP, 1996; Burkhart, 1999), 900,000 hospitalization days (AAP, 1996) and direct costs for hospitals and outpatient care estimated to exceed \$2 billion per year (AAP, 1996; Glass, Lew, Gangarosa, Le Baron, & Ho, 1991).

Little information regarding overutilization of hospital services, relative to care of acute gastroenteritis, exists in the United States and Canada (Merrick et al., 1996). Currently pediatricians and other health care providers are increasingly pressured to

avoid unnecessary hospitalizations (McConnochie, Connors, Lu, & Wilson, 1999). Additionally, hospitalization is disruptive to families and has been associated with notable psychosocial morbidity (McConnochie, Roghmann, Kitzman, Liptak, & McBride, 1997). Based on a study conducted in Ontario, researchers discovered a 14-fold variation for hospitalization rates across counties (To et al., 1996). The availability of hospital beds for children was the only factor that showed a significant positive association with admission rates. Their findings suggest that most children with gastroenteritis can be successfully managed as outpatients and high admission rates may be an indication of unnecessary hospitalization.

Risk Factors for Acute Gastroenteritis and Associated Morbidity and Mortality

Acute gastroenteritis occurs with greater frequency in children who attend day care centers (Alexander, Zinzeleta, & Mackenzie, 1990; Merrick et al., 1996) and where there is crowding, impoverished living conditions, substandard sanitation and generally inadequate health care education (Merrick et al., 1996; Whaley & Wong, 1999). In developing countries that do not have water treatment programs, adequate sanitation, and accessible health care, diarrhea from acute gastroenteritis continues to be a common cause of mortality and morbidity (Stephenson, 1993).

Standards of housing available to many Canadian Aboriginal households remain measurably below what is required for basic comfort, health and safety. Aboriginal households are more than 90 times as likely as other Canadian households to be living without a piped water supply. On reserves, 4.9% of band-owned housing

units contain multiple-family households, compared to 1.2% of all occupied dwellings or more than 4 times the countrywide proportion. A recent study of a shigellosis epidemic in Manitoba, which affected First Nations people disproportionately, concluded that 90% of infections would have been preventable if water, sanitation and housing facilities had been adequate (Royal Commission on Aboriginal Peoples, 2000).

In one case-control study, additional risk factors for severity of disease due to acute gastroenteritis in young children were examined (Mahalanabis, Faruque, Islam, & Hoque, 1996). They reported that infants of illiterate mothers had more than 2 times higher risk of having severe disease from diarrhea. Another finding from this study was that parental income, independent of mother's education, is a significant determination of severe disease following diarrhea in infants and children. Forty-five percent of all status Indians living on reserves in Canada are illiterate (Coulthard, 1999). Although the poverty rate of Aboriginal people is unknown, it is clear they are much poorer than the general population (Charter Committee on Poverty Issues/ National Anti-Poverty Organization, 1993).

Malnourished children are more susceptible and tend to have more severe diarrhea (Gastañaduy & Begue, 1999; Whaley & Wong, 1999). The Aboriginal population is frequently highlighted as a group at nutritional risk because of the disproportionately large number of Aboriginal people living on low incomes. This population is also relatively young (36% less than 15 years of age compared to 21% in the population at large) bringing with it nutritional and health risks of children.

Children are at an increased nutritional risk in part due to their growing ranks among the poor (Health Canada, 2000).

The two most serious consequences of acute viral gastroenteritis are malnutrition and dehydration. The risk of dehydration in children is related to age—the younger the child, the greater the susceptibility and the more severe the diarrhea. The increased frequency and severity of diarrheal disease in infants are also related to their immune systems, which have not previously been exposed to many pathogens and have not acquired protective antibodies (Whaley & Wong, 1999). Young infants have an increased surface area: body volume ratio resulting in increased insensible fluid losses. Infants also have an inherent tendency for more severe vomiting and diarrhea compared with older children and adults (Murphy, 1998). Two studies have identified failure to give oral rehydration solutions (ORS) and discontinuation of breastfeeding during the viral illness as the greatest risk factors for dehydration (Bhattacharya, Bhattacharya, & Manna, 1995; Faruque, Mahalanabis, Islam, Hoque & Hasnat, 1992).

Studies have identified factors associated with an increased risk of death from gastroenteritis. Risk of death was significantly increased if the mother was less than 17 years of age (compared with those age 25 or older), received poor prenatal care, had not completed high school, or had another child within the subsequent 3 years (Ho, Glass, Pinsky, & Anderson, 1988). Another study of 242 infant deaths from infectious diarrhea that occurred in South Carolina found the following factors to be associated with increased risk of death: low birth weight, non-Caucasian race,

inadequate prenatal care, small size of hospital, and illegitimate birth (Gibson & Alexander, 1985).

Few recent studies from Canada or the United States have been found that address the risk factors for morbidity and mortality due to viral gastroenteritis in children less than 5 years of age. One study, from 1978, found that 21 rotavirus deaths in Toronto were among immigrants, suggesting that language difficulties implicated effective contact within the health care system (Carlson, Middleton, & Szymanski, 1978).

Managing Viral Gastroenteritis in Early Childhood

Prevention, early recognition and appropriate treatment regimes are fundamental to reducing the incidence of gastroenteritis and its complications.

Prevention

The best medicine is prevention. Breastfeeding can significantly reduce the incidence of gastroenteritis. This outcome was recently shown in a study using an experimental design with babies who were mainly breastfed compared to minimally or never breastfed babies (Wright, Bauer, Naylor, Sutcliffe, & Clark, 1998).

Most infections that cause acute diarrhea are spread by the fecal-oral route. Meticulous attention to perianal hygiene, disposal of soiled diapers, proper handwashing technique, hygienic food preparation, and isolation of infected persons will minimize the spread of the infection to others (Whaley & Wong, 1999).

In light of the ongoing cost to society and the equal incidence worldwide, a rotavirus vaccine was developed and licensed for use in 1998 in the United States to

prevent severe gastroenteritis, particularly in infancy and the second year of life (Harrison, 1998). In July 1999, CDC (Centers for Disease Control and Prevention) recommended that healthcare providers and parents postpone use of the vaccine due to reports of intussusception among recipients of the rotavirus vaccine (Morbidity and Mortality Weekly Report [MMWR], 1999a). Because of the withdrawal of this vaccine recommendation, the Advisory Committee on Immunization Practices (ACIP) recommends that educational efforts be directed at parents and healthcare providers to help parents prevent dehydration and to recognize and immediately seek medical care for severe diarrhea in children (MMWR, 1999b).

Therapeutic Management

Essential aims of treatment for viral gastroenteritis are to rapidly determine and manage the fluid losses, dehydration, and electrolyte abnormalities that are the principal cause of serious morbidity and mortality (McVerry & Collin, 1999; Northrup & Flanigan, 1994; Straughn & English, 1996).

Clinical assessment of hydration. Assessment of volume depletion by history and physical examination guides the therapy of children with uncomplicated viral gastroenteritis. The severity of dehydration is most reliably expressed in terms of weight loss as a percentage of the total body weight (Cornell, 1997; Murphy, 1998). In a prospective cohort study of children between 3 and 18 months of age, prolonged skin fold, dry oral mucosa, sunken eyes, and altered neurological status were the clinical signs that best correlated with dehydration as determined by pre-rehydration and post-rehydration weights (Duggan et al., 1996).

Determination of the specific etiology for most diarrheas is unimportant because the illness is brief and self-limited and will respond to appropriate fluid and feeding therapy without the use of antibiotics (Cornell, 1997; Northrup & Flanigan, 1994). Laboratory studies should be performed in children who are severely dehydrated, receiving intravenous rehydration therapy or when blood or mucus is present in the stool (Burkhart, 1999; Whaley & Wong, 1999).

Prevention of dehydration. Ideally management of acute gastroenteritis should begin at home, since effective early interventions can reduce complications, such as dehydration and poor nutrition. Parents must be taught to recognize and report the signs and symptoms of dehydration, including decreased urination, less moisture in diapers, dry mouth, no tears when crying, weight loss, irritability, or lethargy (Northrup & Flanigan, 1994; Straughn & English, 1996).

One study, in an Australian Aboriginal community, addressed the primary causes of gastroenteritis (Ratnaike & Chinner, 1994). A before and after study on the effectiveness of a health education program to reduce the incidence of diarrhea and its morbidity in children less than 5 years was undertaken. As a result of the intervention, the average number of diarrhea episodes per child and the incidence of hospitalization due to diarrhea were significantly decreased. Critical factors for the success of this health education program were active community collaboration and participation, and information based on knowledge, attitudes and practices of the residents in this community. Finally, communication problems were minimized as the educators had knowledge of the local language and understood the culture and

learning style of the recipients.

Children who have been determined not to be dehydrated based on the physical examination may be safely continued on an age-appropriate diet including full-strength milk or complex carbohydrates as evidence shows that they are better tolerated than fatty foods or foods with a high simple sugar content (Burkhart, 1999).

Treatment of dehydration. The AAP (1996) states that replacement of fluid and electrolyte losses is the critical central element of effective treatment of acute diarrhea. In all but the most seriously ill children, rehydration is possible using oral rehydration therapy (ORT). The effectiveness of ORT was first demonstrated in major clinical studies undertaken during cholera epidemics in Bangladesh in the late 1960's (Mahalanabis & Snyder, 1996; Meyer, 1994). ORT is one of the major worldwide health care advances of the past decade and it is effective, safer, less painful, and less costly than intravenous rehydration (Cornell, 1997; Whaley & Wong, 1999). ORT, using a simple, inexpensive, glucose and electrolyte solution promoted by the World Health Organization (WHO), has reduced the number of deaths from dehydration due to diarrhea by about a million per year (Nutritional Committee-CPS, 1994). In 1996, the AAP published a practice parameter for treating children dehydrated by acute gastroenteritis and reported that ORT is "as effective as intravenous therapy in rehydrating children with mild to moderate dehydration" (p. 424).

A study, conducted at four urban Canadian hospitals, has shown that oral rehydration is as safe, effective, and practical as conventional intravenous (IV) treatment in the management of mild to moderate dehydration (Issenman & Leung,

1993). This is the first published report of using oral rehydration for Canadian children in hospitals and it has shown that hospitalization and its considerable costs might have been entirely avoided.

Gavin, Merrick, and Davidson (1996) searched the literature for randomized, controlled studies comparing the safety and efficacy of ORT with IV rehydration treatment with pediatric gastroenteritis in developed nations. The evidence suggests: failure of ORT is infrequent (3.6%) and even a lower failure rate existed among children treated in outpatient settings; treatment with ORT had more favourable outcomes on several measures, such as weight gain and duration of diarrhea; and lastly, there seems to be a greater potential for improving the medical treatment of children with acute gastroenteritis and for controlling the costs involved in treating the disease with greater use of ORT. These findings support recommendations of the AAP.

Clear fluids, most often used by parents or recommended by physicians in the past, are not appropriate for use in oral rehydration therapy. Drinks such as colas, ginger ale, apple juice and commercial sports drinks (i.e., Gatorade) are inappropriately high in carbohydrates and osmolality and can exacerbate the diarrhea (Burkhart, 1999; Cornell, 1997; Hugger, Harkless, & Rentschler, 1998; Straughn & English, 1996; Whaley & Wong, 1999). Their low sodium content may contribute to the development of hyponatremia (Burkhart, 1999; Whaley & Wong, 1999). Tea should not be used because of its low sodium content, plain water can dilute the serum and cause hyponatremia, and chicken broth is contraindicated because of its

excessive sodium and inadequate carbohydrate (Burkhart, 1999; Hugger et al., 1998; Whaley & Wong, 1999).

Vomiting is not a contraindication to ORT (AAP, 1996; Nutrition Committee-CPS, 1994). ORS should be given slowly but steadily to minimize vomiting.

Nasogastric tube feeding may be used to avoid fatigue (Murphy, 1998). There are certain contraindications to the use of ORT: protracted vomiting despite small, frequent feedings; worsening diarrhea and an inability to keep up with losses; stupor or coma; and, intestinal ileus and severe dehydration (Nutrition Committee-CPS, 1994).

Meyers et al. (1997) conducted a randomized clinical trial to test the safety of homemade oral rehydration solutions. Several potentially hazardous mixing errors were made. Their findings support the recommendations that generally advise against homemade solutions (Gastañaduy & Begue, 1999).

After rehydration has been accomplished, children require their normal maintenance fluid according to their body weight. Maintenance fluids can be given as breast milk, formula or other fluids appropriate for age. In addition, losses due to vomit and stool should be replaced with extra feeds of ORS (AAP, 1996; Gastañaduy & Begue, 1999; Murphy, 1998).

Early refeeding. The current literature reflects changes in the traditional treatment of diarrhea and dehydration through diet. Until recently, it was considered that the early reintroduction of feeds after acute gastroenteritis risked worsening the illness, causing protracted diarrhea. According to the AAP (1996), conventional

practice was to delay giving food to children who have diarrhea, and when feeding was resumed, only a restricted spectrum of foods has been recommended, and dairy products have been avoided.

Results of one study suggest that the traditional practice of starving an infant for 24 to 48 hours during ORT has no benefit over immediate modified feeding with ORT (Hoghton, Mittal, Sandhu, & Mahdi, 1996). Bowel rest is not necessary and evidence indicates that early oral rehydration and resumption of feeding shortens the course of the disease, reduces the number of stools, and reduces weight loss (AAP, 1996; Hoghton et al., 1996; Lieberman, 1994; Meyers, 1995). Fasting has shown to prolong diarrhea and this may be due to undernutrition of the bowel mucosa which delays the replacement of mucosal cells destroyed by the infection (Nutrition Committee-CPS, 1994). The traditional BRAT diet (bananas, rice, apple sauce and toast or tea) is contraindicated for the child, and especially for the infant because the diet is of low nutritional value, is too high in carbohydrates, and is low in electrolytes (AAP, 1996; Straughn & English, 1996; Whaley & Wong, 1999).

Evidence has now emerged favouring the early reintroduction of feeds. In a recent multi-center European study, 230 weaned children < 3 years of age with acute gastroenteritis were randomly assigned to "early refeeding" or "late refeeding" (Sandhu et al., 1997). The results of this study show that the complete resumption of a child's normal feeding, including lactose-containing formula, after 4 hours of rehydration with glucose ORS led to significantly higher weight gain after rehydration, did not result in worsening of diarrhea or prolongation of diarrhea,

increased vomiting, or lactose intolerance compared with the late feeding group who were given normal feeding after they had received ORS for 24 hours.

During diarrhea episodes there is frequently a reduction in lactase activity in the intestinal brush border but this rarely translates into clinically significant lactose malabsorption (Gastañaduy & Begue, 1999). A metanalysis evaluated the use of lactose-containing formulas in children with diarrhea and concluded that 80% or more can tolerate full-strength lactose-containing formulas safely (Brown, Peerson, & Fontaine, 1997). Breast-fed infants should continue feeding on demand and it has shown to reduce stool output (Gastañaduy & Begue, 1999).

Pharmacologic therapy. As a general rule, pharmacologic agents should not be used to treat acute pediatric diarrhea (AAP, 1996). Rotavirus is a self-limiting disease and tends to improve with the correction of dehydration (Burkhart, 1999; Cornell, 1997). Antiemetics have the potential for adverse effects, including allergic reactions, sedation and acute dystonic reactions (Burkhart, 1999). Antidiarrheal medications are generally not indicated in children with acute gastroenteritis because of lack of convincing evidence to support their use and because of concerns that adverse effects may outweigh any benefits (AAP, 1996; Burkhart, 1999; Keith, 1997).

Summary of Evidence-Based Recommendations

Based on a comprehensive analysis of the literature, recommendations have been formulated for health care providers about the management of acute viral gastroenteritis in children ages 1 month to 5 years. This paper provides a summary of the current evidence-based recommendations developed by the World Health

Organization (WHO), the European Society of Paediatric Gastroenterology and Nutrition (ESPGAN), the AAP Practice Parameter, the Nutrition Committee-CPS and the Children's Hospital Medical Center (CHMC). Areas of significant differences will be referenced. Most patients covered by the guidelines will have a viral illness but the same principles can be applied to children who have a bacterial or protozoal disease.

Treatment Goals:

1. Prevent or limit the severity of dehydration.
2. Prevent the need for intravenous therapies and hospitalizations.
3. Shorten the duration of illness.

Assessing Dehydration:

1. Evaluating weight changes.
2. Mucous membrane hydration.
3. Capillary refill time.
4. Absence of tears.
5. Alterations in mental status.

Prevention of Dehydration:

1. Continue a child with no dehydration on usual age appropriate diet, supplemented, if desired, with ORS at least 45 meq Na \pm /L, and targeted to deliver 10 ml/kg for each stool or emesis.
2. May continue at home with fluid intake dictated by thirst and avoiding high osmolality fluids.
2. Parents and day care centres should keep maintenance solution on hand in

anticipation of episodes of infectious diarrhea (Nutrition Committee-CPS, 1994).

3. ORS and maintenance solutions and instructions in their use should be made available at reasonable costs (Nutrition Committee-CPS, 1994).

Rehydration:

1. Mildly (3 - 5% weight loss) dehydrated children should receive glucose-electrolyte ORT (at least 45 meq Na +/L) at 50 ml/kg or 100 ml/kg (moderate dehydration or 5 - 10% weight loss) of solution over a 4-hour period (AAP, 1996); rehydration with ORS at 10ml/kg/hr (mild) and 15-20 ml/kg/hr (moderate) (CPS, 1994).
2. Replacement of stool losses (at 10 ml/kg for each stool) and of emesis (estimated volume) will require adding appropriate amounts of solution to the total.
3. Manage vomiting by administering small amounts (1 tsp) of solution every 2 minutes.
4. Severe dehydration should initially be treated with intravenous or intraosseous rehydration.
5. Maintenance therapy should be offered once child is rehydrated, i.e. 100 ml/kg/day for first 10 kg of body weight, 50 ml/kg/day for the next 10 kg, and 25 ml/kg/day thereafter.
6. Breastfed infants with dehydration should be given ORT in conjunction with continued breastfeeding.
7. Home-made ORS's are discouraged since serious errors in formulation have occurred.

Refeeding:

1. Restart usual and preferred age appropriate diet as soon as possible following rehydration therapy; avoid fatty foods and BRAT diet (AAP, CHMC, ESPGAN, WHO).
2. Early refeeding should commence as soon as vomiting has resolved, approximately 6 - 12 hours and a full diet should be reinstated within 24 to 48 hours, if possible (Nutrition Committee-CPS).
3. Non-lactose containing formula or milks may be used if diarrhea and abdominal cramps persist beyond expected 5 to 7 day course suggesting clinical lactose intolerance (AAP, Nutrition Committee-CPS).

Anti-diarrheal Agents:

Antidiarrheal drugs, antibiotics and antiemetic therapy are rarely indicated in gastroenteritis in childhood and should be discouraged.

Return to Home:

For children receiving supervised care in a clinic or hospital setting, consider prompt discharge when patients reach following level of recovery (CHMC):

1. Rehydration achieved.
2. IV fluids not required.
3. Oral intake equals or exceeds losses.
4. Adequate family teaching and medical follow-up assured.

Studies Regarding Current Patterns of Treatment

This section of the review explores the quality of care for gastroenteritis in

young children and the reasons for the disparity between ORT recommendations and the everyday practices of physicians and other caregivers. Relatively little is known regarding how children with gastroenteritis are managed and to what extent that treatment is consistent with expert recommendations (Merrick et al., 1996).

Study results suggest that some physicians lack knowledge of current standards for oral rehydration therapy and that even when knowledge is good, they do not necessarily correlate with these standards (Elliott et al., 1996; O'Loughlin et al., 1995; Snyder, 1991). Several surveys have addressed physician knowledge and practice patterns in the management of gastroenteritis and how they deviate from treatment recommendations of the AAP. Four of the most commonly cited deviations are inappropriate oral rehydration solutions, use of ORT with children with no or minimal evidence of dehydration or not using ORT with moderately dehydrated children, withholding of ORT from children with vomiting and inappropriate restriction of feeding, particularly in terms of duration (Merrick et al., 1996).

In 1991, investigators found that less than 30% of practitioners used appropriately constituted oral solutions (Snyder, 1991). Reis et al. (1994) found that 94% of pediatricians used an appropriate oral solution for at least mild dehydration but compliance with AAP guidelines was limited: 30% withheld ORT in children with vomiting or moderate dehydration and 50% fail to advise prompt refeeding.

Interpreting the results of these two surveys, there are definite limitations. This information represents survey information and not actual practice, provides neither information regarding non-pediatrician practice nor the practice of a nationally

representative sample of pediatricians. Information regarding parent compliance is also absent. Both of these surveys found that 49% and 34% of physicians would not recommend ORT in treatment of patients with more than mild dehydration, intravenous fluids being used instead despite their higher cost.

A third survey, conducted in 1992, suggests that few pediatricians and family practitioners follow all aspects of the AAP guidelines as 62% of responding physicians extend the rehydration period to 12 to 24 hours; 62% use lactose-free formula; and fewer than 50% started solids within 24 hours (Bezerra, Stathos, Duncan, Gaines, & Udall, 1992). A Canadian study conducted at four urban hospitals in 1993 found physicians slow to adopt ORT based on lack of familiarity with guidelines or on entrenched patterns of practice (Issenman & Leung, 1993).

The literature cites many reasons for underuse of ORS. Traditionally, poor acceptance of ORT has been attributed to insufficient knowledge of its efficacy and how to implement it (Merrick et al., 1996). However, other studies suggest that lack of physicians' knowledge of ORT guidelines is no longer a primary impediment to adoption of ORT. Significant barriers to use of ORT in practice include: a physician's perceived lack of convenience of ORT administration; staff limitations, financial restraints (Reis et al., 1994) and ORT is considered to be too simple or anti-technology (Lieberman, 1994).

Few studies were found regarding the management of gastroenteritis in the community, especially involving low-income families. ORT is the cornerstone in gastroenteritis management be it at home or in health facilities (AAP, 1996;

WHO/CDD, 1990). The results of two Australian studies indicate that ORT is underutilized and medications are over prescribed in home management of gastroenteritis (Elliott et al., 1996; O'Loughlin et al., 1995). One study suggests that most caregivers expect a child with diarrhea and vomiting to be prescribed medication and that they do not fully appreciate the prime importance of preventing dehydration (Nelson, Chow, Lewindon, & Biswas, 1997).

One study cited the major perceived barriers to the optimal management of gastroenteritis in the community. These barriers were social skills related to inadequate parenting skills and parental anxiety about the condition because of lack of understanding of the disease (Porteous et al., 1997).

An exploratory pilot study was conducted among Hispanic mothers to explore how much role traditional, cultural practices continue to play in their health care in treating their children's illnesses. Findings suggest that practitioners must ensure the provision of anticipatory health guidance and the promotion of preventive health measures in a culturally competent manner (Colucciello & Woelfel, 1998).

Overall, the findings in this portion of the review suggest that physician practices continue to differ importantly from expert recommendations. This discrepancy has been ascribed to multiple factors. No definitive randomized controlled trials of ORT were found in populations comparable to that of Canada or to that of advanced practice nurses. Also, little information was found regarding parental practices and factors that influence their care.

Evaluation of Education Programs

The few studies the author located consisted mainly of education programs directed at health care providers involving physicians, trained health providers and nurses. All of the studies took place in developing countries in hospitals or health centers.

Using a pre- and post-intervention method, one study evaluated the effects of verbal instructions and demonstration by the primary health care nurses on knowledge, attitude, and practice (K.A.P.) of home management of childhood diarrhea by mothers in a rural area of Nigeria (Jinadu, Olusi, Alade, & Ominiya, 1998). Findings demonstrated an improved knowledge level of mothers on ORT but few were practicing it. It was felt that the educational program of the nurses had not been directed at the women's traditional beliefs.

A more recent study evaluated a health worker-training program in diarrhea case management and its effect on patient education (Naimoli et al., 1996). This experience has shown that more effective communication skills of the health provider can improve patient outcomes. Another important finding was that observational data could be powerful tools in helping program managers recognize discrepancies between desired and actual performance.

Another more recent study suggests that on-the-job training does improve the quality of certain aspects of diarrhea case management but those skills should be part of the curriculum in medicine and nursing (Baig & Thaver, 1997). Training on the job can improve on the previous knowledge, but if the skills are not taught earlier,

then the impact of on-the-job training is also delayed.

Implications for Nursing

Based on these studies, prevention, early detection and appropriate treatment regimens are central to reducing the incidence of gastroenteritis in young children. Nurses are in a key position to significantly influence the quality of care and therefore implications for nursing practice are numerous, both in the hospital and community settings. The areas of prevention, treatment, education and research offer excellent opportunities for nursing interventions.

Nurses must communicate effectively with caregivers in every practice setting about the nature of the illness and its causes, prevention, proper use of ORT, early refeeding and recognition of symptoms that indicate the need for intervention. The information must be clear, simple and culturally appropriate. A brochure for parents based on the AAP parameters is available. Informing and educating parents and other caregivers empower them to participate in reducing the incidence and spread of gastroenteritis in the community.

Nurses are challenged to maintain current knowledge of the optimal treatment strategies for gastroenteritis in children. As stated earlier, ORT is still underutilized in the developed world. Nurses have the opportunity to change this situation by becoming familiar with the ORT guidelines and instructing their patients in its appropriate use. The challenge is to get practitioners to implement the guidelines. Some work has been done on changing clinical behaviours of physicians, and includes education at the time the guidelines are disseminated, ongoing reinforcement in the

form of feedback, and incentives to adhere to the guidelines (Burton & Armstrong, 1997). The guidelines for management should be part of the nursing curriculum as well as part of on-the-job training. Protocols, based on major recommendations for the management of gastroenteritis in children, should be available to all health care providers in every practice setting. Both the morbidity of childhood gastroenteritis and related health care costs can be reduced through health promotion and education of parents and health professionals on optimal management.

To provide effective management, prevention and treatment of gastroenteritis in children, nurses must evaluate current strategies and engage in research. More studies are needed that include nurses in various practice settings, especially those serving low-income families. Studies of ORT that focus on nurses' knowledge of guidelines, factors such as barriers to implementation, costs, and acceptability to parents and health care providers, would help facilitate its use. Methods of evaluating interventions in practice should include more direct measures of nurses' behaviours, such as direct nurse observation, patient and staff interviews, and chart reviews.

In summary, it is vital that nurses educate themselves, and their patients' caregivers, to recognize, assess, and manage gastroenteritis in young children. Such knowledge allows the nurse and caregivers to identify the most appropriate management strategies and, thereby, significantly reduce the incidence, spread and complications of viral gastroenteritis.

Summary

In summary, studies have shown that acute gastroenteritis represents a serious

problem for children in the developing world as well as in the developed world. This review of the literature has demonstrated an overall acceptance of expert recommendations for the management of gastroenteritis in young children. Physicians' lack of familiarity with these practice guidelines has also been demonstrated. Little has been documented about the knowledge and practices of advanced practice nurses with regards to the management of gastroenteritis. The purpose of this project was to improve nurses' knowledge of current evidence-based guidelines for the management of gastroenteritis in young children through an educational intervention. The review of the literature has provided evidence-based support for the implementation of this practicum project. Attempts to plan, implement and evaluate the proposed change will help nurses broaden their understanding of the guidelines and help nursing develop as a profession.

CHAPTER THREE: METHODOLOGY

Introduction

This chapter describes the actions taken in project planning, data collection and analysis. Issues of reliability, validity and ethical considerations were also addressed. These activities are consistent with the next step of the Dracup-Breu model. A planned change is a conscious, rational, purposeful process to bring about an innovation (Phillips, 1986). The transition of research from paper to practice through planned change was explored in this chapter.

Project Planning

Change in nursing research utilization in the clinical setting requires a planned process. The setting was analyzed in relation to factors that will inhibit or facilitate the change, and a detailed plan was developed for implementation and evaluation.

Setting

Administrative support for carrying out the planned change is critical to success (Titler et al., 1994). Negotiations for site access began well in advance to the expected start date for the practicum project. Letters requesting access were forwarded to the Director of Patient Services at the Churchill Regional Health Authority (Appendix C). A reply, granting access, may be found in Appendix D.

This practicum project took place at the Churchill Regional Health Authority (CRHA), which is located on the southwestern shores of the Hudson Bay. Churchill,

Manitoba is approximately 966 air kilometers (604 miles) from the province's capital city of Winnipeg. Churchill has a population of ~ 1100 persons. Population statistics for Churchill for the year 1996 were obtained from Statistics Canada (see Appendix E). Age characteristics of the population were provided also with the total number of children 0-4 years of age being 115. A reliable resource person, working at CRHA, estimated the number of children between 0-5 years to be approximately 137 for the year 2000 (W. Pawulski, personal communication, May, 2000).

A community health needs assessment was released in 1997, which described the water, sewage and waste systems in Churchill, Manitoba (Churchill RHA Inc.). The Town of Churchill's water supply is considered safe and potable. The sewage treatment plant has been performing very well and is being operated under its maximum design capacity. A consulting company has developed a waste management plan for the Churchill area, which focused on recycling, collection, disposal and improved hazardous waste collection and handling. Churchill has a unique cross-cultural history, which is reflected by its current population mix of one-third First Nations, one-third Metis and one-third European peoples.

The CRHA combines four health care functions: acute inpatient care, personal care home, ambulatory care, and community services. The acute inpatient care area comprises a 21 bed ward, and a labour and delivery room, operating room, recovery room and a CSR. The personal care home has seven beds, one of which can be used for respite care. The ambulatory care services encompass an emergency room, medical clinic, dental clinic, and a combined in-house and retail pharmacy.

Community Services provides a comprehensive range of services including: public health, diabetes education program, asthma education program, Baby First program, Women and Infant Nutrition program, Probation/Parole Services, child daycare, outpatient mental health services, home care, child welfare and a Receiving Home. Thirteen nurses (11 RNs, 2 LPNs) currently staff the CRHA with 4 vacant positions. Staffing changed day-to-day depending on the number of nurses recruited from Winnipeg to work and the number of resignations.

The author of this practicum project spent 10 weeks working at CRHA in the capacity of an advanced practice nursing student. This setting was chosen because of her past experiences of working in northern communities and the unique opportunity to work in four health care settings. The author spent the majority of her time working in the ambulatory clinic but also sought opportunities to work with the public health nurses and other community health workers. One 8-hour shift per week was also spent working with the "on-call" physician.

The nurse working in an extended role at the CRHA follows the principles outlined in the Delegation of Clinical Function document. "The delegation of function within the primary medical care settings of the Churchill Health Center encompasses the scope of primary health care including the diagnosis, treatment, and management of health problems; prevention and health promotion; and ongoing support with family and community intervention where needed" (J. A. Hildes Northern Medical Unit, 2000, p. 1).

Analysis of Setting

“A change in a nursing practice must be relevant to the clinical setting, viewed as beneficial to nursing care, and consistent with the values and needs of the target population” (Phillips, 1986, p. 394). One must first evaluate the extent to which the research knowledge can be applied to this particular setting. Characteristics of the setting, which were considered, using Dracup-Breu’s model, were relative advantage, compatibility, complexity, trialability, and observability, (MacLachlan, 1986).

An innovation is more likely to be adopted if it is viewed as presenting more of a relative advantage over existing practice and the advantage may relate to patient/staff outcomes, cost, public relations, or satisfaction (Horsley et al., 1983). The potential benefits of the innovation to the nurses were an increased knowledge base related to the management of gastroenteritis, an opportunity to improve the quality of care, increased job satisfaction, and an enhancement of the professional status of nursing. The relative advantage of ORT over IV therapy in improving the quality of care and reducing health care costs is clearly documented in the research literature. The costs of implementing the change related to teaching materials, staff time and providing a staff educator. The financial costs were minimal, as the author of the study has volunteered to implement and evaluate the teaching session in fulfillment of the requirements of her practicum project. Photocopied handouts were the only cost relating to teaching materials. Time was an issue of cost to the staff as they were understaffed and unlikely to find time to attend the teaching workshop during working hours. The staff decided to attend the teaching session during a time

when they were not scheduled to work. After having balanced the costs of implementing the innovation against the potential benefits to clients and staff, the author determined that the benefits of implementing the practice change by far outweighed the costs.

Compatibility is another characteristic of an innovation that needs addressing. "The more an innovation fits the department's established values norms and procedures, the more likely it is to be adopted" (Horsley et al., 1983, p. 5). One of the values of the CRHA, listed in the general orientation package, is learning. "We are proud of our role as a teaching, training, and research facility. We provide opportunities for staff and consumers to grow and to develop new knowledge and skills in a manner which emphasizes education as a key factor in achieving healthy lifestyles, and enhancing preventive health care and wellness" (Churchill Regional Health Authority Inc., 1999, p. 7).

The next factor to be considered in determining practice relevance is complexity. An innovation is more likely to be adopted if it is easily understood and easily implemented (Horsley et al., 1983). The change from administering clear fluids or starting an IV to offering ORT is not complex. No additional skill or expertise is required and actually less time is required by the nurse to make the change when compared to starting an IV. ORT is easily accessible through the pharmacy. Implementation of the planned change was considered to be relatively simple with regards to the number of staff involved, teaching supplies, and the availability of a teacher. The content of the educational sessions was borrowed from research and

easily understood with the aid of an algorithm. The only difficulty anticipated was the actual timing of the intervention so that it would fit into the nurses' schedules.

Another characteristic of the innovation that facilitates acceptance by organizations is its trialability. Whenever possible, it is advisable to carry out a pilot study, which is a small-scale version, or trial run, of the major study (Polit & Hungler, 1997). A small-scale implementation provides data for decisions of whether to reject, modify, or proceed with full implementation of the planned change (MacLachlan, 1986). The author considered implementing an even smaller-scale version of this project in Rankin Inlet, NWT, but due to time constraints and financial reasons, it was decided to proceed with full implementation of the planned change at CRHA. This project likely represents a pilot project for northern communities as it was confined to one facility and one community in northern Manitoba.

The final factor to consider, according to the Dracup-Breu model, is observability. According to Horsley et al. (1983), the more tangible the outcome of the innovation, the more likely it will be adopted. The nurses readily observed their increased knowledge of the management guidelines after completing the posttest. In the long term, once the quality of care and the cost savings become observable to the nurses, physicians, and hospital administrators, the change will spread rapidly through the practice setting. Having analyzed the setting in relation to relative advantage, compatibility, complexity, trialability, and observability, the author decided that the research knowledge could be easily adapted to the clinical setting, the CRHA.

The setting was then analyzed in relation to factors that will inhibit or facilitate

the change. Research utilization, to be successful, requires nurses and other organizational forces to be committed to providing the highest quality of patient care and to changing care as needed to ensure quality (Gennaro, 1994). At CRHA, there was a great deal of support for this project from the Director of Patient Services, the two nursing supervisors, physicians and individual staff nurses. As stated earlier, one of the values of CRHA is commitment to learning. This was evident to the author as administration strongly encouraged and facilitated nurses attending in-hospital seminars. The administrative staff was currently involved in updating the guidelines for infectious diseases, as there had been a number of outbreaks of communicable diseases within the community. Nursing staff was encouraged to familiarize themselves with these guidelines. The promotion of clinical guidelines within the clinical practice setting facilitated the author's planned change. The individual staff nurses were in support of this project as they had all agreed to attend the teaching session when they were not scheduled to work. Also, one nurse volunteered to make a poster announcing the upcoming gastroenteritis workshop.

A number of barriers to implementing the proposed change in practice were identified. The nurses might not know about research findings because it is difficult to access research literature in remote settings, although many journals including pediatric journals were found in the facility's library. The nurses also had access to databases through the computer terminals but obtaining additional research literature would be costly in terms of time and money.

Not all nurses are comfortable with evaluating research. Many nurses are not

prepared at a baccalaureate level (or above), and they might not have received an adequate education in understanding research (Gennaro, 1994).

Change is not easy and it tends to be more difficult when one is trying to modify an individual's beliefs about how things should be done (Askin, Bennett & Shapiro, 1994). As stated in the literature, nurses often relied on tradition and intuition. This type of nursing practice will inhibit the proposed change. Also, many nurses may consider the administration of oral rehydration therapy to be anti-technology and time consuming which was a finding in the literature among physicians. But does this preference for IV therapy over ORT represent the culture of the health care setting? This high-tech approach is a common occurrence in health care facilities today and it is taken for granted that this is the most appropriate choice. High-tech interventions such as IV therapy are not always the appropriate choice as is the situation with mild to moderate dehydration. This tendency to use IV rather than oral fluids is inappropriate, because proper use of ORS is safer, more physiologic, less painful, and less expensive than the use of IV fluids and this has been stated in the literature.

Another potential barrier to implementing the proposed change was physicians' practices, which deviate from the guidelines. The author had private meetings with the two physicians to elicit their support. They were also invited to attend the teaching session. Nurses' increased knowledge related to practice guidelines provided them with a basis for their practice if confronted by opposing beliefs regarding the management of gastroenteritis.

Anxiety related to their knowledge of gastroenteritis may have presented a barrier to nurses attending the teaching session. The nurses were assured of confidentiality with regards to test results. This educational intervention was presented as an opportunity for everyone to learn in a non-threatening environment.

Nurses' desire to maintain status quo was a potential impediment to implementing the planned change. The supervisors encouraging staff members to attend the teaching session offset this potential barrier. Providing staff members with the option of attending one in seven teaching sessions and informing them that participation was voluntary may have facilitated the adoption of the intervention.

These identified barriers to implementing the change in practice may have been diminished by providing the nurses with an opportunity to engage in the process of research utilization. They may have learned that utilizing research in practice not only benefits patients but it also benefits nurses and the nursing profession. The author's role in this project was that of a facilitator of the research utilization process. Strategies for using research findings in practice or the promotion of evidence-based practice were discussed in the final chapter of this report.

Sample

The population was all nurses working in a primary care setting who have the responsibility of managing gastroenteritis. The sample was all nurses working at CRHA during the week of June 26, 2000 (non-probability, convenience sampling). The criteria for inclusion in the study were that the participants were nurses working within the CRHA setting during the above-mentioned time frame and they provided a

verbal consent to participate in the study. Those nurses who were working at CRHA during the month of June, 2000, and who consented to participate, constituted the study sample. A convenience sample of approximately 13 nurses was expected.

Planning for Implementation of the Innovation

To engage the staff and facilitate the implementation of the project, the following steps were planned: communicating to the nurses about the proposed intervention; securing resources; developing materials and procedures to be utilized during the delivery of the educational session; and employing effective teaching strategies.

Formal staff orientation to the project occurred primarily in small group sessions with some one-on-one discussions. Letters of information were sent to all nurses, supervisors, the Director of Patient services, and the two physicians.

(Appendix F). They were informed of the project, its purpose and their role. Private meetings were held with the two supervisors, the Director of Patient Services, and the two physicians to solicit their support.

One staff nurse volunteered to develop a poster announcing the gastroenteritis teaching sessions and the need for each nurse to sign up for one session. This announcement was posted on June 12, 2000 outside of the nurses' lounge. To optimise participation, the staff scheduled the teaching sessions with a choice of dates and times (daytime, afternoon, or evening). The sessions were tentatively planned for the week of June 26, 2000. "Planning for the participation of all relevant persons within the system increase the likelihood that they will be supportive of the change

and communicate that support to others as the change effort proceeds” (Horsley et al., 1983, p.4). The nurses were provided with the option of attending one of seven teaching sessions.

Once the dates of the sessions were finalized, the author booked either the library or the boardroom at the CRHA in which to conduct the intervention. An overhead projector was on hand in each room. Community Services provided the transparencies.

The author developed the materials and procedures required for implementation of the innovation two weeks prior to the teaching session. Whenever possible, materials developed by others, i.e. researchers, should be adapted for use rather than beginning anew, in order to reduce personnel time, costs, and frustrations involved in material development (Horsley et al., 1983). The author of this project was unable to locate, in the literature or at CRHA, any assessment forms, teaching plans, or algorithm pertaining to the management of gastroenteritis in young children. Therefore, the content of the teaching sessions and the algorithm was borrowed from research but the author developed the algorithm. The author acquired a teaching aid from the Nurse Practitioner Journal, which was to be used by the nurses in their clinical practice (see Appendix G). Samples of Pedialyte freezer pops with accompanying information on the signs, prevention and management of dehydration were ordered from the producers of Pedialyte. Each nurse who attended an educational session received a sample.

Before proceeding with the teaching session, the author considered the

utilization of several teaching strategies to promote learning. These included the use of a lecture method, and the principles of organization, primacy, specificity, repetition, and brevity. The author planned to conduct the teaching-learning session utilizing the lecture method. This method is chosen when the lecturer's background and experience can add substantially to a better understanding of the subject matter and when important background information is not available to the group (Whitman, Graham, Gleit & Boyd, 1992). During the lecture the author posed questions directed at the nurses and the nurses were permitted to ask questions. Active participation will hopefully have helped in the learning process. The use of advanced organizers, clues for what is going to happen and what will be expected of them, can increase recall by as much as 50% (Whitman et al., 1992). The objectives and key elements of the teaching session were discussed at the beginning of the teaching session. The nurses were instructed regarding specific aspects of management pertaining to gastroenteritis i.e. assessment, rehydration and refeeding. Key information was presented, emphasized, repeated and summarized in order to strengthen the learning process. The verbal teaching was augmented with the use of audiovisual aids and provision of written materials such as a copy of the algorithm. All of these means reinforced the learning process.

The following is a description of the activities planned during each session. The author obtained informed consent by reviewing the information on the Written Disclaimer (see Appendix H). A copy of the sheet was given to each participant.

During the first 10 minutes, the pretest was administered. Nurses were handed

the pretest, which is indicated by a number, 1 to 15, followed by the letter "a".

Nurses were instructed to complete every question except the two questions pertaining to the evaluation of the teaching session and recommendations for improvement, which belonged to the posttest. The author permitted time to clarify any questions. Prior to the lecture the author collected the pretest. Initially, the objectives and key elements of the teaching session were highlighted. Next, the nurses were informed of current research findings relating to the incidence, morbidity, mortality and risk factors for acute gastroenteritis. The author of the study repeated and augmented key points by the use of overheads (5 minutes).

Recommendations from the literature specific to assessment, prevention, and management of dehydration were discussed. The nurses were presented with a handout that illustrated the management of acute gastroenteritis (see Appendix I). They were guided on the use of the algorithm for history-taking, clinical assessment of hydration and the management of no dehydration to severe dehydration (20 minutes). A 10-minute question period was provided. The posttest was administered during the remaining 15 minutes. Each nurse was handed a questionnaire identified by the same number found on the pretest followed by the letter "b". The author collected the completed posttests. As mentioned earlier, each nurse was provided with a sample from the manufacturers of Pedialyte and a copy of a teaching aid.

Plan for Evaluation

This phase of the research utilization process deals with evaluation, specifically outcome evaluation. The purposes of this evaluation were to collect data in the natural

clinical setting related to the outcome from use of a new research-based intervention and to use this evaluative data for further decision making or possible policy changes.

Evaluation of programs in health care is a role that advanced practice nurses are likely to assume given the growing demand by policy makers and insurance providers to demonstrate high-quality, effective care at the lowest possible cost (Daley & Wright, 2000). The CURN project carried out by Horsley et al., (1983), recommended that there should be one or more dependent variables in the original research base that can be reliably measured by clinicians in the practice setting. The work of Titler et al., (1994), indicated that outcomes could be classified as patient/family, staff, or fiscal in nature. Recall, that the overall purpose of this practicum project was to increase nurses' knowledge of current evidence-based guidelines for the management of gastroenteritis in young children through an educational intervention. Specific aims of the project were to identify nurses' perceptions about barriers to optimal management of gastroenteritis, determine the nurses knowledge level of the guidelines prior to the intervention, and evaluate the effectiveness of the training session in improving nurses' knowledge of the guidelines. The long term objectives of the project were to increase the use of ORT in the treatment of acute gastroenteritis, enable nurses to properly advise parents on the prevention and optimal management of gastroenteritis which will contribute to reducing the incidence of the condition, its mortality and morbidity and related health care costs.

Project design. A pretest - posttest design was used to evaluate the nurses' knowledge of guidelines for the management of gastroenteritis.

Data collection. Training and data collection took place in the medical library or the boardroom of the CRHA. Nurses completed the same pretest and posttest, prior and subsequent to their training. Each set of questionnaires contained the identical number followed by a letter (1a and 1b, 2a and 2b) in order to match each participant's pretest with their posttest. Each participant was handed one set of questionnaires (1a and 1b). A knowledge-validated questionnaire, pertaining to the management of gastroenteritis, was not found in the research. The author consequently developed the tool for data collection and the content was based on the research findings (see Appendix J). Before the teaching session, the nurses received verbal instructions, from the author, on completing the pretest questionnaire. The questionnaire requested information on the demographics of the nurses work role, work setting, years as a nurse, years on current unit, and education. The tool consisted of multiple choice and some true/false questions. General knowledge regarding etiology and risk factors for gastroenteritis, signs of dehydration, use of drugs, and management of dehydration were assessed. The author identified two questions, questions 9 and 12, pertaining to rehydration and refeeding practices, to have greater practical application. Hence, more of a focus was placed on these two questions when analyzing outcomes of the pretest and posttest.

A closed-ended question developed by the author, asked nurses to identify barrier(s) hindering the use of ORT. The seven barriers to the implementation of ORT were generated from research findings. An open-ended question was included which pertained to the nurses' familiarity with guidelines. Time to complete the pretest was

approximately 10 minutes. Following the 20-minute teaching session, the author presented each nurse with the same questionnaire (15 minutes). The nurses were also asked to rate the overall effectiveness of the teaching session, utilizing a Likert scale. The final open-ended question asked nurses to offer suggestions for improving the teaching session.

Limitations with data/method. Questionnaires offer a number of advantages over personal interviews, but they have some drawbacks as well. Questionnaires are generally much less costly and require less time and energy to administer. Group - administered questionnaires, by far, are the least expensive and time consuming of any procedure (Polit & Hungler, 1995). Personal presentation of the questionnaires to the nurses had the obvious advantages of maximizing the number of completed questionnaires and allowed the author to clarify any potential misunderstandings about the instruments. Questionnaires, unlike interviews, offer the possibility of complete anonymity (Polit & Hungler, 1997).

Response rates tend to be lower in questionnaires compared to interviews. Misinterpretations may go undetected by the author, and thus the responses may lead to erroneous conclusions (Polit & Hungler, 1997).

The major drawback of closed-ended questions lies in the possibility of the author neglecting or overlooking some potentially important responses. Open-ended questions allow for a richer and fuller perspective on the topic of interest, if the respondents are verbally responsive (Polit & Hungler, 1995).

The pretest - posttest design in this project provided an easy method for

measuring the change, nurses' knowledge of acute gastroenteritis and its management. The disadvantage of this approach is that it does not allow conclusions to be drawn about why the observed change occurred (Jancken et al., 1999). Thus, it is possible that other extraneous events occurred at the same time as the teaching session and influenced the staff variables being measured.

Reliability and validity. In a research project, the data collection tool would have been assessed for reliability and validity by means of a pilot test. These are two important criteria for assessing the quality of a tool. "An instrument may be said to have internal consistency reliability to the extent that all its subparts are measuring the same characteristic" (Polit & Hungler, 1995, p. 297). In this approach, the items comprising the questionnaire would have been split into two groups and scored independently, and the scores on the two half-tests would have been used to compute a reliability coefficient (Polit & Hungler, 1995).

The second important criterion, validity, is also evaluated. Validity refers to whether or not an instrument accurately measures what it is supposed to be measuring (LoBiondo-Wood & Haber, 1998). Content validity is of importance to this study as it is of special relevance to individuals designing a test to measure knowledge in a specific content area (Polit & Hungler, 1995). There are no completely objective methods of assuring the adequate content coverage of an instrument and experts in the content area may be called on to analyze the items of an instrument (Polit & Hungler, 1995). In view of time constraints, the questionnaire was not assessed for reliability and validity.

Data analysis. The demographic data used to describe the study participants were analyzed using descriptive statistics. In order to impose some order, frequency distribution was performed on the data collected from each question and then organized into tables. Descriptive statistics was used to analyze the data collected from the question pertaining to the barriers to the use of ORT. Percentages of respondents that identified each barrier and the most commonly identified barriers were calculated for both the pretest and posttest and then compared. Pretest and posttest mean scores were compared by means of a paired t-test to determine statistical significance. If the normal distribution assumption were questioned in the pretest/posttest mean scores, using the t-test, a Wilcoxon rank-sum test would be performed. The Wilcoxon Rank Sum Test was performed on total pre and posttest scores to evaluate statistical significance. The five-point Likert scale (from “not very helpful” to “extremely helpful”) was scored using descriptive statistics. Unanswered questions were reported.

Ethical considerations. Ethical risks to the staff nurses were examined. Two issues of concern, confidentiality and anonymity were identified in this practicum project. Ethics approval was sought and granted approval, through an expedited process, from the University of Manitoba Ethics Approval Committee. Before embarking on this practicum project, all nurses, nursing supervisors and the Director of Patient Services, were informed verbally of the purpose of the study. Prior to administering the pretest, an informed consent was obtained through reading of a written disclaimer, and the nurses' acknowledgement of participation. The collection

tool did not record any names but there was the possibility that participant's identity may be revealed through the demographic data. Therefore, all completed questionnaires were secured in a locked cabinet located at the CRHA during the project. The locked cabinet was only accessible to the author. Findings of the study were developed from an aggregation of data to ensure protection of the respondent's anonymity. Involved graduate students from the faculty of nursing at the University of Manitoba, course instructors and study participants have access to this data. This was addressed in the written disclaimer. Data will be securely stored, by the author of this study, for a minimum of seven years.

Implementation of the Innovation

A proposal outlining the purpose of the study, the objectives and the methodology was developed and submitted to the advisory committee for the practicum project. The proposal was reviewed and approved by the committee. The Ethical Review Committee of the Faculty of Nursing at the University of Manitoba approved the project (see Appendix K).

During the week of June 26, 2000, the author conducted 5 one-hour teaching sessions pertaining to the management of gastroenteritis in young children. The nurses and other health care providers including 2 physicians, a medical student, an ambulance attendant, 2 lab technicians, and a liaison from transportation services attended the teaching sessions. The lectures were delivered as planned incorporating all of the teaching strategies previously discussed.

Summary

This chapter provided a description of the practicum setting, sample, and research design. In addition, methods of data collection and analysis were outlined. Issues of reliability, validity and ethical considerations were discussed. The detailed plan for implementing and evaluating the project was also described in this chapter.

CHAPTER 4: FINDINGS OF THE STUDY/RESULTS

Introduction

After conducting the data analyses as planned, the results generated from these analyses will be presented in this chapter. The findings are related to the demographic characteristics of the sample and the objectives of the project.

Demographic Characteristics of the Sample

Of the sixteen nurses that were invited, fifteen (n= 15) participated in the study. Their age range was between 27 and 48 years with a mean of 36. Two nurses did not provide any age-related data. Years as a nurse ranged between 0 and 24 years with a mean of 10 years. Eight nurses (53.3%) were diploma trained, 5 (33%) had a BN or were working on it, and the remainder 2 (13.3%) were LPNs. The majority of nurses worked on the hospital ward (n=12 or 80%) and the remainder worked in public health or in the ambulatory clinic (n=3 or 20%). Years in current work setting ranged between 6.7 weeks and 10 years, with a mean of 2.7 years.

Identify Nurses' Perceptions About Barriers

to Optimal Management of Gastroenteritis

Barriers to the Use of Oral Rehydration Therapy (Pretest)

The major barriers that nurses believed to hinder the use of ORT were that parents lack an understanding of the disease (n=13 or 86.7%) and have inadequate parenting skills (n=11 or 73.3%) (see Appendix L). Five nurses (33.3%) perceived

lack of staffing as a barrier and only 3 (20%) identified cost as a barrier. Regarding other barriers, only 4 nurses (26.7%) believed that their lack of knowledge of guidelines relating to gastroenteritis management presented as a barrier to the use of ORT. The author accepted the pretest findings as a more accurate depiction of nurses' perceptions of barriers than the posttest findings.

Barriers to the Use of Oral Rehydration Therapy (Posttest)

The author of the study believed that the review of the literature might have contaminated the nurses' perceptions of barriers identified in the posttest. The number of identified barriers increased considerably from pretest to posttest. Parent's lack of understanding of the disease and inadequate parenting skills again were identified by the majority of nurses (n=12 or 80%) as the two most significant barriers to the utilization of ORT (see Appendix M). Most nurses (n=11 or 73.3%) now regarded lack of knowledge of guidelines as a barrier to use of ORT. Lack of staffing and cost were recognized as barriers by (n=8 or 53.3%) of the study sample.

Determine Nurses' Knowledge of the Guidelines Prior to the Intervention

Nurses' Knowledge of Management Guidelines (Pretest)

Pretest scores ranged between 4 and 11 points out of a possible 13 points with a mean score of 7.1. A small variation was found between level of education and pretest scores but the sample size prohibited drawing any conclusions Regarding rehydration practices, eight nurses (53.3%) recommended inappropriate clear fluids (see Appendix N). Despite the current AAP recommendations, only 5 (33.3%) nurses believed that children could tolerate full-strength milk after four hours of rehydration

with ORT. The entire sample of nurses correctly identified Canadian Aboriginal children as a high-risk group for gastroenteritis. Most nurses (n=13 or 86.7%) were not familiar with current practice guidelines pertaining to the management of gastroenteritis in young children.

**Evaluate the Effectiveness of the Educational Intervention
in Improving Nurses' Knowledge of the Guidelines**

Nurses' Knowledge of Management Guidelines (Posttest)

Posttest scores ranged from 10 to 13 out of a possible 13 points with a mean of 12.1. Eight nurses achieved a perfect score on the posttest. Number of correct responses per question increased from pretest to posttest in 12 out of 13 questions (see Appendix N). Questions 9 and 12, pertaining to rehydration and refeeding practices, had the greatest increase in correct responses from pretest to posttest. Due to the small variance in test scores (10-13), years as a nurse or level of education did not produce any distinct patterns.

Comparison Between Pretest and Posttest Scores

The pretest scores ranged between 4 and 11 out of a possible 13 points with a mean of 7.0. The posttest scores ranged between 10 and 13 with a mean of 12.1. The graph compared pretest and posttest scores (see Appendix O). The matched pretest/posttest scores were arranged in the order in which the tests were completed. When comparing pretest and posttest scores, all posttest scores were higher with the exception of the first study participant's score.

There was no obvious change in pretest or posttest scores among nurses that

attended the teaching sessions during the earlier part of the week and the latter part of the week. Pretest and posttest mean scores were compared by means of a paired t-test and the difference was statistically significant ($p < .001$). The Wilcoxon rank-sum test was performed on total pre and posttest scores and the difference was statistically significant ($p < .001$).

Nurses' Evaluation of the Educational Intervention

The nurses were asked to evaluate the effectiveness of the teaching session in improving their knowledge of the management guidelines by using a Likert scale (from "not very helpful" to "extremely helpful"). The results ranged between very helpful (4.0) to extremely helpful (5.0) with a mean of 4.5.

Suggestions for improvement of the teaching session included: distribution of handouts, cultural considerations, pictures of children with mild to severe dehydration, table indicating composition of oral rehydration solutions including inappropriate clear fluids, and offering taste tests of various oral rehydration solutions. Four nurses did not provide a response to this open-ended question.

Summary

In this chapter, the author has presented the facts that emerged as a result of analyzing the data. Some meaning of the facts must be presented. In the next chapter, the findings were interpreted.

CHAPTER FIVE: DISCUSSION

Introduction

In this chapter, results were discussed in relation to the objectives of the project and the current literature. The outcome evaluation provided essential data for decision-making or possible policy changes. These activities pertain to the sixth and final phase of Dracup-Breu model of research utilization.

The implications for clinical practice, theory development, and future research were also discussed in the next chapter. In addition, contributions of the study to nursing, limitations and recommendations have been explored.

Identify Nurses' Perceptions About Barriers to Optimal Management of Gastroenteritis

Barriers to the Use of Oral Rehydration Therapy

The most notable findings were that most nurses perceived the two barriers to the optimal management of gastroenteritis as inadequate parenting skills and parents' lack of understanding of the disease. These findings were supported in the literature. Some studies suggested that lack of physicians' knowledge of ORT guidelines is no longer a primary impediment to adoption of ORT (Reis et al., 1994). Porteous et al., 1997, cited the major perceived barriers to the optimal management of gastroenteritis as social skills related to inadequate parenting skills and parental anxiety about the condition because of lack of understanding of the disease. These findings suggested

that efforts to improve use of ORT should expand beyond education of nurses and focus on parental education programs and that practitioners must ensure the provision of anticipatory health guidance and the promotion of preventive health measures.

Cost and staff shortages were not identified as significant barriers to the use of ORT in this study. This finding contrasts with one study as significant barriers to use of ORT in practice included staff limitations and financial restraints. Of note, a large portion of the population in Churchill is Aboriginal and do not pay for most of their medical expenses. Having knowledge of this situation may have influenced the nurses' perceptions of barriers to the utilization of ORT. Interestingly, the nurses did not perceive staff shortage as a significant barrier to the use of ORT even though they were presently experiencing this problem.

Nurses did not identify knowledge of guidelines as an impediment to the use of ORT. This presented as a surprise to the author given the purpose of the project. Traditionally, lack of knowledge of guidelines has been a primary barrier to adoption of ORT (Merrick et al., 1996). But as stated earlier by Reis et al. (1994), lack of knowledge of ORT is no longer a primary impediment to adoption of ORT. Findings from this study and the research suggest that studies should focus on all potential barriers to the use of ORT including cost, staffing, parental knowledge and skills, and health care providers' lack of knowledge of management guidelines. These efforts may have an impact on ORT use. It is interesting to note, knowledge of guidelines was found to be a significant barrier to use of ORT in the posttest. Possible explanations for this finding may be that the nurses' perceptions of barriers were

contaminated by the review of the literature or they failed to recognize their lack of knowledge of ORT guidelines prior to the teaching intervention.

Determine Nurses' Knowledge of Guidelines Prior to the Intervention

Nurses' Knowledge of Management Guidelines (Pretest)

With regards to rehydration and refeeding practices, many of the nurses in this sample diverged from expert recommendations as they recommended inappropriate fluids (n=8 or 53.3%) and delayed the reintroduction of full-strength milk (n=10 or 66.7%). These results were not surprising as the author's survey, personal experiences, and research studies indicated that practitioners' practices continue to differ importantly from the research-based management guidelines for gastroenteritis. In the literature, two of four most commonly cited deviations from the guidelines were inappropriate rehydration solutions and inappropriate restriction of feeding, particularly in terms of duration (Merrick et al., 1996). According to the AAP (1996), conventional practice was to delay giving food to children who have diarrhea, and when feeding was resumed, only a restricted spectrum of foods has been recommended, and dairy products have been avoided.

It was apparent in this study that many nurses clung to traditional methods of managing gastroenteritis and that the majority of them were not familiar with the practice guidelines. These findings were consistent with the literature as one Canadian study found physicians slow to adopt ORT based on lack of familiarity with guidelines or on entrenched patterns of practice (Issenman & Leung, 1993). Based on these findings, nurses in the study are challenged to maintain current knowledge of the

optimal treatment strategies for gastroenteritis, which will provide them with the skills to properly educate parents regarding the prevention and management of gastroenteritis and thereby reduce the consequences of the condition.

All of the nurses correctly identified Canadian Aboriginal children as a high-risk group for gastroenteritis. This question was worded in a manner that suggested a particular kind of answer and therefore increased the risk of response bias (see Appendix N). The majority of the clients seen at CRHA are of Aboriginal descent and therefore the nurses in this study have more exposure to their health status. Being a high-risk group heightens their need for culturally appropriate information and educational programs that focus on prevention and the management of gastroenteritis and thereby help in reducing the incidence and complications associated with gastroenteritis.

Evaluate the Effectiveness of the Educational Intervention
in Improving Nurses' Knowledge of Guidelines

Nurses' Knowledge of Management Guidelines (Posttest)

Based on the analysis of the data, it was concluded that the teaching session was an effective means of increasing nurses' knowledge of guidelines for the management of gastroenteritis in young children. The questions pertaining to rehydration and refeeding practices had the greatest increase in correct responses from pretest to posttest. All of the nurses in the posttest, correctly identified that certain clear fluids were inappropriate for rehydration therapy and that most children can tolerate full-strength milk four hours after rehydrating with ORT. This was a hopeful

outcome of the teaching session as the author had identified these two questions to have greater practical application.

Data analysis of outcomes provides information for further decision-making or possible policy changes in the sixth and final step of the Dracup-Breu model. The acceptance of the research-based change is more likely to occur if the staff perceives the change to have positive outcomes (Phillips, 1986). The results of the teaching session evaluation were one way to illustrate success. Nurses may have received this a positive experience as they were given an opportunity to participate in a research utilization project. The outcome of this study was increased knowledge, which may directly or indirectly improve health care delivery and health care outcomes.

One of the long-term outcomes of the project was to have the nurses transfer the acquired knowledge to practice. A decision to adopt the innovation in practice not only rests on the actual outcomes, but on other considerations such as cost, ease of operation, and staff morale as well (Horsley et al., 1983). The financial costs of developing a new policy would be minimal. Time was an issue of cost to the staff as they were experiencing a staff shortage and there were other changes that were placing unusually heavy demands on the nursing staff. The development of a policy or guideline pertaining to the management of gastroenteritis in young children would be a relatively easy endeavor given the quantity and availability of evidenced-based recommendations. After attending the teaching session, the nurses were more knowledgeable of the fact that ORT was effective, simpler to administer, safer, less painful and less costly than intravenous rehydration. According to several staff

members, staff morale was low. But the staff's enthusiasm was apparent to the author of the project as 15 out of 16 potential study participants attended the teaching session. One of the nursing supervisors voiced a desire to develop a new guideline pertaining to the management of gastroenteritis in the policy and procedure manual. This decision was made without having access to the evaluative outcomes of the teaching session.

After assessing all of the above-mentioned factors, one of the nursing supervisors decided to use the research findings to develop a guideline and incorporate it into the policy and procedure manual. The nursing supervisor informed the author that the Forms Committee would be approached regarding the development of the new guideline.

According to Horsley et al., 1983, the change should not be introduced unless staff and the organization have the capacity to accept and sustain the innovation. Following implementation of the teaching sessions, the CRHA experienced a period with a high rate of staff turnover. For this reason, implementation of the guideline has been delayed.

The advantages of research utilization as an organizational process provide a basis for practice activities that are research based, advance nursing knowledge and practice, and provide direction for future nursing research studies (Horsley et al., 1983). The next portion of this chapter discusses implications for clinical practice and future research, theory development, limitations of the project, recommendations and conclusions.

Implications for Clinical Practice

This project shed light on nurses' perceptions of barriers to the optimal management of gastroenteritis, specifically the use of ORT. Lack of understanding of the disease and poor parenting skills were the two most commonly identified barriers. These results were supported in the literature. These findings suggested that educational efforts should be directed at health care providers as well as parents to help parents prevent dehydration and to recognize and immediately seek medical care for severe diarrhea in children. This was also a recommendation of the Advisory Committee on Immunization Practices (MMWR, 1999b). These efforts will help decrease the complications of gastroenteritis and the morbidity, mortality and substantial health burden associated with the illness.

There are several implications for the community health nurses (CHNs) working with the culturally distinct population in Churchill. Nurses must provide anticipatory health guidance regarding gastroenteritis to prenatal clients in a culturally appropriate manner. CHNs need to work with the community members and key informants regarding issues of adequate water treatment programs, sanitation and housing facilities while maintaining the principle of community development. Community health programs must address their needs and involve them in developing, implementing, and evaluating the community programs.

It was apparent in this study that many nurses clung to traditional methods of managing gastroenteritis and that the majority of them were not familiar with the practice guidelines. Based on these findings, nurses in the study are challenged to

maintain current knowledge of the optimal treatment strategies for gastroenteritis. This increased knowledge will enable them to properly advise parents on the prevention and optimal management of gastroenteritis and thereby contribute to improved client outcomes, possibly narrow the gap between research and practice and help nursing develop as a profession.

Educating nurses about evidenced-based guidelines, such as the management of gastroenteritis, should be part of nursing curriculums and staff development programs. The role of the nurse educator in this process is to develop, implement and evaluate these research-based educational interventions and then promote the dissemination of the new knowledge acquired.

Implications for Research

Future studies should focus on all potential barriers to the use of ORT including cost, staffing, parental knowledge and skills, and health care providers' lack of knowledge of management guidelines. These efforts may facilitate the use of ORT and reduce the risk of the consequences of gastroenteritis including dehydration and death.

This study has provided an example of the application of research-based knowledge to solve a problem in nursing practice, nurses' lack of knowledge of management guidelines for gastroenteritis. This research-based innovation has produced significant outcomes in this particular setting. Based on the analysis of the data, it was concluded that the teaching session was an effective means of increasing nurses' knowledge of guidelines for the management of gastroenteritis in young

children. But no one study is sufficient to support a practice change and therefore, assessment of research implies that results of two or more studies involving a common problem must be synthesized in order to form a research base (Titler et al., 1995). "One way to ensure reliability and verify findings is through multicenter trials in which a research-utilization project can be implemented at several locations", (Askin et al., 1994, p. 337). The advanced practice nurse (APN) can play a key role in facilitating future research utilization efforts to increase nurses' knowledge of guidelines by implementing this researched-based innovation in larger scale, multicenter trials.

According to the literature, relatively little is known regarding the management of gastroenteritis in the community, especially involving families of low income and non-Caucasian race. Future research utilization projects are needed to assess the knowledge level, practices and cultural customs of these groups in managing gastroenteritis at home. These efforts may enable nurses to properly advise parents on the prevention and optimal management of gastroenteritis which will contribute to reducing the incidence of the condition, its mortality and morbidity and related health care costs.

Theory Development

The author used the Dracup-Breu model of nursing research utilization in this practicum project. The Dracup-Breu model provided the framework within which to plan, implement, and evaluate the proposed change to practice. The six steps in the utilization process of the model were briefly described (Phillips, 1986). No step-by-

step process to follow the model was offered. Nurse researchers should develop guidelines for research utilization, which would provide nurses with a simple, practical, systematic approach with a measurable assessment of the implementation and evaluation processes. Little research has been conducted on models of research utilization (Kirchoff, 1984). More research-based projects are needed that use a more systematic approach to the utilization of research in practice so that they provide a useful framework for other practitioners, such as APNs, seeking to change to evidence-based practice in a variety of settings.

Promoting Evidence-Based Practice

Developing a culture of using evidence-based guidelines in practice extends beyond writing and disseminating guidelines, the challenge being to get clinicians to implement the guidelines in practice (Burton & Armstrong, 1997). APNs can play pivotal roles in the dissemination and implementation of practice guidelines by promoting and evaluating their use in their clinical encounters with children and their families (Callender, 1999). APNs can gain access to pediatric practice guidelines through government agencies such as the Agency for Health Care Policy and Research (AHCPR) and professional organizations such as the American Academy of Pediatrics and the Canadian Paediatric Society.

To improve nursing practice effectively with research knowledge, research utilization must become a priority for all nurses and health care organizations. Collaboration between the areas of practice, research and education needs to occur and that clinicians as well as scientists and educators need to be involved in the

process (Dufault, Bielecki, Collins, & Willey, 1995).

Administrative support for making the practice change is critical to success and that might include access to and time for continuing education, promoting research committees, recognizing staff who participate in making practice changes, and rewarding those staff members who serve as advocates for change through positive performance evaluations (Mackay, 1998; Titler et al., 1994). Other strategies that promote the use of research in practice are research grand rounds, newsletters, research bulletin boards, training courses in the organizational change process, and providing electronic access to online bibliographic services (Gennaro, 1994; Rutledge, Ropka, Greene, Nail, & Mooney, 1998).

The procedure manuals, standards of care, and nursing care plans will need to represent current nursing research. Nursing executives must encourage their nursing staff to use research findings. Nursing staff development educators must find ways to assist staff nurses to translate research findings into clinical practice. Ways to facilitate this information transfer would include provision of research skill-building courses and research awareness workshops, development of opportunities for direct research involvement, assistance with research utilization, and evaluation of the extent to which research is used and patient outcomes are improved (Bostrum & Suter, 1993).

Educating students about the research process, the process for using research findings in practice, and encouraging students to make changes in practice based on research findings are techniques used in nursing schools to overcome barriers to

research utilization.

Success of research utilization also depends on the skills of nursing staff members, their commitment to providing the highest quality of nursing care and to changing care as needed to guarantee quality. Another helpful strategy is the publication of papers by clinicians reporting effective use of research in a clinical setting. A researcher working with practitioners in every step of the research utilization process and the development of research journals for clinicians has increased the communication between researcher and practitioner. Researchers must improve the readability and include practice implications in their research reports.

“Guidelines should be carefully scrutinized for their clinical efficacy before they are disseminated, implemented, and embraced” (Merritt, Palmer, Bergman, & Shiono, 1997 p. 112). Policymakers need the input and direction of health care providers such as advanced practice nurses regarding the appropriate scope and content of practice guidelines. This involvement will also aid in maximizing their use.

As we enter the next century, nursing research utilization will become more collaborative and evidence-based nursing interventions will be required to provide cost effective, quality care.

Contribution of Study to Nursing

Most studies have addressed physician knowledge and practice patterns pertaining to the management of gastroenteritis in young children. This study has contributed to nursing's body of knowledge as it assessed nurses' knowledge of management guidelines for gastroenteritis, and evaluated the effectiveness of a

research based educational intervention designed to expand their knowledge base. This study imparted one approach to increasing nurses' knowledge of evidenced-based guidelines and one method of evaluating the outcomes of the intervention, which demonstrated statistically significant results. Dissemination of these findings may prompt additional research utilization projects. The teaching and evaluation methods might be usefully adapted to train other nurses about the management of gastroenteritis.

This project, which focused on educating nurses to integrate management guidelines into practice, provided an example of utilizing research to change a specific problem relating to nursing practice. Educating nurses about guidelines will enable them to properly advise parents on the prevention and optimal management of gastroenteritis and thereby contribute to improved client outcomes, possibly narrow the gap between research and practice and help nursing develop as a profession.

One of the long-term objectives of the project was aimed at nurses transferring the acquired knowledge to practice thereby optimizing the management of gastroenteritis, which will contribute to reducing the incidence of the condition, its mortality and morbidity and related health care costs. Achieving these outcomes will provide support for this type of intervention as the movement in health care is towards evidenced-based practice and outcomes-based practice. Maintaining this focus on evaluating and improving the effect of nursing care on patient outcomes will strengthen the role of the advanced practice nurse and nursing's professional position.

This project also shed light on the nurses' perceptions of barriers to optimal

management of gastroenteritis. These findings could be useful to future nursing researchers.

Limitations

Although nurses' knowledge of management guidelines significantly increased in this project, the major question remaining is how to translate this knowledge into practice. To promote the dissemination of the new knowledge acquired from educational interventions, strategies must be implemented and "A Model for Evidence-Based Practice" is one means of guiding nurses and other health care professionals through a systematic process for the change to evidence-based practice. The model is based on theoretical and research literature related to evidence-based practice, research utilization, standardized language, and change theory (Rosswurm & Larrabee, 1999).

Other limitations included the inability to generalize to other settings and other nurses, due to the small sample size and the lack of random assignment of staff nurse subjects. Ideally, the evaluation should be conducted by an outsider as the author, who was directly involved in the development and delivery of the teaching session, had a vested interest in the outcome of the evaluation and may have introduced some bias.

The top-down approach to change has been utilized in this project. The author of the study identified the need for change in practice and developed an educational intervention to provide the solution to the problem. The literature on planned change documents the importance of people becoming more involved in making the change,

as they are more likely to accept the change (Rogers, 1995). Also, staff participation is essential throughout the research utilization process because they will be applying the innovation in practice.

The teaching method utilized during the teaching session again placed the nurses in a passive role. Research has demonstrated that many students who receive classroom lectures are unable to relate that knowledge to the clinical practice setting and recall diminishes by 45% after 3-4 days and in 8 weeks only 24% of the information is recalled. Students prefer educational strategies that place the student in an active, thinking mode and incorporating active learning techniques is more likely to be successful in producing change (Seeler, Turnwald, & Bull, 1994).

Recommendations

- implement more research projects using a more systematic and collaborative approach to the utilization of research in practice
- utilize multiple methods of evaluating the effectiveness of the teaching session including a follow-up posttest, chart audits, direct observation or interviewing nurses and parents
- direct education efforts at health care providers as well as parents to help in the prevention and optimal management of gastroenteritis
- adapt educational session to incorporate teaching and learning principles, and a culturally sensitive approach
- develop a collaborative approach to writing, disseminating, and implementing evidence-based guidelines in practice

- replicate study using multicenter trials, larger sample size and health care providers
- focus future studies on all potential barriers to the optimal management of gastroenteritis
- target future studies on families of low income or non-Caucasian race and assess their knowledge, practices, and cultural customs in managing gastroenteritis at home

Reflection

From the beginning to the end of this practicum project, I have made several accomplishments and realizations. The process of writing this document has enhanced my writing skills. I have been provided with a better understanding of the processes of research utilization and change through the implementation of this project. The opportunity of teaching other health care providers was satisfying and will be useful to my career.

Many treasures have been shared with me throughout this experience. I have developed relationships with new people and have had the opportunity to laugh and learn with them. The Churchill Regional Health Authority provided me with the opportunity of working in a diverse health care setting with a culturally distinct population, Canadian Aboriginal people.

Were I to repeat this project, I would do some things differently. Two of the most important changes would be to employ better time management skills and to invite ideas about keeping things more simple, two skills that I have not yet fully

developed. I would include other methods of teaching in addition to the lecture method. I would incorporate more practice-oriented questions in the questionnaire.

Above all, I believe that this project has provided me with the opportunity to integrate aspects of every course that I completed over the past two years in the Advanced Practice Nursing Program. The consequences of my learning will benefit my career, other colleagues, and above all my nursing care.

Conclusion

Acute gastroenteritis represents a common yet serious problem for young children worldwide. The literature has shown that many health care providers do not follow the guidelines for management of gastroenteritis and this discrepancy has been repeatedly ascribed to lack of knowledge of the guidelines.

This project attempted to improve nurses' knowledge of evidence-based guidelines pertaining to the management of gastroenteritis by implementing a research-based educational intervention. The evaluative outcomes supported the effectiveness of the intervention.

It is vital that nurses acquire knowledge of evidence-based guidelines, as this knowledge will enable them to optimize the management of gastroenteritis and contribute to reducing the incidence of the condition, its mortality and related health care costs. Evidence-based nursing and outcomes-based practice are becoming an expectation. The ability to gain knowledge of evidence-based guidelines, utilize them in practice, and evaluate their effectiveness in achieving cost-effective, quality care has become a realistic goal for all nurses and the nursing profession.

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Increasing breastfeeding rates to reduce infant illness at the community level.

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Appendix A

Informal Telephone Survey

Management of Acute Gastroenteritis in Children 5 Years and Younger

Questionnaire:

1. No dehydration - what would be your treatment? Fluids? Solids?
2. **Mild** (3-5%) or **moderate** dehydration (5-10%) recommend?
only?
 - types of fluids
 - how long recommend fluids
 - when introduce solids? types?
3. How would you manage vomiting?
4. When would you start an I.V.?
5. Any recommendations re: **breastfeeding**?
6. Would you ever prescribe **drugs** for vomiting and/or diarrhea?
7. Type of **advice** you would give to parents?
8. Are you aware of any **guidelines** related to this topic?

Managing Diarrhea in Children (Inappropriate Management)



Managing diarrhea in children

Dear Parent:

Diarrhea can disrupt essential fluid balance in anyone—and especially in a child. This may make a sick child's recovery take longer.

Observe your sick child carefully. You know he has diarrhea when his bowel movements increase in amount and frequency and they look watery. For example, several loose, runny bowel movements over a few hours signal diarrhea.

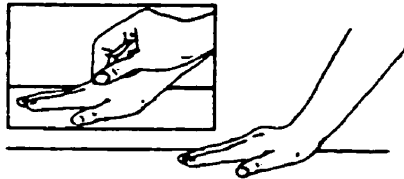
Beware of dehydration, which can result from diarrhea. This is a dangerous condition that should be treated right away by your doctor. Here's how to recognize the signs of dehydration, how to know when to call the doctor, and how to restore lost fluids.

Signs of dehydration

Your child may be dehydrated if

- he stops urinating or produces much less urine than usual
- he appears to be losing weight
- his eyes look sunken.

Try this test: Pinch the skin on top of your child's hand and let it go. If the skin remains in the pinched position, instead of returning to its normal position, your child may be dehydrated.



When to call the doctor

Don't delay getting medical care for your child if

- you notice any dehydration signs
- he's younger than 18 months and has watery bowel movements
- he's an older child whose diarrhea continues after 12 hours
- his bowel movement contains blood or mucus or both.

How to restore fluids

• Encourage clear fluids for the first 24 hours after diarrhea starts. Flat soda (stir a carbonated beverage until it stops fizzing), chicken broth, and tea make good choices.

• Offer soft, bland foods—bananas, rice, applesauce—as your child begins to feel better.

• Avoid giving your child milk and other dairy products, such as cheese and ice cream, when he's sick and for a week after he recovers. These foods may trigger a repeated bout of diarrhea.

• Give an oral rehydrating solution if your doctor advises. This is available in powder form from the drugstore. (Or ask your nurse how to mix a homemade one.) Made with pure water, the solution will bring your child's fluid balance back to normal more effectively than an ordinary liquid, such as cola.

Follow your doctor's instructions on how much to give. Don't offer any other fluid but water if you're using this solution.

Appendix C**Letter of Access**

**Fran Schmidt
273 Overdale Street
Winnipeg, Manitoba
R3J 2G2**

February 14, 2000

**Miss Susan Derk
Director of Patient Services
Churchill Regional Health Authority
Churchill, Manitoba
R0B 0E0**

Dear Miss Derk:

As discussed by my student advisor, Kathleen de Leon-Demare, the practicum is composed of two components: a) satisfactory completion of a minimum of 400 supervised hours in a clinical setting and b) completion of a practice based project.

I am writing to request access to the Churchill Regional Health Authority for the purpose of conducting the practicum experience. This practicum will be undertaken in partial fulfillment of the requirements for the Advanced Practice Nursing major in the Master of Nursing program at the University of Manitoba. The details of the practicum project will be provided at a later date.

Thank you for considering this request and if you have any questions please feel free to contact me.

Sincerely,

Fran Schmidt, BScN, RN



**DIRECTOR OF PATIENT SERVICES
DIRECTOR OF COMMUNITY SERVICES**

Telephone: (204) 675-8319

Fax: (204) 675-2343

E-Mail Address: crhocare@cmrcm.net

February 17, 2000

Ms Fran Schmidt
273 Overdale Street
Winnipeg, Manitoba
R3J 2G2

Dear Ms Schmidt:

This letter is to advise you that I am approving your request for your practicum for your Advanced Practice Nursing at the Churchill Regional Health Authority, Inc. The CRHA enjoys having students with us because it allows staff to learn and teach. Dr. Chris Breneman, Chief of Staff has agreed to be your preceptor.

I am sure that you will find this a rewarding experience and I know that you will find the staff receptive to your needs. If I can be of any assistance, please do not hesitate to contact me.

Yours truly,

Susan M. Derk, R.N., B.N.
Director of Patient Services
Director of Community Services



Churchill RHA Inc.

CHURCHILL, MANITOBA • CANADA

Population Statistics for Churchill

Characteristics	Churchill	Manitoba
Population 1996	1,089	1,113,898
Population 1991	1,143	1,091,942
1991-1996 population change	-4.7	2.0
Land area (square km)	50.93	547,703.85

Characteristics	Churchill			Manitoba		
	Total	Male	Female	Total	Male	Female
Aboriginal Population	505	250	250	128,685	63,620	65,060
Age characteristics of the population						
Total - All persons	1,090	555	535	1,113,900	547,535	566,365
Age 0-4	115	60	60	80,720	41,275	39,445
Age 5-14	170	90	85	163,895	84,090	79,805
Age 15-19	70	35	35	77,075	39,640	38,035
Age 20-24	75	35	45	76,115	38,460	37,650
Age 25-54	540	285	255	472,550	235,815	236,735
Age 55-64	65	35	30	90,780	44,720	48,000
Age 65-74	35	15	20	81,875	37,120	44,755
Age 75 and over	15	5	10	70,290	26,410	43,875
Average age of population	29.2	29.0	29.3	35.7	34.5	36.9
% of the population 15 and over	72.9	72.9	73.8	78.0	77.1	78.8

Letter of Information

Over the past five weeks, I have been working on a practicum project that pertains to the management of acute gastroenteritis. The overall purpose of this project is to increase nurses' knowledge of current evidenced-based guidelines for management of gastroenteritis in young children.

You are invited to attend a one-hour evening workshop the week of June 26, 2000. As decided by the majority of nurses, it will be an evening that you are not scheduled to work. A list will be posted and you will be asked to sign up for one teaching session.

During the workshop you will be asked to complete a pretest. Following the information session, the same questionnaire will be administered (posttest). The questionnaires will not contain any names and confidentiality will be maintained. Your participation is voluntary and you may withdraw from the study at any time without consequence.

Appendix G

PATIENT EDUCATION

Care of the Child with Vomiting and Diarrhea

What is dehydration and how can I prevent it in my child?

When your child vomits and/or has diarrhea, he is losing fluids and minerals that are important to his body. If he loses enough fluid, he can become dehydrated. Although you can usually prevent this problem by giving your child plenty of fluids, certain liquids, such as apple juice, soda, and sports drinks, can cause your child to lose more fluid. It's also not a good idea to give your child plain water, because it lacks important minerals and may make your child sicker.

The best choice is to give your child an oral rehydration solution (ORS) such as Pedialyte, Infalyte, Ricelyte, or Rehydralyte. These solutions safely replace the fluids and minerals your child's body has lost. You can buy these solutions at drugstores and most grocery stores, for between \$2.99 and \$5.49 per liter. If your child prefers a fruitier flavor, you may add 1 teaspoon of presweetened sugar-free Kool-Aid to a chilled 1-liter bottle of commercial ORS. This mixture may also be frozen to make popsicles or crushed in a blender after freezing.

How much ORS should I give my child?

If your child is not vomiting, you do not need to limit the ORS amount you give to him, but encourage your child to take about $\frac{1}{2}$ cup or 4 ounces of ORS after each liquid stool or every hour. Give the ORS by spoon or in small sips. An older child may need 1 cup or 8 ounces every hour. If your child vomits, give one teaspoon of ORS every 1 to 2 minutes.

How can I tell if my child is becoming dehydrated?

If your child is becoming dehydrated you may notice he has a dry mouth with little or no drool. His eyes may seem dry, and he may have no tears. Your child

may be thirsty or may not urinate as often as usual. His eyes may look sunken or his skin will slowly go back to its normal position when pinched. He may also be unusually fussy or sleepy.

When should I call my health care provider?

- When your child's stool has blood or pus in it.
- When your child has signs of dehydration.
- When your child has been vomiting for more than 8 hours or the vomitus shoots out all at once.
- When your child's stomach is swollen or bloated.
- When your child has a fever.
- When your child has abdominal pain for more than 2 hours.
- When your child is unusually sleepy or seems floppy.
- When your child is less than 6 months old and is vomiting or has diarrhea.
- When you have questions or concerns.

What foods will help my child get better if he has diarrhea but isn't vomiting?

A good diet is an important part of diarrhea treatment, so you should encourage your child to drink plenty of liquids and eat regular meals. Continue to breast- or bottle-feed your infant. If he eats solid food, the following are good foods for him to eat:

- starchy foods such as cooked baby cereals, oatmeal, cream of wheat, rice, nonsugared cereals, noodles, potatoes, bread, and yogurt;
- fruits (not those packed in syrup) and vegetables (do not add butter);
- chicken, fish, or meat that is well-cooked.

What foods should I avoid giving my child?

Avoid foods high in sugar or fat:

- drinks such as apple or orange juice, soda (tonic or pop), sports drinks, or sweetened powdered mixes;
- sweets such as candy, gelatin, ice cream, and commercial popsicles;
- sweetened cereals;
- butter, potato chips, and hot dogs.

THE NURSE^{NP} PRACTITIONER[®]
THE AMERICAN JOURNAL OF NURSING PRACTICE

This reprinting and may be photocopied by health care professionals for use in their clinical practice.

Appendix H

Written Disclaimer

You are invited to participate in a practicum project "**Management of Acute Gastroenteritis in Young Children: A Project to Increase Nurses' Knowledge of Evidenced-Based Guidelines**" conducted by Fran Schmidt from the Advanced Practice Nursing major in the Master of Nursing program at the University of Manitoba. The advisory committee members for the practicum project include Dr. Erna Schilder, Chair, Deb Askin, Internal Member, and Dr. Elske Hildes-Ripstein, External Member. Dr. Schilder's work phone number is 1 204 474 8218.

The goal of the project is to increase the nurses' knowledge of current evidenced-based guidelines for management of gastroenteritis in young children.

Participation in the project is entirely voluntary. You are under no obligation to do so. You may withdraw from the study at anytime without consequence.

The project has been approved by the Ethical Review Committee of the Faculty of Nursing at the University of Manitoba.

You will be asked to complete a questionnaire. The questionnaire involves multiple choice and true/false questions pertaining to the incidence and consequences of gastroenteritis, the use of drugs and the management of dehydration. In addition, all participants will be asked to identify barriers to the use of oral rehydration therapy, and their knowledge of any guidelines. There are also a few specific background questions about you. The questionnaire will take about 10 minutes to complete.

After the questionnaire, a 20-minute workshop will be conducted which focuses on the optimal management of gastroenteritis. You will be asked to complete the same questionnaire again with two additional questions pertaining to the effectiveness of the workshop and suggestions for improvement. This should take about 15 minutes. A 15-minute question period will be provided.

All the information you give will be kept confidential. Your name will not be used on any reports about the project. Graduate students from the Faculty of Nursing, University of Manitoba, and their course instructor will have access to the information you provide. However, your name will not be attached to the information you provide.

There are no benefits to you personally but findings from this study may be used in future studies looking at other barriers to the utilization of oral rehydration therapy.

All questionnaires will be secured in a locked cabinet in the author's possession and after seven to ten years, they will be destroyed.

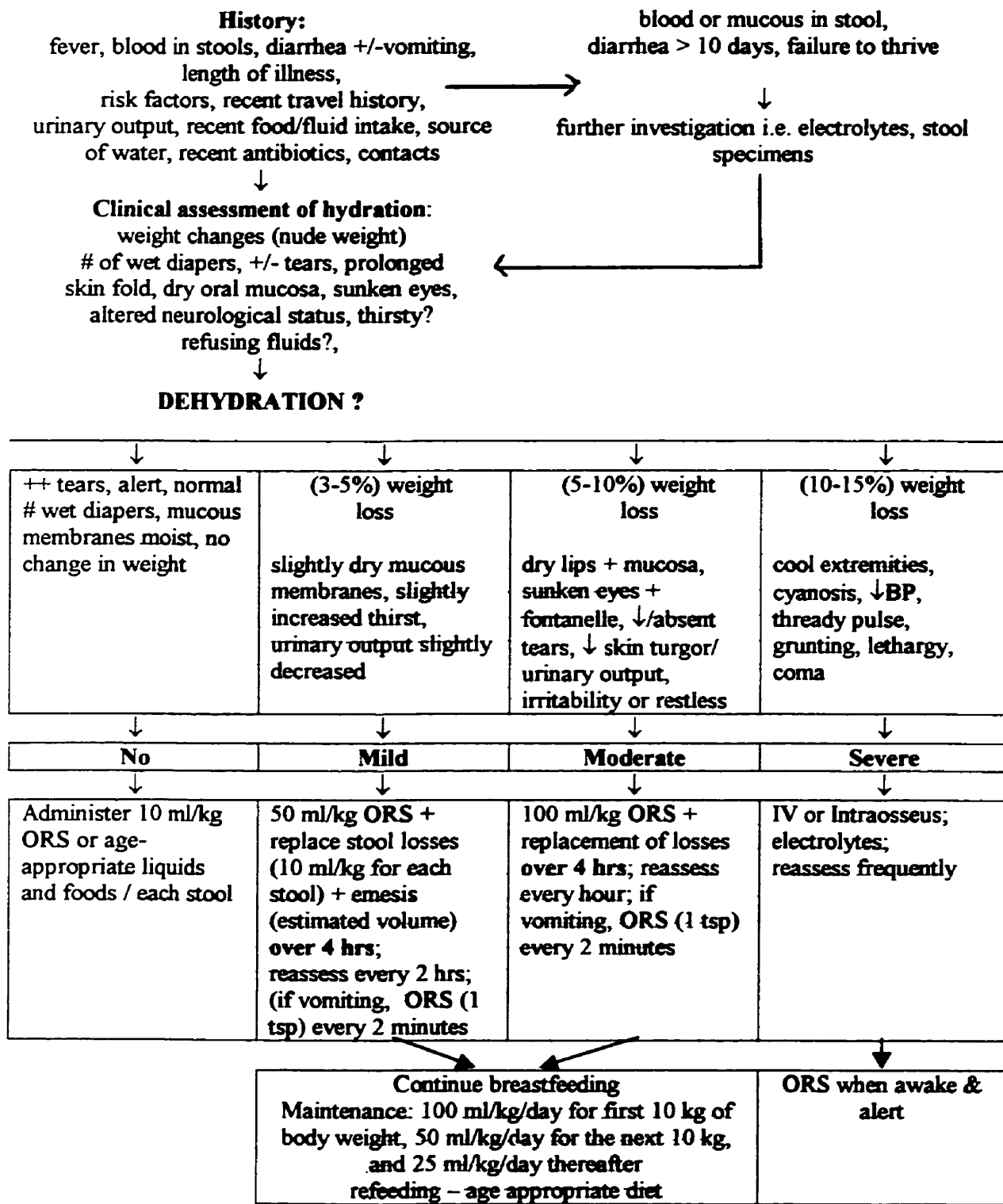
You have an opportunity to have all your questions answered. Any additional questions you may have can be asked at any time. You may refuse to answer some questions contained in the questionnaire. At any time, you may withdraw from the study. You have been offered a copy of the summary of the project.

Date _____

Please send me a copy of the summary of the practicum project report.

Send to: _____ (name)
_____ (address)

Algorithm – Management of Acute Gastroenteritis in Young Children



Appendix J
Sample Collection Tool

Pretest/Posttest

Demographic Information:

Age: _____

Work Role: _____

Work Setting: _____

Years As A Nurse: _____

Years In Current Setting: _____

Education: _____

Questions:

Circle the best answer i.e. A

1. In Canada, viral gastroenteritis leads to what number of deaths per year?
A. 200
B. 400
C. 600
D. 800

2. The consequence(s) of gastroenteritis is/are
A. dehydration and malnutrition
B. dehydration only
C. electrolyte abnormalities
D. shock and cardiac arrest
E. all of the above

3. Estimates of the overall incidence of acute gastroenteritis (episodes/child/year) are
A. higher in developed countries
B. about the same in developed and developing countries
C. higher in developing countries

4. The most important cause of acute infectious diarrhea in developed countries and by far the most important cause of severe dehydrating diarrhea in young children is:
A. Norwalk virus
B. Shigella
C. Rotavirus
D. Giardia

5. Canadian Aboriginal children are a high-risk group for acute gastroenteritis?
 - A. true
 - B. false

6. Determining the specific etiology (via stool specimen) for most diarrheas is important?
 - A. true
 - B. false

7. The cornerstone in gastroenteritis management is
 - A. B.R.A.T. (bananas, rice, apple juice/sauce, tea/toast) diet
 - B. Clear fluids
 - C. Intravenous therapy
 - D. Oral rehydration therapy (Pedialyte)

8. Studies have shown that oral rehydration therapy is as effective as intravenous therapy in rehydrating children with mild to moderate dehydration.
 - A. true
 - B. false

9. Clear fluids (colas, ginger ale, apple juice, and Gatorade) are appropriate for use in oral rehydration therapy.
 - A. true
 - B. false

10. Vomiting is not a contraindication of oral rehydration therapy.
 - A. true
 - B. false

11. Certain contraindication(s) to the use of oral rehydration therapy is/are
 - A. protracted vomiting despite small, frequent feedings
 - B. worsening diarrhea and an inability to keep up with losses
 - C. stupor or coma
 - D. intestinal ileus and severe dehydration
 - E. all of the above

12. Most children can tolerate full-strength milk after 4 hours of rehydration with glucose oral rehydration solutions (Pedialyte).
 - A. true
 - B. false

13. Antiemetics (Gravol) and antidiarrheal medications (Lomotil) are generally not indicated with acute gastroenteritis.
 - A. true
 - B. false

Circle one or more answers:

14. For me, the following is/are barrier(s) to the use of oral rehydration therapy.

- A. lack of convenience
- B. lack of staffing
- C. cost
- D. too simple or anti-technology
- E. inadequate parenting skills
- F. parents' lack of understanding of the disease
- G. my lack of knowledge of guidelines relating to gastroenteritis management

15. List the guidelines, pertaining to the management of gastroenteritis, familiar to you:

16. Circle the response closest to how you feel.

How helpful was the teaching session in improving your knowledge of the management of gastroenteritis?

1	2	3	4	5
Not very helpful				Extremely helpful

17. Would you please take the time to make suggestions for improvement of the teaching sessions:



THE UNIVERSITY OF MANITOBA

Appendix K

FACULTY OF NURSING

106

Helen Glass Centre for Nursing
Winnipeg, Manitoba
Canada R3T 2N2

Tel: (204) 474-7452
Fax: (204) 474-7682

Fran Schmidt
273 Overdale Street
Winnipeg, Manitoba
R3J 2G2

June 26, 2000

Dear Fran:

Re: Practicum Proposal #19: Management of Acute Gastroenteritis in Young Children: A Project to Increase Nurses' Knowledge of Evidence Based Guidelines

With the revisions and clarifications as received in your faxed correspondence of June 22 and June 25th respectively, your practicum proposal is approved.

I would like to take this opportunity to wish you every success with your project.

Sincerely,

Susan McClement, RN PhD(c)
Associate Chair
Ethical Review Committee



APPENDIX L

TABLE: BARRIERS TO THE USE OF ORAL REHYDRATION THERAPY

PRE-TEST

BARRIERS	n =	%
Parents lack of understanding	13	86.7
Inadequate parenting skills	11	73.3
Lack of staffing	5	33.3
My lack of knowledge of guidelines relating to gastroenteritis management	4	26.7
Cost	3	20.0
Too simple or anti-technology	2	13.2
Lack of convenience	2	13.3

APPENDIX M

TABLE: BARRIERS TO THE USE OF ORAL REHYDRATION THERAPY
POST-TEST

BARRIERS	n=	%
Parents lack of understanding	12	80.0
Inadequate parenting skills	12	80.0
My lack of knowledge of guidelines relating to gastroenteritis management	11	73.3
Lack of staffing	8	53.3
Cost	8	53.3
Lack of convenience	6	40.0
Too simple or anti-technology	2	13.3

APPENDIX N

TABLE: QUESTIONNAIRE ITEMS BY PRE-TEST AND POST-TEST SCORE

QUESTIONNAIRE ITEM (Correct answer)	Pre-test Correctly answered		Post-test Correctly answered	
	n=	%	n=	%
1. In Canada, viral gastroenteritis leads to what number of deaths per year? (B)	7	46.7	13	86.7
2. The consequence(s) of gastroenteritis is/are? (E)	9	60.0	13	86.7
3. Estimates of the overall incidence of acute gastroenteritis (episodes/child/year)are? (B)	4	26.7	14	93.3
4. The <u>most</u> important cause of acute infectious diarrhea in <u>developed</u> and by far the most important cause of severe dehydrating diarrhea in young children is? (C)	8	53.3	15	100.0
5. Canadian Aboriginal children are a high-risk group for gastroenteritis? (A)	15	100.0	15	100.0
6. Determining the specific etiology (via stool specimen) for most diarrheas is important? (B)	4	26.7	11	73.3
7. The cornerstone in gastroenteritis management is? (D)	10	66.7	15	100.0
8. Studies have shown that oral rehydration therapy is <u>as effective</u> as intravenous therapy in rehydrating children with mild to moderate dehydration? (A)	13	86.7	14	93.3
9. Clear fluids (colas, ginger ale, apple juice and Gatorade) are appropriate for use in oral rehydration therapy? (B)	7	46.7	15	100.0
10. Vomiting is <u>not</u> a contraindication of oral rehydration therapy? (A)	8	53.3	14	93.3
11. Certain contraindication(s) to the use of oral rehydration therapy is/are? (E)	11	73.3	13	86.7
12. Most children can tolerate full-strength milk after four hours with glucose oral solutions (Pedialyte)? (A)	5	33.3	15	100.0
13. Antiemetics (Gravol) and antidiarrheal medications (Lomotil) are <u>not</u> indicated with acute gastroenteritis? (A)	12	80.0	15	100.0

Appendix O

COMPARISON BETWEEN PRE-TEST AND POST-TEST SCORE

