Parents' Knowledge and Behaviors Related to the Use of Over-The-Counter Cough and Cold Medications

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Author Note

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Abstract

The use of over-the-counter (OTC) cough and cold medications in young children has been common place for decades. However, increasing reports of dangerous side effects and a lack of evidence that supports the efficacy of OTC cough and cold medications children has spurred a change in the recommendations from the Food and Drug Administration (FDA). The purpose of this clinical inquiry was to evaluate the relationship between parental knowledge and behaviors related to the use of OTC cough and cold medications in young children. A secondary goal was to evaluate the effectiveness of the Texas Woman's University College of Nursing Cold Treatment Survey created for this study. The Theory of Dependent Care (TDC) was the theoretical framework for this clinical inquiry.

A demographic survey and the TWU CON Cold Treatment Survey were used to collect data from a convenience sample of 100 parents. Significance was set at 0.05, with a power of 0.80, and effect size of .30. The results indicated no difference between parents of younger children (< 24 months) and parents of older children (25 months to 12 years old) in their knowledge and behavior related to the use of OTC cough and cold medications in their children. Investigation of the data identified trends related to knowledge deficits that need to be addressed in both parent groups. This clinical inquiry inspired the development of a tool designed to collect data related to parental knowledge and behavior where none existed previously. The knowledge gained from this study allowed for the identification of parental knowledge deficits related to the use of OTC cough and cold medications, as well as harmful behaviors related to the treatment of cough and cold symptoms in children.

Parents' Knowledge and Behaviors Related to the Use of Over-The-Counter Cough and Cold Medications

Over-the-counter (OTC) cough and cold medications are widely available and marketed for infants and children in the United States; in fact, drug manufacturers sell 95 million units of pediatric cough and cold medications annually (Pew Prescription Project, 2007). Pharmaceutical companies spent more than 50 million dollars in advertising related to OTC pediatric cough and cold medications from 2006 to 2007 (Pew Prescription Project, 2007). Manufacturers use misleading graphics and dosages based on oral drops or thin strips in order to market these medications to young children, justifying these practices by referencing the Food and Drug Administration (FDA) approval of these products. These practices continue despite the growing evidence that the use of cough and cold medications in children younger than 2 years of age is dangerous and even deadly (Pew Prescription Project, 2007).

Over the last 10 years, there have been numerous emergency room visits in children younger than 2 years of age related to adverse reactions to cold medications (Yaghami, Cordts, Ahlers-Schmidt, Issa, & Warren, 2010). Based on 2004 to 2005 data from the National Electronic Injury Surveillance System, the Centers for Disease Control and Prevention (CDC) and FDA compiled a report which estimated that 1,519 children younger than 2 years were treated in U.S. emergency rooms for adverse reactions and overdoses related to over-the-counter (OTC) cough and cold medications (CDC, 2007). In 2007, the FDA released a safety report revealing 54 deaths related to decongestants and 69 deaths related to antihistamines in young children, with the majority of deaths occurring in those younger than 2 years (Yaghami et al., 2010) Three infants, ages 1 to 6 months, died in 2005. Postmortem blood levels revealed that all

three infants had pseudoephedrine levels ranging from 9 to 14 times the recommended dosage for 2 to 12-year-olds (Srinivasan, Budnitz, Shehab, & Cohen, 2007).

Historically, the FDA's regulatory board for OTC drugs has categorized cough and cold medications as "generally recognized as safe and effective" (GRASE) (Vassilev, Kabadi, & Villa, 2010). Efficacy and safety studies were established for adults, but not for children; therefore, in 1974, a Special Panel on Pediatric Dosing Recommendations was convened. This panel established guidelines using an average adult weight of 60 kilograms. The following recommendations were given: (a) physician consult is needed before administration of cold medications in children younger than 2 years; (b) one fourth of the adult dose of cold medication should be given to children aged 2 to 5 years; and (c) one half of the adult dose of cold medication should be given to children aged 6 to 11 years (Bell & Tunkel, 2010).

There continues to be a lack of research in children related to the effectiveness of cough and cold medications. Of the clinical trials conducted between 1997 and 2007, none showed efficacy above placebo in relief of cough and cold symptoms in children (Vassilev et al., 2010).

There has been increasing concern in the pediatric community for the last 20 years related to the safety and efficacy of OTC cough and cold medications (Sharfstein, North, & Serwint, 2007). A citizen petition submitted to the FDA in March of 2007 raised further concerns related to the safety and efficacy of OTC cough and cold medications in children younger than 6 years of age (Sharfstein et al., 2007). The Nonprescription Drugs Advisory Committee and the Pediatric Advisory Committee reviewed the current literature and determined that published studies did not demonstrate efficacy of cough and cold medications in children. In order to establish efficacy in pediatric patients, clinical studies with clinical endpoints are necessary (Vassilev et al., 2010). The FDA issued a public health advisory in 2008 stating that OTC cough

and cold products should not be used in children under 2 years of age. The FDA continues to review safety and efficacy data on OTC cough and cold medications for children under 11 years of age (Bell & Tunkel, 2010).

Many OTC cough and cold medications are still available but are now labeled for use in children 6 years and older. However, manufacturer labels can lead to parental misinterpretations related to the age of the child for which the medication is intended, as well as the appropriate dosing (Lokker et al., 2009). Lokker et al. (2009) found that when infant graphics were present on the product label, 86% of parents thought these products were appropriate to give to a child younger than 2 years. Additionally, more than 50% of the time, the parents in this study stated that they would give these medications to a child as young as 13 months of age. More than four out of five caregivers stated that they were already using or would use OTC cough and cold medications for their children younger than 2 years, regardless of the FDA warning to consult a physician before use in this age group (Lokker et al., 2009).

Purpose

The purpose of this clinical inquiry was to evaluate the relationship between parental knowledge and behaviors related to the use of OTC cough and cold medications in young children, assessing the differences between parents whose youngest child is aged 2 years or less and parents whose youngest child is greater than 2 years of age. A secondary goal was to evaluate the effectiveness of the Texas Woman's University College of Nursing Cold Treatment Survey (TWU CON) created for this study. The knowledge gained from this study allowed for the identification of parental knowledge deficits related to the use of OTC cough and cold medications, as well as potentially harmful behaviors related to the treatment of cough and cold

symptoms in children. The identification of these problems allowed for targeted educational interventions for parents, thus decreasing potential harm to young children.

The site of this study was a children's clinic in Ellis County, Texas, whose mission is to provide primary care to the medically underserved children in rural north central Texas. The purpose of this study was consistent with the clinic's mission, as this children's clinic actively cares for medically underserved children in need of a medical home.

Problem Statement

Parents are faced with over 30 choices of OTC cough and cold medications, and the labels often contain misleading graphics and language, which leads to misuse and overdose in young children (Pew Prescription Project, 2007). The paucity of research in children, combined with pediatric dosing based on the adult dosing standards, has contributed to the occurrence of more than 1,500 emergency room visits between 2004 and 2005. Additionally, there have been 750,000 phone calls to poison control centers during the last several years due to the effects of inappropriate use of cough and cold medications in children (Sharfstein et al., 2007). Adverse reactions and overdosing of OTC medications have resulted in the deaths of 123 previously healthy children under the age of 6 years (Rimsza & Newberry, 2008). This clinical inquiry project identified and addressed parental knowledge deficits and potentially harmful behaviors related to the treatment of cough and cold symptoms in children.

Research Questions

This research project addressed the following research questions:

1. Does the Texas Woman's College of Nursing Cold Treatment Survey perform as an effective measure of parental knowledge and behaviors related to the use of over-the-counter cough and cold medications and other treatments for cold symptoms in a

population of parents who bring their children to a clinic for underserved children in rural Texas?

2. Is there a significant difference between parents of children aged 24 months and younger versus parents of children between the ages of 25 months and 12 years, in terms of their knowledge and behaviors, related to the use and dosage of over-the-counter cough and cold medications and other treatments for cold symptoms as measured by the TWU CON Cold Treatment Survey?
3. Is there an association between parental knowledge of OTC cough and cold medication in children and parental behavior within each of the groups under study (parents of children ages 24 months and younger versus parents of children between the ages of 25 months and 12 years)?
4. Does the TWU CON Cold Treatment Survey perform as a vehicle to provide an evoke event for targeted educational interventions in this clinic population?

Hypotheses

1. There is a significant difference between parents of children aged 24 months and younger versus parents of children between the ages of 25 months and 12 years, in terms of their knowledge and behaviors, related to the use and dosage of over-the-counter cough and cold medications and other treatments for cold symptoms as measured by the TWU CON Cold Treatment Survey.
2. The association between knowledge and behavior will differ significantly between the groups under study (parents of children aged 24 months and under and parents of children between the ages of 25 months and 12 years).

3. The TWU CON Cold Treatment Survey performs as a vehicle to provide an evoke event for targeted educational interventions in this clinic population.

Null Hypotheses

1. There is no significant difference between parents of children aged 24 months and younger versus parents of children between the ages of 25 months and 12 years, in terms of their knowledge and behaviors, related to the use and dosage of over-the-counter cough and cold medications and other treatments for cold symptoms as measured by the TWU CON Cold Treatment Survey.
2. There is no significant difference in the association of parental knowledge and parental behaviors related to treatment of children with OTC cough and cold medication between the groups under study (parents of children aged 24 months and under and parents of children between the ages of 25 months and 12 years).
3. The TWU CON Cold Treatment Survey does not perform as a vehicle to provide an evoke event for targeted educational interventions in this clinic population.

PICO Question

Is there a significant difference in parental knowledge and behavior related to the use and dosage of OTC cough and cold medications and other remedies to treat cold symptoms in parents of children younger than 24 months of age when compared with parents of children between 25 months of age and 12 years, as measured by the TWU CON Cold Treatment Survey?

Theoretical Framework

The theory of dependent-care (TDC) was the framework used in this study as it describes the capabilities of one person to understand and meet the needs of another, as in a parent caring for a child (Taylor, Renpenning, Geden, Neuman, & Hart, 2001). The TDC was first introduced

as a corollary theory to Orem's theory of self-care: the terms dependent care, dependent care agent, and dependent care agency were first introduced in the 1970s. In 1985, Orem fully defined these concepts as part of her conceptualizations related to family. Orem and other authors later proposed a broad conceptual structure for the TDC. Other models or theories considered foundational to the development of the TDC include "personalism, deliberate action/action system, interpersonal interaction, adult learning, helping, technology, and parenting" (Taylor et al., 2001, p. 39).

Humans are separate and unique individuals but humankind lives, survives, and thrives through a series of interdependent relationships with one another (Taylor, 1989). This concept is fundamental to the social philosophy of personalism, which lends insight to the concept of dependent care (Taylor et al., 2001). Dependent care is comprised of complex sets of organized, coordinated actions performed to achieve specific goals defining dependent care as an action system, as well as a helping situation. Orem described human interaction systems as the" overall conditioning effect of one person on another," shaped through the continuous interactions, differences between the persons, and the organization or lack of organization of the roles between the people involved (Taylor et al., 2001, p. 40). Dependent care is a learned activity gained through formal and informal teaching and is acquired within the context of the family (Taylor, 1989). Varying levels of technology can be involved in dependent care based on the needs of the person. Parenting is a dynamic process "learned from role modeling by family, friends, and peers," as well as formal classes or reading (Taylor et al., 2001, p. 41). Parents must provide changing levels of care based on the developmental needs of their child and fluctuating periods of wellness and illness as the child grows (Taylor et al., 2001).

Orem's framework specifies two types of self-care requisites: essential enduring requisites and situation-specific requisites (Deynes, Orem, & Bekel, 2001). Essential enduring requisites are divided in to two subtypes of self-care requisites: universal self-care requisites, which are tasks basic to all stages of life, and developmental self-care requisites related to the stages of human development. Situation-specific requisites are subdivided into health-deviation self-care requisites that stem from and medical diagnosis and treatments, and developmental self-care requisites that relate to genetic, structural, and functional defects (Deynes et al., 2001). Orem's theory has been identified as one of the most used nursing models in pediatric nursing research related to her outline of developmental self-care requisites and the fact that the dependent-care system can be appropriately applied to the parent-child relationship (Harris & Frey, 2000). Orem explains that children require complete assistance with self-care activities and that the developmental level of the child is a conditioning factor influencing the kind and amount of help required from the dependent care agency, or parent (Gaffney & Moore, 1996).

The relationship between the dependent care agency performance and the basic conditioning factors between mothers and their children was examined by Gaffney & Moore (1996); as expected, the increasing age of the child was associated with decreasing maternal dependent care agency performance. As the child matured and took on greater self-care skills, the dependent care agency performance by the parent changed to match that required by the child. Accordingly, the dependent-care demand determined the amount of dependent care provided (Gaffney & Moore, 1996).

The dependent care demand exists within the dependent person and must be known or recognized by the dependent care agency, creating the dependent-care system (Taylor et al., 2001). The goals of dependent care are for the dependent care agency to "promote development,

provide materials to sustain life, develop and maintain positive relationships, and support the individual through the period of dependency" (Taylor et al., 2001). As it relates to children, the demand expressed is the basis of action for the dependent care agency to respond to the particular needs of the dependent (Taylor et al., 2001). The dependent care agency operates from knowledge acquired over a lifetime of experiences and information gathered from family, friends, and health care providers. During periods of illness, or health-deviation self-care requisites, the dependent care demand may exceed the knowledge or abilities of the dependent care agency, thus creating a dependent care deficit and indicating a need for nursing to become involved.

Parents must adapt to the changing needs of the child as the child progresses along the developmental trajectory. The focus of this clinical inquiry project, as related to the TDC, was on health-deviation self-care requisites and the parent's ability to address their child's DCD deficits during periods of illness. The dependent care demand often increases during periods of illness, to the point that a dependent care deficit is created, requiring parents to seek the assistance and advice of their healthcare provider. In this situation, the Doctor of Nursing Practice provider must assess the needs of the child, as well as the knowledge deficit of the parent, in order to assist the parent in meeting the increased needs of the child, thus eliminating the dependent care deficit. This study focuses on the parents' knowledge and behaviors in treating cold symptoms in their children, particularly their knowledge and use of cold medications.

Definitions of Terms

For the purpose of this study, it is important to define the concepts under investigation. Definitions of parent, child, knowledge, and behavior have been constructed to provide clarity and consistency.

Parent

The conceptual definition of parent is identified as the term for any caregiver in a relationship with the purpose of raising and providing care for a child (*Encyclopedia Britannica*, 2010). According to the theory of dependent care, a parent is a dependent-care agent: an individual person in a relationship who is providing the care, directly or as the manager or coordinator of the care provided (Taylor et al., 2001). The operational definition of parent in this study is any person, male or female, providing primary custodial care of a child. This includes biological parents, stepparents, foster-parents, and grandparents or great-grandparents that identify themselves as a child's primary caregiver. The parent must live in the same household as the child and promote the health and well-being of the child. This information was collected via the TWU CON Cold Treatment Survey Demographic form.

Child

The conceptual definition of a child is defined by the *Merriam-Webster Dictionary* (2010) as "an unborn or recently born person; a young person especially between infancy and youth; a person not yet of age" ("Child", para. 1) According to the theory of dependent care, a child is a dependent: persons who are unable to estimate or engage in activities necessary to regulate their own functioning or development (Harris & Frey, 2000). The operational definition of child in this study is any person aged 0 to 12 years who lives in the same household with an

adult primary care provider who provides custodial care. This information was collected via the TWU CON Cold Treatment Survey Demographic form.

Parental Knowledge

The conceptual definition of knowledge is identified by the *Merriam-Webster Dictionary* (2010) as "The fact or condition of knowing something with familiarity gained through experience or association; acquaintance with or understanding of a science, art, or technique; the fact or condition of being aware of something; the range of one's information or understanding "answered to the best of my knowledge"; the circumstance or condition of apprehending truth or fact through reasoning; cognition; the fact or condition of having information or of being learned. In the theory of dependent care, a caregiver's knowledge is described as the information gathered by the parent from all sources (family members, reading, online searches, and healthcare providers), understood, and applied to the care of a child (Taylor et al., 2001). For the purposes of this study, parental knowledge refers to parents' understanding of the use of OTC cough and cold medications and other therapies to treat cough and cold symptoms in children. The operational definition of parental knowledge will be the individual's responses to the items on the TWU CON Cold Treatment Survey that measure parental knowledge. Parental knowledge is an independent variable that influences a parent's behavior.

Parental Behavior

The conceptual definition of behavior as defined by the *Merriam-Webster Dictionary* (2010) is the "manner of conducting oneself; anything that an organism does involving action and response to stimulation; the response of an individual, group, or species to its environment; the way in which someone behaves" ("Behavior", para. 1). The theoretical definition of parental behavior described by the Theory of Dependent Care is the dependent-care agency: the complex

acquired ability of a mature person to know and meet the self-care requisites of a person with health-derived or health-associated limitations of self-care agency, placing them in a dependent relationship for care (Taylor et al., 2001). For the purposes of this study, parental behavior will refer to parents' actions used to ease cough and cold symptoms in children. The operational definition of parental behavior will be the individual's responses to the items on the TWU CON Cold Treatment Survey that measure parental behaviors. Parental behavior is a dependent variable that is influenced by the parent's knowledge.

Review of Literature

The following review of literature is an overview of OTC cough and cold medication use in young children. Parental knowledge and use of OTC cough and cold medications in young children was examined. The topics included in this review of literature were safety, efficacy, parental knowledge, parental behaviors, and the Food and Drug Administration (FDA) recommendations as they relate to OTC cough and cold medication use in children.

Search Strategies

A comprehensive literature search was conducted using EBSCOhost to access the following electronic databases: PubMed, Medline, CINAHL, Science Direct, Academic Search Complete, Alt HealthWatch, Child Development and Adolescent Studies, Education Research Complete, Education Resource Information Complete, Family & Society Studies World Wide, Health and Psychosocial Instruments, Health Source: Consumer Edition, Health Source: Nursing/Academic Edition, PsychARTICLES, PsychInfo, Psychology and Behavioral Sciences Collection. The following key words were used in varying combinations: over-the-counter cough and cold medications, pediatric, infant, children, parental use, parental knowledge, Food and Drug Administration, adverse reactions, and death. The reference lists of accessed articles

were also reviewed for additional empirical articles. The final articles selected for this clinical inquiry were chosen based on the date of publication, and relevance to the topic being studied.

Over-the-Counter Cough and Cold Medication

The "cold season" occurs from fall to spring with cold symptoms accounting for large amounts of pediatric office visits and phone calls every year (Pappas, Hayden, & Henley, 2008). Cold and cough medications are often seen as the solution for parents who may lose sleep and time from work related to their child's cold. Surveys have demonstrated that more than 50% of preschoolers with cold symptoms were treated with one or more OTC cough and cold medications per month (Orr, Matson, & Cowles, 2006; Pappas et al., 2008). Of the medications given to preschool children, OTC cough and cold medications account for two thirds of the medications used (Orr et al., 2006). Vernacchio, Kelly, Kaufman, and Mitchell (2009) found that 27 million U.S. children younger than 12 years of age used more than one medication per week, and 1 in 8 children used more than three medications per week. OTC medications were given twice as often when compared with prescription medications in a given week. Yaghami et al. (2010) stated that 1 in 10 children in the US are exposed to OTC cough and cold medications in any given week. Despite the evidence that these medications are not effective and even dangerous to young children, many parents remain convinced that these medications help their children (Pappas et al., 2008).

Marketing

Seeking relief from the discomforts of cough and cold symptoms has lead to the development of over 800 OTC cough and cold preparations now available in the U.S. (Pappas et al., 2008). OTC cough and cold medications line the shelves in pharmacies and grocery stores and are available in many forms, including drops, elixirs, chewable tablets and dissolvable strips

(Woo, 2008). The graphics and instructions are often misleading and hard to understand. The depiction of infants or young children on the box while the instructions indicate use in children over six years of age are misleading to parents. The drops, chew tabs and strips are marketed as making medication administration easier for parents. The concern is that they are dosed for children over 6 years, who usually take medications easily, whereas it is younger children who would seem to benefit from easier dosing of medications, and are not in the age group for which these medications are recommended (Woo, 2008).

Safety

In addition to limited and weak evidence of effectiveness of cold medications in children, studies have identified problems such as overdose and adverse reactions associated with cold medication use in children (Smith and Feldman, 1993). Woo (2008) stated that concerns related to the safety of OTC cough and cold medications can be found in the scientific literature spanning the last 15 years. Case reports documenting infants who presented to emergency departments with OTC cold medication toxicity can be found as early as 1992. In 1990, poison control centers reported 73,680 unintentional exposures in children less than 6 years old (Smith and Feldman, 1993). Between 2000 and 2007, another 750,000 reports of adverse reactions and overdoses related to cough and cold medications in children were reported to U.S. poison control centers (Sharfstein et al., 2007). During 2004 to 2005, 1,519 pediatric patients under the age of two years were treated in emergency departments for overdose and/or adverse reactions to OTC cold medications (Woo, 2008).

Eighty –five to 90% of these calls to poison control were related to unintentional ingestions (Vassilev, Chu, Ruck, Adams, and Marcus, 2009). Cold medications are the second most common medication unintentionally ingested by children related to the colorful packaging

and taste (Smith and Feldman, 1993). U.S. poison control centers report OTC cough and cold medications in the top ten exposures in children younger than six years old (Pappas et al., 2008). Serious morbidity is rare; however, the adverse reactions range from sleepiness and irritability to visual hallucinations or psychosis, requiring children to endure gastric lavage and hospitalization (Smith and Feldman, 1993). Vassilev et al. (2009) found that children aged 2 to 11 years experienced a greater proportion of moderate to severe adverse reactions to cold medications when compared with children younger than 2 years.

Medications commonly used in OTC cough and cold medications consist of antihistamines, decongestants, cough suppressants, and expectorants with potential adverse reactions to one or several of these ingredients (Woo, 2008). Adverse reactions commonly seen with antihistamine use are sedation, paradoxical excitability, dizziness, respiratory depression, hallucination, tachycardia, heart block arrhythmias and anticholinergic effects (Pappas et al., 2008). Further, antihistamine-sympathomimetic combinations have been proven dangerous when used in young infants as they can cause respiratory depression (Woo, 2008).

Decongestants are sympathomimetic drugs affecting both the alpha receptors in the vascular smooth muscle and beta-adrenergic receptors in the cardiac musculature resulting in vasoconstriction, increased heart rate and increased force of contraction. Mild central nervous system stimulant effects have been noted in patients sensitive to sympathomimetics (Woo, 2008). These actions in the body lead to adverse reactions such as irritability, tachycardia, sleeplessness, hypertension, headaches, nausea, vomiting, arrhythmias, seizures, and dystonic reactions (Pappas et al., 2008).

Common side effects of cough suppressants include gastrointestinal upset, drowsiness, dizziness, and nausea (Woo, 2008). Adverse reactions related to codeine and hydrocodone

include nausea, vomiting, constipation, dizziness and palpitations (Pappas et al., 2008). Apnea and death may result from respiratory depression caused by narcotic cough suppressants and is directly related to the dose administered. Codeine is conjugated by the liver, increasing the danger when these cough suppressants are used in infants as these pathways are not fully developed, increasing the danger of apnea and death (Pappas et al., 2008). Suppressing a cough may result in a thickening of the mucous, resulting in mucous plugging and significantly exacerbating the child's respiratory condition (Pappas et al., 2008).

OTC cold medications have been confirmed as the cause of death in 15 infant and toddler deaths between 1999 and 2005, with pseudoephedrine identified as a contributor to or the cause of death in eight of the 15 cases (Woo, 2008). Toxic levels of OTC cold medications have been consistently found and reported in many infant deaths. Dart et al. (2009) conducted a study examining U.S. pediatric fatalities related to nonprescription cough and cold medications. This study identified 189 pediatric deaths in children younger than 12 years, with 103 of these deaths related to OTC cough and cold medications. The medications most often involved in the pediatric deaths were pseudoephedrine in 45 of the cases, diphenhydramine in 38 cases, and dextromethorphan in 36 cases (Dart et al., 2009). Chlorpheniramine, brompheniramine, doxylamine and phenylephrine were also mentioned, but significantly less often while guaifenesin was never mentioned related to pediatric deaths. Supratherapeutic doses were found in 88 of the 103 cases of pediatric death (Dart et al., 2009). Possible causes may be a lack of dosing guidelines for this age group, confusing labels, multiple active ingredients, and multiple caregivers administering medications, leading to accidental overdose (Woo, 2008). Further, researchers identified children less than 2 years old as possibly being more sensitive to the potentially fatal side effects related to some of these ingredients in these products (Pappas et al.,

2008). Since the removal of OTC cough and cold medications for children younger than 2 years of age in 2007, emergency department visits related to adverse reactions and overdose have been reduced by half for this age group (Kuehn, 2010).

Other factors that have been found to contribute to the overdosing of OTC cough and cold medications in children are the inconsistent and confusing industry labels, as well as the inaccurate dosing devices, that are being packaged with the medications (Yin, Wolf, Dreyer, Sanders, & Parker, 2010). Yin, Wolf, et al. (2010) conducted a study to determine the prevalence of inconsistent dosing instructions and measuring devices in the most commonly used U.S. OTC pediatric medications. The sample consisted of 200 products representing 99% of the U.S. market share for OTC medications; the categories included analgesic, cold/cough, allergy, and gastrointestinal oral liquid medications. The study found deficits in three areas: failure to include a standardized measuring device, inconsistency between the labeling instructions and the markings on the provided measuring device, and the use of nonstandard measurement units, abbreviations, and numeric formats (Yin, Wolf, et al., 2010). Only 74% of liquid pediatric OTC medications included a standardized measuring device, with dosing cups accounting for 83% of these devices (Yin, Wolf et al., 2010). Dosing devices provided with the medications were found to have markings inconsistent with the dosing instructions on the label in 89% of OTC pediatric products (Yin, Wolf et al., 2010). The devices either lacked the necessary markings or contained superfluous markings, usually for doses larger than the recommended dose, contributing to overdosing errors. Further complicating matters is the fact that 1 in 4 U.S. parents have limited health literacy and a greater number have poor numeracy. In order to decrease dosing errors, measuring devices should only bear markings relevant to the dosing instructions (Yin, Wolf et al., 2010).

Measurement units, abbreviations, and numeric formats should be standardized across all OTC products. Yin, Wolf, et al. (2010) found that 5.5% of products used nonstandard units of measurement such as drams, cubic centimeters, and fluid ounces in the dosing instructions; however, milliliter (71.5%) and teaspoon (77.5%) were used most frequently. Only 35% of products studied used a single unit of measure for all recommended doses listed on the label; 55% used two units of measure and 9.5% used three or more. Further, the majority of products used nonstandard abbreviations for milliliter, teaspoon, and tablespoon. The commonly used terms "teaspoon" and "tablespoon" were often misinterpreted, contributing to three-fold errors in dosing and were considered an endorsement to use a kitchen spoon. The nonstandard use of decimals without leading zeros (.5 versus 0.5) contributed to 10-fold overdoses. The American Academy of Pediatrics (AAP) recommends that all pediatric medications be dosed in milliliters rather that teaspoons or tablespoons. However, this will require educating the public on proper dosing and use of standardized measuring devices (Yin, Wolf et al., 2010).

Efficacy

In a review of clinical trials from 1950 to 1991, Smith and Feldman (1993) found a lack of controlled studies addressing the treatment of cold symptoms in children. Of the four studies identified, two involved preschool children and no clinical benefit was found. Two studies involved children ages 5 to 12 years, which showed a reduction in symptoms; however, no control groups were used. Randomized controlled trials of cold medications in this population are needed with a particular focus on specific dosing and adverse reactions for each age group (Smith and Feldman, 1993). Based on the lack of evidence that cough and cold medications are effective in children it is recommended that they not be used in children under the age of 12 years (Woo, 2008).

Ingredients commonly found in children's over-the-counter cold medications include decongestants, cough suppressants, expectorants and antihistamines (Woo, 2008). Antihistamines commonly found in children's OTC cold medications include chlorpheniramine, brompheniramine, and diphenhydramine. Antihistamines are H_1 receptor antagonists and function by blocking the action of histamine in the respiratory tract, thereby decreasing congestion related to allergies. Antihistamines have been proven effective for the treatment of allergic rhinitis (Orr et al., 2006). The use of systemic antihistamines for allergic rhinitis has been proven effective for symptom relief, improvement in quality of life, and the reduction of asthma severity.

In contrast, studies have shown that antihistamines have no effect on congestion produced in response to viral infections and therefore have no role in treating the common cold (Orr et al., 2006; Ryan, Brewer, & Small, 2008). The few well-designed studies of antihistamine use in children have shown no improvement in cold symptoms in the treated group. In fact, half of the children in the treated group were asleep 2 hours after treatment and more than half of the children were better 2 days later, regardless of treatment (Pappas et al., 2008). The incidence of otitis media was also unaffected by the use of antihistamine-decongestant combinations (Pappas et al., 2008). The AAP does not recommend the use of antihistamines or decongestions for the treatment of chronic otitis media with effusion, as they have been proven ineffective in decreasing the duration of illness, preventing recurrent infection, or preventing the need for surgery (Orr et al., 2006). Further, antihistamine-decongestant combinations have been proven ineffective in small children (Ryan et al., 2008).

The decongestants used in today's products are pseudoephedrine or phenylephrine, both of which are adrenergic receptor agonists or sympathomimetic drugs (Woo, 2008). These

medications produce vasoconstriction within the mucosa of the respiratory tract thereby reducing swelling in the mucous membranes and temporarily reducing congestion. Studies involving decongestants have demonstrated temporary relief of cold symptoms in adults; however, studies in children show no benefits in this age group (Pappas et al., 2008).

The cough suppressant used in OTC cough medications is dextromethorphan, derived from the D isomer of the codeine analogue, a narcotic analgesic known as levorphanol, which acts centrally on the medulla to suppress cough (Woo, 2008). Studies have shown no difference among dextromethorphan, codeine and placebo when used in children between the ages of 18 months and 12 years. Additionally, all children recovered from their cough symptoms within 3 days, regardless of the treatment group (Pappas et al., 2008; Ryan et al., 2008; Vassilev, Kabadi, & Villa, 2010). The antihistamine diphenhydramine is often marketed as a cough suppressant for children. The mechanism of action is unknown, but it is believed that the CNS depressive effects may depress the respiratory reflexes, thereby depressing cough (Woo, 2008). Three studies reported no difference among placebo, diphenhydramine, or dextromethorphan in decreasing cough frequency and severity or improving sleep quality (Pappas et al., 2008; Ryan et al., 2008;Vassilev et al., 2010).

Theoretically, narcotic cough suppressants containing codeine or hydrocodone act centrally in the brainstem to quiet cough symptoms but have proven ineffective, even in adults (Pappas et al., 2008). The most commonly used expectorant in the United States is guaifenesin. Guaifenesin decreases the surface tension and viscosity of mucous making is easier to expectorate excretions. Studies designed to investigate the efficacy of guaifenesin have failed to demonstrate any improvement in pulmonary function or a decrease in mucous viscosity (Woo, 2008). Pappas et al. (2008) stated that guaifenesin showed no effect on decreasing mucous

volume, quality of the mucous, or cough frequency. Many OTC cough preparations contain both dextromethorphan and guaifenesin however, if both medications worked as advertised patients would be left with thinned secretions that they would be unable to remove from their airway (Pappas et al., 2008).

FDA Recommendations

FDA approved dosing guidelines for the use of OTC cold medications for infants and children do not exist, as safety and efficacy studies in this age group have never been conducted (Woo, 2008). Therefore, the amounts of OTC cough and cold medications that can cause illness and death in children have not been established.

The FDA Modernization Act of 1997 combined with the Best Pharmaceuticals for Children Act of 2003 have resulted in 138 medications with pediatric pharmacokinetic, safety and efficacy data that have been updated and relabeled (Woo, 2008). Pharmaceutical companies are rewarded for conducting pediatric safety and efficacy studies by being given a 6-month extension on their patents.

In 2008, the FDA released their official recommendations for the use of cough and cold medications in children, stating that these medications have not been proven safe or effective and should not be used in children under the age of two years (Pappas et al., 2008). Further, federal health officials recommended a label change replacing the "consult a physician" advice to "do not use in children under two years unless directed by a physician." The FDA is now reviewing data related to cough and cold medication use in children aged 2 to 11 years.

In 2009, the FDA released recommendations that all OTC medications include: (1) a measuring device; (2) the device and directions should use the same units of measurement and abbreviations; (3) the measuring device should only bear relevant markings; (4) all abbreviations

should be standard and include definitions; (5) decimals and fractions should be used with care; (6) studies should be conducted to confirm accurate use by the public (Yin, Wolf et al., 2010).

Parental Knowledge

It is critical to educate parents in the natural progression and duration of cold symptoms in their children, as many parents mistakenly believe that OTC cough and cold medications will shorten or cure their child's illness (Woo, 2008). Parents reported using cough and cold medications for symptoms such as stomach flu, diarrhea, ear infections, runny nose, sore throat, cough, and skin infections. Only 30% of parents were able to state the appropriate dose for their child as well as appropriately measure the dose (Orr et al., 2006).

Lokker et al. (2009) conducted a study investigating misinterpretations of OTC pediatric cough and cold medications. The study found that parent literacy, numeracy, packaging graphics and language all contributed to caregivers giving OTC cough and cold medications inappropriately. In a sample of 182 caregivers, 99% had adequate literacy skills, 17% had greater than 9th grade numeracy skills, and 36% had less than 6th grade numeracy skills.

Based on the front of the product packaging alone, 86% of caregivers felt at least one of the four products viewed was safe for children less than 24 months old (Lokker et al., 2009). Graphics such as pictures of infants, droppers, or teddy bears, the word "infant," and the words "pediatrician recommended" were the three most common influences in the caregiver's perception of the age indication (Lokker et al., 2009). Lokker et al. (2009) found that caregivers with numeracy skills less than the 9th grade endorsed inappropriate use of OTC medications in their young children. Interestingly, caregivers with numeracy skills greater than 9th grade were also more likely to endorse inappropriate use of OTC medications in young children. This study further revealed that some parents had difficulty interpreting the age guidelines and interpreted

the statement “for children under 2 years consult a physician” as an endorsement to use these medications in children under 2 years (Lokker et al., 2009). Hanoch, Gummerum, Miron-Shatz, & Himmelstein (2010) conducted a study in highly educated parents and found that even this population had trouble understanding and following the package instructions, potentially explaining why parents of children younger than 2 years did not consult a physician before using OTC cough and cold medications in this age group. Further, in this same population of parents one third of them were unable to correctly identify the active ingredients in the cold medication they reported giving their child (Hanoch et al., 2010).

The Institute of Medicine and Healthy People 2010 define health literacy as the degree to which a person has the capacity to “obtain, process, and understand basic health information and services” in order to make competent health decisions (U.S. Department of Education, 2006, p. iii). In 2003, the U.S. Department of Education conducted a National Assessment of Adult Literacy which included items designed to measure health literacy (US Department of Education, 2006). This assessment included 19,000 adults ages 16 years and older. Participants were reported to reside in either households or prisons.

The majority of U.S. adults (53%) demonstrated intermediate health literacy levels, while 34% were categorized at basic or below basic health literacy (U.S. Department of Education, 2006). Hispanic adults had lower health literacy levels than any other ethnic or racial group. Adults who only spoke English before entering school had higher health literacy than those speaking another language or another language and English. Each higher level of educational attainment resulted in a higher level of health literacy. Forty-nine percent of adults who had not completed high school had below basic health literacy skills, while only 15% of high school graduates and 3% of participants with a bachelor’s degree had below basic skills. Adults

obtaining health insurance through an employer, a family member's employer, the military, or who purchased private insurance had a higher health literacy score than those receiving Medicare or Medicaid. Twenty-seven percent of Medicare recipients and 30% of Medicaid recipients had below basic health literacy (US Department of Education, 2006).

Yin et al. (2009) studied a sample of 6100 parents from a total sample 18,000 adults in order to explore the role of health literacy related to child health disparities. The researchers determined that 11.2% of parents had below basic health literacy skills, 17.5% had basic skills, 56.3% had intermediate skills, and 15.1% had proficient health literacy skills. The study compared adult health literacy skills between parent and non-parent groups and found parents to be younger and more highly educated when compared with non-parents. Conversely, parents were also more likely to be Hispanic, be born outside the United States, have limited English proficiency, and live below the level of poverty. Limited English and level of education were the strongest predictors for having basic or below basic health literacy level. Having less than a high school education resulted in a greater than 8 times chance of having low health literacy, while low English proficiency resulted in a greater than 18 times chance of being categorized as having basic or below-basic health literacy.

Yin et al. (2009) evaluated parent's performance on health literacy assessment tasks such as health insurance forms, nutrition/obesity, medication, and immunization related tasks. In relation to medication labels, 59.2% of parents reported problems with understanding directions, those with below basic (73.6%) and basic (42.7%) health literacy reported difficulty understanding label directions most often. Education, race/ethnicity, and income play a role in a parent's ability to comprehend medication labels; however, health literacy was the most statistically significant variable of this ability.

One in four U.S. parents have limited health literacy skills, while only 1 in 7 are considered to have proficient health literacy skills (Yin et al., 2009). More importantly, low health literacy skills were identified as an independent predictor of having one uninsured child in the household as well as difficulty understanding medication labels. Further complicating matters, written drug information given to parents, such as consumer medication-information handouts and FDA medication guidelines, were written at a 10th grade or higher reading level, which is too high for the majority of adults in the United States (Yin et al., 2009).

Parental failure to use a measuring device has been identified as a contributor to significant dosing errors in children; the parent's ability to accurately use the device raises concerns even further (Yin, Wolf, et al., 2010). Yin, Mendelsohn et al. (2010) conducted a study to assess parents' abilities to measure liquid medication accurately as well as how the parents level of health literacy impacted the frequency and magnitude of dosing errors. The researchers found that 50% of parents made errors when measuring liquid medications. Parents with children less than 2 years old were more likely (65.4%) to inappropriately dose their child with doses as high as 30 ml per dose (1.25 ml is recommended), while 41.7% of parents with children 2 to 5 years old inappropriately dosed their child with doses up to 23 ml (2.5 ml is recommended) (Yaghami et al., 2010). The confusion faced by parents related to the multitude of available measuring devices for liquid medications, which vary widely in their increments and units of measure (milliliter, teaspoon, and tablespoon), could be intensifying these errors. The inconsistencies in measuring devices, combined with limited health literacy, contribute to parental dosing errors and can have deadly ramifications (Yin, Mendelsohn et al., 2010).

Yin, Mendelsohn, et al. (2010) assessed parents' health literacy and then tested their ability to dose liquid medications using a medicine cup, oral syringe, oral syringe with bottle

adapter, dropper, and dosing spoon. The results demonstrated that parents with the lowest health literacy were at the highest risk of making dosing errors when measuring liquid medications. Health literacy was statistically significant for dosing errors with the use of the dosing cup as well as the dosing spoon, as over 99% of errors involved overdose. Errors involving the use of dosing cups stemmed from confusion between teaspoon and tablespoon, assuming the cup was a unit of measure, and assuming the full cup was the dose. Consistent dosing directions and units of measurement across manufacturers' products have the potential to decrease medication errors thereby increasing safety when using OTC medications.

In addition to the inability to dose liquid medications accurately, Yaghami et al., (2010) found that parents had unreasonable expectations regarding the amount of time between dosing the medication and the onset of symptom relief. Most parents expected the medication to have an effect on symptoms in about an hour; however, some parents stated they expected to see symptom improvement within minutes from giving the medication. This raised concerns that some parents may repeat the dose sooner than recommended or give another medication with similar active ingredients, resulting in overdoses (Yaghami et al., 2010).

Parental Behavior

Miron-Shatz, Barron, Hanoch, Gummerum, & Doniger (2010) conducted a study to investigate parental experience on adherence to the FDA warning related to the use of OTC cough and cold medications in infants and children less than 2 years of age. Based on decision-making literature, when information on rare side effects is released, people have difficulty incorporating this information into their decisions. As people gain information from both external sources and personal experience, information and warnings can result in very different decisions based on an individual's experience. People who have little experience with risk-

causing agents rely more heavily on warnings, while people having safe experiences with risk-causing agents will continue their exposure despite new information and warnings (Miron-Shatz et al. 2010).

Miron-Shatz et al., (2010) conducted an online survey of 218 parents having at least one child age 2 years or younger, and who were aware of FDA warning related to the use OTC cough and cold medications in young children. The majority of participants were female (82.9%) with a college degree (63.1%). The study compared experienced parents who had older children in addition to a child under 2 years with inexperienced parents who only reported having a child 2 years or younger. The majority of inexperienced parents (53.3%) complied with the FDA warning while only 28.4% of the experienced parents followed the warning. Parental experience was the most significant predictor for adherence to the FDA warning; mistrust of the FDA, or lack of information was not significant between groups (Miron-Shatz et al., 2010). However, a study by Hanoch et al. (2010) showed that 49.6% of parents who had children under 2 years of age reported not trusting, or were not sure whether to trust the FDA recommendations. Parents who doubted the FDA recommendations were more likely to continue to give their children OTC cough and cold medications, those who were unsure were as likely to continue to use OTC medications, as they were to stop using them. Even parents who trusted the FDA recommendations indicated uncertainty with whether or not to adhere to these recommendations (Hanoch et al., 2010). Yagami et al. (2010) conducted a study demonstrating the same trend, finding that 35% of experienced parents compared with 23.9% of inexperienced parents would continue to give OTC cold medications to their young children despite the FDA warning.

In a survey given to 1,265 parents, 44% confirmed that they usually gave their child OTC cough and cold medications for cold symptoms (Garbutt, Sterkel, Banister, Walbert, & Strunk,

2010). Consistent with findings of other studies, parents of older children age 2 to 11 years were more likely (53%) to use OTC cough and cold mediations when compared to parents of children younger than 2 years (18%) (Garbutt et al., 2010). However, Hanoch et al. (2010) found that parents of children younger than 2 years were also less likely to seek medical advice before using these products despite the product label instructions to do so. Parental attitudes demonstrated that 70% believed OTC cough and cold medications would make their child more comfortable, while only 32% agreed that these medications may cause serious life threatening side effects in children younger than 2 years old (Garbutt et al., 2010).

Of the parents surveyed, 73% were aware of the FDA warning not to use OTC cough and cold medications in young infants and children (Garbutt et al., 2010). Despite this information, 61% of parents with children 2 to 11 years stated that they would continue to use these products, while only 15% of parents with children less than 2 years would continue to use these medications for their child's symptoms (Garbutt et al., 2010). Hanoch et al. (2010) found that only 28.5% of parents considered OTC cough and cold medications to be "very safe" while the majority of parents felt they were only somewhat safe or unsure. However, the majority of parents, even those who reported side effects in their children, indicated that they would continue to use these medications.

The fact that experienced parents were less likely to adhere to the FDA warning than inexperienced parents further corroborates this trend of continued use of OTC cough and cold medicines as identified by Miron-Shatz et al., (2010). However, experienced parents who stated that they received a lot of information were more likely to be compliant, relying more on drug packaging than public announcements. This study suggests that drug packaging and vivid case studies illustrating the detrimental effects of OTC medications may be a more effective way to

disseminate information to parents than relying on public announcements (Miron-Shatz et al., 2010). However, Hanoch et al. (2010) voices concerns that package instructions are not being fully read and understood as 80% of parents were found to store these products inappropriately as instructed on the packaging.

Garbutt et al. (2010) found that 21 % of parents were more likely to ask for an antibiotic for cold symptoms, while 40% would ask for an alternative symptomatic treatment. Of these, black parents were more likely to ask for an antibiotic, while parents whose child had Medicaid insurance were more likely to request an alternative treatment. Parents with a college education were less likely to request either an antibiotic or an alternative treatment for their child's cold symptoms.

Orr et al. (2006) reported that a significant percentage of parents who use OTC cough and cold medications as preemptive treatment or social medication. Preemptive treatment is the use of medication for what the parent perceives as beneficial side effects, such as the sedative effects of antihistamines, or for anecdotal reasons such as the calming effect of acetaminophen. The benefits of social medication may also extend to the parent, such as helping the child to sleep so the parent can also get a good night's sleep.

Non-Pharmacologic Interventions

Homeopathic medicines use highly diluted ingredients thought to stimulate the body's natural defenses; however, large randomized controlled clinical trials in children do not exist (Beil, 2010). The ingredients in these products may be so diluted that they are undetectable. Further, several homeopathic key concepts are not consistent with the established laws of science. Herbal products are not regulated by the FDA as they are considered dietary supplements; therefore; they are not tested for safety, potency, or effectiveness before being sold.

These products can vary widely in the substance used as well as the amount of active ingredient, with no established pediatric dose.

Some safe non-pharmacologic interventions exist that parents can use to relieve children's cold symptoms, such as a bulb syringe to remove nasal secretions as well as saline nose drops and a humidifier (Woo, 2008). Salt has natural anti-inflammatory properties proven to loosen and help release mucous thereby easing breathing (Beil, 2010). Further, nasal irrigation with saline is effective in reducing infection by flushing cold and flu viruses from the nasal passages (Moyad, 2009). Saline nasal preparations used multiple times a day are safe and effective for the treatment and/or prevention of upper airway infections in both adults and children (Moyad, 2009). Older children can be taught to gargle with warm salt water in order to soothe a sore throat (Moyad, 2009). In addition, clinical trial data suggests that gargling warm salt water several times a day during cold and flu season may flush bacterial or viral pathogens from the oral cavity decreasing the risk of infection (Moyad, 2009). Moist air using a cool mist humidifier or steaming up the bathroom can also loosen mucous and reduce nasal congestion (Beil, 2010).

In children over 12 months old, parents may use honey or corn syrup to relieve cough symptoms (Pappas et al., 2008). Paul et al. (2007) conducted a study comparing honey, dextromethorphan, and no treatment on nocturnal cough and quality of sleep in children. This study found that honey was the most effective treatment for the reduction of nocturnal cough symptoms as well as increasing sleep quality of both children and their parents. Honey contains antioxidant and antimicrobial properties, which have been proposed as the mechanism of action related to the healing abilities of honey. Honey also has a soothing effect on the irritated tissues of the throat, which may contribute to the reduction of cough symptoms (Paul et al., 2007).

Darker colored honey, like buckwheat honey, tends to have higher amounts of antioxidant compounds and may increase the effect of honey on the treatment of cough. Unlike dextromethorphan, honey is generally recognized as a safe treatment. Nevertheless, honey should not be used in children younger than 1 year of age related to the risk of infantile botulism (Paul et al., 2007). The dosing of honey is similar to that of OTC cough medications: a half teaspoon for children 1 to 5 years of age, one teaspoon for children 6 to 11 years, and two teaspoons for children 12 years and older (Beil, 2010).

The use of vitamins, probiotics, and, vapor rub have also been found to be beneficial in the treatment of cough and cold symptoms in children. The use of vitamin D has shown epidemiologic evidence that it is effective in preventing and improving recovery related to cold and flu infections (Moyad, 2009). The American Academy of Pediatrics (AAP) recommends 400 IU daily; an 8 ounce of milk contains 100 IU of Vitamin D (Beil, 2010). Vitamin C in combination with conventional medicine has been proven effective in lowering the risk of pneumonia as well as contributing to a faster recovery.

The research related to probiotics in children 3 to 5 years of age demonstrated a decreased incidence of colds when they consumed active lactobacillus cultures daily for six months. Those that did contract a cold had a shorter duration of symptoms (Beil, 2010). Paul et al. (2010) conducted a study investigating the effects of vapor rub on nocturnal cough and cold symptoms in children, Paul et al. (2010) found that the use of vapor rub in children was effective in reducing cough and congestion and increasing the child's ability to sleep. This compound is thought to work by activating the TRPM8 cation channel, a thermally sensitive receptor, to improve the nasal sensation of airflow in congested children and adults. Vapor rub

has also been shown effective in decreasing respiratory rate and restlessness related to acute bronchitis (Paul et al., 2010).

In summary, parents need to understand the expected duration of symptoms for URIs and to return to the doctor for symptoms such as rapid or labored breathing, or for a cold lasting longer than 10 days (Pappas et al., 2008). Teaching parents the natural progression of a cold, as well as the means to safely relieve their child's symptoms, and encouraging them to contact their provider before administering any OTC cold medications will help to decrease the inappropriate treatment of cough and cold symptoms in young children (Woo, 2008).

Instrumentation

The TWU CON Cold Treatment Survey is a 17-question, self -administered survey that was designed to assess parents' knowledge and behaviors related to the use of OTC cough and cold medications in this clinic situation. This tool was based on the Yaghami Parent Survey tool from the University of Kansas Medical Center (Yaghami et al., 2010), with items adapted to this clinic situation. Additional items were added to the original survey to facilitate targeted educational interventions for parents whose children were patients at the clinic site. The 17-item TWU CON Cold Treatment Survey gathered data on how parents dose OTC cough and cold medications, as well as parents' expectations of medication effects. Sixteen of the items yield a maximum of five points and represent high efficacy of cold treatment behavior and knowledge, with the total survey score ranging from 16 to 80. For example, parents identified whether or not they use any alternative interventions for their child's cold symptoms, and the efficacy of the selected items yielded a score from zero for *least efficacy* to five for *most efficacy* or those items that were most likely to be beneficial with the higher score. One item of the 17 items was demographic in nature and indicated ease versus difficulty in parental understanding of cold

treatment dosing, which would relate the possible direction for effective parental education. Although this tool was a self-administered survey, the investigator or medical assistants present in the clinic provided assistance as needed.

No indication of reliability or validity statistics were found in the literature or obtained from the Yaghami Parent Survey tool authors. As such, after the creation of the TWU CON Cold Treatment Survey, the Lynn (1986) content validity index (CVI) methodology served to evaluate the validity of the survey. The CVI tool was distributed to five experts in the field of pediatrics. Each expert rated the individual questions for relevance using a Likert scale as follows:

1. Item does not measure concept.
2. Item measures concept but is not clearly stated.
3. Item needs minor revision for clarity.
4. Item measures concept and it is clearly stated.
5. UK Unknown/No opinion.

The expert reviewers returned a content validity score of 0.944, indicating excellent validity of the questions contained in the survey (Lynn, 1986).

Two scales exist in the TWU CON Cold Treatment Survey: (a) Behavior and (b) Knowledge. Three Texas Woman's University College of Nursing faculty familiar with the instrument reviewed the instrument and assigned each item a "behavior" or "knowledge" label. The label was based on the human domain necessary to answer the question. The conceptual definitions of these domains are illustrated in Table 1. A pre-data collection 95.8% agreement existed among the faculty. Once data were collected during the actual study, factor and item analyses were conducted to further evaluate original scale conceptions.

Table 1

Conceptual Definition of Instrument Scales: Behavior and Knowledge

Behavior	Knowledge
1a: the manner of conducting oneself 1b: anything that an organism does involving action and response to stimulation c : the response of an individual, group, or species to its environment (Merriam-Webster Dictionary Online, 2010).	2a (1): the fact or condition of knowing something with familiarity gained through experience or association (2) : acquaintance with or understanding of a science, art, or technique 2b (1): the fact or condition of being aware of something (2): the range of one's information or understanding "answered to the best of my knowledge" 2c: the circumstance or condition of apprehending truth or fact through reasoning : cognition 2d: the fact or condition of having information or of being learned "a person of unusual knowledge" (Merriam-Webster Dictionary Online, 2010).

A 13 question demographic survey served to gather information on study participants. This information related individual, yet anonymous, information to parents' knowledge levels and behaviors regarding the use of OTC cough and cold medications in children. This information determined inclusion or exclusion status for participation in this clinical inquiry.

Population and Sample

The investigator conducted a power analysis to determine sample size. A moderate effect size (0.30) was used as an indicator for clinically relevant differences between parents of children aged 2 years and younger compared to parents with children aged 25 months to 12 years (Cohen, 1992). This division in population is consistent with FDA determination that OTC cough and cold medicine caused significant harm in children younger than 2 years (Yin, Wolf, et al., 2010). Using standard criteria (Cohen, 1992) consisting of a target power of .80, an alpha determination of .05, an effect size of .30, the sample size of 100 participants (50 participants per group) would be appropriate for the proposed statistical analysis (independent t-tests). In addition, this sample size meets minimal criteria of 5 subjects per item for preliminary exploratory factor trends analysis (Tabachnick & Fidell, 2007).

The rural clinic that is the site of the clinical investigation project has an estimated patient population of 9,000 children ranging in age from newborn to 15 years, and is comprised of multiple ethnicities, including Caucasian, Hispanic, and African American families. The investigator obtained a convenience sample of 100 parents with children 24 months or younger and parents of children 25 months to 12 years old. Eligible participants for inclusion in the study met the following criteria: (a) parents with children 24 months old and younger; (b) parents with children 25 months to 12 years old; (c) parents 18 years or older; (d) English speaking; (e) parents who reside with the child; and (f) parents who are willing to participate. The exclusion criteria were: (a) parents whose youngest child is greater than 12 years old; (b) parents

The following procedures were used to obtain the sample population:

1. Eligible parents were identified by the front office staff when they checked in for an appointment and were asked to complete the anonymous survey. The receptionist used a script supplied by the primary investigator (Appendix D). Parental statement of willingness to participate was considered as their consent to participate. The medical assistants were notified by the receptionist, and they escorted the parent and child to an exam room where participants completed the study survey. Participants were informed that they could withdraw from the study at anytime.
2. Parents completed the TWU CON Cold Treatment Survey and the demographic questionnaire in the privacy of the exam room.
3. When the survey was completed, the participants placed the survey in the collection box provided.
4. The clinical staff answered parents' questions. Following the completion of the survey, a copy of the FDA advisory on the use of cough and cold medication in children was provided to the parent informing them of the current recommendations (Appendix E).
5. Identifying information was not collected with the survey or the demographic tool, ensuring anonymity of the study participants.

Implementation

The implementation of this clinical inquiry project consisted of development of project objectives, project management strategies involving timeline creation and actual timeline evaluation, and determination of project requirements from the clinic that is the site of the project (Harris, Roussel, Walters & Dearman, 2011). Formal permission was obtained from the project

clinic (Appendix C) , as well as submission and receipt of permission from the Texas Woman's University Institutional Review Board for approval (Appendix B).

Project Objectives

The data collected during the study served to address each of the three project objectives and the four research questions. Objective one was to determine the effectiveness of the TWU CON Cold Treatment Survey. This objective relates to the first research question in that both this objective and research question address the effectiveness of the TWU CON Cold Treatment Survey in measuring parental knowledge and behaviors related to the use of OTC cough and cold medications in their children. Although the TWU CON Cold Treatment Survey served to gather valuable information related to this clinic population, statistical analyses indicated that this survey did not meet criteria for scale reliability (Pallant, 2007), limiting the ability of these findings to be generalized to other clinical pediatric populations or sites.

The second project objective was to assess the potential for harm due to the inappropriate parental treatment of cough and cold symptoms in children who attend a clinic for underserved children in rural Texas. This objective relates to the fourth research question, in that the TWU Cold Treatment Survey will identify potentially harmful use of OTC cough and cold medications in children, and provide an evoke event for identification of high risk situations, which could benefit from targeted educational interventions. An evoke event was defined for this clinical inquiry project as an event called forth from a latent or potential state by stimulation; "evoked potentials"; "an elicited response" (Merriam-Webster, 2010). These targeted educational interventions could decrease the potential for harm related to inappropriate OTC cough and cold mediations use. Research hypothesis four and null hypotheses four relate to the above objective and research question. The TWU CON Cold Treatment Survey did, in fact, provide an evoke

event that facilitated identification of high risk situations, which would benefit from targeted educational interventions.

Objective three was to compare parents with children 24 months and younger to parents with children 25 months to 12 years related to the use and dosage of OTC cough and cold medications. This objective related to research question two in that this question was constructed to compare these groups based on their knowledge and behaviors related to OTC cough and cold medication use in their children. Objective three also related to research question three, which was constructed to investigate the association between parental knowledge of OTC cough and cold mediations and parental behavior related to the use of these medications in their children within each of the two study groups. The investigator was unable to reject the null hypotheses for research questions two and three, indicating that the two study groups were not statistically different in measured behaviors or knowledge about OTC cough and cold medicine. These relationships among research questions and project objectives are illustrated in Table 2.

Table 2

Research Questions and Project Objectives

Research Questions	Project Objectives
1. Does the TWU College of Nursing Cold Treatment Survey perform as an effective measure of parental knowledge and behaviors related to the use of OTC cough and cold medications and other treatments for cold symptoms in a population of parents who bring their children to a clinic for underserved children in rural Texas?	1. Determine the effectiveness of the TWU College of Nursing Cold Treatment Survey in a population of parents who bring their children to a clinic for underserved children in rural

	Texas.
2. Is there a significant difference between parents of children aged 24 months and younger versus parents of children between the ages of 25 months and 12 years, in terms of their knowledge and behaviors, related to the use and dosage of OTC cough and cold mediations and other treatments for cold symptoms as measured by the TUW College of Nursing Cold Treatment Survey?	2. Assess the potential for harm due to inappropriate parental treatment of cough and cold symptoms in children who attend a clinic for underserved children in rural Texas.
3. Is there an association between parental knowledge of OTC cough and cold medications in children and parental behavior within each of the groups under study (parents of children ages 24 months and younger versus parents of children between the ages of 25 months and 12 years)?	3. Compare knowledge and behaviors related to the use and dosage of OTC cough and cold medications in parents who have children aged 24 months and younger and parents who have children aged 25 months to 12 years.
4. Does the TWU College of Nursing Cold Treatment Survey perform as a vehicle to provide an evoke event for targeted educational interventions in this clinic population?	

Table 3

Research Hypotheses and Null Hypotheses

Research Hypotheses	Null Hypotheses
1. There is a significant difference between parents of children aged 24 moths and younger versus parents of children ages 25 months to 12 years, in terms of their knowledge and behaviors, related to the use and dosage of OTC cough and cold medications and other treatments for cold symptoms as measured by the TWU College of Nursing Cold Treatment Survey.	1. There is no significant difference between parents of children aged 24 moths and younger versus parents of children ages 25 months to 12 years, in terms of their knowledge and behaviors, related to the use and dosage of OTC cough and cold medications and other treatments for cold symptoms as measured by the TWU College of Nursing Cold Treatment Survey.
2. The association between knowledge and behavior will differ significantly between the groups under study (parents of children aged 24 months and under and parents of children between the ages of 25 months and 12 years).	2. There is no significant difference in the association of parental knowledge and parental behaviors related to treatment of children with OTC cough and cold medications between groups under study (parents of children aged 24 months and under and parents of children between the ages of 25 months and 12 years).
3. The TWU College of Nursing Cold Treatment Survey performs as a vehicle to	3. The TWU College of Nursing Cold Treatment Survey does not perform as a

provide an evoke event for targeted educational interventions in this clinic population.	vehicle to provide an evoke event for targeted educational interventions in this clinic population.

Methodology

The investigator obtained consent to conduct this clinical inquiry at a clinic for underserved children in rural Texas; permission was given by the clinic owner (Appendix C). In order to protect the rights of the participants, appropriate steps were taken to obtain permission from the TWU Institutional Review Board. The study protocols were designed in compliance with TWU IRB standards. Permission from the TWU Institutional Review Board was received on October 27, 2010 (Appendix B).

In preparation for this clinical inquiry, meetings with clinic staff were conducted in order to educate all those involved about the project. The project director conducted a total of four meetings with clinic staff who were involved in the clinical inquiry project. During the first meeting, the project directors discussed the IRB certifications, which would be needed for all the clinic personnel involved in the project. Two other meetings included discussions of the inclusion/exclusion criteria for participants and participant recruitment procedures. The last meeting included a discussion about how the surveys were to be distributed and collected. The project director answered staff's questions at the end of each meeting. Personnel were instructed to provide assistance to the participants, as needed. Power analysis determined that a sample size of 100 participants would be necessary for the clinical inquiry. A convenience sample of 100 parents, therefore, were recruited from the site of this clinical inquiry project.

The questionnaires were randomly numbered and then distributed as participants were identified and recruited. No identifying information was collected to ensure anonymity. The participants completed the surveys in the privacy of an exam room. Clinic staff who attended preliminary educational meetings were available to answer any questions voiced by the participants. At completion, the participants placed the questionnaire in a collection box. The investigator scored the questionnaires then entered the information into SPSS for statistical analysis. Completed surveys were locked in a filing cabinet at the clinic site.

The analysis for this clinical inquiry involved determining a CVI for the TWU CON Cold Treatment Survey (Lynn, 1986). Following data collection, reliability (e.g., Cronbach's alpha coefficient) and validity statistics (e.g., factor analyses) were assessed for the TWU CON Cold Treatment Survey. Statistical analyses consisted of item-item, item-scale, scale-scale correlations, Cronbach's alpha coefficient coefficient, and factor analysis (Pallant, 2007, pp.101-104).

A t-test was used to compare the mean knowledge and mean behavior between the groups under study. MANOVA was used to compare the two groups on knowledge and behavior simultaneously (Pallant, 2007, pp. 275-288). Knowledge and behavior scores were submitted to Pearson correlation analysis for all participants combined, and within each of the groups under study. The correlations within each group were evaluated using Fisher's Z-transform test to determine correlation coefficients for each group were significantly different from each other (Pallant, 2007, p. 126-141). Statistical consultation was obtained from a team composed of a TWU statistician from the Mathematics Department and faculty members from the College of Nursing.

Timeline

Initial timeline proposed for this project began in August 2010 to and completed February 2011, with data collections beginning in October. The proposed timeline and the actual timeline for this clinical inquiry project are located in Appendix A. Data collection began in November 2010. The actual timeline began with the creation and initial validation of the survey tool in August 2010 through October 2010. The project proposal was written and submitted to the capstone committee and the IRB for approval in October 2010. Official approval from the Texas Woman's University Institutional Review Board was received on October 27, 2010. Approval from the capstone committee was also received in October. The enrollment of study participants began in November 2010. Surveys were scored as they were received. Data entry into SPSS began in December 2010. Data analysis began in January 2011 and lasted until mid March. The final project paper was submitted for approval in late March, and the capstone project was successfully defended on March 25, 2011.

Project Requirements

Texas Woman's University provided support for the study through the Institutional Review Board (IRB) approval for the study (Appendix B). Following the IRB approval, the primary investigator implemented the following protocol.

The study site was a children's clinic in rural, Texas. Clinic support consisted of approval of the project and consent to allow research involving the parents of clinic patients (Appendix C). The personnel and support for the project consisted of the front office staff, the medical assistants, the nurse practitioners, and the physician employed by the clinic at the time of the study. The support needed from the clinical site was the cooperation of the clinic owner, management, office staff, and the medical assistants who assisted with administration and

collection of the survey tools. The clinic site also provided the supplies necessary for the printing and stapling of the survey tool, as well as pens for participant use.

In addition to IRB approval, Texas Woman's University provided support of this project through the student's Professional Capstone committee review with approval of the project. A statistician was consulted throughout the course of the study. The cover letter, demographic tool, and the TWU CON Cold Treatment Survey are located in appendix F.

Evaluation

The evaluation of this clinical project includes analysis of the population and sample, the questions addressed in this inquiry project, and evaluation of these questions. Statistical evaluations of the demographics, research questions, and variables are presented in the following sections. Statistical tables and graphs related to the project are located in Appendices H through R.

Population and Sample

The sample consisted of 100 caregivers, of these 85% were female and 14% were male. Ninety-eight percent of the participants were parents, and 2% were grand/great grandparents who were primary caregivers of children who were clinic patients. Fifteen percent of the sample respondents indicated they did not complete high school, and 33% of the respondents indicated they were high school graduates. The majority of the population (37%) reported some college or trade school, while 8% obtained an associate's degree, and 5% had a bachelor's degree.

Regarding marital status, 29% of the participants reported they were single, while the majority of participants (55%) indicated they were married. Twenty-four percent stated that they were the only caregiver in the home, and 76% reported they received some form of help in caring for their children. The mean age of the participants was 28.9 years, with a range from 18 to 76

years. Respondents indicated their youngest child ranged in age from 1 month to 12 years old, with a mean age of the youngest child being 3.27 years.

When asked whether they were Mexican-Hispanic, 41% of the participants responded positively. The ethnicity of the sample indicated that 54% identified themselves as White, 11% Black, 1% Asian, and 23% identified themselves as "other." Ninety-two percent of the participants were U. S. citizens, and 7% were Mexican citizens.

Caregiver responders indicated that 80% were insured through Medicaid, 19% had private insurance, and 1% of the children were uninsured. Seventy-four percent of the sample population spoke English, and 26% of the participants spoke both English and Spanish.

Table 4

Sample Population Demographics

Variable	Level	Frequency	Valid (%)	Total (%)
Age	< 2 years	53	90.6	100
	> 2 years	47	91.5	100
Gender	Female	85	85.9	85
	Male	14	14.1	14
	Total	99	100	99
Relationship	Parent	98	98	98
	Grand/Great Grandparent	2	2	100
Marital	Single	29	29	29
	Married	55	55	84
	Divorced	5	5	89
	Separated	1	1	90

	Widowed	1	1	91
	Committed Relationship	9	9	100
Mexican	Yes	41	41	41.4
	No	58	58	100
Ethnicity	White	54	60.7	60.7
	Black	11	12.4	73
	Asian	1	1.1	74.2
	Other	23	25.8	100
Language	English	74	74	74
	Both English and Spanish	26	26	100
Caregiver	Yes	24	24	24
	No	76	76	100
Insurance	Medicaid/CHIPs	80	80	80
	Private	19	19	99
	None	1	1	100
Citizenship	United States	92	92	92
	Mexico	7	7	99
	Other Country	1	1	100
Education	< 12^{th} Grade	15	15.2	15.2
	High School Graduate	33	33.3	48.5
	Some College or Trade School	37	37.4	85.9

Associate Degree	8	8.1	93.9
Bachelors Degree	5	5.1	99
Graduate Degree	1	1	100

Research Question I: **Instrumentation. (Reliability and Validity)**

Does the Texas Woman's College of Nursing Cold Treatment Survey perform as an effective measure of parental knowledge and behaviors related to the use of over-the-counter cough and cold medications and other treatments for cold symptoms in a population of parents who bring their children to a clinic for underserved children in rural Texas? A CVI has been determined for the TWU CON Cold Treatment Survey (Lynn, 1986). Following data collection reliability (e.g., Cronbach's alpha coefficient coefficient) and validity statistics (e.g., factor analyses) were computed. Statistical analyses consisted of item-item, item-scale, scale-scale correlations, Cronbach's alpha coefficient, and factor analysis (Pallant, 2007, pp.101-104).

Reliability of the Total Scale. Reliability testing of the total scale yielded a Cronbach's alpha coefficient of .359 and an inter-item correlation mean of .038. The analysis included the "scale if item deleted" option in SPSS, which indicated that if the item EKq5RecodeNoMed were removed the Cronbach's alpha coefficient would increase to .444. Repeated Cronbach's alpha coefficient indicated that after removing EKq5RecodeNoMed, the remaining items in the total scale resulted in a Cronbach's alpha coefficient of .444 with an mean inter-item correlation of .054, indicating weak relationships among the items of the scale.

Reliability of the Behavior Subscale. Analysis of all seven items of the Behavior scale resulted in a Cronbach's alpha coefficient of .402 and an inter-item correlation mean of .115. The analysis included the scale if item deleted option in SPSS, which indicated that if the item

EBq11RecodeMedChoice were removed, the Cronbach's alpha coefficient would increase to .667. Repeated Cronbach's alpha coefficient analysis after removing EBq11RecodeMedChoice11 item, resulted in a Cronbach's alpha coefficient of .667 and an inter-item correlation mean of .235, indicating a moderate relationship between the items of this subscale. The analysis included the scale if item deleted option in SPSS, which indicated that if the item EBq13RecodeOtherMed was removed this would increase the Cronbach's alpha coefficient to .720. When the test was repeated without this item, the Cronbach's alpha coefficient actually decreased to .665. Therefore, this item was retained.

Reliability of the Knowledge Subscale. In order to determine the internal consistency of the Knowledge subscale, reliability statistics were performed. With all eight items in the Knowledge subscale, the Cronbach's alpha coefficient was .378 with a mean inter-item correlation of .056. This finding means that, in this sample, the Knowledge subscale did not meet criteria for scale reliability (Pallant, 2007). The analysis included the scale if item deleted option in SPSS, without indication that deletion of any item would increase the Cronbach's alpha coefficient.

Item-Item Correlations. The item-item correlations conducted on the behavior subscale resulted in several statistically significant correlations. EBq1RecodeFrequency resulted in a moderate positive correlation (r = .311, n = 98, p = > .01) with EBq2WhichMed, indicating that parents who use OTC cough and cold medications in their children were more likely to also ask a doctor, nurse, or pharmacist which medication to give their child. EBq1RecodeFrequency had a small positive correlation (r = .263, n = 98, p = > .01) with EBq3HowMuch indicating that parents who use OTC cough and cold medications in their children were also slightly more likely to ask a doctor, nurse, or pharmacist how much medication would be appropriate to give their child. Finally, EBq1 had a large positive correlation (r = .560, n = 98, p = .01) with

EBq16RecodeMedHome indicating parents who use OTC cough and cold medications for their children were more likely to keep these medications in their home. EBq2WhichMed had a large positive correlation (r = .826, n = 98, p > .01) with EBq3HowMuch indicating that parents who would ask a doctor, nurse, or pharmacist which medication to give their child were also more likely to ask how much of the medication would be appropriate to give their child.

Item-item correlations conducted on the Knowledge subscale resulted in only one small positive correlation (r = .251, n = 98, p = < .05) between EKq6RecodeTMHelped and EKq5RecodeNoMed, indicating that parents who believed Tylenol or Motrin helped alleviate cold symptoms were slightly more likely to believe that a cold could go away without medication.

The item-item correlations conducted on the total scale resulted in several small and moderate correlations. EBq9RecodeOtherTx resulted in a small negative correlation (r = -.255, n = 98, p = .05) with EKq6RecodeTMHelped indicating that parents who use other treatments for cough and cold symptoms in their children were slightly less likely to not bevieve Tylenol or Motrin help relieve cough and cold symptoms. EBq1RecodeFrequency resulted in a moderate positive correlation (r = .414, n = 98, p = >.01) with EKq4MedHelped indicating that parents who use OTC cough and cold medications in their children were more likely to believe that these medications help relieve their child's cough and cold symptoms. EBq11RecodeMedChoice resulted in a moderate positive correlation (r = .396, n = 98, p = >.01) with EKq8RecodeAgeMedsHelp, indicating that parents who chose one of the four OTC cough and cold medication options were also more likely to believe that their child was old enough to receive OTC cough and cold medications.

Item-Scale Correlations. Item-scale correlations resulted in several strong positive correlations between the Behavior scale and the Behavior items, and two negative correlations between the Behavior subscale and the Knowledge subscale items. The total Behavior subscale resulted in a strong positive correlation with several Behavior subscale items: EBq1RecodeFrequency (r = .727, n = 57, p = >.01), EBq2WhichMed (r = .707, n = 57, p = >.01), EBq3HowMuch (r = .653, n = 57, p = >.01), and EBq16RecodeMedHome (r = .701, n = 57, p = >.01). These positive correlations indicated that the participants with higher scores on these items were more likely to have high efficacy in their behaviors with treating cough and cold symptoms in their children. The Behavior subscale and Knowledge subscale item correlations resulted in one small negative correlation (r = -.305, n = 57, p = >.01) with EKq4RecodeMedHelped indicating high efficacy in behavior and low efficacy related to the knowledge of whether or not cold medications are helpful in children. The Behavior subscale correlations also resulted in one moderate negative correlation with Kq8RecodeAgeMedsHelp (r = -.290, n = 57, p = >.01), indicating that parents who have high efficacy related to behaviors in treating their child's cough and cold symptoms do not understand when their child is old enough to receive OTC cough and cold medications. In summary, in this sample, high efficacy as indicated with higher Behavior subscale scores did not correlate with higher Knowledge subscale scores.

Scale-Scale Correlations. Scale-Scale reliability statistics were conducted, resulting in a Cronbach's alpha coefficient of .017 and an inter-item correlation mean of .017. The minimum and maximum were both .017 with a range of .000. Scale-scale statistics do not indicate a correlation between the Behavior subscale and the Knowledge subscale.

Factor Analysis Findings Related to Research Question 1. In order to examine validity of proposed Knowledge and Behavior subscales of the TWU CON Cold Treatment Survey (15

variables, 100 cases), exploratory factor analysis to determine factor trends was conducted. This analysis would assist in determining if different variables were measuring commonalities and could be used in further analysis as a tool for variable reduction. The 15 items of the TWU CON Cold Tool Treatment Survey initially were subjected to Principal Component Analysis (PCA) (parallel analysis) using SPSS version 15 for the 100 available cases. Pallant (2007) summarized recommendations regarding sample size for PCA, and the smallest sample size recommended was 150 cases. Tables illustrating these findings are included in Appendix L.

The initial rotation technique used was Direct Obliminination with rotated solution. The correlation matrix revealed some, but not many, coefficients with values greater than .3. The Kaiser-Meyer-Olkin (KMO) value was .506, less than recommended value of .6 (Pallant, 2007). Bartlett's Test of Sphericity reached statistical significance (Sig = .000). PCA revealed 6 components with Eigenvalues greater than .1 explaining 66% of the cumulative variance, which is slightly less than the recommended 70% (Pallant, 2007). A Monte Carlo PCA (Random Number Generator) was used to average values for 100 sets of data of the same size of the Cold Tool. With the Random Number Generator, six component Eigenvalues were produced, all with corresponding values less than the real data file, which supported the PCA 6-component finding.

The Scree Plot revealed a clear break after the second component. Further PCA analysis forcing two components explained only 29% of the cumulative variance, far lower than the recommended 70% (Pallant, 2007). Therefore, the 2-component analysis solution was rejected. PCA using a Varimax rotation solution was performed on the scale, which produced similar results. None of the components had 4 or more loadings above .60 in absolute value, thereby not establishing reliability for samples with less than 150 cases (Stevens, 1996).

The results of the factor analyses performed on the Cold Tool Scale were unable to reliably determine if the different variables included in the scale were measuring commonalities that could be used as a tool for variable reduction in further analyses. A summary of the findings supporting this explanation includes:

1. The KMO value was .506, and the recommended value is greater than .6
2. The PCA revealed 6-component s explaining 66% of cumulative variance, and recommended explanation of cumulative variance is 70% or more.
3. The Scree Plot suggested a 2 component solution. PCA (2 components) explained 29% of the cumulative variance. The recommended explanation of cumulative variance is 70% or more.
4. The available sample size was 100 cases. The minimum recommended sample size is 150 cases.
5. No component had 4 or more loadings above .60.

Additional Findings. Simple frequencies were assessed for all items of the TWU CON Cold Treatment, as illustrated in Table 5. Of the 100 participants 32% indicated that they usually use OTC cough and cold medications in their children. Thirty-five percent of participants (n = 98) responded that they always ask a provider which medication to give their child and 35% indicated that they would also ask a provider how much medication would be appropriate to give their child. When asked if they used therapies other than OTC cough and cold medications to treat their child's cough and cold symptoms, the participants indicated, using a table of alternative therapies, that 92% (n = 100) of them would use therapies that were considered neither helpful or harmful, while 8% used therapies that were considered potentially helpful. The majority (75%) of the sample participants (n = 100) indicated that they did not believe that

Tylenol and Motrin helped relieve cough and cold symptoms. However, when asked if antibiotics helped cough and cold symptoms 68% of the participants (*n* = 99) believed that antibiotics helped a cold resolve faster. When asked how old a child must be to receive OTC cough and cold medications 61% of the sample population (*n* = 83) indicated that a child under the age of 4 years could be given these medications.

Inappropriate measurement of medications by parents has been identified as a cause of potential harm in children when it comes to the use of OTC cough and cold medications (Yin, Wolf, et al., 2010). The majority of the sample participants (95%, *n* = 98) indicated that they used a medicine cup, dropper, or syringe to measure the medication, while 3% admitted to using a kitchen spoon to give their child OTC cough and cold medications. Of this sample population (*n* = 94%) 75% appropriately indicated that the onset of activity of OTC cough and cold medications is greater than 30 minutes. Despite the FDA public health advisory, only 59% of the sample participants (*n* = 98%) indicated that they knew OTC cough and cold medications had been removed from pharmacy shelves for children younger than 2 years old. Parental lack of understanding age guidelines and package instructions leading to inappropriate use of OTC cough and cold medications in children has been well documented (Hanoch et al., 2010). However, in this sample population (n = 95%) 87% believed that the example of instructions provided for OTC cough and cold medications in the survey were easy to understand. Contradictory to the indication by this sample population that the instructions on OTC cough and cold mediations were easy to understand their scores on the total scale, Behavior subscale, and Knowledge subscale were well below the total possible scores for these scales: Behavior subscale (*M* = 18.4, *SD* = 5.22) of a possible 35 points, Knowledge subscale (*M* = 18.7, *SD* =

6.98) of a possible 40 points, and total scale (M = 37.9, SD = 9.21) of a possible 76 points including the covariate.

Table 5

Simple Frequencies

Variable	Level	Frequency	%Valid	%Total
Frequency	Never	13	13	13
	Seldom	28	28	41
	Half the time	22	22	63
	Usually	32	32	95
	Always	5	5	100
WhichMed	Never	9	9	9
	Seldom	13	13	22
	Half the time	9	9	31
	Usually	34	34	65
	Always	35	35	100
HowMuch	Never	10	10.2	10.2
	Seldom	25	25.5	35.7
	Half the time	4	4.1	39.8
	Usually	20	20.4	60.2
	Always	39	39.8	100
OtherTx	2.5	92	92	92
	5	8	8	100
TMHelped	Yes	25	25	25

	No	75	75	100
AnbxHelped	Yes	68	68.7	68.7
	No	31	31.3	100
AgeMedsHelped	< 4 years	61	73.5	73.5
	> 4 years	22	26.5	100
MeasureTool	Kitchen spoon	3	3.1	3.1
	Medication dropper, syringe, cup	95	96.9	100
Time	< 30 minutes	19	20.2	20.2
	> 30 minutes	75	79.8	100
RemovedMed	Yes	59	60.2	60.2
	No	39	39.8	100
InstEasy	Yes	87	91.6	91.6
	No	8	8.4	100
BehaviorScore	Range	Mean	SD	
	7.50 – 30.5	18.4	5.21	
KnowledgeScore	Range	Mean	SD	
	3.00 – 36.0	18.7	6.975	
TotalScore	Range	Mean	SD	
	13.50 – 63.50	37.96	9.21	

Research Question 2: Two Group Comparison

There is a significant difference between parents of children aged 24 months and younger versus parents of children between the ages of 25 months and 12 years, in terms of their knowledge and behaviors, related to the use and dosage of over-the-counter cough and cold medications and other treatments for cold symptoms as measured by the TWU CON Cold Treatment Survey. In order to answer this research question descriptive statistics were conducted to compare parents of children younger than 24 months (Group 1) with parents of children 25 months to 12 years (Group 2). A t-test was used to compare the mean knowledge and mean behavior between the groups under study.

Descriptives statistics for the two groups under study. This clinical inquiry will compare parents with children younger than 24 months (Group 1) with parents of children 25 months to 12 years (Group 2). Fifty-three percent of participants' youngest child was less than 24 months, while 46% of the participants' youngest child were aged from 25 months to 12 years. The Group 1 consisted of 53 participants, and Group 2 was comprised of 46 participants. Tests for normality for both parent groups were conducted.

Normality testing for the Behavior subscale scores in Group 1 resulted in a mean of 24.24, standard deviation of 5.164, with a minimum of 13.00, a maximum of 33.00 and a range of 20.00. Behavior subscale score distributions for Group 1 were normally distributed, as evidenced by a Kolmogorov-Smirnov value of .200, with a skewness of -.080, indicating a clustering of scores to the right, and a kurtosis of -.484, indicating a platykurtic distribution. The histogram and boxplot appeared normally distributed and no outliers were identified.

Normality testing for the Knowledge subscale scores for Group 1 resulted in a mean of 24.54, standard deviation of 5.662, with a minimum of 10.00, a maximum of 38.00, and a range

of 28.00. The distribution of Knowledge subscale scores for Group 1 were normally distributed with a Kolmogorov-Smirnov value of .200, a skewness value of -.006 and a kurtosis value of -.223, indicating an normal curve with a negative skew and a platykurtic distribution. The histogram and boxplot appeared normally distributed, with no outliers identified.

The normality testing for the total scores for Group 1 resulted in a mean of 49.65, a standard deviation of 7.319,with a minimum of 38.00, a maximum = 70.00, and a range of 32.00. The distribution of total scores for Group 1, as evidenced by a Kolmogorov-Smirnov value of .200, a skewness value of .714 and a kurtosis value of .522 indicating an normal curve with a positive skew and a peaked distribution. The histogram and boxplot appeared normally distributed, with no apparent outliers.

The normality testing for the behavior score distributions for Group 2 resulted in a mean of 23.68, standard deviation of 4.224, with a minimum of 17.00, a maximum of 33.00 and a range of 1.00. The distribution of the behavior scores were normally distributed, as evidenced by a Kolmogorov-Smirnov value of .200, with a skewness value of .248, indicating a clustering of scores to the left, and a kurtosis of -.573, indicating a platykurtic distribution. The histogram and boxplot appeared normally distributed with no apparent outliers.

The normality testing for the Knowledge subscale score distributions for Group 2 resulted in a mean of 23.86, a standard deviation of 4.224, with a minimum of 17.00, a maximum of 33.00, and a range of 16.00. The distribution of knowledge scores for Group 2 were normally distributed, as evidenced by a Kolmogorov-Smirnov value of 2.00, a skewness value of .140, and a kurtosis value of -.253, indicating a normal curve with a negative skew, with score clustered to the right and a platykurtic distribution. The histogram and boxplot appeared normally distributed with no outliers identified.

The normality testing for the total TWU CON Cold Treatment Survey score distributions for Group 2 resulted in a mean of 50.50, a standard deviation of 8.342, with a minimum of 36.00, a maximum of 65.00, and a range of 29.00. The distribution of total scores for Group 2 were normally distributed with a Kolmogorov-Smirnov value of .200, a skewness value of -.072 and a kurtosis value of -.652, indicating a normal curve with a negative skew and a platykurtic distribution. The histogram and boxplot appeared normally distributed with no outliers were identified.

T-test to Compare Groups. A t-test was used to compare the mean knowledge and mean behavior between the groups under study as the assumptions of normality were met. An independent sample t-test was conducted to compare the total Knowledge subscale scores, total Behavior subscale scores, and total TWU CON Cold Treatment Survey scores for parents whose youngest child was under 24 months (Group 1) and parents whose youngest child was 25 months to 12 years (Group 2). The Levene's test for equality of variances resulted in a significance of .829 for the total Knowledge subscale comparison between the two groups, indicating that the assumption of equal variance has not been violated. There was no significant difference in the mean Knowledge subscale scores: Group 1 (M = 24.54, SD = 5.66) and Group 2 (M = 26.24, SD = 6.125); $t(95) = -1.428$, $p = .157$ (two-tailed) between Group 1 and Group 2. The Levene's test for equality of variances resulted in a significance of .464 for the total Behavior subscale comparison between the two groups, indicating that the assumption of equal variance was not been violated. There was no significant difference in the mean scores for total behavior: Group 1 (M = 24.24, SD = 5.164), and Group 2 (M = 23.68, SD = 4.224), t(52) = .420, p = .676 (two-tailed). The Levene's test for equality of variances resulted in a significance of .526 for the total TWU CON Cold Treatment Survey score comparison between the two groups, indicating that

the assumption of equal variance had not been violated. There was no significant difference in the mean scores for total cold score: Group 1 (M = 49.65, SD = 7.319), and Group 2 (M = 50.50, SD = 8.342), t(52) = -.403, p = .6886 (two-tailed). The affirmative hypothesis was rejected, and the null hypothesis was accepted.

Additional Findings. Correlations between groups were conducted to compare the responses of parents with younger children (24 months or less) with parents of older children (25 months to 12 years). Both parent groups in this study sample had a moderate positive correlation between EBq1RecodeFrequency and EBq4RecodeMedHelped (r = .395, n = 50, p = .01) indicating that parents who would use cold medication felt that these medications helped relieve their child's cough and cold symptoms.

In Group 1 item EBq3HowMuch resulted in a moderate positive correlation with EKq8RecodeAgeMedsHelp (r = .347, n = 43, p = < .05) indicating that parents who would ask a provider how much medication to give their child felt that their child was old enough to receive the medication. The only other correlation identified in Group 1 was between EBq11RecodeMedChoice and EKq8RecodeAgeMedsHelp resulting in a moderate positive correlation (r = .443, n = 43, p = < .01) indicating that parents in this group who chose one of the four medication options on the survey for their child felt that their child was old enough to receive the medication.

In Group 2 EBq3HowMuch had a moderate positive correlation with EKq17RecodeRemovedMed (r = .331, n = 44, p = < .05) indicating that parents who would ask a provider how much medication to give their child were also aware of the FDA recommendation that these medications should not be used in children under 2 years. This parent group also demonstrated a moderate positive correlation between EBq2WhichMed and

EKq17RecodeRemovedMed (r = .308, n = 45, p = < .05) indicating that parents who would ask a provider which medication to give their child were also aware of the FDA advisory on OTC cough and cold medications. This was not considered a negative finding as the children in this age group are over 24 months, but may reflect that the FDA advisory may have made this parent group more cautious in the use of OTC cough and cold medication use in their children. Group 2 had two moderate correlations related to EBq16RecodeMedHome resulting in two moderate positive correlations with EBq4RecodeMedHelped (r = .322, n = 44, p = < .05) and EKq6RecodeTMHelped (r = .311, n = 44, p = < .05) indicating that parents who kept medications in their home felt that these medications helped and that Tylenol and Motrin also helped to relieve their child's cough and cold symptoms.

Research Question 3: Within Group Comparison

Is there an association between parental knowledge of OTC cough and cold medications in children and parental behavior within each of the groups under study (parents of children ages 24 months and younger versus parents of children between the ages of 25 months and 12 years)?

Knowledge subscale scores and Behavior subscale scores were submitted for Pearson correlation analysis for all participants combined resulting in a Cronbach's alpha coefficient of .017 and an inter-item correlation mean value of .017. The minimum and maximum were both .017 with a range of .000. Scale-scale statistics do not meet the criteria for reliability of scales. The Person correlation analysis conducted to compare groups for Knowledge subscale scores and Behavior subscale scores resulted in Group 1 (r = -.053, n = 53, p = > .05) and Group 2 (r = .171, n = 46, p = > .05), indicating no correlation between groups. The correlations within each group were analyzed using Fisher's Z-transform test to determine if the correlations are significantly

different resulting in a Z_{obs} value of .053 for Group 1 and a Z_{obs} value of .173 for Group 2, which indicated no significant difference between groups. These results indicated that the Group 1 and Group 2 were alike.

A one-way between groups multivariate analysis of variance (MANOVA) was performed to investigate the difference between Group 1 and Group 2 related to total Knowledge subscale scores and total Behavior subscale scores. Two dependent variables (total Knowledge subscale score and total Behavior subscale score) and one independent variable (Age Groups) were used for this analysis. Preliminary assumption testing was conducted to determine normality, linearity, univariate and multivariate outliners, homogeneity of variance-covariance matrices, and multicolinearity, with no major violations noted except for that of multicolinearity. The two dependent variables were found to have a Pearson correlation of r = .898, p = .017, n = 57. There were no statistically significant difference found between Group 1 and Group 2 on the combined dependent variables, F (2, 53) = .472, p = .626; Wilk's Lambada = .983; partial eta squared = .017. When the results for the dependent variables were considered individually, total Knowledge subscale scores F (1, 54) = .761, p = .387; partial eta squared = .014 and total Behavior subscale scores F (1, 54) = .176, p = .676; partial eta squared = .003 indicate no significant between the groups under study. An inspection of the means scores show similar results for both groups for total knowledge: Group 1 (M = 25.41, SD = 5.467), Group 2 (M = 26.82, SD = 6.507) and total Behavior subscale scores: Group 1 (M = 24.24, SD = 5.164), Group 2 (M = 23.68, SD 4.224). The affirmative hypothesis was rejected, and the null hypothesis was accepted.

Research Question 4.

Does the TWU College of Nursing Cold Treatment Survey perform as a vehicle to provide an evoke event for targeted educational interventions in this clinic population? In order to determine if the TWU CON Cold Treatment Survey has the ability to perform as a vehicle to provide an evoke event for targeted educational interventions for the clinic population under study, a standard multiple regression was performed. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity (Pallant, 2007). EBq1RecodeFrequency was entered as the dependent variable in Step 1. EBq2WhichMed, EBq16RecodeMedHome, EBq4RecodeMedHelped were entered at Step 2. The model as a whole was statistically significant, explaining 44.6% of the variance of EBq1RecodeFrequency, R-square = .446, F (3, 90) = 24.115, p = < .001. In the model Ebq2WhichMed (Beta = .217, p = .009) was statistically significant, explaining 21.7% of the variance, EBq16RecodeMedHome (Beta = .438, p = < .001) was statistically significant, explaining 43.8% of the variance, EBq4RecodeMedHelped (Beta = .320, p = < .001) was statistically significant, explaining 32% of the variance. The unique contribution of each variable for explanation of the variance was Ebq2WhichMed = 4.5%, (Part = .211), EBq16RecodeMedHome = 23.7%, (Part = .487), EBq4RecodeMedHelped = 9.7%, (Part = .311). These three measures (Ebq2WhichMed, EBq16RecodeMedHome, and EBq4RecodeMedHelped) are strong predictors (explaining 44.6% of the variation) for the use of OTC cough and cold medication in the subject population.

The results of the standard multiple regression performed on the TWU CON Cold Treatment Survey reliably determined three different variables included in the scale as strong

predictors for the use of OTC cough and cold medication. A summary of the predictive items are as follows:

1. Ebq2WhichMed: If you did decide to use over-the-counter cough and cold medicine, would you ask a doctor, nurse, or pharmacist which medicine you should give your child?
2. EBq4RecodeMedHelped: How often does over-the-counter cough and cold medicine help a child's cold symptoms, such as a cough or runny nose?
3. EBq16RecodeMedHome: Do you usually keep over-the-counter medicines for cough, cold or runny nose for children in your home?
4. Variables above predicted 44.6% of the variance for: EBq1RecodeFrequency: Would you have used over-the-counter cough and cold medicine to treat your child's cold symptoms, such as a cough or runny nose?

These findings lend support to the proposition that these questions are more likely to relate to the actual behavior of parental administration of cold and cough medicine to their children.

Additional findings. Reassuring findings for this clinic population were that parents in Group 2 who are aware of the FDA recommendations seem to have become more cautious in their use of OTC cough and cold medications in that they would ask a provider which medication and how much would be appropriate for their child. Parents as a whole indicated that they did use an appropriate measuring device to administer medication to their child. The parents in this sample also indicated that they understood that OTC cough and cold medications took greater than 30 minutes to onset. However, the majority of the findings for both groups related to parental knowledge and behaviors are concerning.

Parents in Group 1(children < 24 months old) indicated that they kept OTC cough and cold medications in their home and felt that these medications were effective in relieving their child's cough and cold symptoms. This parent group also chose a medication for their child on the survey and answered that they would ask a provider how much medication to give indicating that their child was old enough to receive the medication. Concerns in parent Group 2 are related to their indication that they keep OTC cough and cold mediations in their home answering that they would use them for their children. This group of parents felt these medications as well as Tylenol and Motrin relieved their child's cough and cold symptoms.

Other items of concern were that all participants in the sample thought the instructions on OTC cough and cold medications were easy to understand, though as stated above, their education level and the fact that they are a high Medicaid population may suggest that they are at high risk for below basic health literacy (U. S. Department of Education, 2006). Another concern for this study sample is that there was no correlation between the use of OTC cough and cold medication and the acknowledgement of the FDA recommendation that these medications not be used in children under 2 years of age, though 59% the sample as a whole indicated that they were aware of the FDA recommendations.

Participants were asked to choose among a group of 24 possible complimentary therapies. These therapies were classified as being harmful, neither beneficial or harmful, or beneficial based upon current research evidence. In response to this item, the majority of parents (92%) in this study sample (combined groups) chose complimentary therapies considered not harmful or helpful, only 8% of parents chose therapies that were considered helpful.

End Products

A study of parents' knowledge and behaviors related to the use of OTC cough and cold medications comparing parents of children younger than 24 months and parents of children 25 months to 12 years assessed the similarities and differences between the groups and identified knowledge deficits and potentially harmful behaviors. All parents received a copy of the FDA recommendations for cough and cold medications in children.

The sponsoring university and the clinic for children located in rural Texas received copies of the completed study and results comparing parent groups' knowledge and behaviors related to the use of OTC cough and cold medications and other treatments for cold symptoms as measured by the TWU CON Cold Treatment Survey. Approximately 80% of all children seen in the clinic that is the site of the clinical inquiry project presented with cold symptoms. Each provider sees 20 to 30 children a day. Based on the study findings, the clinic is able to customize a special screening tool of the 3 items closely related to the actual behavior of administration of OTC cough and cold medicine to children. Those who respond positively to these items will receive an informational handout and a follow-up phone call from clinic staff two days after the visit. In the past year's winter cold and flu season (September 2009 - April 2010), four children presented to the emergency room or to the clinic experiencing side effects from improper administration of OTC cough and cold medicine. With increased awareness and changed protocols among clinic providers, there have been no incidents during the current cold and flu season (2010- 2011). Deliverables include the following: (a) increased knowledge about parents' use of OTC and other cold and cough therapies, (b) improved screening of those parents' most likely to administer OTC cough and cold medicine to their children, and (c) implementation of an educational and follow-up strategy in those parents.

Conclusions

The study of parental knowledge and behaviors related to OTC cough and cold medications are necessary in order to identify where the knowledge gaps are so that parents can be effectively educated on the proper use of these medications in their children. This clinical inquiry has brought to the surface several areas in parental knowledge and behaviors that need to be addressed in this population.

Discussion

The TWU CON Cold Treatment Survey was created to serve as a vehicle to explore the knowledge and behavior of parents of children who are patients at a rural clinic. Although scale construction for further generalized research studies was not a specific goal, the project director did perform initial analyses of reliability and validity of the scale. The examination of the behavior subscale resulted in a Cronbach's alpha reliability coefficient of .667 (with item 11 removed) did meet the requirement for reliability based on Aiken (1979), which states that a Cronbach's alpha reliability coefficient of .65 is satisfactory. The Behavior subscale contained 3 items with all 3 retained, which were 5-point Likert scale construction. The other two items were dichotomous. The Knowledge subscale had only one 5-point Likert scale item, with innovative use of illustrations and completion forming the other items. The decreased Cronbach's alpha coefficient for the Knowledge subscale (.378), and the total TWU CON Cold Treatment Survey (.359), could relate to the use of innovative, but different, items to assess behavior and knowledge.

There was little relationship measured between the total Knowledge subscale score and items and the total Behavior subscales score and items. The consistency in which the respondents answered the items in the Behavior subscale could indicate consistent behavior

patterns in the way parents respond to their child's cold symptoms. The inconsistency of parental responses may not reflect the general unreliability of the Knowledge subscale as much as this inconsistency could reflect a true lack of knowledge of OTC cough and cold medications. In this study sample, 41% of participants identified themselves as Mexican/Hispanic, which according to the U.S. Department of Education (2006), tends to be associated with lower health literacy compared to any other ethnic or racial group. Low-English proficiency and level of education are the strongest predictors for having basic or below basic health literacy (Yin et al., 2009). Participants with less than a high school education had an 8 times greater chance of low health literacy, while those with low English proficiency had a greater than 18 times chance of being classified as basic or below-basic health literacy. The educational level of the participants in this study sample were: 15% had less than a 12^{th} grade education and only 33% were high school graduates.

Eighty percent of the population under study were Medicaid recipients, and 30% of Medicaid recipients had below basic health literacy (U.S. Department of Education, 2006). Considering these factors (education, ethnicity, English proficiency, and Medicaid) of these study participants as they relate to health literacy may explain the inconsistency of the way this population responded to the Knowledge sub-scale items, indicating a glaring need for education related to the knowledge needed to appropriately use OTC cough and cold medications in their children.

The project director proposed a difference in parental knowledge and behavior between parents with children younger than 24 months (Group 1) and parents with children 25 months to 12 years (Group 2). A t-test was conducted to compare the two parent groups under study, which resulted in finding no difference, based on knowledge and behavior between the parent

groups. The results indicated that both groups perform efficaciously with respect to behavior in the treatment of their child's cold symptoms, but need equal amounts of education related to their knowledge of OTC cold medications. The investigator was unable to reject the null hypothesis.

Although the FDA has separated these two groups, with the younger group being more high risk for harm, these two groups of parents were alike in their responses to the survey (59% of the respondents said they were aware of the FDA recommendation, and responses on this item did not correlate with behavior). In this clinic population, knowledge of FDA recommendations did not influence responses on the Behavior subscale. A study by Hanoch et al. (2010) showed that 49.6% of parents with children younger than 2 years old did not trust the FDA warnings related to OTC cough and cold medications. Parents who doubted the FDA recommendations were more likely to continue to use these medications. Even parents who trusted the FDA recommendations indicated uncertainty about whether or not to adhere to these recommendations (Hanoch et al., 2010).

The last research question investigated whether or not the TUW CON Cold Treatment Survey would perform as a vehicle for an evoke event to target educational interventions. A standard multiple regression was performed in order to analyze this research question. A post-priori power analysis was conducted on the R2 .446 value of the multiple regression. According to Cohen (1992), a sample of 93 with three independent variables yields a power of 1.0 at alpha .0001 and effect size of .8050. Three measures (EBq2WhichMed, EBq16RecodeMedHome, and EBq4RecodeMedHelped) were identified as strong predictors for the use of OTC cough and cold medications. Parents who keep medications in their home, who would ask a provider which medication to give their child, and who felt that these medications help relieve their child's cough and cold symptoms were more likely to respond that they would use these medications for

their child's symptoms. Discovery of these strong predictors regarding the frequency of parental use of OTC cough and cold medications in their children provides an opportunity for targeted education. The project director developed a screening tool based on these predictive measures, which will be incorporated within the EMR. A positive response to any of these predictors will elicit a cue to give these parents a special handout about cough and cold medication (Appendix S). This will also enter the "Nurse Call" account for a follow-up call to check on this patient in two days.

Strengths and Limitations

There were several limitations of this study. The study used a sample of convenience limiting the ability to generalize the results to other populations. The study was also short in duration, extending the study to 6 months and increasing the sample size may have resulted in more significant results. Finally, this study was conducted with a newly developed tool as a previously validated tool has not been developed. The study has several strengths. First, this study used a high Medicaid population; no studies on parental knowledge and behavior have been published for this population. There was no monetary fee for the tool development. The study would be easy for future researchers to replicate. The results from this clinical inquiry project will be presented at the TWU Creative Arts and Research Symposium, the TWU DNP Celebration of Scholarship Day, and the Sigma Theta Tau 41st Biennial Convention. Manuscripts will be prepared and submitted to peer-reviewed scholarly journals for publication. This document will be stored in the TWU Dallas campus library, and a digital copy will be maintained in the author's digital portfolio for the use of other DNP students.

Future Research

- Development of a valid reliable cough and cold symptom tool for other clinic populations
- Development of strategies to identify parents who may unintentionally cause harm to their children through inappropriate medication administration
- Which is most effective – educational handout alone or hand-out with follow-up phone call?
- strategies for use of the electronic health care record to cue providers and staff when specific patient situations occur.
- Exploration of reasons related to ineffectiveness of parental response to FDA advisories

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Appendix A

Proposed Time Line

1. Create the Cold Treatment Survey tool in August and September 2010.
2. Write the capstone proposal and obtain approval from my Capstone committee members by September 2010.
3. Submit the project concept proposal and consent form to Texas Woman's University (TWU) Institutional Review Board (IRB) for expedited approval in September 2010.
4. Enroll participants and collect data via Cold Treatment Survey in late October through November 2010.
5. Enter data collected into the Statistical Package for the Social Sciences (SPSS) for analysis in November 2010.
6. Submit completed capstone paper to the Texas Woman's University (TWU) committee by February 2010.

Actual Time Line

1. Created the Cold Treatment Survey tool from August through October 2010.
2. Wrote the capstone proposal and obtained approval from my Capstone committee members by October 2010.
3. Submitted the project concept proposal and obtained consent from the Texas Woman's University Institutional Review Board for expedited approval in October. Official approval from the Texas Woman's University Institutional Review Board received on October 27, 2010.
4. Enrolled participants and collected data via the Cold Treatment Survey in November 2010.
5. Entered the data collected into the Statistical Package for the Social Sciences (SPSS) for analysis in December 2010.
6. Submit completed capstone paper to the Texas Woman's University committee by March 2010.

Appendix B

IRB Revision Request Letter

October 21, 2010

Ms. Lori Thompson
601 South Clay Suite 101
Ennis TX 75119

Dear Ms. Thompson:

Re: Parents' knowledge and behaviors related to the use of over-the-counter cough and cold medications

The above referenced study has been reviewed by the TWU Institutional Review Board (IRB) to determine whether it meets requirements for the protection of individual rights. Before we can give you approval to begin your study, you must address the following:

On the Application:

1. P 3, the first research question needs to be removed. The study does not seem to test the reliability and the validity issue.

2. P5, one inclusion criteria under patient information: eligible participants have children younger than 24 months, "or" between 25 months to 12 years old.

3. P 6. On the top: The phrase "Completion of the survey instrument serve as consent for the study" should be placed at the top of your survey instrument.

4. P6, item B: How many participants will be needed for each group? On item 10c, a specific date is needed when identifiable data will be destroyed.

5. P7, on the recruitment script: the sentence "Do you read in English?" should be added.

6. P8: The medical assistant should not be present while participants are filling out the survey. The participants should voluntarily drop the completed survey in a designated box by themselves. If it was not completed in details, the PI could decide how to manage the data later on. What are the benefits to the participants?

7. P 10: the file or data should not be stored at the house of the PI. The data should be shredded by a specific date (mm/dd/yyyy). Item 9: what is the role of the PI? The two medical assistants do not seem to be in charge of "identifying" the potential participants in the method section.

8. The survey instrument should have the title of the study, the name of the PI, and a place for the random ID number.

IRB Approval

TWU
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October 27, 2010

Ms. Lori Thompson
601 South Clay Suite 101
Ennis, TX 75119

Dear Ms. Thompson:

Re: Parents' knowledge and behaviors related to the use of over-the-counter cough and cold medications (Protocol #: 16282)

Your application to the IRB was reviewed and approved on 10/27/2010. This approval is valid for one (1) year. The study may not continue after the approval period without additional IRB review and approval for continuation. It is your responsibility to assure that this study is not conducted beyond the expiration date.

Any modifications to this study must be submitted for review to the IRB using the Modification Request Form. Additionally, the IRB must be notified immediately of any unanticipated incidents. If you have any questions, please contact the TWU IRB.

A final report must be submitted to the IRB at the conclusion of the study. If using a consent form, copies of the signed informed consent are to be submitted with the final report before the study file can be closed.

The Institutional Review Board is pleased to acknowledge your sense of responsibility for ethical research. If you have any questions concerning this review, please contact me at (214) 706-2461 or email SLin@twu.edu.

Sincerely,

Suh-Jen Lin

Dr. Suh-Jen Lin, Chair
Institutional Review Board - Dallas

cc. Dr. Stephanie Woods, College of Nursing - Dallas
Dr. Barbara Gray, College of Nursing - Dallas
Graduate School

DECADE OF ACHIEVEMENT
1999 - 2009

Appendix C

EMMANUEL E. SACKEY, MD
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972-875-5220
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IRS# 75-2756842

School of Nursing
Texas Woman's University
5500 Southwestern Medical Ave
Dallas, Texas 75235

To whom it may concern,

Ennis Children's Clinic is willing to assist and provide the site for the nursing research project entitled "Parents' knowledge and behaviors related to the use of over-the-counter cough and cold medications" being conducted by Doctor of Nursing Practice student Lori Thompson. If you have reason for question you are welcome to contact my office.

Sincerely,

Emmanuel E. Sackey, MD, FAAN
President, Ennis Children's Clinic

Appendix D

Script for Participant Recruitment

The receptionist at the clinical site will identify child caregivers who are eligible to participate based on inclusion and exclusion criteria and ask for verbal consent to participate in the study. The receptionist will use the following script:

Hi, how are you today? We are conducting a study to help us understand how parents care for their children when they have cough and cold symptoms. We are asking parents to fill out an anonymous survey about this. Can I ask you some questions to see if you would be eligible to help us with this survey?

- Are you above the age of 18 years?
- How old is your youngest child?
- Do you read in English?

If you consent to be part of this study, our medical assistant will go with you to the exam room. You can complete the survey and turn it in to the medical assistant when you are done. If you have any questions, the medical assistant can answer them for you. Coloring books are available for your children in the exam room to occupy them. Thank you for your help.

Appendix E
FDA Public Health Advisory
Nonprescription Cough and Cold Medicine Use in Children

What should parents know about using cough and cold products in children?

- Do ***not*** use cough and cold products in children under 2 years of age UNLESS given specific directions to do so by a healthcare provider.

- Do not give children medicine that is packaged and made for adults. Use only products marked for use in babies, infants or children (sometimes called "pediatric" use).

- Cough and cold medicines come in many different strengths. If you are unsure about the right product for your child, ask a healthcare provider.

- If other medicines (over-the-counter or prescription) are being given to a child, the child's healthcare provider should review and approve their combined use.

- Read all of the information in the "Drug Facts" box on the package label so that you know the ***active ingredients*** and the ***warnings***.

- Follow the ***directions*** in the "Drug Facts" box. Do not give a child medicine more often or in greater amounts than is stated on the package.

- Too much medicine may lead to serious and life-threatening side effects, particularly in children aged 2 years and younger.

- For liquid products, parents should use the measuring device (dropper, dosing cup or dosing spoon) that is packaged with each different medicine formulation and that is marked to deliver the recommended dose. A kitchen teaspoon or tablespoon is not an appropriate measuring device for giving medicines to children.

- If a measuring device is not included with the product, parents should purchase one at the pharmacy. Make sure that the dropper, dosing cup or dosing spoon has markings on it that match the dosing that is in the ***directions*** in the "Drug Facts" box on the package label, or is recommended by the child's health care provider.

- If you DO NOT UNDERSTAND the instructions on the product, or how to use the dosing device (dropper, dosing cup or dosing spoon), DO NOT USE the medicine. Consult your healthcare provider if you have questions or are confused.

- Cough and cold medicines only treat the symptoms of the common cold such as runny nose, congestion, fever, aches, and irritability. They do not cure the common cold. Children get better with time.

- If a child's condition worsens or does not improve, stop using the product and immediately take the child to a health care provider for evaluation.

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Appendix F

TWU CON Cold Treatment Survey Cover Letter

Parent Survey for over the counter cough and cold medication use

We are asking parents of children who are less than12 years old what they think about over-the-counter cough and cold medicines. Over-the-counter medicines are those that you can buy at the store without a doctor's prescription. We are asking questions about your use of these medicines in the past 2 years. This survey is voluntary and no one will be able to know who you are from the answers you give. Your completion of the survey instrument serves as consent for the study. Your input in the study will not affect the service or care your child gets in our clinic today.

If you have more than one child who is less than 12 years old, we would like you to answer the questions keeping only your youngest child in mind. You will fill out the survey in an exam room. If you have questions, please ask the nurse. When you are finished filling out the survey please give it to the nurse.

Thank you for your answers!

TWU CON Cold Treatment Survey Demographic Collection Tool

Demographic Information 1

Please indicate your answer by filling in the blanks or circling the best answer.					
My age is:	____ Number of Years				
I am:	Male	Female			
My role as the person who cares for this child is:	Parent	Step Parent	Grandparent Or Great Grandparent	Foster parent	Other
Marital Status	Single	Married	Divorced	Separated	Widowed
I see myself as:	Mexican-Hispanic	Not Mexican Hispanic			
My race is:	White	Black	Asian	Native American	
I speak:	English	Spanish	Both English and Spanish	Other Language	

Demographic Information 2

I am the only caregiver in my home:	Yes	No				
My Insurance for my children is:	Medicaid/ CHIP (State Insurance)	Insurance Plan	No Insurance			
I was born in:	United States	Mexico	Other Country			
I have lived in the United States:	_____ Number of years					
What is your education:	less than 12th grade	High School Graduate	Some College or Trade School	Associate Degree	Bachelors degree	Graduate degree
Age of Children:(start with your youngest child's age)	1._____	2._____	3._____	4._____	5._____	

Texas Woman's University, College of Nursing
Cold Treatment Survey

Over-the-counter medicine is medicine you can buy that does not need a prescription.
A **child's cold** has a **cough** and/or a **runny nose.**

Answer these questions as if your youngest child experienced a cold **during last two years**

1. Would you have used over-the-counter cough and cold medicine to treat your child's cold symptoms, such as a cough or runny nose? (Circle one answer)	Never	Seldom	Half the time	Usually	Always
2. If you did decide to use over-the-counter cough and cold medicine, would you ask a doctor, nurse, or pharmacist **which** medicine you should give your child? (Circle one answer)	Never	Seldom	Half the time	Usually	Always
3. If you did decided to use over-the-counter cough and cold medicine, would you ask a doctor, nurse, or pharmacist **how much** medicine you should give your child? (Circle one answer)	Never	Seldom	Half the time	Usually	Always
4. How often does over-the-counter cough and cold medicine help a child's cold symptoms, such as a cough or runny nose? (Circle one answer)	It never helps.	It seldom helps.	It helps about half the time.	It usually helps.	It always helps.
5. Can a child's cough, cold, or runny nose go away without giving any medicine at all?	Yes		No		
6. Does Tylenol or Motrin help a child's cold symptoms, such as cough or runny nose?	Yes		No		
7. Does an antibiotic help a child with a cold get well faster?	Yes		No		

8. At what age do you believe a child is old enough for over-the-counter cough or runny nose medicine? ____months or ____ years?

Texas Woman's University, College of Nursing
Cold Treatment Survey

9. Sometimes parents use other things to help children when they have a cough, cold, or runny nose. Would you use any of the following to help your sick child when they have had a cough, cold, or runny nose? (Circle any you have used)

Saline drops or spray	Chicken soup	Vitamin C	Kava Kava
Hot tea	Onions	Echinacea	Zinc Lozenges
Chamomile tea	Massage	Cool bath	Cupping
Music	Humidifier	Elderberry	Rubbing Alcohol
Prayer	Steamy room	Ginger root tea	Coining
Garlic	Warm bath	Vapor Rub	Candling

10. Is there any other remedy (or remedies) you have tried for your child's cough, cold, or runny nose that is not listed above? Please write the name of the remedy or remedies in the space below. If you don't use any other remedies write "No" in the blank.

_____

Texas Woman's University, College of Nursing
Cold Treatment Survey

How old is your youngest child? _____ months old or _____ years old.

11. If you felt you had to use a medicine for your youngest child's cough, cold, or runny nose, which one of these four over-the-counter (OTC) medicines would you choose? (circle one)

How to give:

age	dose
children under 6 years	do not use
6 to 12 years	2 teaspoons every 6 hours
adults and children 12 years and over	4 teaspoons every 6 hours

Weight	Age	Dose (tsp or ml)
Under 35 lbs	Under 4 years	do not use
36-47 lbs	4-5 years	Do not use unless directed by a doctor
48-95 lbs	6-11 years	2 tsp or 10 mL

Age	Dose (tsp or ml)
Adults and children 12 years of age and over	10 mL every 12 hours not to exceed 20 mL in 24 hours
Children 6 to under 12 years of age	5 mL every 12 hours not to exceed 10 mL in 24 hours
Children 4 to under 6 years of age	2.5 mL every 12 hours not to exceed 5 mL in 24 hours
Children under 4 years of age	Do not use

Age	Dose (tsp or ml)
Children 6 to under 12 years of age	every 4 hrs. *1-2 teaspoonfuls*
Children 4 to under 6 years of age	every 4 hrs. *1/2 1 teaspoonful*
Children under 4 years of age	Do not use!

12. Are these dosing instructions easy to understand? **Yes** **No**

13. If you would not use any of the above over-the-counter medicines for your youngest child's cough, cold or runny nose is there another over-the-counter medicine you would use? Write "No" if you do not use any OTC medicines._____

Texas Woman's University, College of Nursing
Cold Treatment Survey

14. Which one of the measuring tools would you use to measure liquid medicine for **your youngest** child? (circle all that apply)	Kitchen spoon	Medicine cup	Medicine syringe	Medicine dropper
15. How soon would you expect these over-the-counter cough and cold medicines to help a child's cough, cold, or runny nose?	In less than 30 minutes		More than 30 minutes	
16. Do you usually keep over-the-counter medicines for cough, cold or runny nose for children in your home?	Yes		No	
17. Did you know that pharmacies have removed over-the-counter cough, cold or runny nose medicines for babies less than 2 years old from their shelves?	Yes		No	

One Covariate ~ 12

Eight Behavioral (1, 2, 3, 9, 10, 11, 13, 16)

Eight Knowledge (4, 5, 6, 7, 8, 14, 15, 17

Appendix G

Statistical Plan

In order to determine the effectiveness of the TWU CON Cold Treatment Survey in the selected population for this study, the following statistical processes will be used. The CVI determined for the TWU CON Cold Treatment Survey was 0.944, an excellent rating according to Lynn, (1986). Reliability and validity will also be conducted for the TWU CON Cold Treatment Survey. The statistical analysis will consist of item-item, item-scale, scale-scale correlations and Cronbach's alpha coefficient, validity testing: scale-scale correlations and factor analysis (Pallant, 2007, pp.101-104).

A t-test will be used to compare the mean knowledge and mean behavior between the groups under study if the assumptions (homogeneity of variance, symmetric distributions) are met; if not, a Mann-Whitney U will be used for the comparisons. MANOVA will be used to compare the two groups on knowledge and behavior simultaneously (Pallant, 2007, pp. 232-240). A power analysis with an alpha of 0.05, a power of 0.8, and a moderate effect size yielded a subject number of 50 participants per group, requiring 100 participants for this study (Cohen, 1992).

Knowledge and behavior scores will be submitted to Pearson correlation analysis for all participants combined, and within each of the groups under study. The correlations within each group will be analyzed using Fisher's Z-transform test to determine if the correlations are significantly different (Pallant, 2007, p. 126-141). A statistician will be consulted.

Appendix H

Scale: Reliability: Total Cold (all Items) Research Question 1

Case Processing Summary

		N	%
Cases	Valid	48	48.0
	Excluded[a]	52	52.0
	Total	100	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha coefficient	Cronbach's alpha coefficient Based on Standardized Items	N of Items
.359	.375	15

Item Statistics

	Mean	Std. Deviation	N
EBq1RecodeFrequency	3.2708	1.19822	48
EBq2WhichMed	3.6458	1.36038	48
EBq3HowMuch	3.4375	1.50044	48
EBq9RecodeOtherTx	3.1250	.48925	48
EBq11RecodeMedChoice	3.1667	2.01413	48
EBq13RecodeOtherMed	4.5833	1.08830	48
EBq16RecodeMedHome	2.6667	1.99290	48
EKq4RecodeMedHelped	3.0833	.94155	48
EKq5RecodeNoMed	2.8333	2.01413	48
EKq6RecodeTMHelped	4.3333	1.50649	48
EKq7RecodeAnbxHelped r	2.1667	1.83736	48
EKq8AgeMedsHelped	2.0000	1.75038	48
EKq14RecodeMeasureTool	4.9167	.57735	48
EKq15RecodeTime	4.4167	1.42670	48
EKq17RecodeRemovedMed	3.5833	1.93328	48

	EBq1RecodeFrequency	EBq2WhichMed Ask doctor,	EBq3HowMuch	EBq9RecodeOtherTx	EBq11RecodeMedChoice	EBq13RecodeOtherMed	EBq16RecodeMedHome	EKq4RecodeMedHelped
EBq1RecodeFrequency	1.000					.		
EBq2WhichMed	.452	1.000						
EBq3HowMuch	.335	.870	1.000					
EBq9RecodeOtherTx	.159	.132	.098	1.000				
EBq11RecodeMedChoice	-.107	-.304	-.236	-.108	1.000			
EBq13RecodeOtherMed	.154	.128	.140	-.060	-.201	1.000		
EBq16RecodeMedHome	.662	.379	.235	.131	-.155	.092	1.000	
EKq4RecodeMedHelped	.357	-.043	-.132	.162	.082	.035	.151	1.000
EKq5RecodeNoMed	-.175	-.379	-.412	-.065	.175	-.110	-.184	.142
EKq6RecodeTMHelped	.102	-.159	-.245	-.115	-.075	.035	.265	.220
EKq7RecodeAnbxHelped faster	.240	-.035	-.096	-.166	.038	.078	.201	-.008
EKq8AgeMedsHelped	.152	.080	.122	-.149	.435	-.045	.000	.103
EKq14RecodeMeasureTool	.156	.178	.141	.038	-.134	-.056	.123	.013
EKq15RecodeTime	-.055	.023	.162	-.137	.094	-.050	-.249	-.026
EKq17RecodeRemovedMed	.022	.129	.042	.011	.018	-.206	.184	-.214

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Inter-Item Correlations	.038	-.412	.870	1.282	-2.112	.038	15

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's alpha coefficient if Item Deleted
EBq1RecodeFrequency	47.9583	42.722	.515	.621	.237
EBq2WhichMed	47.5833	45.993	.237	.815	.307
EBq3HowMuch	47.7917	47.317	.129	.803	.337
EBq9RecodeOtherTx	48.1042	52.351	-.052	.174	.367
EBq11RecodeMedChoice	48.0625	49.124	-.034	.356	.404
EBq13RecodeOtherMed	46.6458	51.595	-.036	.167	.376
EBq16RecodeMedHome	48.5625	39.783	.337	.573	.244
EKq4RecodeMedHelped	48.1458	49.276	.156	.324	.337
EKq5RecodeNoMed	48.3958	52.202	-.139	.287	.444
EKq6RecodeTMHelped	46.8958	48.393	.074	.299	.354
EKq7RecodeAnbxHelped	49.0625	42.188	.279	.282	.276
EKq8AgeMedsHelped	49.2292	43.670	.237	.334	.296
EKq14RecodeMeasureTool	46.3125	51.666	.027	.148	.360
EKq15RecodeTime	46.8125	52.113	-.093	.192	.401
EKq17RecodeRemovedMed	47.6458	45.255	.124	.308	.339

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
51.2292	52.223	7.22655	15

Appendix I

Scale: Reliability Behavior (ALL items)

Case Processing Summary

		N	%
Cases	Valid	57	57.0
	Excluded[a]	43	43.0
	Total	100	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha coefficient	Cronbach's alpha coefficient Based on Standardized Items	N of Items
.402	.477	7

Item Statistics

	Mean	Std. Deviation	N
EBq1RecodeFrequency	3.3333	1.18523	57
EBq2WhichMed	3.7719	1.30955	57
EBq3HowMuch	3.5614	1.48826	57
EBq9RecodeOtherTx	3.1404	.51543	57
EBq11RecodeMedChoice	3.1053	2.01498	57
EBq13RecodeOtherMed	4.5088	1.15144	57
EBq16RecodeMedHome	2.5439	1.96460	57

Inter-Item Correlation Matrix

	EBq1RecodeFrequency	EBq2WhichMed	EBq3HowMuch	EBq9RecodeOtherTx	EBq11RecodeMedChoice	EBq13RecodeOtherMed	EBq16RecodeMedHome
EBq1RecodeFrequency	1.000						
EBq2WhichMed	.476	1.000					
	.368	.846	1.000				
EBq9RecodeOtherTx	.156	.154	.128	1.000			
EBq11RecodeMedChoice	-.150	-.275	-.258	-.152	1.000		
EBq13RecodeOtherMed	.122	.043	.101	-.243	-.162	1.000	
EBq16RecodeMedHome	.603	.334	.211	.205	-.114	.025	1.000

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Inter-Item Correlations	.115	-.275	.846	1.121	-3.076	.085	7

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's alpha coefficient if Item Deleted
EBq1RecodeFrequency	20.6316	15.844	.572	.459	.182
EBq2WhichMed	20.1930	15.551	.520	.757	.187
EBq3HowMuch	20.4035	15.602	.410	.726	.229
EBq9RecodeOtherTx	20.8246	21.969	.084	.141	.404
EBq11RecodeMedChoice	20.8596	24.266	-.286	.123	.667
EBq13RecodeOtherMed	19.4561	21.431	-.011	.134	.443
EBq16RecodeMedHome	21.4211	13.391	.375	.388	.215

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
23.9649	22.642	4.75832	7

Appendix J

Scale: Reliability Behavior-EBq11RecodeMedChoice

Case Processing Summary

		N	%
Cases	Valid	57	57.0
	Excluded[a]	43	43.0
	Total	100	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha coefficient	Cronbach's alpha coefficient Based on Standardized Items	N of Items
.667	.649	6

Item Statistics

	Mean	Std. Deviation	N
Would you have used OTC CCM to tx	3.3333	1.18523	57
Ask doctor, nurse, pharmacist which med?	3.7719	1.30955	57
Ask doctor, nurse, pharmacist how much med?	3.5614	1.48826	57
What other tx would you use	3.1404	.51543	57
If you don't use the above OTC CCM which one would you use	4.5088	1.15144	57
Do you usually keep OTC CCMs in your home	2.5439	1.96460	57

Inter-Item Correlation Matrix

	Would you have used OTC CCM to tx	Ask doctor, nurse, pharmacist which med?	Ask doctor, nurse, pharmacist how much med?	What other tx would you use	If you don't use the above OTC CCM which one would you use	Do you usually keep OTC CCMs in your home
Would you have used OTC CCM to tx	1.000					
Ask doctor, nurse, pharmacist which med?	.476	1.000				
Ask doctor, nurse, pharmacist how much med?	.368	.846	1.000			
What other tx would you use	.156	.154	.128	1.000		
If you don't use the above OTC CCM which one would you use	.122	.043	.101	-.243	1.000	
Do you usually keep OTC CCMs in your home	.603	.334	.211	.205	.025	1.000

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Inter-Item Correlations	.235	-.243	.846	1.089	-3.483	.066	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's alpha coefficient if Item Deleted
Would you have used OTC CCM to tx	17.5263	16.754	.629	.459	.550
Ask doctor, nurse, pharmacist which med?	17.0877	15.724	.657	.754	.529
Ask doctor, nurse, pharmacist how much med?	17.2982	15.677	.541	.726	.567
What other tx would you use	17.7193	23.277	.145	.118	.685
If you don't use the above OTC CCM which one would you use	16.3509	22.303	.059	.103	.720
Do you usually keep OTC CCMs in your home	18.3158	14.113	.426	.388	.637

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
20.8596	24.266	4.92602	6

Appendix K

Scale: Reliability Knowledge

Case Processing Summary

		N	%
Cases	Valid	76	76.0
	Excluded[a]	24	24.0
	Total	100	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha coefficient	Cronbach's alpha coefficient Based on Standardized Items	N of Items
.378	.322	8

Item Statistics

	Mean	Std. Deviation	N
EKq4RecodeMedHelped	3.0658	.85378	76
EKq5RecodeNoMed	2.5263	1.95601	76
EKq6RecodeTMHelped	4.1579	1.64157	76
EKq7RecodeAnbxHelped	2.1579	1.82613	76
EKq8AgeMedsHelped	2.0526	1.77309	76
EKq14RecodeMeasureTool	4.8947	.64455	76
EKq15RecodeTime	4.3158	1.51623	76
EKq17RecodeRemovedMed	3.3684	1.97884	76

Inter-Item Correlation Matrix

	EKq4RecodeMedHelped	EKq5RecodeNoMed	EKq6RecodeTMHelped	EKq7RecodeAnbxHelped	EKq8AgeMedsHelped	EKq14RecodeMeasureTool	EKq15RecodeTime	EKq17RecodeRemovedMed
EKq4RecodeMedHelped	1.000							
EKq5RecodeNoMed	.067	1.000						
EKq6RecodeTMHelped	.230	.206	1.000					
EKq7RecodeAnbxHelped	-.084	.215	.045	1.000				
EKq8AgeMedsHelped	.130	.023	.089	.080	1.000			
EKq14RecodeMeasureTool	-.084	-.040	-.085	.105	.098	1.000		
EKq15RecodeTime	-.088	-.003	-.063	.136	.192	-.075	1.000	
EKq17RecodeRemovedMed	-.125	-.009	.228	.117	.253	.031	-.022	1.000

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Inter-Item Correlations	.056	-.125	.253	.378	-2.022	.013	8

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's alpha coefficient if Item Deleted
EKq4RecodeMedHelped	23.4737	29.426	.028	.134	.388
EKq5RecodeNoMed	24.0132	23.533	.161	.095	.347
EKq6RecodeTMHelped	22.3816	23.972	.233	.163	.307
EKq7RecodeAnbxHelped	24.3816	23.172	.222	.098	.310
EKq8AgeMedsHelped	24.4868	22.653	.273	.151	.280
EKq14RecodeMeasureTool	21.6447	29.965	.004	.051	.390
EKq15RecodeTime	22.2237	27.163	.060	.090	.391
EKq17RecodeRemovedMed	23.1711	22.944	.187	.168	.331

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
26.5395	30.412	5.51469	8

Descriptive Statistics

	Mean	Std. Deviation	N
totalBehavior	23.96	4.758	57
totalKnowledge	25.3800	5.90117	100

Correlations

		totalBehavior	totalKnowledge
totalBehavior	Pearson Correlation	1	.017
	Sig. (2-tailed)		.898
	N	57	57
totalKnowledge	Pearson Correlation	.017	1
	Sig. (2-tailed)	.898	
	N	57	100

Appendix L

Research Question 1, Factor Analysis: Q1 – Q17:

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.507
Bartlett's Test of Sphericity	Approx. Chi-Square	162.466
	df	105
	Sig.	.000

Communalities

	Initial	Extraction
EBq1RecodeFrequency Would you have used OTC CCM to tx	1.000	.766
EBq2WhichMed Ask doctor, nurse, pharmacist which med?	1.000	.789
EBq3HowMuch Ask doctor, nurse, pharmacist how much med?	1.000	.857
EBq9RecodeOtherTx What other tx would you use	1.000	.643
EBq11RecodeMedChoice Which one of the four med would you choose	1.000	.729
EBq13RecodeOtherMed If you don't use the above OTC CCM which one would you use	1.000	.683
EBq16RecodeMedHome Do you usually keep OTC CCMs in your home	1.000	.593
EKq4RecodeMedHelped How often does OTC CCM help a childs cold	1.000	.617
EKq5RecodeNoMed Can a childs cold go away with no med	1.000	.550
EKq6RecodeTMHelped Does Tylenol or Motrin help with cold symptoms	1.000	.646
EKq7RecodeAnbxHelped Does an anbx help a cold get well faster	1.000	.672
EKq8AgeMedsHelped At what age is a child old enough for OTC CCM	1.000	.766
EKq14RecodeMeasureTool Which measuring tool would you use	1.000	.348
EKq15RecodeTime How soon would you expect these OTC CCM to help	1.000	.585

EKq17RecodeRemovedMed Did you know med were removed for children less than 2 years	1.000	.649

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.489	16.596	16.596	2.489	16.596	16.596	2.194	14.629	14.629
2	1.827	12.179	28.775	1.827	12.179	28.775	1.977	13.177	27.807
3	1.562	10.412	39.186	1.562	10.412	39.186	1.521	10.140	37.947
4	1.480	9.868	49.055	1.480	9.868	49.055	1.518	10.123	48.070
5	1.301	8.673	57.728	1.301	8.673	57.728	1.354	9.030	57.100
6	1.234	8.225	65.953	1.234	8.225	65.953	1.328	8.854	65.953
7	.986	6.571	72.524						
8	.843	5.619	78.144						
9	.725	4.832	82.976						
10	.640	4.269	87.244						
11	.581	3.874	91.119						
12	.512	3.413	94.532						
13	.425	2.831	97.363						
14	.253	1.688	99.051						
15	.142	.949	100.000						

Extraction Method: Principal Component Analysis.

Number of variables: 15
Number of subjects: 100
Number of replications: 100
++
Eigenvalue # Random Eigenvalue Standard Dev
++
1 1.7324 .0988
2 1.5458 .0674
3 1.4203 .0599
4 1.3098 .0479
5 1.2118 .0435
6 1.1199 .0358
7 1.0389 .0442
8 0.9612 .0416
9 0.8848 .0353
10 0.8087 .0343
11 0.7353 .0359
12 0.6686 .0366
13 0.5914 .0393
14 0.5261 .0405
15 0.4450 .0367
++
3/16/2011 7:37:34 PM
Monte Carlo PCA for Parallel Analysis
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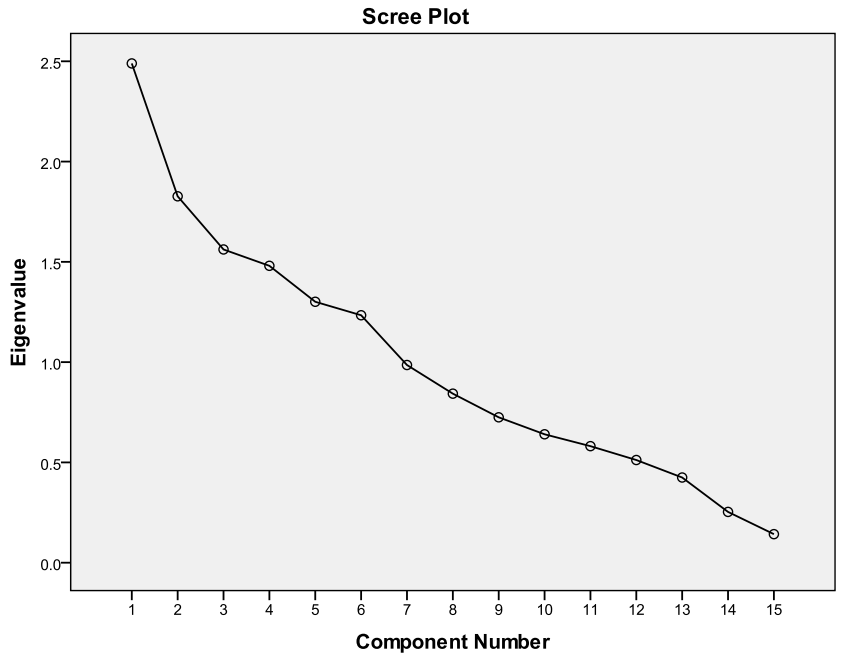


Component Matrix[a]

	Component					
	1	2	3	4	5	6
EBq1RecodeFrequency Would you have used OTC CCM to tx	.699	.431				
EBq2WhichMed Ask doctor, nurse, pharmacist which med?	.799					
EBq3HowMuch Ask doctor, nurse, pharmacist how much med?	.772					
EBq9RecodeOtherTx What other tx would you use				.512		
EBq11RecodeMedChoice Which one of the four med would you choose				.550		
EBq13RecodeOtherMed If you don't use the above OTC CCM which one would you use				-.744		
EBq16RecodeMedHome Do you usually keep OTC CCMs in your home	.551	.411				
EKq4RecodeMedHelped How often does OTC CCM help a childs cold		.598				
EKq5RecodeNoMed Can a childs cold go away with no med					.528	
EKq6RecodeTMHelped Does Tylenol or Motrin help with cold symptoms		.682				
EKq7RecodeAnbxHelped Does an anbx help a cold get well faster						.644
EKq8AgeMedsHelped At what age is a child old enough for OTC CCM			.659			

EKq14RecodeMeasureTool Which measuring tool would you use						
EKq15RecodeTime How soon would you expect these OTC CCM to help			.520			.455
EKq17RecodeRemovedMed Did you know med were removed for children less than 2 years					.514	

Extraction Method: Principal Component Analysis.

a. 6 components extracted.

Rotated Component Matrix[a]

	Component					
	1	2	3	4	5	6
EBq1RecodeFrequency Would you have used OTC CCM to tx		.806				
EBq2WhichMed Ask doctor, nurse, pharmacist which med?	.861					
EBq3HowMuch Ask doctor, nurse, pharmacist how much med?	.919					
EBq9RecodeOtherTx What other tx would you use			-.739			
EBq11RecodeMedChoice Which one of the four med would you choose				.775		
EBq13RecodeOtherMed If you don't use the above OTC CCM which one would you use			.778			
EBq16RecodeMedHome Do you usually keep OTC CCMs in your home		.744				
EKq4RecodeMedHelped How often does OTC CCM help a childs cold		.709				

EKq5RecodeNoMed Can a childs cold go away with no med				.569	
EKq6RecodeTMHelped Does Tylenol or Motrin help with cold symptoms	.433				.467
EKq7RecodeAnbxHelped Does an anbx help a cold get well faster				.816	
EKq8AgeMedsHelped At what age is a child old enough for OTC CCM		.799			
EKq14RecodeMeasureTool Which measuring tool would you use					.539
EKq15RecodeTime How soon would you expect these OTC CCM to help				.508	
EKq17RecodeRemovedMed Did you know med were removed for children less than 2 years					.722

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Component Transformation Matrix

Component	1	2	3	4	5	6
1	.794	.572	-.031	-.102	-.136	.109
2	-.444	.692	.413	.302	.154	.197
3	.374	-.329	.173	.671	.459	.248
4	-.142	.225	-.826	.485	-.094	-.050
5	-.099	.009	-.320	-.420	.428	.727
6	.045	.187	-.118	-.191	.745	-.597

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Two Component Extraction Findings: (not retained):

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.489	16.596	16.596	2.489	16.596	16.596	2.228	14.852	14.852
2	1.827	12.179	28.775	1.827	12.179	28.775	2.088	13.923	28.775
3	1.562	10.412	39.186						
4	1.480	9.868	49.055						
5	1.301	8.673	57.728						
6	1.234	8.225	65.953						
7	.986	6.571	72.524						
8	.843	5.619	78.144						
9	.725	4.832	82.976						
10	.640	4.269	87.244						
11	.581	3.874	91.119						
12	.512	3.413	94.532						
13	.425	2.831	97.363						
14	.253	1.688	99.051						
15	.142	.949	100.000						

Extraction Method: Principal Component Analysis.

Appendix M

Tests for Normality for Split Groups Research Question 2

Case Processing Summary

ageYoungestCategory		Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
1 24months and under	totalKnowledge	53	100.0%	0	.0%	53	100.0%
2 over 24months to 12yrs	totalKnowledge	46	100.0%	0	.0%	46	100.0%

Descriptives[a]

ageYoungestCategory				Statistic	Std. Error
1 24months and under	totalKnowledge	Mean		24.5472	.77776
		95% Confidence Interval for Mean	Lower Bound	22.9865	
			Upper Bound	26.1079	
		5% Trimmed Mean		24.5734	
		Median		24.0000	
		Variance		32.060	
		Std. Deviation		5.66218	
		Minimum		10.00	
		Maximum		38.00	
		Range		28.00	
		Interquartile Range		8.50	
		Skewness		-.006	.327
		Kurtosis		-.223	.644
2 over 24months to 12yrs	totalKnowledge	Mean		26.2391	.90313
		95% Confidence Interval for Mean	Lower Bound	24.4201	
			Upper Bound	28.0581	
		5% Trimmed Mean		26.1787	
		Median		26.0000	
		Variance		37.519	
		Std. Deviation		6.12530	
		Minimum		13.00	
		Maximum		40.00	
		Range		27.00	
		Interquartile Range		8.25	
		Skewness		.140	.350

Kurtosis	-.253	.688

a. totalKnowledge is constant in one or more split files. It has been omitted.

Extreme Values[b]

ageYoungestCategory				Case Number	Value
1 24months and under	totalKnowledge	Highest	1	34	38.00
			2	44	34.00
			3	47	33.00
			4	50	33.00
			5	22	32.00
		Lowest	1	49	10.00
			2	35	15.00
			3	31	16.00
			4	14	17.00
			5	2	17.00
2 over 24months to 12yrs	totalKnowledge	Highest	1	58	40.00
			2	67	38.00
			3	79	37.00
			4	89	36.00
			5	90	35.00
		Lowest	1	66	13.00
			2	62	16.00
			3	92	17.00
			4	91	17.00
			5	72	18.00[a]

a. Only a partial list of cases with the value 18.00 are shown in the table of lower extremes.

b. totalKnowledge is constant in one or more split files. It has been omitted.

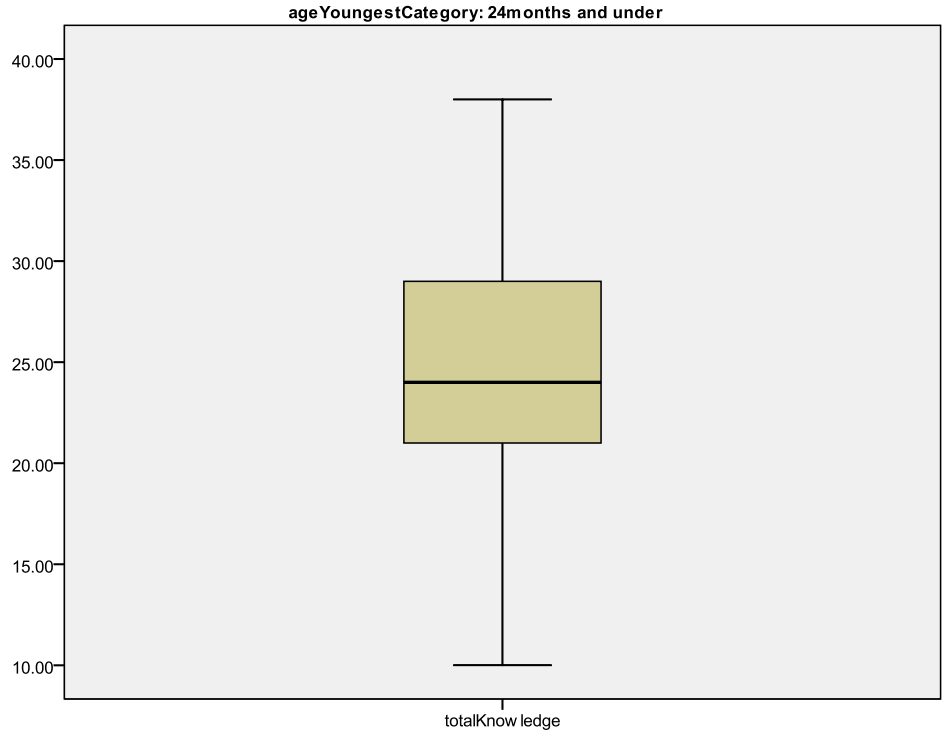
Tests of Normality[b]

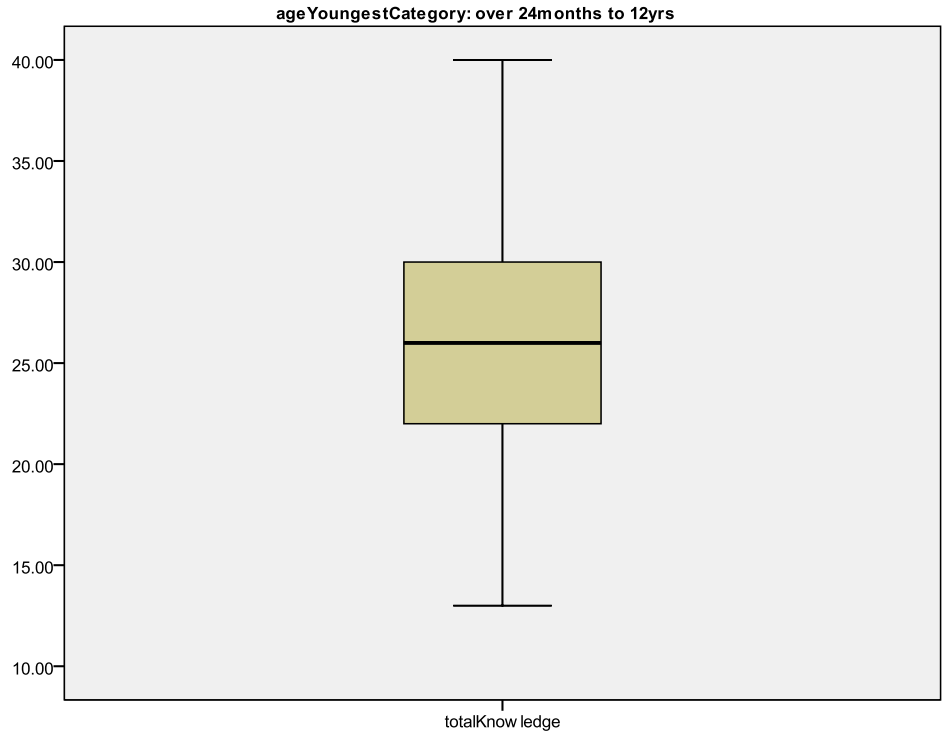
ageYoungestCategory		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
1 24months and under	totalKnowledge	.086	53	.200*	.986	53	.789
2 over 24months to 12yrs	totalKnowledge	.103	46	.200*	.987	46	.873

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

b. totalKnowledge is constant in one or more split files. It has been omitted.


ageYoungestCategory: 24months and under
40.00
35.00
30.00
25.00
20.00
15.00
10.00
totalKnow ledge


ageYoungestCategory: over 24months to 12yrs
40.00
35.00
30.00
25.00
20.00
15.00
10.00
totalKnow ledge

Case Processing Summary

ageYoungestCategory		Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
1 24months and under	totalBehavior	34	64.2%	19	35.8%	53	100.0%
2 over 24months to 12yrs	totalBehavior	22	47.8%	24	52.2%	46	100.0%

Descriptives[a]

ageYoungestCategory				Statistic	Std. Error
1 24months and under	totalBehavior	Mean		24.24	.886
		95% Confidence Interval for Mean	Lower Bound	22.43	
			Upper Bound	26.04	
		5% Trimmed Mean		24.30	
		Median		24.00	
		Variance		26.670	
		Std. Deviation		5.164	
		Minimum		13	
		Maximum		33	
		Range		20	
		Interquartile Range		8	
		Skewness		-.080	.403
		Kurtosis		-.484	.788
2 over 24months to 12yrs	totalBehavior	Mean		23.68	.901
		95% Confidence Interval for Mean	Lower Bound	21.81	
			Upper Bound	25.55	
		5% Trimmed Mean		23.55	
		Median		24.50	
		Variance		17.846	
		Std. Deviation		4.224	
		Minimum		17	
		Maximum		33	
		Range		16	
		Interquartile Range		7	
		Skewness		.248	.491
		Kurtosis		-.573	.953

a. totalBehavior is constant in one or more split files. It has been omitted.

Extreme Values[b]

ageYoungestCategory				Case Number	Value
1 24months and under	totalBehavior	Highest	1	6	33
			2	26	33
			3	42	33
			4	34	32
			5	44	30
		Lowest	1	45	13
			2	17	16
			3	10	16
			4	51	18
			5	28	18[a]
2 over 24months to 12yrs	totalBehavior	Highest	1	65	33
			2	56	29
			3	96	29
			4	59	28
			5	64	27
		Lowest	1	100	17
			2	72	18
			3	94	19
			4	82	19
			5	71	19

a. Only a partial list of cases with the value 18 are shown in the table of lower extremes.

b. totalBehavior is constant in one or more split files. It has been omitted.

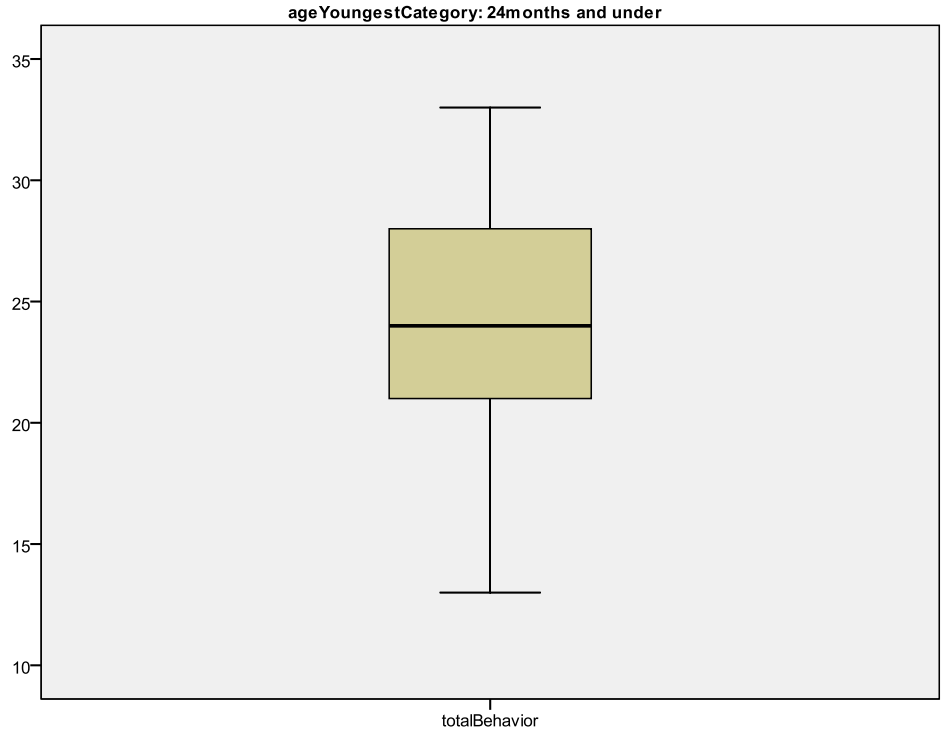
Tests of Normality[b]

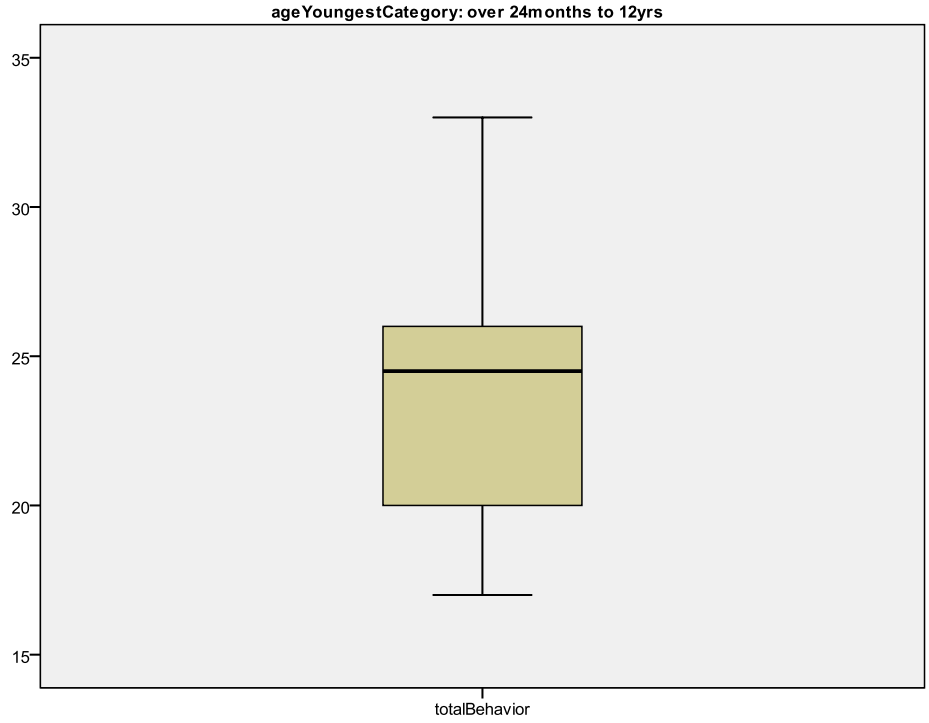
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
ageYoungestCategory		Statistic	df	Sig.	Statistic	df	Sig.
1 24months and under	totalBehavior	.077	34	.200*	.976	34	.649
2 over 24months to 12yrs	totalBehavior	.126	22	.200*	.961	22	.503

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

b. totalBehavior is constant in one or more split files. It has been omitted.


ageYoungestCategory: 24months and under
35
30
25
20
15
10
totalBehavior


ageYoungestCategory: over 24months to 12yrs
35
30
25
20
15
totalBehavior

Case Processing Summary

ageYoungestCategory		Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
1 24months and under	totalCold	34	64.2%	19	35.8%	53	100.0%
2 over 24months to 12yrs	totalCold	22	47.8%	24	52.2%	46	100.0%

Descriptives[a]

ageYoungestCategory				Statistic	Std. Error
1 24months and under	totalCold	Mean		49.65	1.255
		95% Confidence Interval for Mean	Lower Bound	47.09	
			Upper Bound	52.20	
		5% Trimmed Mean		49.25	
		Median		49.00	
		Variance		53.569	
		Std. Deviation		7.319	
		Minimum		38	
		Maximum		70	
		Range		32	
		Interquartile Range		11	
		Skewness		.714	.403
		Kurtosis		.522	.788
2 over 24months to 12yrs	totalCold	Mean		50.50	1.779
		95% Confidence Interval for Mean	Lower Bound	46.80	
			Upper Bound	54.20	
		5% Trimmed Mean		50.50	
		Median		51.00	
		Variance		69.595	
		Std. Deviation		8.342	
		Minimum		36	

	Maximum	65	
	Range	29	
	Interquartile Range	11	
	Skewness	-.072	.491
	Kurtosis	-.652	.953

a. totalCold is constant in one or more split files. It has been omitted.

Extreme Values[c]

ageYoungestCategory				Case Number	Value
1 24months and under	totalCold	Highest	1	34	70
			2	44	64
			3	50	62
			4	18	57
			5	42	56
		Lowest	1	45	38
			2	30	40
			3	31	41
			4	29	41
			5	19	41[a]
2 over 24months to 12yrs	totalCold	Highest	1	58	65
			2	65	64
			3	89	61
			4	59	59
			5	96	58
		Lowest	1	72	36
			2	91	37
			3	66	38
			4	62	40
			5	94	46[b]

a. Only a partial list of cases with the value 41 are shown in the table of lower extremes.

b. Only a partial list of cases with the value 46 are shown in the table of lower extremes.

Extreme Values[c]

ageYoungestCategory				Case Number	Value
1 24months and under	totalCold	Highest	1	34	70
			2	44	64
			3	50	62
			4	18	57
			5	42	56
		Lowest	1	45	38
			2	30	40
			3	31	41
			4	29	41
			5	19	41[a]
2 over 24months to 12yrs	totalCold	Highest	1	58	65
			2	65	64
			3	89	61
			4	59	59
			5	96	58
		Lowest	1	72	36
			2	91	37
			3	66	38
			4	62	40
			5	94	46[b]

a. Only a partial list of cases with the value 41 are shown in the table of lower extremes.

b. Only a partial list of cases with the value 46 are shown in the table of lower extremes.

c. totalCold is constant in one or more split files. It has been omitted.

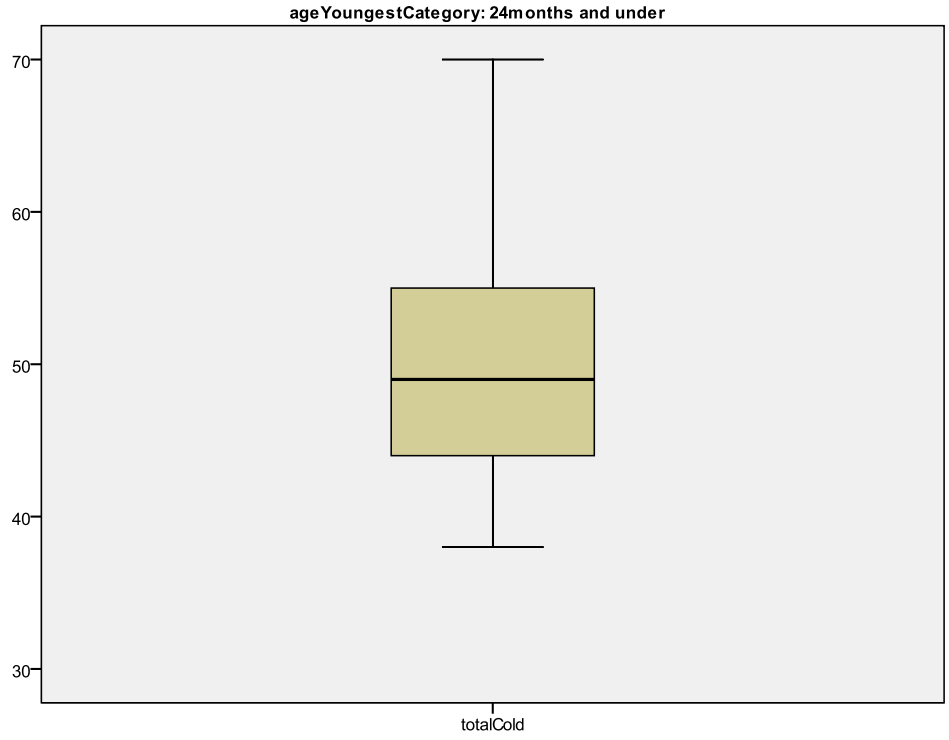
Tests of Normality[b]

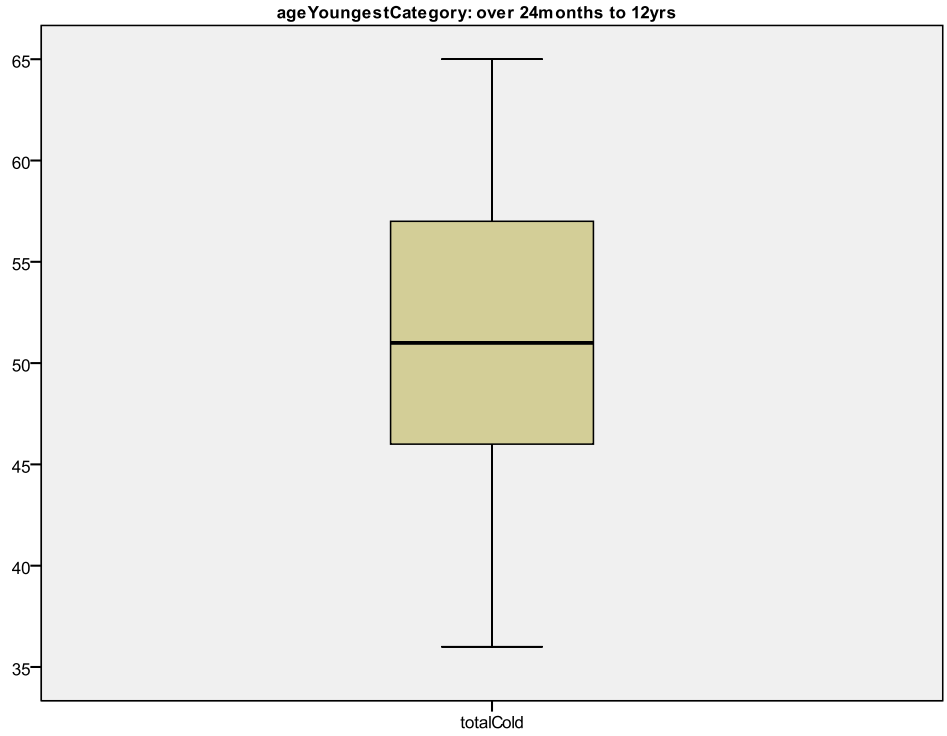
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
ageYoungestCategory		Statistic	df	Sig.	Statistic	df	Sig.
1 24months and under	totalCold	.098	34	.200*	.952	34	.145
2 over 24months to 12yrs	totalCold	.113	22	.200*	.967	22	.635

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

b. totalCold is constant in one or more split files. It has been omitted.




ageYoungestCategory: over 24months to 12yrs
65
60
55
50
45
40
35
totalCold

Descriptive Statistics for Research Question 2

Case Processing Summary

	ageYoungestCategory ageYoungestCategory	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
totalBehavior	24months and under	34	64.2%	19	35.8%	53	100.0%
	over 24months to 12yrs	23	48.9%	24	51.1%	47	100.0%
totalKnowledge	24months and under	53	100.0%	0	.0%	53	100.0%
	over 24months to 12yrs	47	100.0%	0	.0%	47	100.0%

Descriptives

	ageYoungestCategory ageYoungestCategory			Statistic	Std. Error
totalBehavior	24months and under	Mean		24.24	.886
		95% Confidence Interval for Mean	Lower Bound	22.43	
			Upper Bound	26.04	
		5% Trimmed Mean		24.30	
		Median		24.00	
		Variance		26.670	
		Std. Deviation		5.164	
		Minimum		13	
		Maximum		33	
		Range		20	
		Interquartile Range		8	
		Skewness		-.080	.403
		Kurtosis		-.484	.788
	over 24months to 12yrs	Mean		23.57	.868
		95% Confidence Interval for Mean	Lower Bound	21.76	
			Upper Bound	25.37	
		5% Trimmed Mean		23.43	
		Median		24.00	
		Variance		17.348	
		Std. Deviation		4.165	
		Minimum		17	
		Maximum		33	

		Range		16	
		Interquartile Range		6	
		Skewness		.325	.481
		Kurtosis		-.510	.935
totalKnowledge	24months and under	Mean		24.5472	.77776
		95% Confidence Interval for Mean	Lower Bound	22.9865	
			Upper Bound	26.1079	
		5% Trimmed Mean		24.5734	
		Median		24.0000	
		Variance		32.060	
		Std. Deviation		5.66218	
		Minimum		10.00	
		Maximum		38.00	
		Range		28.00	
		Interquartile Range		8.50	
		Skewness		-.006	.327
		Kurtosis		-.223	.644
	over 24months to 12yrs	Mean		26.3191	.88732
		95% Confidence Interval for Mean	Lower Bound	24.5331	
			Upper Bound	28.1052	
		5% Trimmed Mean		26.2671	
		Median		26.0000	
		Variance		37.005	
		Std. Deviation		6.08314	
		Minimum		13.00	
		Maximum		40.00	
		Range		27.00	
		Interquartile Range		8.00	
		Skewness		.104	.347
		Kurtosis		-.244	.681

Extreme Values

	ageYoungestCategory	ageYoungestCategory		Case Number	ID	Value
totalBehavior	24months and under	Highest	1	13	43.00	33
			2	39	11.00	33
			3	53	72.00	33
			4	50	58.00	32
			5	89	77.00	30
		Lowest	1	57	82.00	13
			2	78	29.00	16
			3	49	15.00	16
			4	69	41.00	18
			5	37	94.00	18[a]
	over 24months to 12yrs	Highest	1	99	26.00	33
			2	3	5.00	29
			3	67	92.00	29
			4	93	10.00	28
			5	97	25.00	27
		Lowest	1	62	100.00	17
			2	70	44.00	18
			3	87	37.00	19
			4	75	87.00	19
			5	64	64.00	19
totalKnowledge	24months and under	Highest	1	50	58.00	38.00
			2	89	77.00	34.00
			3	36	84.00	33.00
			4	84	90.00	33.00
			5	20	39.00	32.00
		Lowest	1	21	89.00	10.00
			2	27	60.00	15.00
			3	15	52.00	16.00
			4	54	21.00	17.00
			5	31	1.00	17.00
	over 24months to 12yrs	Highest	1	48	8.00	40.00

		2	95	30.00	38.00
		3	77	59.00	37.00
		4	29	79.00	36.00
		5	65	80.00	35.00
	Lowest	1	7	27.00	13.00
		2	58	22.00	16.00
		3	66	85.00	17.00
		4	44	81.00	17.00
		5	90	16.00	18.00[a]

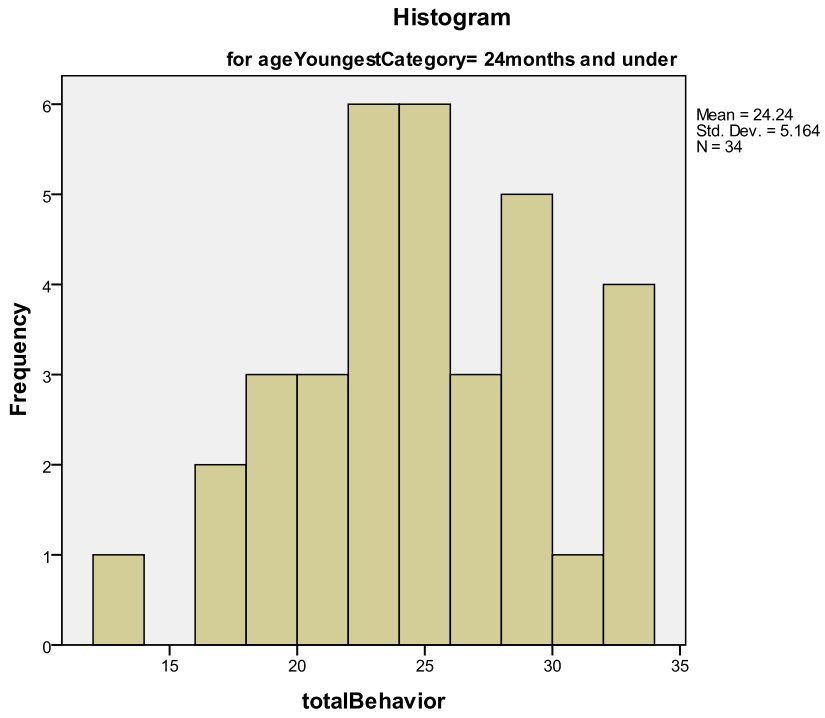
a. Only a partial list of cases with the value 18 are shown in the table of lower extremes.

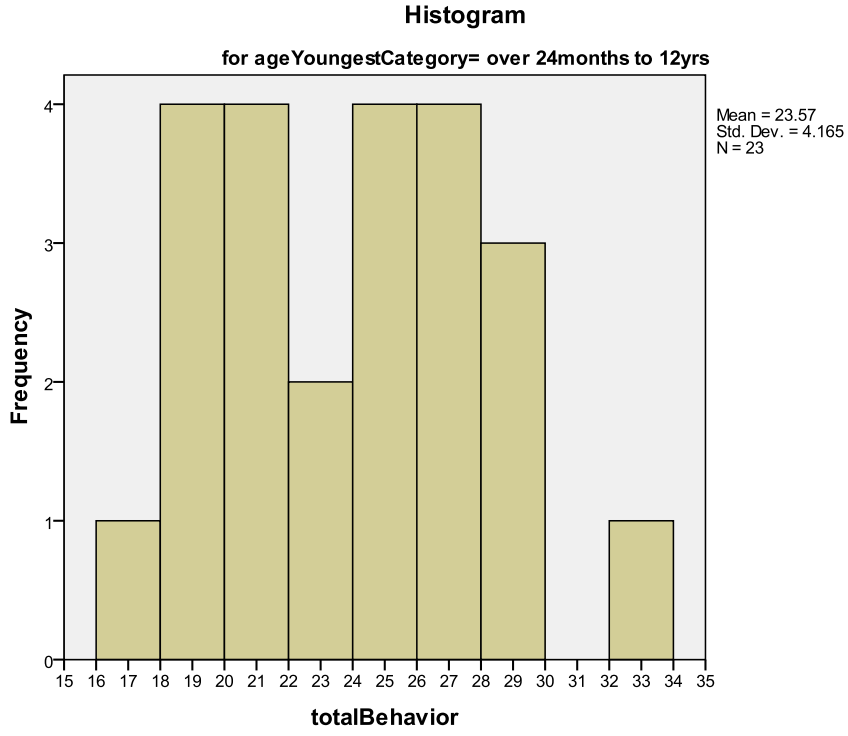
Tests of Normality

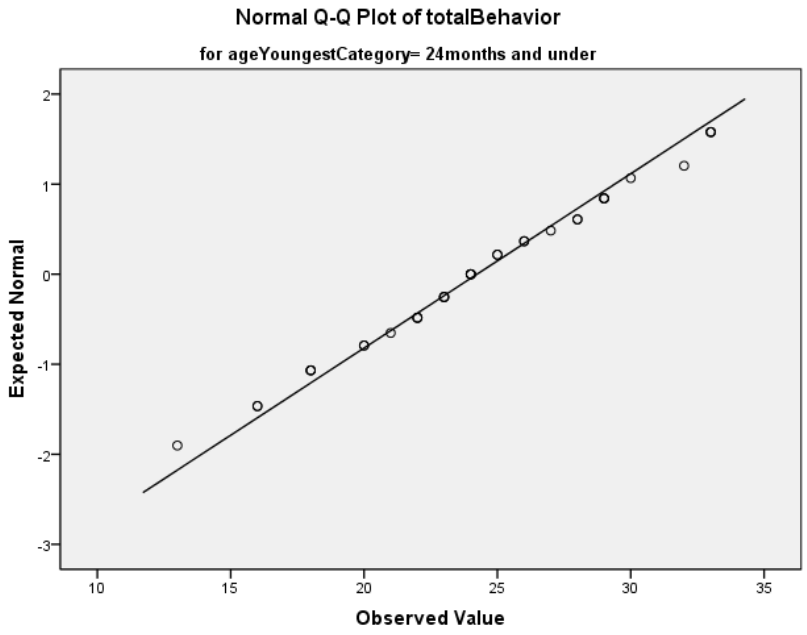
	ageYoungestCategory	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	ageYoungestCategory	Statistic	df	Sig.	Statistic	df	Sig.
totalBehavior	24months and under	.077	34	.200*	.976	34	.649
	over 24months to 12yrs	.122	23	.200*	.962	23	.502
totalKnowledge	24months and under	.086	53	.200*	.986	53	.789
	over 24months to 12yrs	.094	47	.200*	.988	47	.897

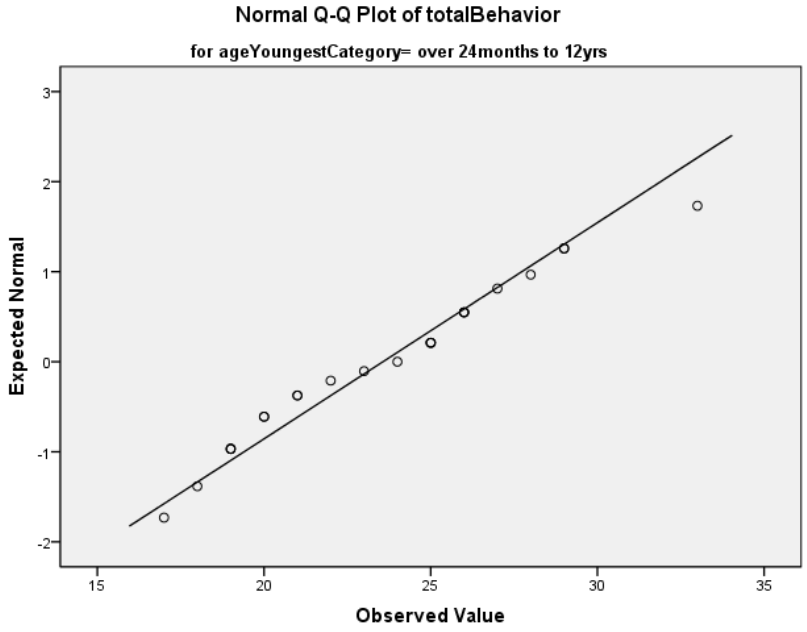
a. Lilliefors Significance Correction

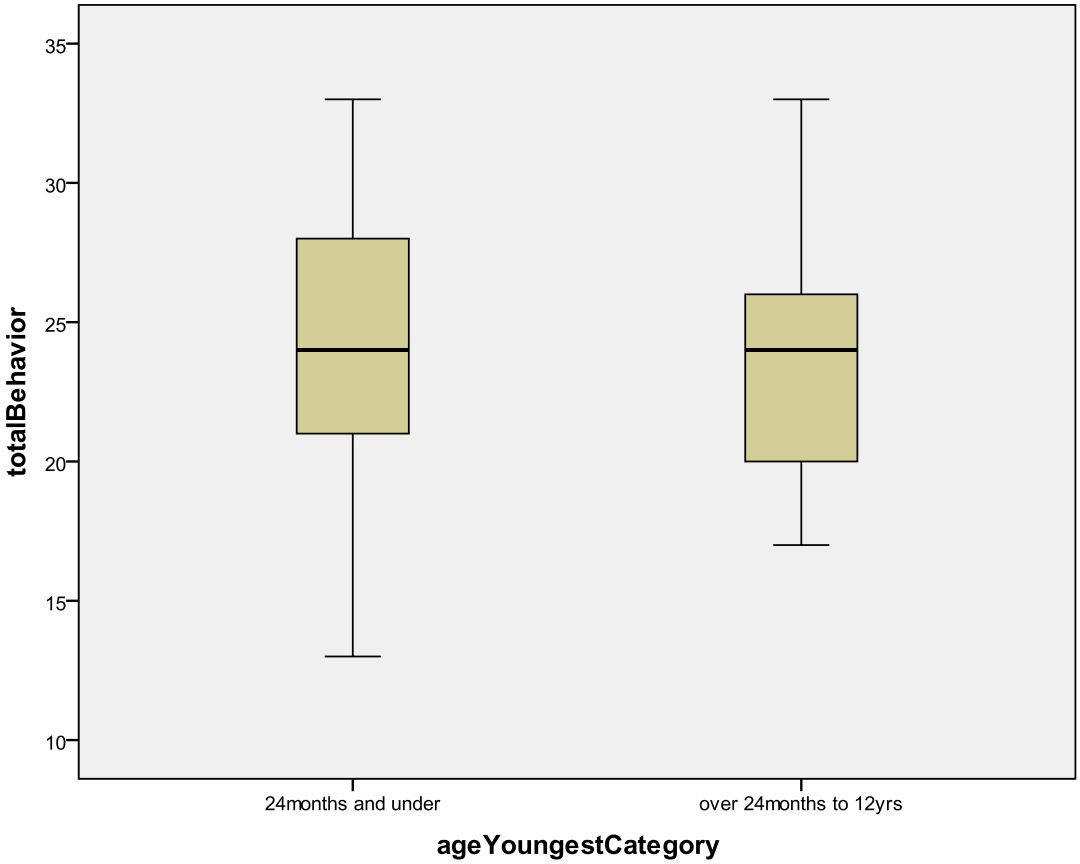
*. This is a lower bound of the true significance.


Histogram
for ageYoungestCategory= 24months and under
Mean = 24.24
Std. Dev. = 5.164
N = 34
Frequency
totalBehavior


Histogram
for ageYoungestCategory= over 24months to 12yrs
Mean = 23.57
Std. Dev. = 4.165
N = 23
Frequency
totalBehavior


Normal Q-Q Plot of totalBehavior
for ageYoungestCategory= 24months and under
Expected Normal
Observed Value
2
1
0
-1
-2
-3
10
15
20
25
30
35


Normal Q-Q Plot of totalBehavior
for ageYoungestCategory= over 24months to 12yrs
Expected Normal
Observed Value
3
2
1
0
-1
-2
15
20
25
30
35


35
30
25
20
15
10
totalBehavior
24months and under
over 24months to 12yrs
ageYoungestCategory

Appendix N

T-test for Research Question 2

Group Statistics

	ageYoungestCategory	N	Mean	Std. Deviation	Std. Error Mean
totalKnowledge	1 24months and under	53	24.5472	5.66218	.77776
	2 over 24months to 12yrs	46	26.2391	6.12530	.90313
totalBehavior	1 24months and under	34	24.24	5.164	.886
	2 over 24months to 12yrs	22	23.68	4.224	.901
totalCold	1 24months and under	34	49.65	7.319	1.255
	2 over 24months to 12yrs	22	50.50	8.342	1.779

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
totalKnowledge	Equal variances assumed	.047	.829	-1.428	97	.157	-1.69196	1.18521	-4.04427	.66034
	Equal variances not assumed			-1.420	92.480	.159	-1.69196	1.19187	-4.05895	.67503
totalBehavior	Equal variances assumed	.543	.464	.420	54	.676	.553	1.319	-2.091	3.198
	Equal variances not assumed			.438	50.939	.663	.553	1.263	-1.983	3.089
totalCold	Equal variances assumed	.526	.471	-.403	54	.688	-.853	2.116	-5.095	3.389
	Equal variances not assumed			-.392	40.702	.697	-.853	2.177	-5.250	3.544

Appendix O

Research Question 3 MANOVA

Between-Subjects Factors

		Value Label	N
ageYoungestCategory	1	24months and under	34
	2	over 24months to 12yrs	22

Descriptive Statistics

	ageYoungestCategory	Mean	Std. Deviation	N
totalKnowledge	1 24months and under	25.4118	5.46680	34
	2 over 24months to 12yrs	26.8182	6.50741	22
	Total	25.9643	5.88052	56
totalBehavior	1 24months and under	24.24	5.164	34
	2 over 24months to 12yrs	23.68	4.224	22
	Total	24.02	4.784	56

Box's Test of Equality of Covariance Matrices[a]

Box's M	2.455
F	.783
df1	3
df2	91501.402
Sig.	.503

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + ageYoungestCategory

Multivariate Tests[b]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.977	1126.447[a]	2.000	53.000	.000	.977
	Wilks' Lambda	.023	1126.447[a]	2.000	53.000	.000	.977
	Hotelling's Trace	42.507	1126.447[a]	2.000	53.000	.000	.977
	Roy's Largest Root	42.507	1126.447[a]	2.000	53.000	.000	.977
ageYoungestCategory	Pillai's Trace	.017	.472[a]	2.000	53.000	.626	.017
	Wilks' Lambda	.983	.472[a]	2.000	53.000	.626	.017
	Hotelling's Trace	.018	.472[a]	2.000	53.000	.626	.017
	Roy's Largest Root	.018	.472[a]	2.000	53.000	.626	.017

a. Exact statistic

b. Design: Intercept + ageYoungestCategory

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
totalKnowledge	.074	1	54	.787
totalBehavior	.543	1	54	.464

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + ageYoungestCategory

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	totalKnowledge	26.421[a]	1	26.421	.761	.387	.014
	totalBehavior	4.092[b]	1	4.092	.176	.676	.003
Intercept	totalKnowledge	36437.849	1	36437.849	1049.126	.000	.951
	totalBehavior	30668.663	1	30668.663	1319.723	.000	.961
ageYoungestCategory	totalKnowledge	26.421	1	26.421	.761	.387	.014
	totalBehavior	4.092	1	4.092	.176	.676	.003
Error	totalKnowledge	1875.508	54	34.732			
	totalBehavior	1254.890	54	23.239			
Total	totalKnowledge	39654.000	56				
	totalBehavior	33563.000	56				
Corrected Total	totalKnowledge	1901.929	55				
	totalBehavior	1258.982	55				

a. R Squared = .014 (Adjusted R Squared = -.004)

b. R Squared = .003 (Adjusted R Squared = -.015)

ageYoungestCategory

Dependent Variable	ageYoungestCategory	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
totalKnowledge	1 24months and under	25.412	1.011	23.385	27.438
	2 over 24months to 12yrs	26.818	1.256	24.299	29.337
totalBehavior	1 24months and under	24.235	.827	22.578	25.893
	2 over 24months to 12yrs	23.682	1.028	21.621	25.742

Appendix P

Standard Multiple Regression: Research Question 4

Descriptive Statistics

	Mean	Std. Deviation	N
EBq1RecodeFrequency Would you have used OTC CCM to tx	3.1200	1.14838	100
EBq2WhichMed Ask doctor, nurse, pharmacist which med?	3.7300	1.30929	100
EBq16RecodeMedHome Do you usually keep OTC CCMs in your home	2.2784	1.87496	97
EKq4RecodeMedHelped How often does OTC CCM help a childs cold	2.9897	.84773	97

Correlations

		EBq1RecodeFrequency Would you have used OTC CCM to tx	EBq2WhichMed Ask doctor, nurse, pharmacist which med?	EBq16RecodeMedHome Do you usually keep OTC CCMs in your home	EKq4RecodeMedHelped How often does OTC CCM help a childs cold
Pearson Correlation	EBq1RecodeFrequency Would you have used OTC CCM to tx	1.000			
	EBq2WhichMed Ask doctor, nurse, pharmacist which med?	.311	1.000		
	EBq16RecodeMedHome Do you usually keep OTC CCMs in your home	.560	.229	1.000	
	EKq4RecodeMedHelped How often does OTC CCM help a childs cold	.414	-.022	.225	1.000
Sig. (1-tailed)	EBq1RecodeFrequency Would you have used OTC CCM to tx	.	.001	.000	.000
	EBq2WhichMed Ask doctor, nurse, pharmacist which med?	.001	.	.012	.417
	EBq16RecodeMedHome Do you usually keep OTC CCMs in your home	.000	.012	.	.015

	EKq4RecodeMedHelped How often does OTC CCM help a childs cold	.000	.417	.015	.
N	EBq1RecodeFrequency Would you have used OTC CCM to tx	100	100	97	97
	EBq2WhichMed Ask doctor, nurse, pharmacist which med?	100	100	97	97
	EBq16RecodeMedHome Do you usually keep OTC CCMs in your home	97	97	97	94
	EKq4RecodeMedHelped How often does OTC CCM help a childs cold	97	97	94	97

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EKq4RecodeMedHelped How often does OTC CCM help a childs cold, EBq2WhichMed Ask doctor, nurse, pharmacist which med?, EBq16RecodeMedHome Do you usually keep OTC CCMs in your home[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: EBq1RecodeFrequency Would you have used OTC CCM to tx

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.668[a]	.446	.427	.86918	.446	24.115	3	90	.000

a. Predictors: (Constant), EKq4RecodeMedHelped How often does OTC CCM help a childs cold, EBq2WhichMed Ask doctor, nurse, pharmacist which med?, EBq16RecodeMedHome Do you usually keep OTC CCMs in your home

b. Dependent Variable: EBq1RecodeFrequency Would you have used OTC CCM to tx

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.654	3	18.218	24.115	.000[a]
	Residual	67.993	90	.755		
	Total	122.647	93			

a. Predictors: (Constant), EKq4RecodeMedHelped How often does OTC CCM help a childs cold, EBq2WhichMed Ask doctor, nurse, pharmacist which med?, EBq16RecodeMedHome Do you usually keep OTC CCMs in your home

b. Dependent Variable: EBq1RecodeFrequency Would you have used OTC CCM to tx

Coefficients[a]

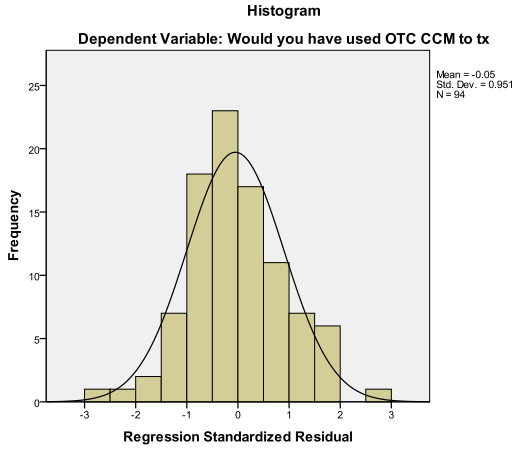
Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.501	.423		1.184	.240					
	EBq2WhichMed Ask doctor, nurse, pharmacist which med?	.190	.071	.217	2.684	.009	.311	.272	.211	.942	1.062
	EBq16RecodeMedHome Do you usually keep OTC CCMs in your home	.268	.051	.438	5.283	.000	.560	.487	.415	.895	1.118
	EKq4RecodeMedHelped How often does OTC CCM help a childs cold	.434	.109	.320	3.964	.000	.414	.386	.311	.944	1.060

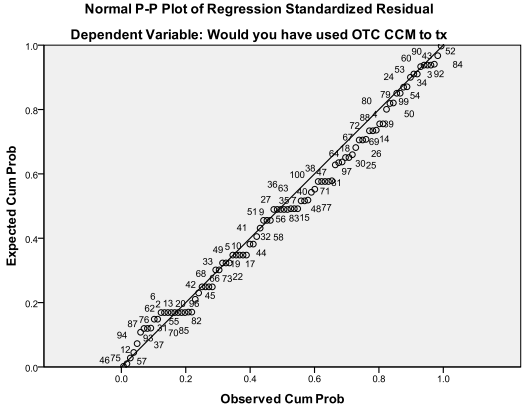
a. Dependent Variable: EBq1RecodeFrequency Would you have used OTC CCM to tx

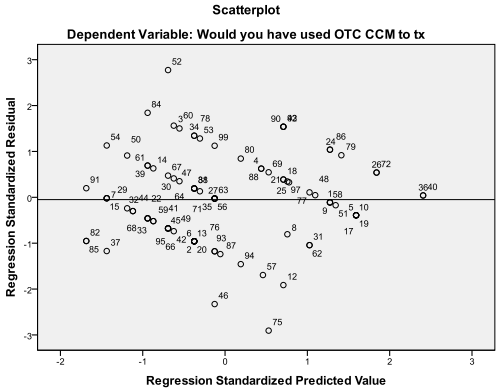
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.8277	4.9647	3.1181	.76265	94
Std. Predicted Value	-1.686	2.406	-.002	.995	94
Standard Error of Predicted Value	.115	.324	.174	.043	94
Adjusted Predicted Value	1.8140	4.9613	3.1182	.76057	94
Residual	-2.52586	2.41082	-.04366	.82634	94
Std. Residual	-2.906	2.774	-.050	.951	94
Stud. Residual	-3.008	2.831	-.050	.973	94
Deleted Residual	-2.70602	2.51081	-.04370	.86506	94
Stud. Deleted Residual	-3.154	2.949	-.051	.986	94
Mahal. Distance	.643	11.936	2.958	1.988	94
Cook's Distance	.000	.161	.011	.022	94
Centered Leverage Value	.007	.128	.032	.021	94

a. Dependent Variable: EBq1RecodeFrequency Would you have used OTC CCM to tx


Histogram
Dependent Variable: Would you have used OTC CCM to tx
Mean = -0.05
Std. Dev. = 0.951
N = 94
Frequency
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Would you have used OTC CCM to tx
Expected Cum Prob
Observed Cum Prob


Scatterplot
Dependent Variable: Would you have used OTC CCM to tx
Regression Standardized Residual
Regression Standardized Predicted Value

Appendix Q

Additional Findings: Frequency of Questions

Statistics

	Frequency	OtherTx	MedChoice	OtherMed	MedHome	MedHelped	NoMed	TMHelped	AnbxHelped	AgeMedsHelped	MeasureTool	Time	RemovedMed	InstEasy	BehaviorScore	KnowledgeScore	TotalScore
N Valid	100	100	98	59	97	97	100	100	99	83	98	94	98	95	100	100	100
Missing	0	0	2	41	3	3	0	0	1	17	2	6	2	5	0	0	0
Mean	2.8800	2.7000	1.5612	2.7458	1.3196	3.0103	1.6300	1.7500	1.3131	1.2651	1.9694	1.7979	1.3980	1.0842	18.4000	18.7000	37.9600
Median	3.0000	2.5000	2.0000	3.0000	1.0000	3.0000	2.0000	2.0000	1.0000	1.0000	2.0000	2.0000	1.0000	1.0000	18.2500	19.0000	37.5000
Std. Deviation	1.14838	.68165	.49879	.57515	.46874	.84773	.48524	.43519	.46613	.44405	.17315	.40374	.49199	.27918	5.21556	6.97543	9.20740

Frequency

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 never	13	13.0	13.0	13.0
	2.00 seldom	28	28.0	28.0	41.0
	3.00 half the time	22	22.0	22.0	63.0
	4.00 usually	32	32.0	32.0	95.0
	5.00 always	5	5.0	5.0	100.0
	Total	100	100.0	100.0	

OtherTx

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.50	92	92.0	92.0	92.0
	5.00	8	8.0	8.0	100.0
	Total	100	100.0	100.0	

MedChoice

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 <4years	43	43.0	43.9	43.9
	2.00 >4years	55	55.0	56.1	100.0
	Total	98	98.0	100.0	
Missing	System	2	2.0		
Total		100	100.0		

OtherMed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 <4years	4	4.0	6.8	6.8
	2.00 >4years	7	7.0	11.9	18.6
	3.00 no med	48	48.0	81.4	100.0
	Total	59	59.0	100.0	
Missing	System	41	41.0		
Total		100	100.0		

MedHome

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 yes	66	66.0	68.0	68.0
	2.00 no	31	31.0	32.0	100.0
	Total	97	97.0	100.0	
Missing	System	3	3.0		
Total		100	100.0		

MedHelped

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 never	5	5.0	5.2	5.2
	2.00 seldom	19	19.0	19.6	24.7
	3.00 half the time	43	43.0	44.3	69.1
	4.00 usually	30	30.0	30.9	100.0
	Total	97	97.0	100.0	
Missing	System	3	3.0		
Total		100	100.0		

NoMed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 yes	37	37.0	37.0	37.0
	2.00 no	63	63.0	63.0	100.0
	Total	100	100.0	100.0	

Ask doctor, nurse, pharmacist which med?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 never	9	9.0	9.0	9.0
	2.00 seldom	13	13.0	13.0	22.0
	3.00 half the time	9	9.0	9.0	31.0
	4.00 usually	34	34.0	34.0	65.0
	5.00 always	35	35.0	35.0	100.0
	Total	100	100.0	100.0	

Ask doctor, nurse, pharmacist how much med?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 never	10	10.0	10.2	10.2
	2.00 seldom	25	25.0	25.5	35.7
	3.00 half the time	4	4.0	4.1	39.8
	4.00 usually	20	20.0	20.4	60.2
	5.00 always	39	39.0	39.8	100.0
	Total	98	98.0	100.0	
Missing	System	2	2.0		
Total		100	100.0		

TMHelped

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 yes	25	25.0	25.0	25.0
	2.00 no	75	75.0	75.0	100.0
	Total	100	100.0	100.0	

AnbxHelped

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 yes	68	68.0	68.7	68.7
	2.00 no	31	31.0	31.3	100.0
	Total	99	99.0	100.0	
Missing	System	1	1.0		
Total		100	100.0		

AgeMedsHelped

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 < 4 years	61	61.0	73.5	73.5
	2.00 > 4 years	22	22.0	26.5	100.0
	Total	83	83.0	100.0	
Missing	System	17	17.0		
Total		100	100.0		

MeasureTool

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 kitchen spoon	3	3.0	3.1	3.1
	2.00 medicine cup, syringe, dropper	95	95.0	96.9	100.0
	Total	98	98.0	100.0	
Missing	System	2	2.0		
Total		100	100.0		

Time

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 <30 minutes	19	19.0	20.2	20.2
	2.00 >30 minutes	75	75.0	79.8	100.0
	Total	94	94.0	100.0	
Missing	System	6	6.0		
Total		100	100.0		

RemovedMed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 yes	59	59.0	60.2	60.2
	2.00 no	39	39.0	39.8	100.0
	Total	98	98.0	100.0	
Missing	System	2	2.0		
Total		100	100.0		

InstEasy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 yes	87	87.0	91.6	91.6
	2.00 no	8	8.0	8.4	100.0
	Total	95	95.0	100.0	
Missing	System	5	5.0		
Total		100	100.0		

BehaviorScore

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	7.50	1	1.0	1.0	1.0
	8.50	1	1.0	1.0	2.0
	9.50	4	4.0	4.0	6.0
	10.50	3	3.0	3.0	9.0
	11.50	2	2.0	2.0	11.0
	12.50	4	4.0	4.0	15.0
	13.50	6	6.0	6.0	21.0
	14.50	5	5.0	5.0	26.0
	15.50	8	8.0	8.0	34.0
	16.50	5	5.0	5.0	39.0
	17.00	1	1.0	1.0	40.0
	17.50	10	10.0	10.0	50.0
	19.00	1	1.0	1.0	51.0
	19.50	15	15.0	15.0	66.0
	20.50	3	3.0	3.0	69.0
	21.00	1	1.0	1.0	70.0
	21.50	8	8.0	8.0	78.0
	22.00	1	1.0	1.0	79.0
	22.50	3	3.0	3.0	82.0
	23.50	3	3.0	3.0	85.0
	24.00	2	2.0	2.0	87.0
	24.50	3	3.0	3.0	90.0
	25.00	1	1.0	1.0	91.0
	26.00	1	1.0	1.0	92.0
	26.50	1	1.0	1.0	93.0
	27.50	1	1.0	1.0	94.0

	28.50	1	1.0	1.0	95.0
	29.50	4	4.0	4.0	99.0
	30.50	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

KnowledgeScore

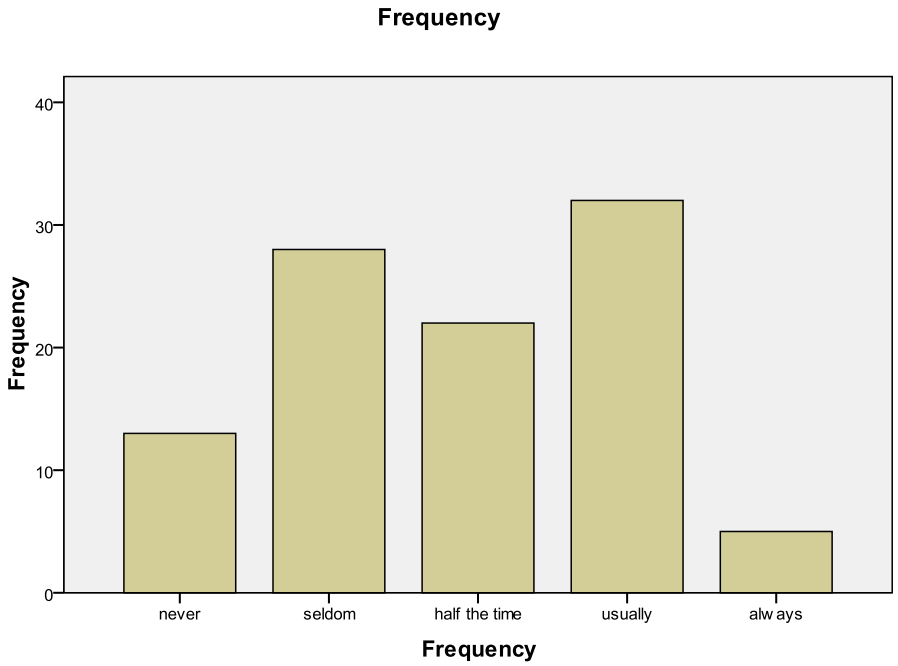
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3.00	1	1.0	1.0	1.0
	5.00	1	1.0	1.0	2.0
	8.00	5	5.0	5.0	7.0
	9.00	6	6.0	6.0	13.0
	10.00	1	1.0	1.0	14.0
	11.00	1	1.0	1.0	15.0
	13.00	7	7.0	7.0	22.0
	14.00	11	11.0	11.0	33.0
	15.00	4	4.0	4.0	37.0
	16.00	3	3.0	3.0	40.0
	17.00	1	1.0	1.0	41.0
	18.00	8	8.0	8.0	49.0
	19.00	12	12.0	12.0	61.0
	20.00	4	4.0	4.0	65.0
	21.00	1	1.0	1.0	66.0
	23.00	5	5.0	5.0	71.0
	24.00	8	8.0	8.0	79.0
	25.00	7	7.0	7.0	86.0
	26.00	1	1.0	1.0	87.0
	28.00	5	5.0	5.0	92.0
	29.00	2	2.0	2.0	94.0
	30.00	1	1.0	1.0	95.0

	31.00	1	1.0	1.0	96.0
	33.00	1	1.0	1.0	97.0
	34.00	2	2.0	2.0	99.0
	36.00	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

TotalScore

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	13.50	1	1.0	1.0	1.0
	19.50	2	2.0	2.0	3.0
	20.00	1	1.0	1.0	4.0
	22.50	2	2.0	2.0	6.0
	25.50	2	2.0	2.0	8.0
	26.50	2	2.0	2.0	10.0
	27.50	2	2.0	2.0	12.0
	28.50	5	5.0	5.0	17.0
	29.50	4	4.0	4.0	21.0
	30.50	2	2.0	2.0	23.0
	31.50	1	1.0	1.0	24.0
	32.50	6	6.0	6.0	30.0
	33.50	4	4.0	4.0	34.0
	34.00	1	1.0	1.0	35.0
	34.50	2	2.0	2.0	37.0
	35.00	1	1.0	1.0	38.0
	35.50	2	2.0	2.0	40.0
	36.00	1	1.0	1.0	41.0
	36.50	4	4.0	4.0	45.0
	37.00	1	1.0	1.0	46.0
	37.50	7	7.0	7.0	53.0

38.50	3	3.0	3.0	56.0
39.00	1	1.0	1.0	57.0
39.50	3	3.0	3.0	60.0
40.50	3	3.0	3.0	63.0
41.00	1	1.0	1.0	64.0
41.50	3	3.0	3.0	67.0
42.50	3	3.0	3.0	70.0
43.50	5	5.0	5.0	75.0
44.50	3	3.0	3.0	78.0
45.50	5	5.0	5.0	83.0
46.50	2	2.0	2.0	85.0
47.50	2	2.0	2.0	87.0
48.50	2	2.0	2.0	89.0
50.50	2	2.0	2.0	91.0
51.50	2	2.0	2.0	93.0
52.00	1	1.0	1.0	94.0
53.50	2	2.0	2.0	96.0
55.50	1	1.0	1.0	97.0
56.50	1	1.0	1.0	98.0
57.50	1	1.0	1.0	99.0
63.50	1	1.0	1.0	100.0
Total	100	100.0	100.0	


Frequency
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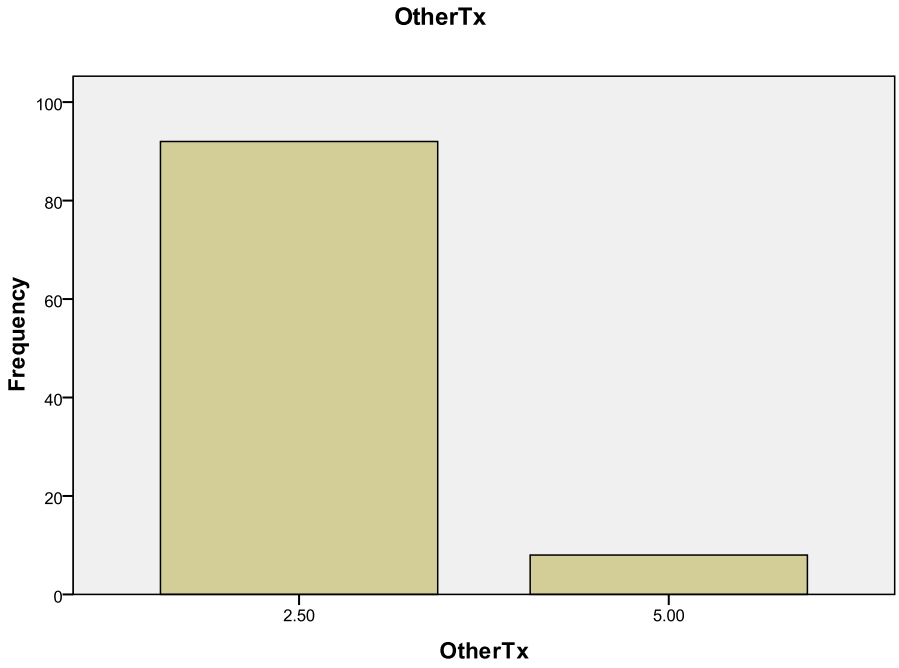
30
20
10
0
Frequency
never
seldom
half the time
usually
alw ays
Frequency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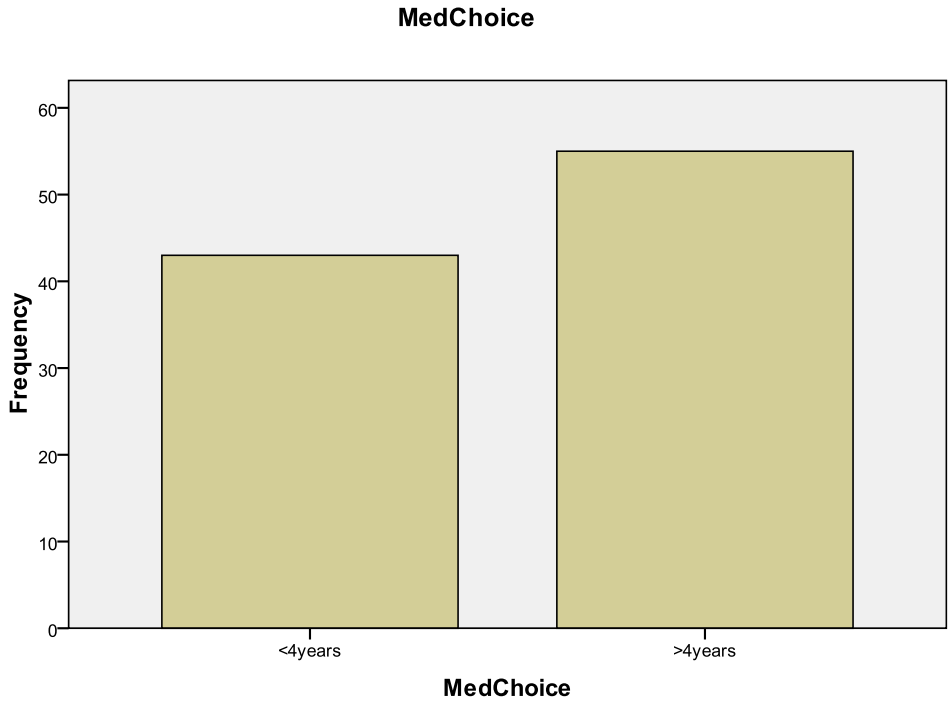
60
40
20
0
Frequency
2.50
5.00
OtherTx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30
20
10
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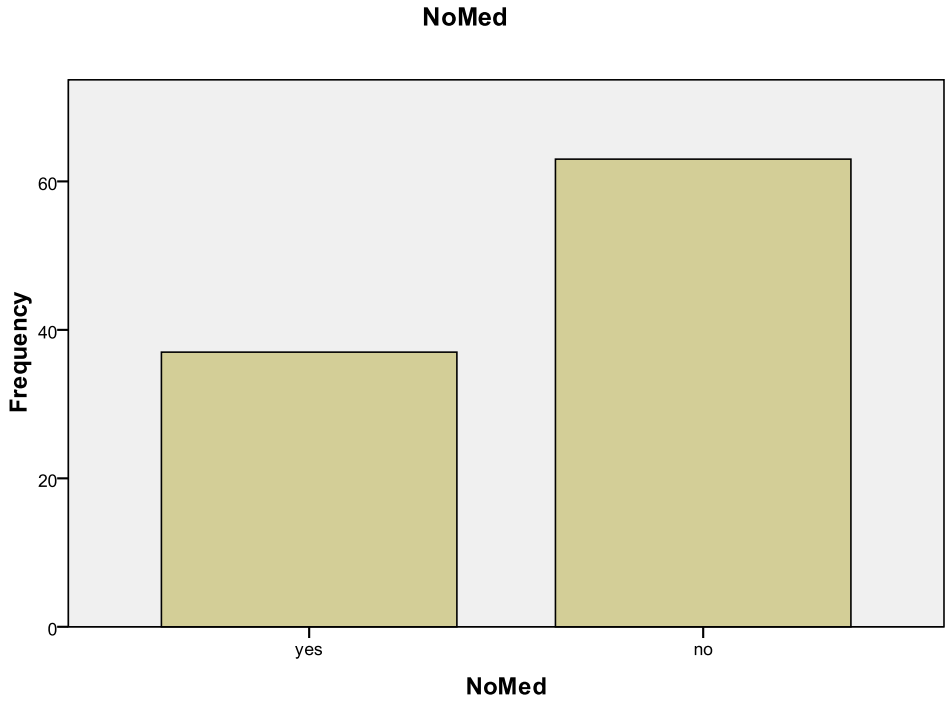
>4years
MedChoice


NoMed
Frequency
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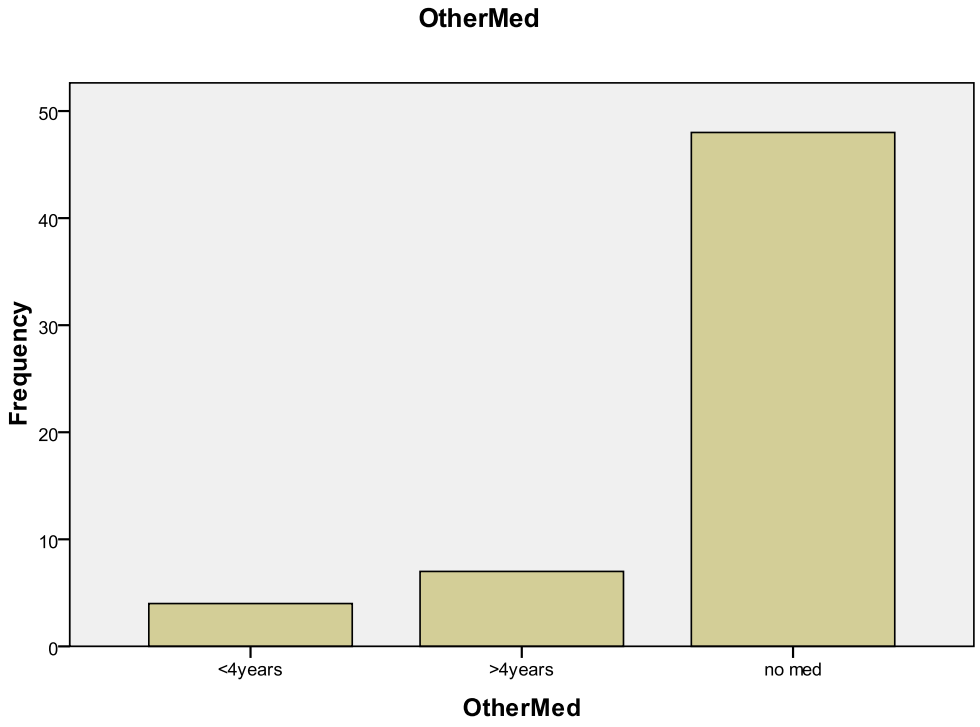
40
20
0
yes
no
NoMed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Frequency
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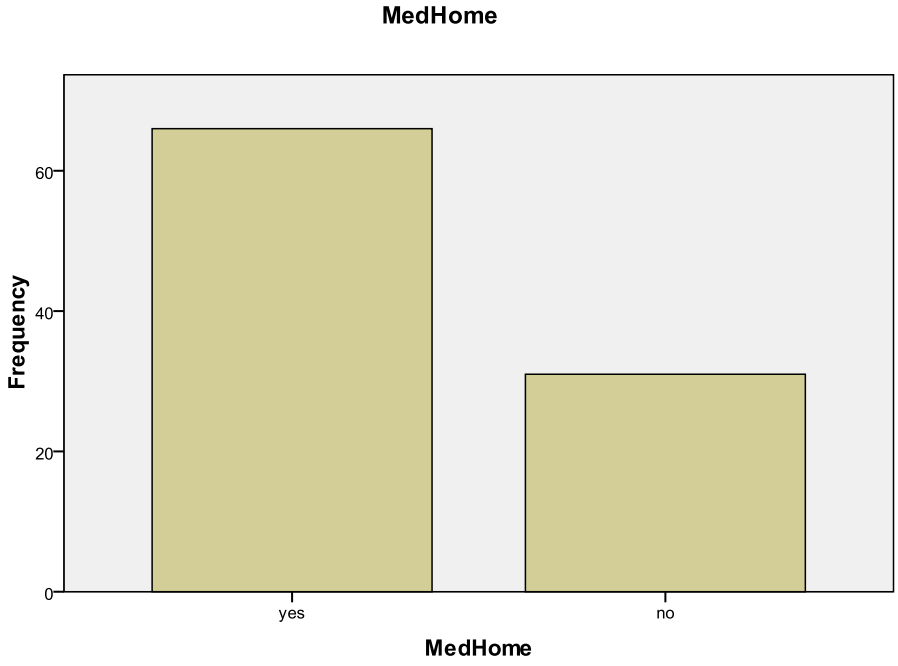
40
30
20
10
0
<4years
>4years
no med
OtherMed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Frequency
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40
20
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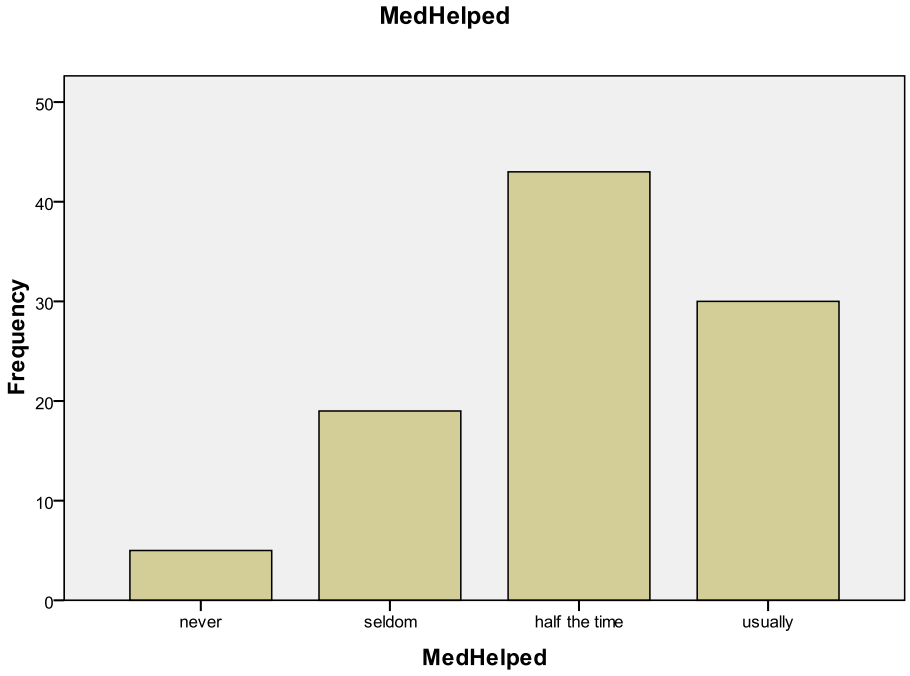
yes
no
MedHome


MedHelped
Frequency
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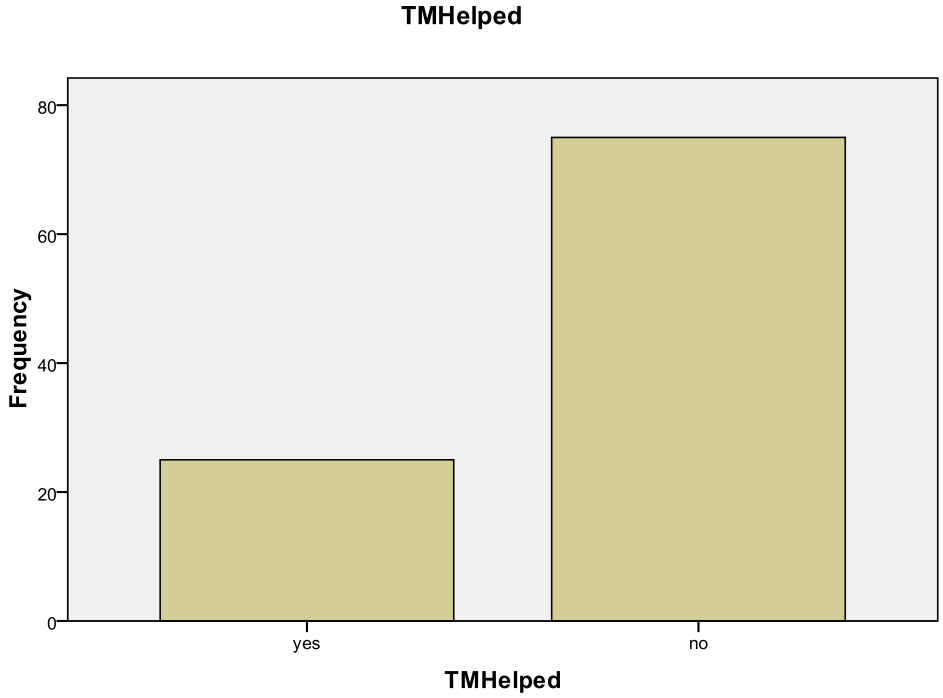
40
30
20
10
0
never
seldom
half the time
usually
MedHelped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Frequency
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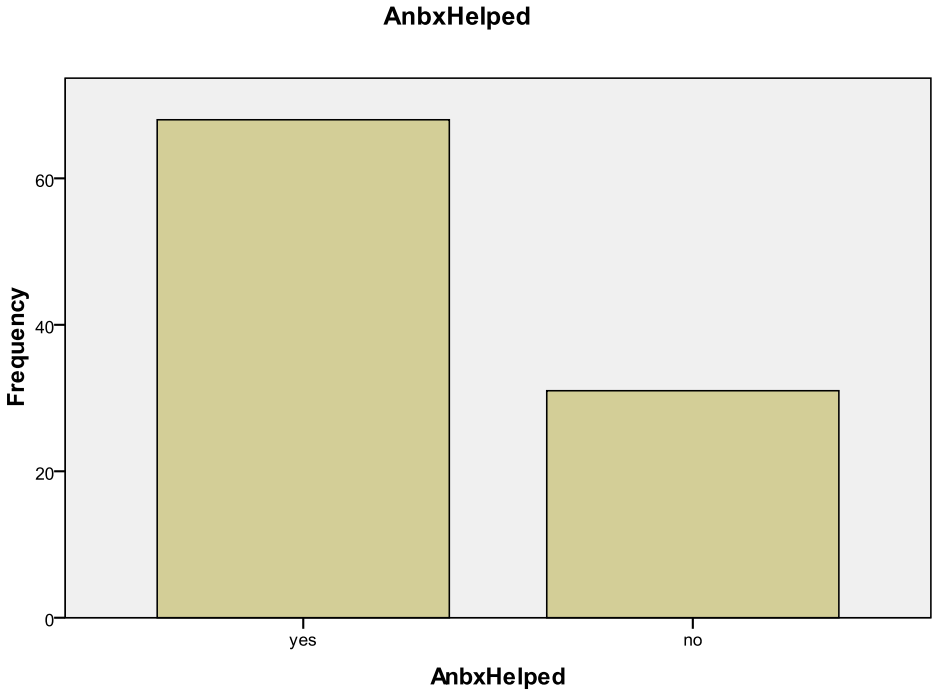
60
40
20
0
yes
no
TMHelped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Frequency
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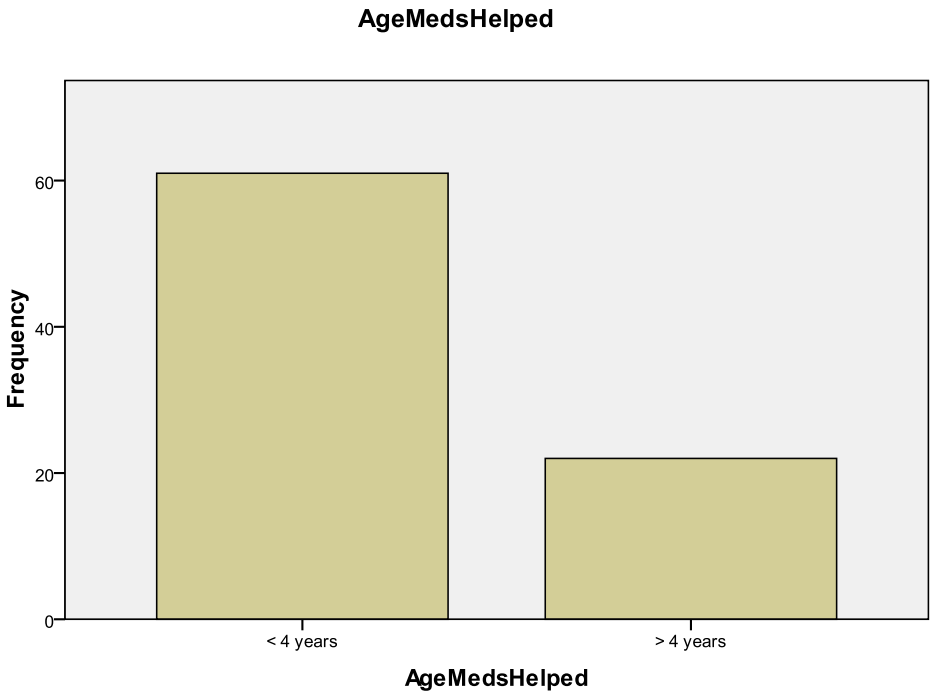
40
20
0
yes
no
AnbxHelped


AgeMedsHelped
Frequency
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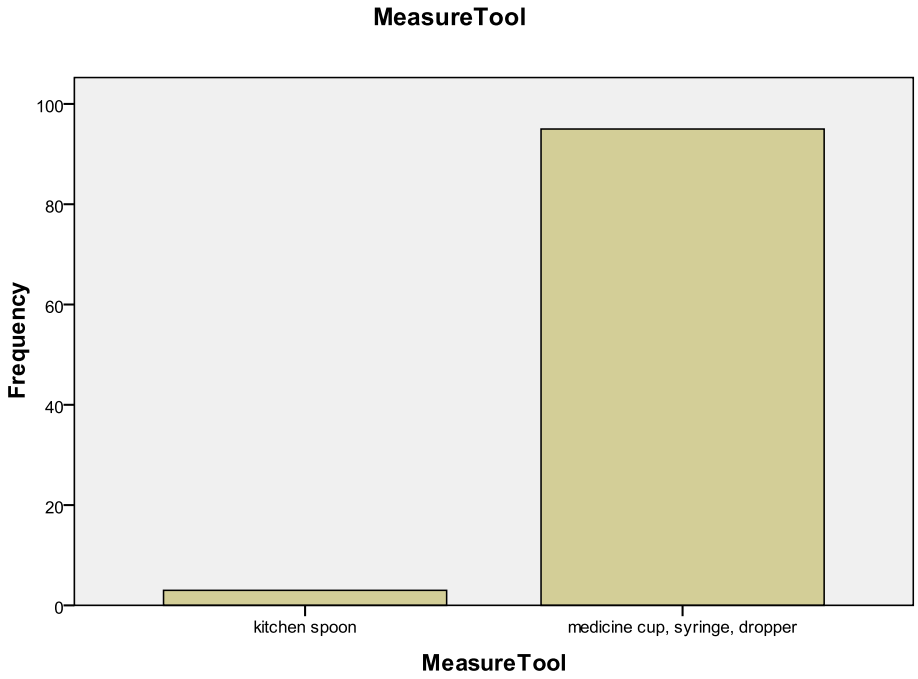
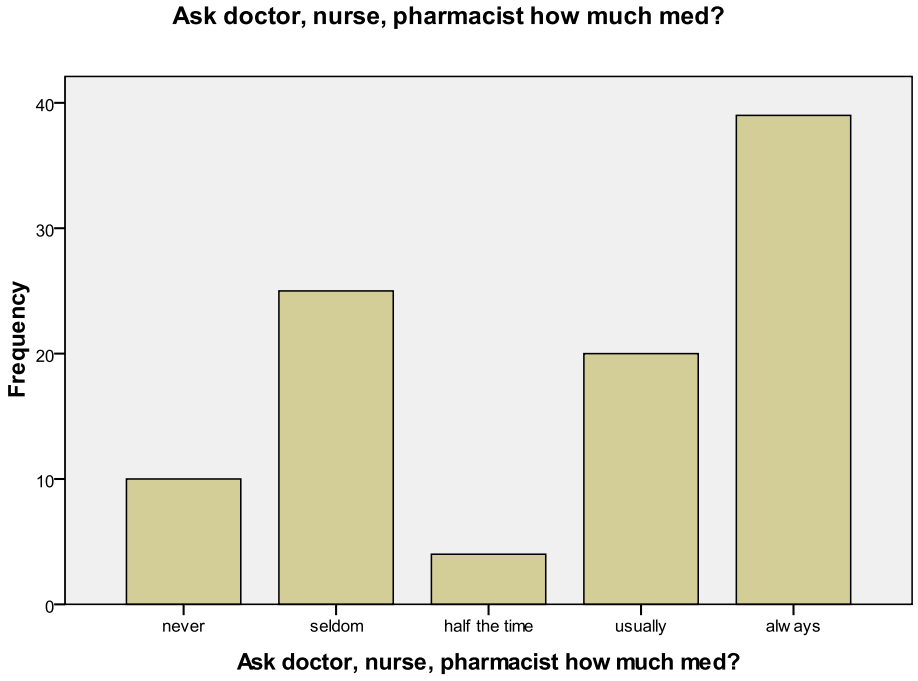
40
20
0
< 4 years
> 4 years
AgeMedsHelped


MeasureTool
Frequency
100
80
60
40
20
0
kitchen spoon
medicine cup, syringe, dropper
MeasureTool


Ask doctor, nurse, pharmacist how much med?
Frequency
40
30
20
10
0
never
seldom
half the time
usually
alw ays
Ask doctor, nurse, pharmacist how much med?

Appendix R: Split Group Correlations

Correlations

ageYoungestCategory			How often does OTC CCM help a childs cold	Can a childs cold go away with no med	Does Tylenol or Motrin help with cold symptoms	Does an anbx help a cold get well faster	At what age is a child old enough for OTC CCM	Which measuring tool would you use	How soon would you expect these OTC CCM to help	Did you know med were removed for children less than 2 years
1 24months and under	Would you have used OTC CCM to tx	Pearson Correlation	.395**	-.224	.052	.090	.149	.[a]	-.122	.018
		Sig. (2-tailed)	.005	.106	.711	.526	.335	.	.402	.901
		N	50	53	53	52	44	52	49	52
	Ask doctor, nurse, pharmacist which med?	Pearson Correlation	-.061	-.141	-.104	-.048	.278	.[a]	.201	.020
		Sig. (2-tailed)	.674	.313	.460	.737	.068	.	.166	.886
		N	50	53	53	52	44	52	49	52
	Ask doctor, nurse, pharmacist how much med?	Pearson Correlation	-.123	-.145	-.179	.089	.347*	.[a]	.198	-.023
		Sig. (2-tailed)	.396	.303	.204	.534	.023	.	.177	.873
		N	50	52	52	51	43	51	48	51
	What other tx would you use	Pearson Correlation	.027	-.065	-.279*	-.036	-.072	.[a]	-.293*	.054

		Sig. (2-tailed)	.851	.646	.043	.800	.643	.	.041	.702
		N	50	53	53	52	44	52	49	52
	Which one of the four med would you choose	Pearson Correlation	-.024	-.073	-.127	.120	.433**	.[a]	.209	.077
		Sig. (2-tailed)	.870	.606	.368	.402	.004	.	.155	.591
		N	49	52	52	51	43	51	48	51
	If you don't use the above OTC CCM which one would you use	Pearson Correlation	.039	.070	.232	.050	-.116	.[a]	.106	-.293
		Sig. (2-tailed)	.832	.688	.180	.777	.535	.	.550	.087
		N	32	35	35	35	31	35	34	35
	Do you usually keep OTC CCMs in your home	Pearson Correlation	.168	-.161	.131	.126	-.111	.[a]	-.034	.113
		Sig. (2-tailed)	.250	.254	.356	.380	.472	.	.815	.426
		N	49	52	52	51	44	52	49	52
2 over 24months to 12yrs	Would you have used OTC CCM to tx	Pearson Correlation	.493**	-.017	.081	.138	.297	-.032	-.112	.000
		Sig. (2-tailed)	.001	.911	.592	.360	.070	.834	.469	1.000
		N	46	46	46	46	38	45	44	45
	Ask doctor, nurse, pharmacist which med?	Pearson Correlation	.049	-.201	-.096	-.100	.035	-.031	-.286	.308*
		Sig. (2-tailed)	.745	.180	.525	.510	.837	.838	.060	.040
		N	46	46	46	46	38	45	44	45

Ask doctor, nurse, pharmacist how much med?	Pearson Correlation	.029	-.281	-.004	-.087	.151	.025	-.086	.331*
	Sig. (2-tailed)	.848	.061	.977	.571	.373	.870	.585	.028
	N	45	45	45	45	37	44	43	44
What other tx would you use	Pearson Correlation	.070	.083	-.237	.114	-.247	.071	.137	.000
	Sig. (2-tailed)	.645	.582	.113	.449	.134	.641	.375	1.000
	N	46	46	46	46	38	45	44	45
Which one of the four med would you choose	Pearson Correlation	.035	.208	-.061	.024	.200	-.118	.083	-.164
	Sig. (2-tailed)	.822	.170	.689	.878	.230	.447	.597	.288
	N	45	45	45	45	38	44	43	44
If you don't use the above OTC CCM which one would you use	Pearson Correlation	.005	-.172	.167	.018	.395	.206	.014	.041
	Sig. (2-tailed)	.983	.432	.446	.935	.076	.358	.953	.856
	N	23	23	23	23	21	22	21	22
Do you usually keep OTC CCMs in your home	Pearson Correlation	.327*	-.039	.311*	-.090	.141	-.037	-.235	.010
	Sig. (2-tailed)	.030	.804	.040	.563	.407	.812	.128	.950
	N	44	44	44	44	37	44	43	44

a. Cannot be computed because at least one of the variables is constant.

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

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

Appendix: S

ENNIS CHILDREN'S CLINIC

Cold Risk Questionnaire

1. If you did decide to use over-the-counter cough and cold medicine, would you ask a doctor, nurse, or pharmacist **which** medicine you should give your child? Yes No

2. How often does over-the-counter cough and cold medicine help a child's cold symptoms, such as a cough or runny nose? Yes No

3. Does Tylenol or Motrin will help a child's cold symptoms, such as cough or runny nose? Yes No

4. Do you usually keep over-the-counter medicines for cough, cold or runny nose for children in your home? Yes No

KIDS HEALTH FROM NEMOURS

Treating the Common Cold in Children

Bringing sniffles and sneezes and perhaps a sore throat and annoying cough, the common cold catches all of us from time to time.

With kids getting as many as eight colds per year or more, this contagious viral infection of the upper respiratory tract is the most common infectious disease in the United States and the No. 1 reason kids visit the doctor and stay home from school.

Causes

Most colds are caused by rhinoviruses that are in invisible droplets in the air we breathe or on things we touch. More than 100 different rhinoviruses can infiltrate the protective lining of the nose and throat, triggering an immune system reaction that can cause a throat sore and headache, and make it hard to breathe through the nose.

Air that's dry — indoors or out — can lower resistance to infection by the viruses that cause colds. And so can being a smoker or being around someone who's smoking. People who smoke are more likely to catch a cold than people who don't — and their symptoms will probably be worse, last longer, and are more likely to lead to bronchitis or even pneumonia.

But despite what old wives' tales may have you believe, not wearing a jacket or sweater when it's chilly, sitting or sleeping in a draft, and going outside while your hair's wet **do not** cause colds.

Signs and Symptoms

The first symptoms of a cold are often a tickle in the throat, a runny or stuffy nose, and sneezing. Kids with colds may also have a sore throat, cough, headache, mild fever, fatigue, muscle aches, and loss of appetite. Nasal discharge may change from watery to thick yellow or green.

Contagiousness

Colds are most contagious during the first 2 to 4 days after symptoms appear, and may be contagious for up to 3 weeks. Your can catch a cold from person-to-person contact or by breathing in virus particles spread through the air by sneezing or coughing. Touching the mouth or nose after touching skin or another surface contaminated with a rhinovirus can also spread a cold.

Prevention

Because so many viruses cause them, there isn't a vaccine that can protect against catching colds. But to help prevent them, kids should:

- try to steer clear of anyone who smokes or who has a cold. Virus particles can travel up to 12 feet through the air when someone with a cold coughs or sneezes, and secondhand smoke can make your child more likely to get sick.
- wash their hands thoroughly and frequently, especially after blowing their noses
- cover their noses and mouths when coughing or sneezing (have them sneeze or cough into a shirtsleeve, though, not their hands — this helps prevent the spread of germs)
- not use the same towels or eating utensils as someone who has a cold. They also shouldn't drink from the same glass, can, or bottle as anyone else — you never know who might be about to come down with a cold and is already spreading the virus.
- not pick up other people's used tissues

Researchers aren't sure whether taking extra zinc or vitamin C can limit how long cold symptoms last or how severe they become, but large doses taken every day *can* cause negative side effects.

The results of most studies on the value of herbal remedies, such as echinacea, are either negative or inconclusive, and few properly designed scientific studies of these treatments have been done in kids.

Talk to your doctor before you decide to give your child any herbal remedy or more than the recommended daily allowance (RDA) of any vitamin or supplement.

Duration

Cold symptoms usually appear 2 or 3 days after exposure to a source of infection. Most colds clear up within 1 week, but some last for as long as 2 weeks.

Treatment

"Time cures all." That may not always be true, but in the case of the common cold, it's pretty close. Medicine can't cure the common cold, but it can be used to relieve such symptoms as muscle aches, headache, and fever. You can give your child acetaminophen or ibuprofen based on the package recommendations for age or weight.

However, aspirin should **never** be given to children younger than 12, and all kids and teens under age 19 shouldn't take aspirin during viral illnesses, because such use may increase the risk of developing Reye syndrome, a rare but serious condition that can be fatal.

Although you may be tempted to give your child over-the-counter (OTC) decongestants and antihistamines to try to ease the cold symptoms, there's little or no evidence to support that they actually work. In fact, decongestants can cause hallucinations, irritability, and irregular heartbeats in infants and shouldn't be used in children younger than 2 without first consulting a doctor.

Some ways you can help ease cold discomfort include:

- saltwater drops in the nostrils to relieve nasal congestion (you can buy these — also called saline nose drops — at any pharmacy)
- a cool-mist humidifier to increase air moisture
- petroleum jelly on the skin under the nose to soothe rawness
- hard candy or cough drops to relieve sore throat (for kids older than 3 years)
- a warm bath or heating pad to soothe aches and pains
- steam from a hot shower to help your child breathe more easily

But what about chicken soup? There's no real proof that eating it can cure a cold, but sick people have been swearing by it for more than 800 years. Why? Chicken soup contains a mucus-thinning amino acid called cysteine, and some research shows that chicken soup helps control congestion-causing white cells, called neutrophils.

The best plan, though, is not to worry about whether to "feed a cold" or "starve a fever." Just make sure your child eats when hungry and drinks plenty of fluids like water or juice to help replace the fluids lost during fever or mucus production. Avoid serving caffeinated beverages, though, which can cause frequent urination and, therefore, increase the risk of dehydration.

When to Call the Doctor

Your doctor won't be able to identify the specific virus causing cold symptoms, but can examine your child's throat and ears and take a throat culture to make sure the symptoms aren't from another condition that may need specific treatment. (If your child's symptoms get worse instead of better after 3 days or so, the problem could be strep throat, sinusitis, pneumonia, or bronchitis, especially if your child or teen smokes.)

Taking a throat culture is a simple, painless procedure that involves brushing the inside of the throat with a long cotton swab. Examining the germs that stick to the swab will help the doctor determine whether your child has strep throat and needs treatment with antibiotics.

If symptoms last for more than a week, appear at the same time every year, or occur when your child is exposed to pollen, dust, animals, or another substance, your child could have an allergy. A child who has trouble breathing or wheezes when he or she catches a cold could have asthma.

Also see your doctor if you think your child might have more than a cold or is getting worse instead of better.

Also call the doctor if your child has any of these symptoms:

- coughing up a lot of mucus
- shortness of breath
- unusual lethargy/tiredness
- inability to keep food or liquids down or poor fluid intake
- increasing headache or facial or throat pain
- severely painful sore throat that interferes with swallowing
- fever of 103 degrees Fahrenheit (39.3° Celsius) or higher, or a fever of 101° F (38.0° C) or higher that lasts for more than a day
- chest or stomach pain
- swollen glands (lymph nodes) in the neck
- earache

Like most virus infections, colds just have to run their course. Getting plenty of rest, avoiding vigorous activity, and drinking lots of fluids — juice, water, and noncaffeinated beverages — all may help your child feel better while on the mend.

Keeping up regular activities like going to school probably won't make a cold any worse. But it *will* increase the likelihood that the cold will spread to classmates or friends. So you might want to put some daily routines aside until your child is feeling better.

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