INTRODUCING CLEAN DELIVERY KITS TO IMPROVE KNOWLEDGE OF CLEAN BIRTH PRACTICES IN HAITI

by

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ABSTRACT

GRACE CATHERINE OSTAN. Introducing clean delivery kits to improve knowledge of clean birth practices in Haiti. (Under the direction of DR. ILANA CHERTOK)

Maternal and infant mortality rates in developing countries are significantly higher than rates in developed countries with sepsis contributing to mortality. Cleanliness at birth has been identified by the World Health Organization (WHO) as a key element to reducing the risk of maternal-infant morbidity and mortality. There is evidence to support the importance of clean birth practices and use of clean delivery kits (CDKs) to promote improved maternal-infant health outcomes. The purpose of this quantitative study was to evaluate an intervention providing CDKs and clean birth education to examine the effect on knowledge and understanding of clean birth practices among women in Grand Goave, Haiti. A total of 18 Haitian women of childbearing age were enrolled in the study. The hypothesis of the study stated that maternal education of clean birth practices and use of the CDK contributes to improved knowledge of clean birth practices. Evaluation of the intervention showed that provision of a CDK with the educational intervention was associated with improved mean scores of the pre-and post-test surveys (N=17, pre-test summary mean=6.35, post-test summary=7.71, p=0.000). The role play evaluation further indicated that there was a knowledge improvement of use of the CDK and clean birth practices. An educational intervention with use of a CDK can improve knowledge in relation to clean birth practices and use of CDKs are vital to improving maternal-infant outcomes in low resource settings.

DEDICATION

To my loving parents who believed in my calling as a Nurse, have encouraged, and supported me in my journey with unconditional love. Thank you for your prayers as this would not have been possible without God's grace. To my loving husband who has listened, been patient, and run the distance with me to this finish line. Your never-ending support and steadfast love have my eternal thanks.

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CHAPTER 1: NATURE OF THE PROJECT

1.1 Introduction and Background

The proposed DNP scholarly project aimed to educate women of childbearing age in Haiti about the importance and basic techniques of cleanliness at birth according to World Health Organization (WHO) standards of clean delivery. The project sought to study the effect of improved knowledge of clean birth practices post an educational intervention that included education regarding proper use of a clean delivery kit (CDK). The project director of the DNP project partnered with the Bless Back Worldwide program serving the Grand Goave community in southwestern Haiti. The project impacted women that reside in or near the Grand Goave community who attended the Women's Health conference held in July 2016 in Grand Goave, Haiti at the Mission of Hope International Center in collaboration with Bless Back Worldwide. The project utilized pre-post-test evaluation, teach back method of instruction and demonstration, and role play in order to test knowledge of cleanliness techniques at birth. The project also included a pre-post-test survey and educational component with medical providers in the community.

The pre-post-test evaluation was conducted before and after the educational intervention and was adapted for literacy issues of the target population. The evidence-based project educated women of childbearing age of the WHO's six Principles of Cleanliness at birth and demonstrated techniques for clean birth using a CDK. The

components of the kit promote hygienic birth practices following the educational intervention of the WHO's six Principles of Cleanliness at Birth. The six principles are: (1) clean hands, (2) clean delivery surface, (3) clean perineum, (4) clean cord cutting instrument, (5) clean cord ties, and (6) clean cord care of the newborn baby (Winani et al., 2007).

On January 12, 2010, an earthquake occurred in Haiti claiming more than 200,000 lives, injuring approximately 300,000, displacing more than one million, and altogether affecting the lives of over 3,000,000 (or 30% of the population) (Amibor, 2013). Following the 2010 earthquake, Haiti's maternal-infant health conditions worsened. Haiti has the highest rates of infant and maternal mortality in the Western hemisphere (UNICEF, 2010). According to the World Bank Group (2016), in 2015, infant mortality in Haiti was reported to be 52 per 1,000 live births. The maternal mortality ratio (MMR), in 2015, was reported to be 359 maternal deaths per 100,000 live births. It is interesting to note the comparison between Haiti and a developed country such as the U.S. where in 2015, according to the World Bank Group (2015), infant mortality was reported to be 6 per 1,000 live births. The MMR in 2015 in the U.S. was reported to be 14 maternal deaths per 100,000 live births.

1.2 Problem Statement

Haiti is the poorest country in the Western Hemisphere, and 62% of the population lives on less than US $1.25 a day (UNICEF, 2013). Haiti is a largely rural country with the lowest per capita income in the hemisphere leading to a lack of health resources and thus, high morbidity and mortality. Access to health care in the many rural areas of Haiti is extremely limited, and health services available locally are often not

equipped for obstetric emergencies (Anderson, Morton, Naik, & Gebrian, 2007). In Haiti, long distances, inadequate transportation, and lack of information or education prevent women from going to medical facilities for prenatal care and delivery. According to UNICEF (2013), approximately two-thirds of deliveries in Haiti occur at home. Cleanliness at birth has been identified by the World Health Organization (WHO) (2012), as a key element to reducing the risk of maternal-infant morbidity and mortality. There is evidence to support the importance of a CDK in addition to clean birth practices and such practices can and must be promoted. A few basic items are needed in order to achieve the "six cleans" and therefore a CDK is vital.

1.3 Purpose of the Project

The purpose of this DNP scholarly project was to conduct an intervention providing CDKs (U.S. cost $2 per kit) and clean birth education in order to examine the effect on improved knowledge and understanding of clean birth practices among women in Grand Goave, Haiti.

1.4 Significance of the Project

The maternal mortality rate in industrialized countries is 1 in 4,100, whereas the rate in developing countries is as high as 1 in 13 (UNICEF, 2002). Annually around the world, over 4 million infants die in the first four weeks of life; 3 million of these deaths occur in the early neonatal period. Of these deaths, 98% occur in the developing world (WHO, 2006). Women and infants born in remote rural locations are least likely to receive adequate healthcare services due to multiple factors including lack of transportation, access, and financial means as well as limited healthcare resources. Women and infants in developing countries often die due to perinatal complications.

Many complications are due to infection, which are preventable or treatable, especially during the birth process (Hundley et al., 2011; WHO, 2015).

Postpartum puerperal sepsis (genital tract infection), is among the leading cause of preventable maternal death and is particularly prevalent in developing countries such as Haiti, where home delivery and unhygienic births are common (WHO, 2015). At least 75,000 maternal deaths each year, mostly in developing countries, are associated with puerperal sepsis. Poor hygiene during the intrapartum period has been recognized as a risk factor for sepsis for over 150 years (Hussein & Fortney, 2004). Some unhygienic practices observed in developing countries include introduction of unclean substances into the vagina (such as unclean hands, local herbs, and dirt) and use of unclean delivery surfaces (WHO, 1999). Factors associated with the relatively high incidence of infant cord infection in the developing world include unhygienic cutting of the cord, application of unclean substances to the cord stump, and covering the stump with unclean fabric (Balsara et al.,2009). Furthermore, the risk of infant infection is increased with the use of unclean instruments, such as broken glass or rocks, to cut the cord and the application of unclean substances on the cord (WHO, 1999). Umbilical cord infection contributes to infant infection and subsequent infant death, particularly among infants delivered at home without a skilled birth attendant or under unhygienic conditions.

Cleanliness at birth has been identified by the WHO as a key element to reducing the risk of maternal-infant morbidity and mortality (WHO, 2012). It is estimated that if 90% of home births globally (54 million) implemented clean birth practices, the lives of approximately 6,300 women and 102,000 newborns would be saved each year. Uptake of clean birth practices may be catalyzed by use of CDKs (Blencowe et al., 2010). Several

studies have shown the contribution of CDK use in reducing the risk of life threatening infections (Hundley et al., 2011). Clean birth practices at home would reduce mortality from neonatal infections by an estimated median of 15% and from tetanus by 30% as well as would reduce maternal mortality from infections by a median of 20% (Blencowe et al., 2011). The use of CDKs aids in promoting clean birth practices as the kits contain basic items needed to achieve the "six cleans." The WHO recommends that CDK contents include: a plastic sheet to serve as a clean surface for delivery, soap for cleaning of birth attendant's hands, sterile/clean razor blade for cutting the umbilical cord (WHO, 1996) as well as soap to clean the perineum, clean cord ties or cord clamp, and clean gauze for cord care (WHO, 1999).

CDKs have the potential to improve safe care at birth and support positive maternal-infant birth outcomes. While they have been introduced in many developing countries, barriers to CDK use include lack of resources, affordability, access, education, training, and cultural acceptability. Measurement of outcomes associated with CDK use includes reduced maternal infection (puerperal sepsis), reduced infant cord stump infection (omphalitis), and reduced infant maternal mortality. Intervention studies often involve training and education of implementing clean birth practices and CDK use, although limited research has been conducted specifically evaluating outcomes related to improvement in knowledge and use of clean birth practices. Behavioral and practice changes facilitated through educational interventions increase women's knowledge regarding clean birth practices and CDK use which is essential to improving birth outcomes. The relationship between education and perinatal and neonatal mortality is complex but several studies have demonstrated reduced rates of infant and child mortality

in association with increased levels of maternal education (Moss, Darmstadt, Marsh, Black & Santosham, 2002).

1.5 Clinical Question

For women in Haiti (P), does education related to use of a clean delivery kit (CDK) at birth (I) compared with no education related to use of a clean delivery kit (CDK) at birth (C) improve knowledge of clean birth practices according to World Health Organization (WHO) standards?

1.6 Project Objectives and Outcomes

The main objectives of this DNP project were to implement an educational intervention with women in Grand Goave, Haiti and provide a CDK ultimately serving to: 1) improve knowledge in relation to the WHO's six Principles of Cleanliness at Birth, 2) demonstrate proper use of the delivery kit, 3) gather qualitative information from kit users in the Grand Goave community on the awareness and acceptability of the educational intervention, and 4) implement a practice change with the Bless Back Worldwide clinic site in Grand Goave, Haiti for improved future infant maternal health outcomes. Important outcomes for this DNP Scholarly Project associated with use of the CDK include behaviors, improved knowledge in relation to the WHO's six principles of cleanliness at birth, and intentions that might reasonably be expected to be related to long-term improvements in maternal-infant health. These would include indicators of behavior change such as the women demonstrating through role play and teach back, clean birth practices in association with use of the items in the clean delivery kit; washing hands with a bar of *soap*, cutting the umbilical cord with a clean *scalpel*, utilizing a clean

cord *clamp*, putting on a pair of *gloves*, etc. Each one of the kit's contents is selected to help ensure one of these "six cleans" (Winani et al., 2007).

By introducing the proper use and importance of a CDK in Grand Goave, Haiti, the project goal was to increase awareness, knowledge, and acceptability of this tool as a means to ultimately improve neonatal and maternal mortality rates in the region in the long term. In partnering with Bless Back Worldwide and Mission of Hope International, an outcome that was expected is to enact a practice change by the organization to continue this project within their clinic to affect positive change and improve outcomes in home deliveries in Haiti.

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Literature Review

A systematic review of published literature was undertaken to identify intervention studies of CDK implementation among women in developing countries with an education component of clean birth practices. The outcomes of interest were overall increase in use of CDK, improved knowledge of clean birth practices, and improved infant maternal mortality and morbidity. The target population was primarily women of childbearing age in developing countries but for the purpose of the review, included birth attendants and care providers as well. To conduct the literature search for this review, an online database search of MEDLINE, CINAHL, Cochrane, Google Scholar, and associated websites such as the Program for Appropriate Technology in Health (PATH) and WHO was conducted using combinations of the following search terms: *"clean/safe birth/delivery," "birth/delivery kit/pack," "clean delivery," "developing country," "infant mortality, "maternal mortality," hygiene," "birth practices," "education," "knowledge," and "home birth"*.

The inclusion criteria were peer reviewed articles published from 1980 to the present in the English language involving human subjects. Full text papers were reviewed and studies with information on kit use, education related to clean birth practices, and outcomes were assessed. Only studies that included an intervention package of a clean delivery kit and an education component pertaining to clean birth practices were included. The exclusion criteria were studies that did not focus on an education

intervention regarding clean birth practices or CDK use. The references from the articles found were examined for relevance and their relation to the topic of CDK use, educational intervention, and impact on clean birth practices. The search elicited over 201 hits. After initial screening of titles and abstracts, full text publications of potentially eligible studies were examined. Snowball searching was used where literature referenced in key study papers was also searched. A total of 51 studies were retrieved for review and of these reports, 5 studies were relevant to the review objective and criteria.

Five studies were identified that examined interventions focused on use of a CDK (Tsu, 2000; Mullany et al., 2006; Winani et al., 2007; Balsara et al., 2009; Darmstadt et al., 2009). All of the studies contained an intervention package of a CDK with education related to clean birth practices. The educational intervention in each study used the WHOs six principles of clean birth to present CDK use and was delivered by a trained provider during antenatal care at a health facility (Mullany et al., 2006; Winani et al., 2007; Balsara et al., 2009; Darmstadt et al., 2009) or through pictorially depicted steps outlining the clean birth process which was provided as inserts in the CDK packages (Tsu, 2000).

The study conducted by Balsara et al. (2009), sought to explore the impact of a CDK on clean delivery practices during births and to explore CDK acceptability among local birth attendants who used the kit. The results showed that CDK users in the home were more likely to report that the birth attendant had clean hands ($P<0.001$), washed or wiped the mother's perineum ($P<0.001$), used a sterile cord tie ($P=0.001$), applied antiseptic to the cord after cutting ($P<0.001$), and used a sterile cord cover ($P<0.001$) as compared with non-CDK users. CDK users at the facility were more likely to report that

the birth attendant washed or wiped the mother's perineum (P=0.049) and used a sterile cord cover (P=0.030) as compared with non-CDK users. Acceptability of the CDK was high as a majority of CDK users (89.1%) indicated that they intended to use the CDK for their next delivery. A considerable proportion of mothers (78.7%) mentioned that they would be willing to share the cost of the CDK and were willing to contribute up to 5 Egyptian pounds (equivalent to U.S. $1.10) per CDK (Balsara et al., 2009).

Darmstadt et al. (2009), conducted a cross-sectional cohort study in Egypt that explored the use of CDKs on morbidity due to newborn umbilical cord and maternal puerperal infections. Results of multiple logistic regression analyses showed an independent association between decreased cord infection and CDK use [odds ratio (OR)=0.42, 95% confidence interval (CI) 0.18-0.97, p=0.041)]. Women who used a CDK also had lower rates of puerperal infection (OR=0.11, 95% CI 0.01-1.06), although the statistical strength of the association was of borderline significance (p=0.057) (Darmstadt et al., 2009).

Mullany et al. (2006) conducted a cluster randomized trial study in rural Nepal, there they examined the efficacy of topical antiseptic (chlorhexidine) treatment and clean cord care birth practices on outcomes of cord infection and neonatal mortality. Results of the study report that a number of intermediate determinants were associated with umbilical cord infection. These included a protective benefit of hand washing, by both the birth assistant (with soap) before delivery (RR=0.69, 95 percent CI: 0.61, 0.79) and the mother during the first 14 days of life (RR=0.71, 95 percent CI: 0.56, 0.91), and the reported correct use of the soap in the clean delivery kit (RR= 0.51, 95 percent CI: 0.45, 0.58). Other items in the kit, such as the new blade and clean string, were not associated

with decreased infection, but the almost universal use of these items (>99 percent) led to low statistical power to detect any true differences (Mullany et al., 2006).

Winani et al. (2007), implemented a cross-sectional study that was conducted in 10 study sites across two districts in Tanzania. The main purpose of the study was to evaluate the effect of the use of CDKs on the incidence of cord infection and puerperal sepsis, and to assess factors associated with the development of such infections. Overall results of the study indicated that infants born to women who used the CDKs were 13.1 times less likely to develop cord infection than infants born to women who did not use the kits. The incidence of cord infection among infants whose mothers cut the cord with a clean razor blade was 1.7% compared to 4.5% who used an old or used cutting instrument ($p=0.026$). Additionally, cord infection was three times lower among infants who did not have any substances placed on the cord stump compared to the infants whose cord had applications (1.5% vs. 4.9%, respectively; $p<0.001$) (Winani et al., 2007).

Furthermore, women who used the kit for delivery were 3.2 times less likely to develop puerperal sepsis than women who did not use the kit. Women who did not use at least the plastic sheet for delivery were more likely to develop puerperal sepsis than those who used the sheet (OR: 3.2, 95% CI [1.85, 5.63]). Among the 820 women attended by birth assistants who washed their hands during delivery developed puerperal sepsis (1.5%, n=12) compared to the 25 women attended by traditional attendants who did not wash their hands (8.0%, n=2) ($p=0.012$). Although there was a significant difference in the incidence of puerperal sepsis between women who inserted herbs, soil, or other substances into the vagina and those who did not (98% and 1%, respectively, $p<0.001$),

this practice was rare. Almost all women (99%) reported that they used clean materials to cover their perineum after delivery (Winani et al., 2007).

Tsu (2000), conducted a cohort study in rural Nepal to determine infant maternal outcomes, in particular, umbilical cord infections, in relation to use of CDKs and clean birth practices. The study aimed to examine the use of CDKs and any associated factors including: behaviors, knowledge, and intentions such as hand washing, cord cutting, correct use of items in the kit, and safe reuse or disposal of kit items postpartum (Tsu, 2000). Results revealed that kit users were more likely to use soap, among both trained (96% vs 73%) and untrained attendants (84% vs 46%). Among trained attendants, slightly more kit users washed their hands before cutting the cord (96% vs 90%), but among untrained attendants many more kit users than non-users washed their hands (91% vs. 76%; $p < .001$).

About 70% of all attendants put nothing on the cord immediately after cutting. About 60% of all attendants put mustard oil on the stump later, while about 30% put nothing on it. About half put a clean cloth on the stump, and less than 5% kept it uncovered. Use of a clean cloth or nothing on the stump (vs. a dirty cloth) and washing hands with soap before cutting the cord were both significantly associated with reduced infection. Kit users had less than half the infection rate (0.45; 95% C.I. 0.25-0.81) of kit non-users who did not use a new or boiled blade and clean cutting surface (after adjusting for confounders) (Tsu, 2000).

The purpose of this review was to identify intervention studies that have evaluated the outcomes of CDK use in developing countries, which informs recommendations of effective strategies (Hundley et al, 2011). The five intervention

studies demonstrated various positive outcomes associated with CDK use. The outcomes measured in the reviewed intervention studies differed. Two studies examined clean birth practices in relation to CDK use specifically (Tsu, 2000; Balsara et al., 2009). The results of those two studies found statistically significant association between CDK use in the home and birth attendant hand washing, clean cord tie or clamp use, clean blade use, and clean delivery surface (Tsu, 2000; Balsara et al., 2009). Two studies specifically focused on umbilical cord infections (Tsu, 2000; Mullany et al., 2006) three studies examined umbilical cord infection and puerperal sepsis (Winani et al., 2007; Balsara et al., 2009; Darmstadt et al., 2009;) and two studies examined outcomes of acceptability of the CDK (Tsu, 2000, Balsara et al., 2009).

The CDKs presented in the reviewed studies were intended to be clean (not sterile) and for single, disposable use. There were some differences in the contents of each CDK, but all CDKs included basic items to ensure clean cutting and tying of the umbilical cord. The studies identified were conducted in Africa or Asia and primarily in rural areas, however, two studies included urban locations (Winani et al., 2007; Darmstadt et al., 2009). Three studies compared CDK use in home and facility settings (Winani et al., 2007; Balsara et al., 2009; Darmstadt et al., 2009). Those three studies reported that women who delivered at home were more likely to report higher CDK use than those who delivered in facilities (Winani et al., 2007; Balsara et al., 2009; Darmstadt et al., 2009), perhaps related to maternal perception that facilities provided their own clean birth practice materials. Information regarding the individual who used the CDK in each study was not clear in many of the studies, although some research studies intended for TBA and maternal use (Tsu, 2000; Mullany et al., 2006; Balsara et al., 2009;

Darmstadt et al., 2009) while others focused solely on maternal use (Winani et al., 2007). The skills or educational level of TBAs were not included in the studies, although training of the attendant was included in some of the educational intervention packages (Balsara et al., 2009; Darmstadt et al, 2009).

Pictorial instructions of kit use were included in the five studies. Four of the studies included an in-person education component in the intervention (Mullany et al., 2006; Winani et al., 2007; Balsara et al., 2009; Darmstadt et al., 2009) and one study relied on a pictorial insert (Tsu, 2000). Lack of knowledge of basic clean birth practices and of understanding of CDK use role in preventing maternal and neonatal infections were limiting factors to the appropriate use of CDK items. Thus, health education messages focusing on clean birth practices were essential to bring about behavior change along with kit distribution (Mullany et al., 2006; Winani et al., 2007; Balsara et al., 2009; Darmstadt et al., 2009). The study without an in-person education component (Tsu, 2000) was retained in the current review due to its specific outcome measures of clean birth practices in relation to use of a CDK. The study also had value in examining knowledge and behaviors in relation to clean birth intervention using a visual, pictorial education approach.

Tsu (2000) explained that the antenatal period presents an opportunity to provide educational messages at a time when families are particularly motivated to heed the messages and to consider healthful practices. The study showed a high level of compliance with the pictorial messages teaching CDK use and clean birth behaviors, although there was less success in changing early breastfeeding and wrapping behaviors that were not directly related to the CDK. Possible reasons for lack of compliance may

include a lack of understanding of the rationale for the specific behavior or use of the item which are limited in explanation without in-person engagement in instruction. Also, cultural beliefs and practices may preclude desired outcomes. Qualitative research suggests that women did not use pictorial instructions because they showed women lying down to give birth which was contrary to their cultural practice (PATH, 2002). Recognizing cultural views, spiritual belief systems, community support, literacy, and educational background all contribute to how a person makes a health decision. When developing an educational intervention for implementation, it is essential to understand the cultural context of the target population to ensure an appropriate and acceptable intervention approach.

2.2 Gaps in Literature

The primary limitation of this review is the lack of high or moderate quality evidence of the intervention strategies aimed at improving women's knowledge of CDK use and clean birth practices. There was an apparent assumption among many of the studies that provision of CDKs would lead to use and that each item in the kit would be appropriately utilized, leading to clean birth practices. While clean birth and postnatal care is widely accepted, there is low-quality evidence of the effect of these interventions, especially in low income settings (Blencowe et al., 2011). While the findings of the studies support beneficial effects of clean birth practices, the studies did not specifically look at improved maternal knowledge following intervention. Improved knowledge is vital for practice change. Furthermore, the studies did not evaluate the cultural acceptability of the CDK use and clean birth practices which is also important in sustainable implementation of these practices in the community. More research is needed

to evaluate the effectiveness of maternal educational strategies in promoting CDK use and clean birth practices based upon the evidence-based WHO principles of clean delivery among women in developing countries.

Regions in developing countries with a high maternal and infant mortality rate as well as a high prevalence of preventable high-risk practices are potentially poised to benefit from application of the principles of CDK use with clean birth practice education. Studies that focus on implementation of education in combination with CDKs in developing countries, have the potential to improve knowledge and improve clean birth practices. Findings in the previous mentioned studies suggest that the use of CDKs and clean birth practices are associated with an increased likelihood of maternal-infant survival in rural settings where access to health resources, formal healthcare, and institutional deliveries may be limited (Tsu, 2000; Mullany et al., 2006; Winani et al., 2007; Balsara et al., 2009; Darmstadt et al., 2009). CDK use provides some of the necessary components of clean birth in home birth settings, especially when combined with comprehensive evidence-based educational strategies targeting women, birth attendants, and care providers.

2.3 Theoretical Framework

The theoretical framework utilized to guide the study was based upon the constructs of the well-established and widely used Health Belief Model (HBM) (Rosenstock, Strecher, & Becker, 1988). The Health Belief Model was developed in the 1950s by social psychologists working for the U.S. Public Health Services and since elaborated on, this cognitive model has provided the basis for understanding health risk behavior as well as prevention-focused interventions and research (Rosenstock, 1974;

Rosenstock, Strecher, & Becker, 1988). Quantitative research that uses the HBM as a framework for understanding health-related risk taking among diverse groups could inform understanding of how to better serve a certain population's needs.

The original HBM suggested that whether individuals undertook preventive health behaviors was contingent on four factors: (a) their perceived susceptibility to an adverse health outcome; (b) their perceptions of the level of severity of the adverse health outcome and related consequential outcomes; (c) their perceptions of the benefits of given preventive behaviors, in terms of helping them avoid the adverse health outcome; and (d) the perceived barriers to (or costs of) implementing given preventive behaviors (Rosenstock, 1974). A fifth factor, their level of perceived self-efficacy in implementing preventive behaviors, was later added to the model (Rosenstock et al., 1988). Self-efficacy refers to the degree to which individuals believe that they are capable of implementing preventive actions (Bandura, 1977).

The HBM can be applied to use of the CDK, based on the understanding that a person will take a health-related action in relation to birth upon learning about the potential benefit of the CDK in reducing maternal and infant mortality,

1. feels that a negative health condition (i.e., infant maternal mortality) can be avoided,

2. has a positive expectation that by taking a recommended action, he/she will avoid a negative health condition (i.e., improved knowledge regarding use of a CDK will lead to clean birth practices and improved health outcomes for mother and baby), and

3. believes that he/she can successfully take a recommended health action (i.e., he/she can use CDKs comfortably and demonstrate clean birth practices with confidence).

The Health Belief Model is a framework for motivating people to take positive health actions that uses the desire to avoid a negative health consequence as the prime motivation. For example, infant and maternal mortality is a negative health consequence, and the desire to avoid it can be used to motivate birthing mothers in developing countries into practicing clean birth practices with the use of a CDK. The HBM can be an effective framework to use when developing health education strategies. A large research study reviewed 46 studies of HBM-based prevention programs published between 1974 and 1984. The HBM-based programs focused on a variety of health actions. The results of the meta-analysis provided substantial empirical support for the efficacy of the HBM (Becker, 1974). By utilizing role-play/teach back in the study, it further assessed if there was true understanding and improvement in knowledge of the women's ability to use the CDK properly and demonstrate clean birth practices.

CHAPTER 3: PROJECT DESIGN

3.1 Methodology

3.1.1 Subjects

The participants of the study that were impacted in this scholarly project are Haitian women of childbearing age (18-45 years old) who reside in the Grand Goave region and who attended the Annual Women's Health conference held in July 2016 in Grand Goave, Haiti at the Mission of Hope International Center in collaboration with Bless Back Worldwide.

3.1.2 Setting

The setting was Grand Goave, Haiti which is located in southwestern Haiti. All parts of the study took place in a classroom setting at the conference at Mission of Hope International Center. This portion of the study took place at one time, on one day, for 60 minutes without follow-up.

3.1.3 Measures

The measurement tools of the pre-test and post-test surveys were developed by the primary project director Grace Ostan with assistance of the lead chair Dr. Ilana Chertok, as well as discussions with the medical expert Dr. Blank who has experience on the ground in the community of Grand Goave, Haiti. The surveys were also reviewed with Haitian women in the Charlotte, NC area who are familiar with Bless Back

Worldwide and have a frame of cultural reference of the country. For a detailed description of the pre- and post-test surveys of the women and medical providers included in the study, the education component outline, the clean birth practice handout, and the role play evaluation tool (see Appendix B, C, D, E, F, and G).

3.1.4 Intervention and Data Collection

Advertisement of the Annual Women's Health Conference was verbal in nature by staff of the Mission of Hope International organization that is currently based on the ground in Grand Goave, Haiti. Women who fit inclusion criteria were randomly selected as they entered the conference grounds. Women were verbally recruited with the assistance of a Haitian translator (See Appendix A for a recruitment script that was used). Women that were interested in participating (N=18), were then taken to a classroom setting and gave thumbprint consent post being informed of the study via a Haitian translator who provided the information to the women in Creole. After consent, the women were give a unique identification study number. The women were then asked to participate in a pre-survey test, attend an educational session related to clean birth practices in accordance with WHO standards, and take a post-survey test in order to test knowledge of cleanliness techniques at birth.

The primary project director (the DNP student who is a Family Nurse Practitioner with experience in providing healthcare on international mission trips) conducted the educational session with all 60 women at the conference (including the 18 women in the study) during a 30-minute time slot for teaching at the Annual Women's Health Conference on clean birth practices and use of a clean delivery kit according to WHO standards. The education component utilized a handout that each woman at the

educational intervention (60 including the 18 study women) received. The handout emphasized the six principles of cleanliness at birth in accordance with WHO standards (Appendix D).

Study participants (N=18) were involved for 60 minutes' total whereas general attendees (non-study participants from whom no research data was collected, (numbering 60 women) attended only the 30-minute educational session. The information was provided in Creole via use of Haitian translators. The pre- and post-test surveys were read to the 18 women in a classroom setting via use of interpreters one on one. The women's responses to the questions were recorded via pen and paper by the translator with the primary project director monitoring.

The pre-and post-test evaluation was conducted before and after the educational intervention and was adapted for literacy issues of the target population. The study followed the 18 women in the study from the time they took the survey, through the educational session, and then ending with their participation in the post-test survey. One participant was lost to follow up after the educational intervention as she did not return for the post-test, thereby making the final number of survey participants to be a total of 17. Qualitative data in the form of answers in the surveys was collected. Primary outcome measurements were to identify if knowledge of clean birth practices improved post the educational intervention. The survey identified areas of improved knowledge. Women were randomly selected (25 women) following the educational intervention to participate in the role play/teach back portion. This tool was not intended for research rather to evaluate the educational session that was conducted and further evaluate knowledge improvement.

3.1.5 Confidentiality of Data

In Haiti, the procedures that were followed included: distribution of surveys, collection of surveys, role play evaluation form, and the educational program. In Haiti, the project director kept hard copies of the completed surveys and completed role-play evaluation forms in a locked briefcase. Upon return to the U.S., the DNP student transferred the information from the surveys to an Excel spreadsheet stored on her hard drive and transferred to a flash drive in order to share the non-identifiable data with the DNP lead chair for analysis. After returning to Charlotte, data entry, data management, data analysis, and recording of findings were completed. The data is stored on a flash drive which was then inputted into a laptop computer where it is a secure network with password access. The laptop, flash drive, and any physical copies of surveys/questionnaires were stored in a locked office. The project director is the only person who has access to the data. No identifying information of name or birth date was taken as it is anonymous surveys. Data will be kept on file during the duration of the DNP program and during the timeline of proposed submission for publication no less than 3 years following the expiration date of the project approved by UNCC's IRB.

3.2 Project Analysis

3.2.1 Translation

This DNP scholarly project aimed at providing a clean delivery kit with education to impoverished women in Haiti. The clean delivery kit affords women the components recommended by the WHO for a safe and hygienic birth, using environmentally friendly and culturally appealing materials. Provision of the CDK in combination with education improves women's knowledge, empowers her in the decision-making process, and gives

her tools to promote clean birth and reduce the risk of infant and maternal mortality. This project can easily be replicated and implemented in other developing countries or low resource settings where home births are common or where there is a lack of education in regard to clean birth practices among the community.

3.2.2 Impact on Practice

By providing education to women in a developing country such as Haiti, regarding WHO standards for clean birth practices, it allowed the project director of the DNP scholarly project to empower these women to make active practice changes in their community regarding infant maternal health and will hopefully provide for improved knowledge, awareness, and ultimately better infant maternal health outcomes that can impact generations to come.

Vital resources included in this project include the site of Mission of Hope International Center where the Annual Women's Health Conference took place. Mission of Hope has an active women's clinic on site with medical providers available which will act as a wonderful follow-up resource for the women in the community. By providing surveys and education to the medical providers regarding clean birth practices, the hope is that it can further their knowledge and practice in the community regarding clean birth. This DNP scholarly project is committed to quality care of the women and children in Haiti and it ultimately seeks improvement in maternal infant health outcomes in Haiti. This program has the potential for implementation in other settings and further translation into clinical practice. This project is community focused and sought to train, educate, and improve the knowledge of women and ultimately the overall health of the community.

3.2.3 Fiscal Impact

Clean delivery kits are basic, inexpensive kits (estimated cost per kit, $2 U.S.) that help mothers and newborns avoid acquiring infections during childbirth. The kits can be modified to accommodate cultural birth practices while maintaining a simple and effective approach to clean birth. A key goal of this DNP scholarly project was to make sure the kits were available to the women they were designed to help in Haiti. Kits were distributed to the women that participated in the study. In addition, kits were left at the Mission of Hope International Center in order for medical providers to continue to distribute to women of childbearing age that present to the clinic in need. Given access to supplies, kit production, and distribution can be done on the ground in Grand Goave, Haiti. Future plans potentially include assisting community health promoters in developing a plan to use CDKs as an income-generating activity that would contribute to local health programs and further help the economy of Haiti.

CHAPTER 4: CHAPTER FOUR: PROJECT RESULTS

4.1 Sample Demographics

Characteristics of the 18 study participants are shown in Table 1. The average age of participants was 28.1 years +- 5.2 (range=23-45) and 100% are female. Over half (55.6%) of the participants were from Grand Goave where the study took place. A majority of the women (72.2%) claimed Protestant to be their primary religion. Two thirds (66.7%) of the women reported being single in their marital status. Over half of the participants were able to read (77.8%) and write (66.7%). Half of the participants reported secondary school as the last grade completed (55.6%) with (11.1%) of the participants reporting never attending school.

Table 4.1. Characteristics of the Participants (N=18)

N (%) or Mean +- *SD* [Median, (Min, Max)]	
Characteristic	Participants (n=18)
Age (years)	28.11+- 5.2 [27 (23,45)]
Gender	
Female	18 (100%)
Village	
Grand Goave	10 (55.6%)
Rue St. Francois	4 (22.2%)
Other villages	4 (22.2%)

Table 4.1 (continued)

N (%) or Mean +- *SD* [Median, (Min, Max)]	
Characteristic	Participants (n=18)
Religion	
Protestant	13 (72.2%)
Catholic	4 (22.2%)
Marital status	
Married	6 (33.3%)
Single	12 (66.7%)
Able to read	
Yes	14 (77.8%)
No	4 (22.2%)
Able to write	
Yes	12 (66.7%)
No	6 (33.3%)
Last grade completed	
Primary	5 (27.8%)
Secondary	10 (55.6%)
University	1 (5.6%)
No school	2 (11.1%)
Number of children born to mother	
1-4	5(27.8%)
5-8	7 (38.9%)
9-12	6 (33.3%)
Number of children still living to date	
1	5 (5.278%)
2	7 (38.9%)
4	3 (16.7%)
5	1 (5.6%)
6	1 (5.6%)
8	1 (5.6%)

4.2 Intervention Data

Previous birth experience of the participants is shown in Table 2. The participants were asked questions in the pre-survey regarding previous delivery experiences in order to obtain more information of the common birthing practices in the region. The women's responses revealed cultural norms and common birthing experiences of women in the region of Grand Goave, Haiti. The responses also revealed the utilization of clean birth practices. More than half of the women (55.6%) responded that they gave birth at home. Women had differing responses as to who assisted them in delivery and gave more than one response with most women reporting a friend (38.9%) and nurse/doctor (44.4%) assisting them in previous deliveries. Women reported that during delivery the assistants washed their hands and the participant's vagina prior to delivering the baby (83.3% and 83.3%, respectively). Over half of the responses of the participants noted that the assistant wore gloves (72.2%), while some participants responded no or they could not recall if the assistant had worn protective gloves (22.6%, 5.6%). One third of the women reported that substances had been inserted into or on top of their vagina following delivery (33.3%). A majority of the women in the study gave birth on the bare ground during delivery (55.6%). Participant's reported using a blade (61.1%) most frequently to cut the umbilical cord. Responses varied for how the instrument used to cut the umbilical cord was cleaned, with 16.7% reporting the instrument was washed with soap and water, 11.1% reporting nothing occurred to clean the instrument and 38.9% reporting they could not recall what was done to the instrument. Almost three quarters of the participants responded that the umbilical cord was tied (72.2%) noting "it was tied with a string." A majority of the participants noted that no substance (61.1%) was placed on the umbilical stump after it was cut, however there were some participants that noted herbs or plants were placed on the umbilical stump (11.1%).

Table 4.2. Previous Birth Experience of the Participants (N=18)

N (%)	
Characteristic	Participants (n=18)
Where did you give birth to your most recent child?	
At home	10 (55.6%)
Hospital/Clinic	8 (44.4%)
Who assisted you during delivery?	
Relative	7 (38.9%)
Friend	4 (22.2%)
Untrained Birth Attendant	3 (16.7%)
Trained Birth Attendant	2 (11.1%)
Nurse/Doctor	8 (44.4%)
Did the birth attendant assisting during delivery wash their hands prior to delivery of the baby?	
Yes	15(83.3%)
No	2 (11.1%)
Do not remember	1 (5.6%)
Did the birth attendant wash your vagina before you gave birth?	
Yes	15 (83.3%)
No	3 (16.7%)
Did the birth attendant wear gloves?	
Yes	13 (72.2%)
No	4 (22.2%)
Do not remember	1 (5.6%)
Were any of the following substances inserted into or on top of your vagina after delivery?	
Herbs, plants, or soil	6 (33.3%)
Other	3 (16.7%
None	9 (50%)
Onto what surface did you give birth?	
Bed	6 (33.3%)
Bare ground	10(55.6%)
Other	2 (11.1%)

Table 4.2 (continued)

N (%)	
Characteristic	Participants (n=18)
What instrument was used to cut the baby's umbilical cord?	
Blade	11 (61.1%)
Scissors	6 (33.3%)
Do not know	1 (5.6%)
What was done to the instrument used to cut the cord?	
Washed with soap and water	3 (16.7%)
Wiped with a clean cloth	3 (16.7%)
Boiled in water	3 (16.7%)
Nothing	2 (11.1%)
Do not remember	7 (38.9%)
How was the cord tied or clamped after it was cut?	
Tied	13 (72.2%)
Clamp	1 (5.6%)
No response	4 (22.2%)
What substance was put on the cord after it was cut?	
Herbs or plants	2 (11.1%)
Sulfur or soil	1 (5.6%)
Nothing	11 (61.1%)
Gauze or cloth	4 (22.2%)

Table 4.3. Pre-and Post-Test Results (N=18)

N (% of participants who reported "Yes"), Mode, Median and Sum Score of Mean Pre-and Post-Test		
	Pre-Test	Post Test
Have you ever heard of or used a clean delivery kit (CDK)?	11 (61.1%)	16 (88.9%)
	Mode: 1	Mode: 1
	Median: 1.00	Median: 1.00

Table 4.3 (continued)

N (% of participants who reported "Yes"), Mode, Median and Sum Score of Mean Pre-and Post-Test		
	Pre-Test	Post Test
Are you familiar with the World Health Organization's (WHO) 6 principles of cleanliness?	6 (33.3%) Mode:0 Median: 0.00	17 (94.4%) Mode:1 Median:1.00
Washing your hands with a bar of soap prior to and during delivery is important.	13 (72.2%) Mode:1 Median:1.00	17 (94.4%) Mode:1 Median:1.00
The use of gloves during the delivery process is important.	18 (100%) Mode:1 Median: 1.00	17 (94.4%) Mode:1 Median:1.00
A clean cloth or sheet should be placed under the woman during delivery.	17 (94.4%) Mode:1 Median:1.00	17 (94.4%) Mode: 1 Median: 1.00
Boiled or new razor blades/scalpels are used to cut the umbilical cord.	15 (83.3%) Mode:1 Median:1.00	12 (66.7%) Mode: 1 Median: 1.00
The umbilical cord is tied with a clean cord tie or cord clamp.	17 (94.4%) Mode: 1 Median: 1.00	17 (94.4%) Mode:1 Median: 1.00
The WHOs 6 principles of cleanliness state that unclean substances (e.g., soil, herbs, plants) should not be introduced into the vagina.	1 (5.6%) Mode:0 Median: 0.00	16 (88.9%) Mode: 0 Median: 0.00
Would you use the CDK if it was available to you?	16 (88.9%) Mode: 1 Median:1.00	17 (94.4%) Mode:1 Median: 1.00

4.3 Project Outcomes and Discussion

In SPSS, when analyzing the output for Spearman's Rho nonparametric correlations, it was noted that there were three questions in the pre-survey that had significant association for the pre-test sum score and they were: Did the birth attendant wear gloves? (Yes, correlation coefficient=-0.634, p=0.005), Who assisted you during delivery? (Friend, correlation coefficient=0.480, p=0.044), and Have you ever heard of or used a CDK? (Yes, correlation coefficient=0.580, p=0.012). A t-test was conducted to determine if there were any variables that were associated with scoring differences in the pre-test score. There was a significant difference in the baseline pre-test score for women who had heard of or used the CDK (No (N=7), Mean (SD)=5.6(0.8), Yes (N=11), Mean(SD)= 6.8(1.0), t=-2.823, p=0.012), possibly explaining their higher baseline score. Due to the small sample size, a non-parametric Mann-Whitney U test was done for the variable "heard of or used a CDK". Those who had heard of the CDK had significantly higher pretest scores with a large effect size (r=0.580, Z=-2.390, p=0.017).

A Wilcoxon signed ranks test was used to compare two sets of sum scores of the participants as repeated measures under different conditions, before and after the intervention. The median score (50^{th} percentile) of the pre-test=6.0 and the post-test=8.0, z=-3.247, p=0.001. These results indicate that there was a significant difference in knowledge of clean birth practices following the intervention. A paired samples t-test was conducted to look at the difference in pre-and post-test scores. The results indicate that there was an increase in mean scores from pre-test and post-test (N=17, pre-test summary mean=6.35, post-test summary=7.71, p=0.000). A bootstrap test was conducted to test the stability of the analytical model and procedures listed prior and ensure that the above results are accurate when applied to a theoretical, larger sample size such as N=1,000.

Bootstrap results for the paired samples test with a theoretically calculated sample of 1,000 participants were also statistically significant higher (Pre-test & Post-test sum p=0.002, 95% CI -1.88235, -0.82353), supporting the influence of the intervention on increasing the knowledge of the participants.

60 women at the conference rotated through the educational session with 25 women completing the role play (Appendix F). The role play evaluation tool was scored on a scale of 1-10 (1 is poor and 10 is exceptional), with a majority of the women (92%, n=23) scoring between 8-10. This further indicated improved knowledge and understanding of the CDK and its contents and clean birth practices. On the survey, there were two open-ended questions that women were able to answer. The first question asked, “How would using the CDK affect infant and maternal health in Haiti?” There was a common theme that emerged from the women’s responses in that they answered it will “keep the mom and baby safe” and to “avoid infection.” The second question asked, “What is your reason for using a CDK?” A common response was “to keep the baby in good health” and “have a positive result for mother and baby.” This thematic analysis of the women’s qualitative responses on the survey further indicates improved knowledge about benefits of clean birth practices.

CHAPTER 5: IMPLICATIONS

5.1 Implications for Practice and Future Practice

This study ensured that medical providers in the community obtained a CDK, and in the process, received education about importance, use, and disposal of kits. This strategy fostered a link between the women of the community and this clinic. The results of the study indicate that there was an improvement in knowledge of clean birth practices post an educational intervention and role-play with use of a CDK; hand washing, use of gloves, use of a sterilized blade, umbilical cord clamp, and under pad. Strategies of education combined with CDK use should be promoted by the international community in order to increase knowledge in relation to clean birth practices and reduce potential risks of infection among mother and baby.

Safe birth is fundamental to maternal and infant health promotion and reduction of mortality. Education regarding clean birth and birth preparedness with a CDK should be promoted along with other evidence-based interventions such as universal access to skilled birth attendants and referral systems with access to emergency obstetric and infant care (Blencowe et al., 2010). Nurses are essential to the implementation of CDKs and clean birth practice intervention programs for childbearing women in developing countries. It is in poor developing countries and communities, where health needs are greatest and physicians are scarce, that nurses play an even greater role in healthcare delivery, often serving as the sole health providers in rural villages or urban slums.

Access to qualified and knowledgeable midwives and nurses often means the difference between life and death (Davis, 2012). Globally, nurses are often the primary health providers within a community, because health systems often operate with minimal resources and infrastructure. Nurses are on the frontlines caring for patients. Nurses provide maternal and infant health education in effective ways. Nurses have the opportunity to play a larger role in determining their countries' health policies. Health care is a human right.

Millennium Development Goals (MDG) 4 and 5 established by WHO are to reduce child mortality and improve maternal health by 2015 (WHO, 2015). In order to accelerate progress towards achieving MDGs 4 and 5, a major focus must be placed on increasing the quality and access of care before, during and after birth. This type of initiative and investment requires healthcare workers, specifically nurses on the frontlines that are connected with women, communities, linked with local health networks, and equipped with the necessities needed for basic and safe birth services and family planning. Nurses are strong, hard-working, and an inspiring group of professionals who serve as colleagues, teachers, and experts in their home countries, as well as throughout the global community. Nurses are on the forefront of a changing healthcare system and have the capacity to lead and educate future generations of nurses in developing countries where they are needed, to improve the quality of care and to bring essential knowledge and perspectives to the decision-making process (Davis, 2012).

5.2 Limitations

There were limitations in this study such as the small sample size of 18 women with 1 lost to follow up. There was another presenting limitation of a language barrier

since the women in the study's primary language is Creole. Literacy barrier's may have played a significant role in impacting the women's level of understanding and knowledge of the educational intervention. In addition, there was a lack of ability to compare the post-intervention role play assessment with any baseline to discover if there was a true difference. In addition, this study targeted solely women but it is also important to consider cultural considerations and ensure that health-education messages are not only given to mothers or women, but also include decision-makers within the household.

5.3 Summary

The results of the study indicate that maternal education of clean birth practices and use of the CDK contributes to improved knowledge of clean birth practices among a sample of women living in Haiti. The utilization of a CDK with the educational intervention was associated with improved mean scores of the pre-and post-test surveys. The role play evaluation further indicated that there was a knowledge improvement of use of the CDK and clean birth practices. The qualitative survey responses of the women further indicate improved knowledge about benefits of clean birth practices which will ultimately lead to improved outcomes for mother and baby.

5.4 Recommendations

In low-resource settings where a high proportion of mothers give birth at home, supplies needed to conduct a clean delivery are often unavailable even in hospitals and health clinics. Making clean delivery kits available at a local health clinic with implementation of an educational intervention can improve knowledge of clean birth practices among women and improve maternal- infant outcomes. Strategically educating and providing CDKs to a medical clinic within the community has the potential to foster

a stronger link between pregnant women who receive traditional birth practices with evidence-based antenatal care. In areas where home deliveries are common, the CDK can serve as an important medium through which clean birth practices can be promoted to improve infant maternal outcomes.

5.5 Sustaining the Change

By educating the providers at the clinic, the hope was to raise their awareness of the need for CDKs, improve their knowledge regarding clean birth techniques according to WHO standards, and gain a deeper understanding of the cultural norms of birth practices in the Grand Goave area. The clinic was supplied with left over CDKs with instructions to educate women that present to the clinic for a pre-natal visit or that can benefit from use of a CDK in their community. By educating the women in the Grand Goave area, the hope is that the women will take this improved knowledge and information back to their communities and the teaching will continue to other women and families. The benefits of a clean birth have long been recognized. Estimates show that if this basic and feasible action was achieved for all of the 135 million births each year, over 100,000 lives could be saved annually (Blencowe et al., 2010). The goal of ending preventable maternal-infant morbidity and mortality is a call to action across all regions of the globe, developed and developing, including areas where substantial progress has already been made. Among developing countries where maternal and infant infection rates and death counts remain high, the challenge is clear. Efforts to save lives must be accelerated and complemented with research, education, and quality, evidence-based healthcare service (WHO, 2015).

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APPENDIX A: RECRUITMENT SCRIPT

Hi, my name is_____, I'm working with a graduate nursing student from UNCC. She is interested in finding out about birth practices in Haiti. I hope you are willing to answer some questions. We appreciate your participation.

APPENDIX B: PRE – TEST SURVEY HAITIAN WOMEN

Date of Survey:_____

Name of Mother's Community/Village:_____

Mother's Religion:_____

Mother's Age:_____

Marital status:

_____Married

_____Divorced

_____Widowed

_____Single

Education level:

_____Are you able to read?

_____Are you able to write?

What was the last grade you completed in school?

_____Primary school only

_____Secondary school

_____University or post-university

_____No school

_____Literacy classes

Number of children born to mother: _____

Number of children still living to date: _____

Have you ever had a child that passed away? _____

If yes, what age was the child? _____

Questions to woman:

1. How many deliveries of friends or relatives have you attended or helped during the past year? _____

The following questions refer to the birth of your most recent child.

2. How long ago was your most recent child's birth? _____ years

3. Where did you give birth to your most recent child?

   _____Home

   _____Relative or friend's home

   _____Hospital or clinic

   _____Other

4. Who assisted you during delivery?

   _____Relative

   _____Friend

   _____Untrained Birth Attendant

   _____Trained Birth Attendant

   _____Nurse/Doctor

5. Did the birth attendant assisting you during delivery to give birth wash her hands before delivering the baby?

_____Yes

_____No

_____Do not remember

6. Did the birth attendant wash your vagina before you gave birth?

_____Yes

_____No

_____Do not remember

7. Did the birth attendant wear gloves?

_____Yes

_____No

_____Do not remember

8. Were any of the following substances inserted into or on top of your vagina after delivery? (check all that apply)

_____Herbs or plants (e.g.: Pimento leaves, Menthol)

_____Soil

_____Sulfur

_____Other (specify): _____

_____None

9. On to what surface did you give birth?

_____Bed

_____Bare ground

_____Mat

_____Other (specify): _____

10. What instrument was used to cut the baby's umbilical cord? _____

11. What was done to the instrument used to cut the cord? (Check all that apply.)

_____Washed with soap and water

_____Wiped with a clean cloth

_____Boiled in water

_____Nothing

_____Do not remember

12. How was the cord tied or clamped after it was cut?_____

13. What substance was put on the cord after it was cut? (Check all that apply.)

_____Herbs or plants (e.g.: Pimento leaves, Menthol)

_____Soil

_____Sulfur

_____Nothing

_____Other (Specify): _____

Check the appropriate response:

1. Have you ever heard of or used a clean delivery kit (CDK)?

   _____Yes

   _____No

2. Are you familiar with the World Health Organization's (WHO) 6 principles of cleanliness?

   _____Yes

   _____No

3. Washing your hands with a bar of soap prior to and during delivery is not important.

   _____Yes

   _____No

4. The use of gloves during the delivery process is important.

   _____Yes

   _____No

5. A clean cloth or sheet should be placed under the woman during delivery.

   _____Yes

   _____No

6. Boiled or new razor blades/scalpels are used to cut the umbilical cord.

   _____Yes

   _____No

7. The umbilical cord is tied with a clean cord tie or cord clamp.

_____Yes

_____No

8. The WHOs 6 principles of cleanliness states that unclean substances (e.g. soil, herbs, plants) should be introduced into the vagina.

_____Yes

_____No

9. Would you use the CDK if it was available to you?

_____Yes

_____No

10. What is your reason for your answer for question #9?

_____

_____

_____

_____

11. In your opinion, how would using the CDK affect infant and maternal health in Haiti?

_____

_____

_____

_____

APPENDIX C: EDUCATION COMPONENT

The clean birth kits are designed to follow the World Health Organization guidelines for birthing kits, which states: “The hands of the birth attendant must be washed with soap and water, as well as the perineum of the mother. The surface on which the delivery takes place must be clean. Instruments for cord care (razor blade, cutting surface, cord ties) should be clear and preferably sterile. Nothing should be applied to the cutting surface or to the stump. The stump should be left uncovered to dry and mummify, eventually dropping off.”

WHO: The Six Principles of Cleanliness

1. Clean hands
2. Clean perineum/vagina
3. Nothing unclean introduced into the vagina
4. Clean delivery surface
5. Clean cord cutting instrument
6. Clean cord care including cutting surface and cord ties

Modeling the contents of the clean delivery kit (CDK) and demonstrating what each item is to be used for.

APPENDIX D: CLEAN BIRTH HANDOUT

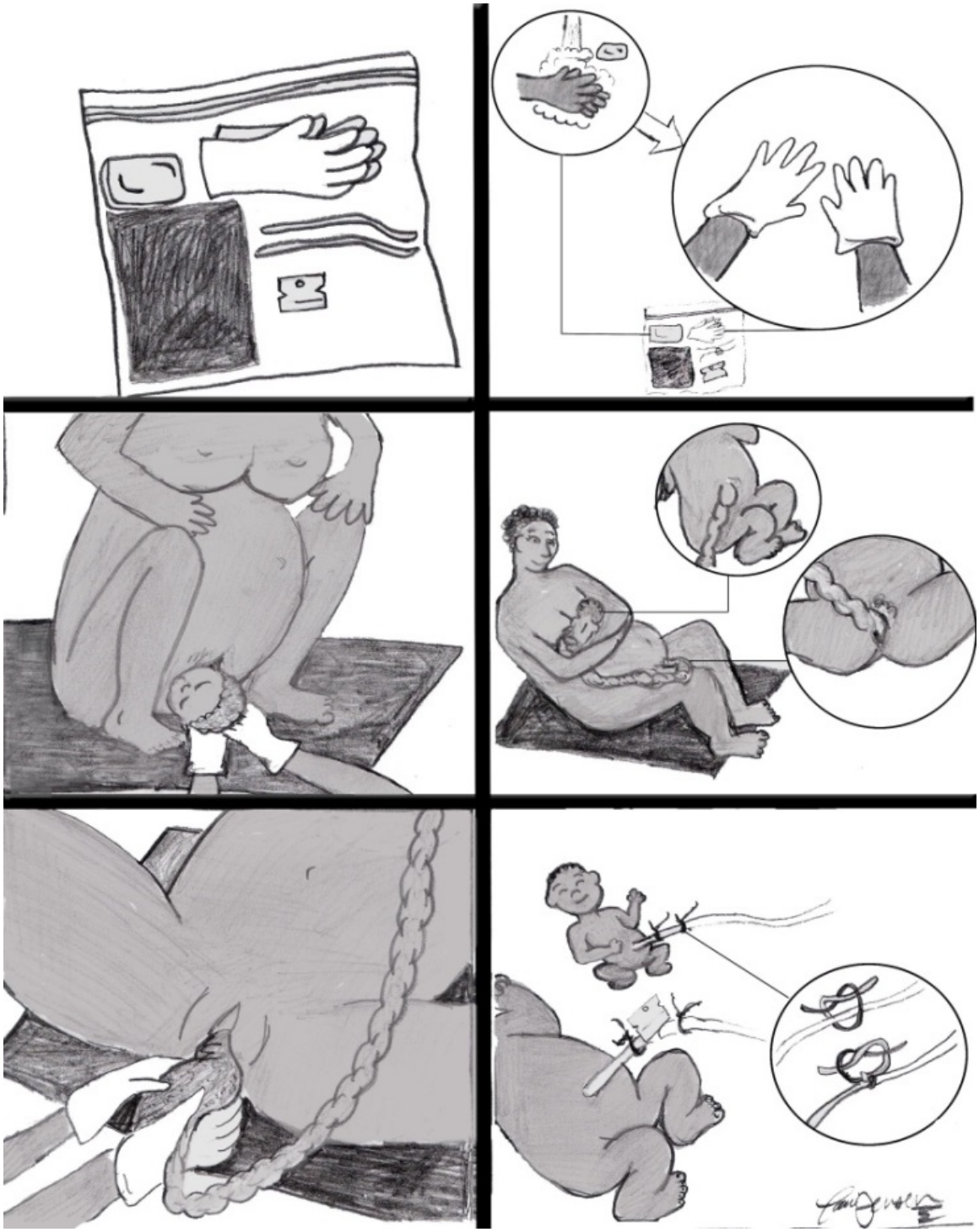


Figure D.1. Illustrations depicting use of a clean delivery kit

Clean birth principles:

1. Clean hands – Soap and Gloves
2. Clean delivery surface – Underpad
3. Clean cord cutting instrument – Blade
4. Clean vagina
5. Clean cord clamp or clean cord ties – Cord clamp

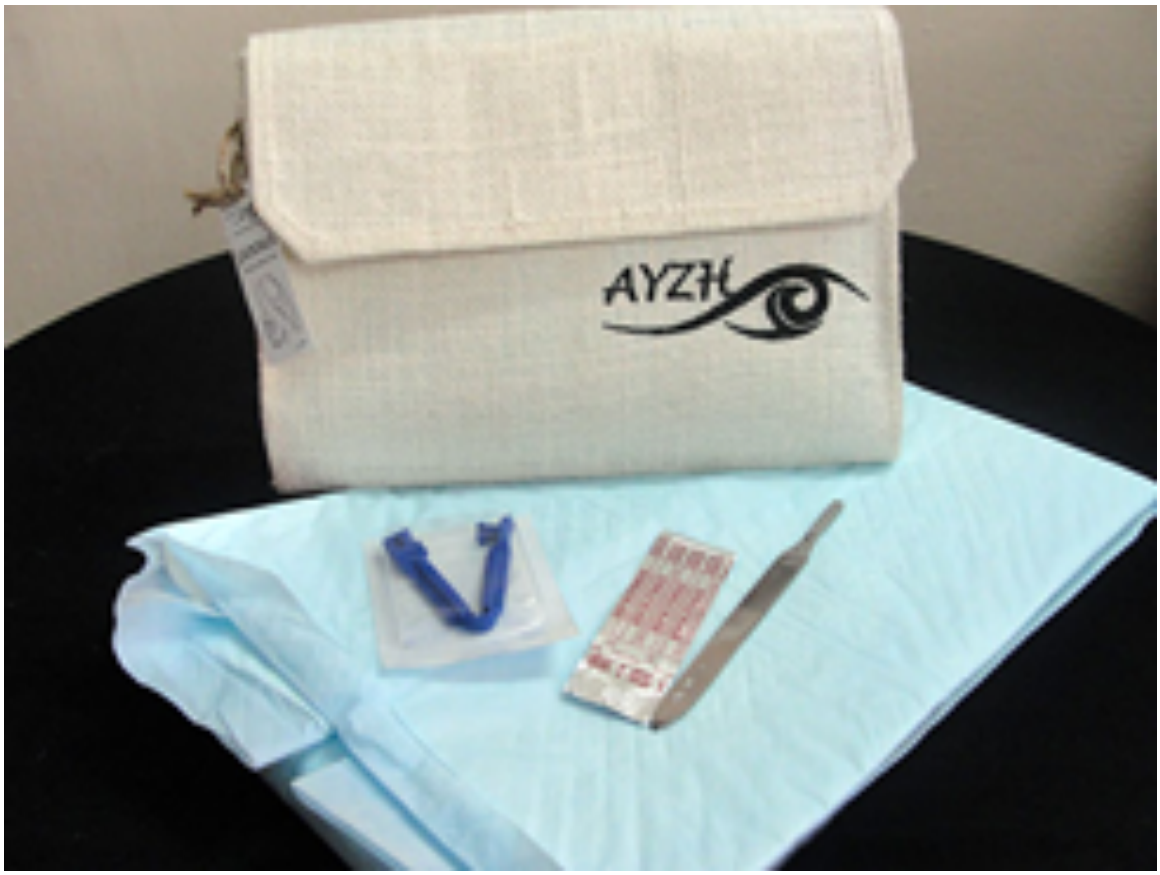


Figure D.2. Example of a clean delivery kit

APPENDIX E: POST-TEST SURVEY HAITIAN WOMEN

Check the appropriate response:

1. Have you ever heard of or used a clean delivery kit (CDK)?

   _____Yes

   _____No

2. Are you familiar with the World Health Organization's (WHO) 6 principles of cleanliness?

   _____Yes

   _____No

3. Washing your hands with a bar of soap prior to and during delivery is not important.

   _____Yes

   _____No

4. The use of gloves during the delivery process is important.

   _____Yes

   _____No

5. A clean cloth or sheet should be placed under the woman during delivery.

   _____Yes

   _____No

6. Boiled or new razor blades/scalpels are used to cut the umbilical cord.

_____Yes

_____No

7. The umbilical cord is tied with a clean cord tie or cord clamp.

_____Yes

_____No

8. The WHOs 6 principles of cleanliness states that unclean substances (e.g. soil, herbs, plants) should be introduced into the vagina.

_____Yes

_____No

9. Would you use the CDK if it was available to you?

_____Yes

_____No

10. What is your reason for your answer for question #9?

_____

_____

_____

_____

11. In your opinion, how would using the CDK affect infant and maternal health in Haiti?

_____

_____

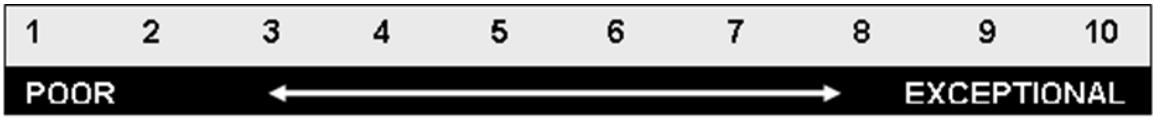
_____

_____

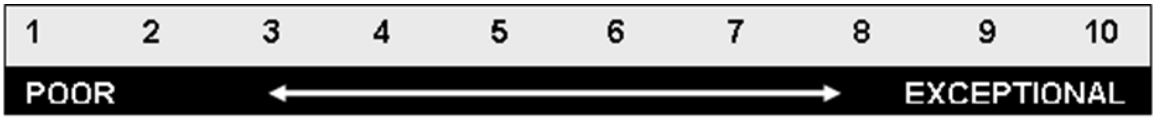
APPENDIX F: ROLE PLAY EVALUATION FORM

Instructions: Please circle the number that best describes the person's actions in the role-play where 1 is Poor and 10 is Exceptional.

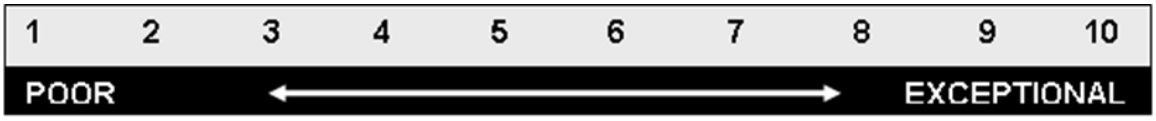
1. Clean Hands



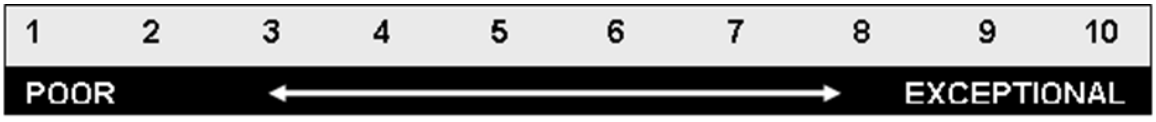
2. Used Bar of Soap



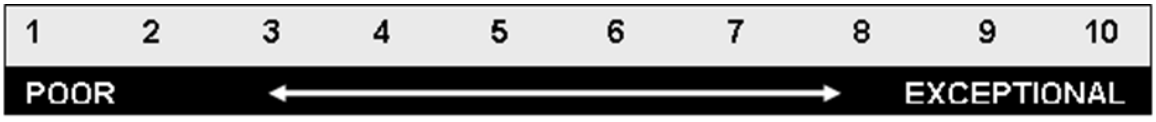
3. Used Underpad



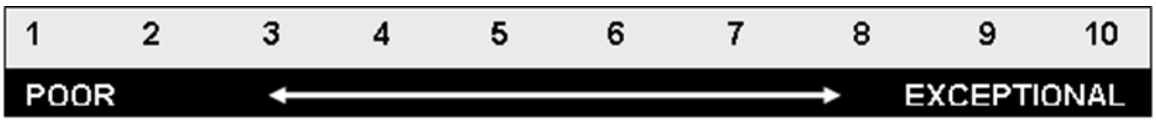
4. Clean Delivery Surface



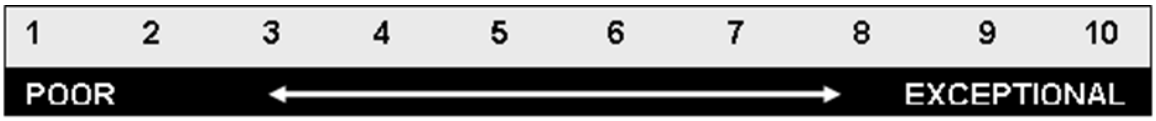
5. Put on a Pair of Clean Gloves



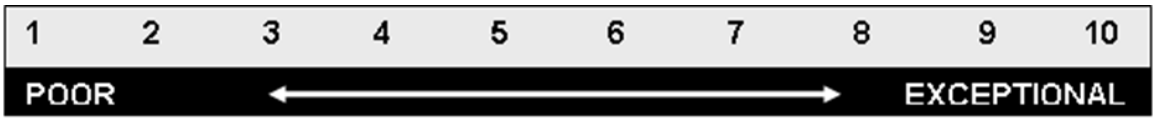
6. Clean Perineum



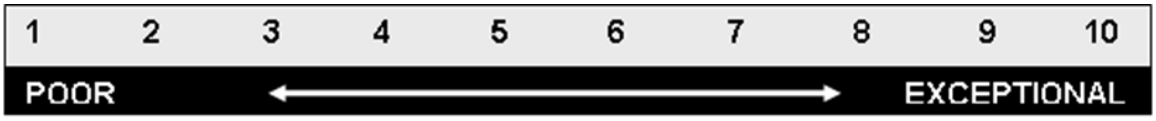
7. Clean Cord Cutting Instrument



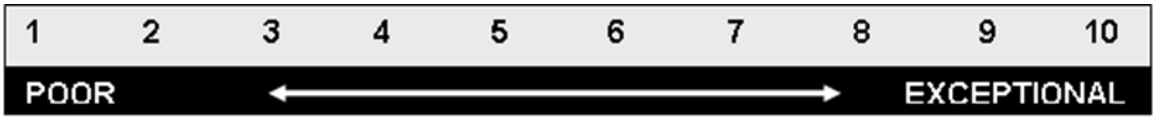
8. Use of a Clean Blade



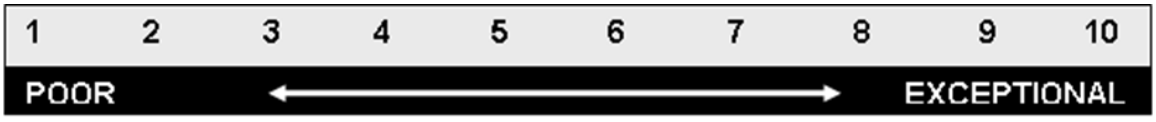
9. Clean Cord Care



10. Use of a Clean Cord Clamp and Gauze



11. Use of Instructional Picture Sheet in the CDK



Comments:

APPENDIX G: PRE-TEST SURVEY HAITIAN MEDICAL PROVIDERS

Please, place in ballot box after completing the survey.

Circle the appropriate response:

1. Home delivery in Haiti is common; the majority of births occur at home and not at a nearby clinic or hospital.

   True

   False

2. Untrained traditional birth attendants (TBA's), relatives, or neighbors commonly assist in deliveries.

   Yes

   No

3. Hands are washed with soap during the delivery process.

   Yes

   No

4. Gloves are used during the delivery process.

   Yes

   No

5. A clean cloth is placed under the woman during delivery.

   Yes

   No

6. Boiled or new razor blades/scalpels are used to cut the umbilical cord.

   Yes

   No

7. The umbilical cord is cut on a clean surface.

   Yes

   No

8. The umbilical cord is tied with a clean tie or a clean clamp is used.

   Yes

   No

9. Substances (e.g., antibacterial ointment, dirt, cow dung, herbs, plants) are placed on the umbilical cord after cutting.

   Yes

   No

10. Substances (e.g., dirt, cow dung, herbs, plants) are introduced into the vagina post-delivery.

    Yes

    No

Circle the appropriate response:

1. Are clean birth practices common in home deliveries in Grand Goave, Haiti?

   Yes

   No

2. Standards of cleanliness at the time of delivery are poor in Grand Goave, Haiti.

   Yes

   No

3. What is the reason for the low rate of clean birth practices?

   _____

   _____

   _____

4. Infant mortality is high in Grand Goave, Haiti.

   Yes

   No

5. Maternal mortality is high in Grand Goave, Haiti.

   Yes

   No

6. Have you ever heard of or used a clean delivery kit (CDK)?

   Yes

   No

7. What items are available in a clean delivery kit (Check all that apply)?

   _____Clean plastic sheet

   _____Cord clamp/Cord ties

   _____Clean razor blade/scalpel

   _____Bar of soap

   _____Pair of gloves

   _____Pictorial instruction sheet

   _____All of the above

   _____None of the above

8. Is washing your hands with soap prior to and during delivery important?

   Yes

   No

9. Are you familiar with the World Health Organization's (WHOs) six principles of cleanliness?

   Yes

   No

10. The WHOs six principles of cleanliness includes clean hands, clean perineum, clean delivery surface, clean cord cutting instrument, and clean cord care including cutting surface and ties.

    True

    False

11. The WHOs six principles of cleanliness states that nothing unclean should be introduced into the vagina.

    True

    False

12. Would you use CDKs if they were available to you?

    Yes

    No

13. If yes to question #12, why?

    _____

    _____

    _____

14. Is washing your hands with soap prior to and during delivery important?

    Yes

    No

15. Do you feel the CDK would improve clean practices at birth?

    Yes

    No

16. Do you think the CDK would decrease infant and maternal mortality rates in Haiti?

    Yes

    No

APPENDIX H: POST-TEST SURVEY HAITIAN MEDICAL PROVIDERS

Please, place in ballot box after completing the survey.

Circle the appropriate response:

1. Did the instructions in the delivery kit help you to learn or remember something about how to do a clean delivery? (Choose all that apply).

   _____wash hands washed with soap

   _____use cord ties/cord clamp

   _____ use plastic sheet/underpad

   _____ wear gloves

   _____ use clean razor blade/scalpel

   _____Nothing

   _____Do not remember

   _____Other

2. Have you ever heard of or used a clean delivery kit (CDK)?

   Yes

   No

3. What items are available in a clean delivery kit (Check all that apply)?

   _____Clean plastic sheet

   _____Cord clamp/Cord ties

   _____Clean razor blade/scalpel

_____Bar of soap

_____Pair of gloves

_____Pictorial instruction sheet

_____All of the above

_____None of the above

4. Is washing your hands with soap prior to and during delivery important?

   Yes

   No

5. Are you familiar with the World Health Organization's (WHOs) six principles of cleanliness?

   Yes

   No

6. The WHOs six principles of cleanliness includes clean hands, clean perineum, clean delivery surface, clean cord cutting instrument, and clean cord care including cutting surface and ties.

   True

   False

7. The WHOs six principles of cleanliness states that nothing unclean should be introduced into the vagina.

   True

   False

8. Would you use CDKs if they were available to you?

   Yes

   No

9. If yes to question #8, why?

   _____

   _____

   _____

10. Is washing your hands with soap prior to and during delivery important?

    Yes

    No

11. Do you feel the CDK would improve clean practices at birth?

    Yes

    No

12. Do you think the CDK would decrease infant and maternal mortality rates in Haiti?

    Yes

    No