USING PRECEDE-PROCEED AT THE INITIATON OF OUTREACH COLLABORATION ADDRESSING MATERNAL MORBIDTY AND MORTALITY IN CUSCO, PERU

by

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Dedication

To Drs. Danny O. Jacobs and Christine Arcari for the belief this was possible. To Dr. Cara Pennel for all the mentoring and patience to make the belief a reality and to my family; Aristides, Pano and Maria for all their love and support.

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Abstract: The PRECEDE-PROCEED Model is a logic model that provides a framework for program planning but has been used infrequently in Obstetrics and Gynecology. The aim of this project was to use the PRECEDE-PROCEED logic model to identify local factors affecting maternal health in the remote areas surrounding Cusco city, Peru which would more likely build a sustainable collaboration compared to a traditional educational conference alone.

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List of Abbreviations

[UTMB	University of Texas Medical Branch
GSBS	Graduate School of Biomedical Science
TDC	Thesis and Dissertation Coordinator
AEAFUIGCTDT	An example Abbreviation for Use in the Graduate College Thesis and Dissertation Template]

Chapter 1 Introduction

In 2015, the maternal mortality rate (MMR) in Peru was 68/100,000 live births compared to 14/100,000 live births in the United States (1). In comparison to the 1990 Peru data, this is a marked improvement from the maternal mortality of 250/100,000 deaths per live births (2), but it remains above the desired WHO regional average goal of 52/100,000 deaths per live births (1). Further, the Sustainable Development Goals for 2030 include a global reduction of maternal mortality ratio to less than 70/100 000 live births (3). Though overall, the changes in healthcare in Peru place that country within the Sustainable goal range, the MMR remains high in rural areas especially in remote ones with little access to health care or with indigenous or younger mothers. (1,4,5). Globally, obstetric complications continue to be amongst the highest contributors to maternal mortality. Bleeding, preeclampsia and preexisting medical conditions are the three biggest contributors (1,6).

The longstanding collaboration between the University of Texas Medical Branch (UTMB) and the Universidad Peruana Cayetano Heredia (UPCH) in Peru has led to established research and education programs in the Cusco Region of Peru. This UTMB-UPCH association has worked closely with the Cusco Ministry of Health in public health priorities for the region. Among these, taking steps to further address and reduce maternal mortality in Cusco and surrounding rural areas. Training personnel from remote health centers to recognize and perform the initial management of obstetric complications like preterm labor, infection, and postpartum hemorrhage was considered important health priorities. This gave me an opportunity to utilize a validated logic model to understand

the social determinants of health identified by healthcare providers as affecting maternal health and quality of life in the Cusco area. I considered that understanding the local factors influencing maternal health care would help us create an educational conference tailored to local needs and strengthen the outreach collaboration.

In terms of outreach efforts, the United States is the largest contributor to governmental, nongovernmental and private sector global health programs, spending 10.8 billion dollars toward these efforts in fiscal year 2018 (7).

Numerous organizations aim to improve health care and health outcomes for women and focus on providing supplies, nutrition, healthcare, research and education. Some top charities are readily recognizable such as the "March of Dimes", "Every Mother Counts" and yet others not so well known such as "Carry the Future", "Good+ Foundation", "Global Midwife Education Foundation", "Women in Need" and "Circle of Health International" (8). These along with many other organizations provide services, and donate time and resources focusing in general areas including sanitation, vaccination, medical supplies, surgery, improving health and providing education (8-11).

Data in 2014 suggests that in the United States alone over 1.5 million organizations of all varieties; not for profit, public, private, charities, foundations and communities, were in existence (12). In Texas alone, in 2014, there were 4,794 organizations whose total giving was listed at over $3 billion dollars and with combined total assets over $48 billion dollars (13). However, it is not clear if organizational stated missions are coupled with full understanding of the needs and complexities of the communities with which they engage. It is also unclear if these organizations/institutions have processes in place for evaluation of the impact and sustainability of their efforts.

Models with comprehensive and well delineated approaches such as those used by the Bill & Melinda Gates Foundation; that include; the identification of challenges, opportunities, implantation strategies and evaluation mechanisms are not necessarily followed by others (14).

If a goal is health improvement, a health program with goals and objectives, a clear start and end point and evaluation of processes and outcomes are necessary steps in the approach to address the complexity of factors affecting a community and it's health care. When addressing needs for population health improvement a "wide angle shot" (15), to view connections between health, gaps, environmental effects on health, knowledge and social influences, is needed (15). The PRECEDE-PROCEED model is an established framework that provides a wide view to address both ecological and education influences, behavior and constructs to affect changes in population health outcomes and quality of life (15,16). Also, by addressing the cultural, social and environment issues, a step toward shared trust and respect is taken and the probability increases that the recommended approaches will be accepted by the population (15).

RESEARCH OBJECTIVE

The primary objective of this project is to use a logic model framework, PRECEDE-PROCEED, to understand local factors affecting maternal health in the remote areas surrounding Cusco city, Peru. To also use this information to guide future conference topics and enhance the sustainability of the collaboration between UTMB, UPCH and the Ministry of Health in Cusco, Peru.

SPECIFIC AIMS

1) Utilize the first three phases of the PRECEDE-PROCEED framework to identify determinants of maternal health, in the area surrounding Cusco, Peru.

2) Introduce the concept of the PRECEDE-PROCEED to participants of a conference dedicated to addressing Obstetrics conditions affecting maternal morbidity and mortality in Cusco, Peru.

3) Adapt a focus group format for obtaining responses to questions focused on the first three phases of the PRECEDE-PROCEED model.

4) Identify predisposing, enabling and reinforcing factors affecting maternal health care and quality of life.

5) Use qualitative analysis to interpret the responses provided by the conference participants.

SIGNIFICANCE

The World Health Organization has identified that 99% of maternal mortality occurs in poor countries outside the United States and is highest for those women living in rural areas (17). The "Saving Mother's Lives" initiative has contributed to a 44% overall reduction of maternal mortality worldwide, but the new Sustainable Development Goals remain a challenge to attain (18). A review of available data from 2003-2014, by Say et al. confirms the biggest threats to a mother's life are hemorrhage, pregnancy related hypertensive disorders and sepsis (6). Socioeconomic inequities are present and the poorest women more often receive less than four, and in some cases only one, prenatal care visit during a pregnancy (19). Organizations with the best chance to affect change will use validated methodologies and logic models to understand complex

communities and confounders such as ecologic and educational influences affecting behavior and quality of life (14).

Chapter 2 Background and Literature Review

EPIDEMIOLOGIC DESCRIPTION OF THE HEALTH PROBLEM

This case study was described by Care.org (5). The story is not new, nor is it isolated, but demonstrates the preventable obstacles faced by a mother giving birth in a remote rural area of Peru. Antonia lived in the high Andes and though she had given birth seven times before, this birth on Good Friday would be different. There were no birth attendants in her village, and together with her spouse they had delivered their previous children at home. This time, after the infant's birth, the placenta was retained and bleeding ensued. Roads out of the village were sketchy at best and the nearest hospital was one hour away. Braving the elements and roads, Antonia's spouse borrowed a motorcycle, which broke, then a bicycle to reach the hospital to find a broken ambulance and no doctor. Once the doctor is found they return to the village, it is now four hours after the delivery. They are one hour too late. Antonia had died from postpartum hemorrhage due to a retained placenta (5).

Globally, roughly one woman dies every two minutes from a pregnancy related cause surrounding the act of giving birth (17). Hemorrhage is the primary etiology for maternal demise in multiple regions of the world particularly when the area is rural, poor, and occupied by indigenous peoples (17).

Maternal Mortality reductions in Peru from 214 to 68 deaths /100,000 live births in the time frame from 1990-2015 (20) were in part due to interventions from multiple organizations, but perhaps also influenced by booming economic growth from 2002-2013 (21). The economic growth reduced poverty, but also coincided with government

initiatives to increase years of compulsory education (2) and supporting a human-rights focused strategy for healthcare (22), maternal programs, quality metrics and health insurance (23). Hallmark programs such as "Foundations to Enhance Management of Maternal Emergencies (FEMME)" (24) have also increased access to prenatal care as much as 46% and decreased maternal deaths by 49% in areas where the program is active (24). The program realized these successes by focusing on challenges to emergency obstetric care in one rural community. The culturally sensitive approach they used, along with training and protocols for emergency care have been adopted elsewhere in Peru (25). Continuing to address maternal health, morbidity and mortality especially for obstetric emergencies such as hemorrhage has the potential to significantly decrease death and improve maternal quality of life.

SCIENTIFIC BACKGROUND

From 2009-2015, maternal mortality has decreased worldwide by 44% (2) and overall Peru had demonstrated a similar reduction. However, the Ministry of Health for the surrounding Cusco area reports the rural women in the area around Cusco continue to have higher mortality (26). The Ministry of Health in Peru aims to reduce maternal mortality by improving obstetric care, cultural awareness and facilities and promoting education of health care workers.

Indigenous peoples make up approximately 23.6% of the Peruvian population, and in a systematic review by Castro et al, being a member of an indigenous ethnic group was associated with poorer health outcomes compared to nonindigenous peoples (22). Women who were indigenous versus non-indigenous showed different rates in prenatal care 78.3 vs 85.6%, delivering in a health facility 14.4 vs 65.2%, and attending a

postpartum visit 42 vs 64.5% (22). Poorer outcomes were not the result of genetics but a result of bias, discrimination, and missed heath care opportunities and Castro et al. identified a "triple threat" for indigenous women being low economic status, belonging to an ethnic group and being a woman (22). Provider bias, fear of poor treatment, abuse, language barriers, and ignorance of ethnic practices are also key factors adversely influencing indigenous health care. As long as these key components are not addressed in a culturally sensitive manner health inequity will still remain (22). An indigenous peoples, the Quechua, reside in healthcare areas surrounding Cusco. Data in our survey, identified language barriers and Quechua birth preferences such as vertical births. We were able tour one hospital in Cusco that embraced options for vertical birth and maintained open discussions about the herbal medicines. By their report, they were slowly increasing the number of in hospital deliveries for Quechuan women (personal correspondence).

Confounders in the reduction in maternal mortality in Peru from 1990 to 2015 include economic growth, which leads to new programs and decreasing fertility (2). Six years of education was compulsory until laws changed in 1993 increasing the compulsory rule to 11 years. Weitzman investigated the effect of increasing women's education on their healthcare and found each additional year of education increased the probability of delivering in a health facility by 4%. Other positives were increasing autonomy and choosing contraception (2). This is not the only example of the positive association of education on healthcare. A secondary analysis of a larger Global Network study, conducted by the Eunice Kennedy Shriver National Institute of Child Health and Human Development, identified reductions in stillbirth and neonatal death (within 7 days of

birth) by educating birth attendants in rural areas where home births were prevalent (27). Stillbirth in these cases was an infant death very soon after birth. Birth attendant training included infant resuscitation, breastfeeding, keeping an infant warm after birth, utilizing skin-to-skin, and basic couplet care. Attendants then taught mothers what they had learned (27).

PRECEDE-PROCEED MODEL

The PRECEDE-PROCEED approach to program planning or evaluation, focuses on eight phases for assessment, implementation and evaluation. Figure 1. The first three phases explore ecological and educational interactions affecting opportunities for behavioral changes to affect positive changes in the quality of life indicator. (15). The acronyms for each portion of the model in part explain the components. PRECEDE stands for "predisposing, reinforcing, enabling, education, ecological diagnosis and evaluation" (15). While PROCEED stands for "policy, regulatory, and organizational constructs in educational and environmental development" (15) As described by Green and Kreuter the PRECEDE-PROCEED model is "like solving a mystery" (15). The beginning of the mystery is phase 1 and the task is the identification of a social assessment of the target groups indicators for quality of life. Phase 2 focuses on specific epidemiology assessments that identify genetic, behavioral and other vital data, behaviors and external confounders. Phases 1 and 2 are often the data elements and sources used by organizations affecting long term planning and quality of life in chronic conditions. Phase 1 and 2 are also often in place at the time the logic model is employed (15). Phase 3 involves the three components: predisposing, reinforcing and enabling factors. Further defined, predisposing factors are "a person or population's knowledge, attitudes, beliefs,

values, and perceptions that facilitate or binder motivation for change" (15); reinforcing factors are "the rewards received and the feedback the learner receives from others following adoption of a behavior" (15); and enabling factors are "those skills, resources, or barriers that can help or hinder the desired behavioral changes as well as environmental changes" (15).

LIMITATIONS AND GAPS IN EXISTING LITERATURE

The PRECEDE-PROCEED logic model was chosen for this project as there was little evidence this model had been used in program planning or outreach efforts in Obstetrics. An expanded literature search was conducted searching for articles focused on the use of PRECEDE-PROCEED in Obstetrics. The strategy involved searching the phrase PRECEDE-PROCEED with global health or developing countries or international cooperation or health status/healthcare disparities or health services accessibility or maternal health services or maternal mortality or pregnancy complications or pregnancy. The search strategy and number of articles noted for each combination are listed in Table 1. Search step 12 on this same table demonstrates the results of finally combing the phrase PRECEDE PROCEED with the other search phrases with only 25 articles being identified. After limiting the search to English language articles, there were 23 articles identified as being specific for PRECEDE PROCEED during pregnancy. Review of these 23 articles revealed only 5 were specific to maternal care (28-32).

This demonstrated that logic models have been used in developing and evaluating programs in healthcare, however, there were limited examples of the application of a PRECEDE-PROCEED logic model in developing an outreach program in obstetrics.

RATIONALE

My rationale for this project was employing a logic model in an initial outreach collaboration would give the team a better knowledge and understanding of the community dynamics and needs and strengthen the collaboration with the community. It would also improve our ability to tailor the education focused on maternal care, decreasing maternal mortality and improving quality or life. In addition, use of focus groups and a conceptual framework in the earliest phases of a collaborative relationship will more clearly identify modifiable social determinants of maternal health, health gaps and educational needs that cannot be determined by a traditional conference format alone.

Chapter 3 Data and Methods

STUDY DESIGN

This is a descriptive study utilizing a modified focus group and questionnaire during a conference focused on improving maternal health.

The conference agenda included lectures, hands on simulations and a focus group exercise. The lectures included the topics: preterm labor, postpartum hemorrhage, and fetal monitoring in addition to a lecture describing PRECEDE-PROCEED.

A traditional lecture format and classroom seating was used when delivering the lectures. Likewise, the PRECEDE-PROCEED lecture was brief and delivered using power point slides and classroom seating. This lecture focused on the three phases of the PRECEDE-PROCEED logic model and the component parts. During this presentation postpartum hemorrhage was used as an example of a specific morbidity to be addressed via the logic framework.

Two hands on simulations were conducted. The first was an exercise practicing what was learned in the postpartum hemorrhage lecture pertaining to estimating blood loss. The second exercise was practicing placement of an intrauterine balloon to stop postpartum hemorrhage.

The focus group exercise was planned to take place after lectures and simulations had occurred. The same questionnaire would be given to each focus group to complete.

The number of participants for the conference was unknown at the initial planning stages for the study. The focus group questions were constructed using guidelines from

the Focus Group 4th eds. with a multiple-category design (33) and postpartum hemorrhage, a topic of interest as identified by the Cusco, Peru Ministry of Health was the focus.

FOCUS GROUPS

Focus groups are a familiar strategy to use with individuals or groups to identify beliefs, perceived barriers, behavior, perceived ecological and environmental influences and motivators influencing quality of life, and collect information on population views (33,34). A format for a focus group can include introductory questions which encourage a group to become familiar with each other and to begin open conversation (33). Robust group interaction are the keys to successful focus group meetings (34). Key questions address the main goal of the study and may occupy the bulk of the study and ending questions provide for closure, reflection, summary and a final important question that can be used to ensure critical components have been covered (33). Phrase each question to focus on the topic or topics of interest, arrange in a sequence that makes sense for the given study, pilot and get feedback before testing, revise, consider time needed and submit to the focus group. Simple open-ended questions allow for the participants to guide their own response compared to closed-ended questions. Focus groups can be varying sizes, but an optimal choice is suggested to be six to eight participants per group and no less than three per group (34).

The questionnaire created for this project used open ended questions. In total, there were nine questions and a skeleton diagram of the PRECEDE-PROCEED framework. The first three questions were opening questions. Opening questions included self-identification of the participants' role in healthcare, location of clinic and

hobbies. Opening questions were used as means of introduction and a way to familiarize the participants with each other in order to foster an open dialogue during the focus group activity (33). The following six questions focused on factors applicable to the PRECEDE-PROCEED framework, postpartum hemorrhage and quality of life (Table 2). A skeleton example of the flow diagram of the first three phases of PRECEDE-PROCEED was also included (Figure 2). The questionnaire was created in English and translated into Spanish by collaborators who spoke Spanish as a first language and were from Peru.

While all lectures for the conference were delivered with the room in classroom seating, the participants were asked to turn their chairs to form groups of 4-6 people for the focus groups. Once in their groups, one questionnaire was given to each group. They were instructed to work through the questionnaire and framework as a group, identify a group scribe, and write the group answers on the questionnaire. Group members may have known each other, but questionnaires were anonymous in that no identifying information was available to the investigator.

Description of the participant demographics and qualitative analysis of the all the combined responses for all answers to questions on the questionnaire and PRECEDE-PROCEED template was planned. In addition, hand coding was also planned to be able to more clearly place answers from the six questionnaires into the three categories of predisposing, enabling or reinforcing factors. The descriptions of predisposing, reinforcing and enabling factors from the literature were used as a guide and are listed in Table 3.

The process for running the word frequency query was the same for the general combined data and hand coded data. Each word frequency query was performed first using an exact word match and the repeated using the synonym match approach.

IRB considerations: Conference participants were completing a questionnaire without personal identifiers. Individuals and groups were not known by the investigator and the answers were considered anonymous. The UTMB IRB was contacted and confirmed a formal IRB application was not needed and due to the design of the project would not need further oversight from the UTMB IRB.

SETTING AND STUDY POPULATION

The participants provided health care in the Cusco region were invited to a two day conference by the Ministry of Health. I was not aware of any specific qualifications used for the invitation. The conference location was a local Cusco clinic facility with conference room capabilities. Healthcare providers were self-identified as physicians and midwives. Participants were not randomized and could self-select the focus group in which they participated. The sampling method was by convenience and not randomized. Lectures and were conducted in the traditional slide presentation format, followed by questions and answers. Simulations were arranged around the conference room and participants separated into small enough groups to allow for interaction with each other and have a hands-on experience at each simulation station.

The focus group portion of the conference occurred after lectures and simulations. The focus groups participants self-selected their groups. Facilitators circulated between groups to clarify questions on the questionnaire and to keep the groups on target to complete the questions. One hour was allowed to complete the questionnaire. The focus

groups continued to be engaged after one hour and the facilitators encouraged a wrap up at 75 minutes.

DATA SOURCES AND MEASUREMENT

Data sources were the completed questionnaires. The questionnaire was anonymous and included occupational title, work location, and answers to the questions and framework described above. The questionnaire was created in Spanish. The translation from English to Spanish was performed by two members of the team who were native Peruvians. Answers to the questionnaire were written in Spanish and were translated back from Spanish to English by the same two members of the team. Six separate groups were formed during the session. Each group self-selected and was comprised of 4-6 participants. A scribe was also selected from each group to record responses.

Demographics were measured by descriptive methods as the sample size was too small for other comparisons. A qualitative analysis program was used to identify word frequency analysis of answers to the questions and frameworks (35).

ANALYTIC PLAN

The plan for this project was to use descriptive statistics for the demographic data. Qualitative data analysis using the QSR International's NVivo 12 qualitative data analysis software was planned for the questionnaire and framework answers (35).

The questionnaires are completed in Spanish and translated back into English by two medical collaborators who were born in Peru and familiar with any nuances in language that were particular to the Cusco area.

The answers to questionnaires were reviewed and for some questions it appeared there may have been more than one question implied in the sentence. For example, "what are the skills, resources and barriers to affecting changes". The participants listed their answers separately under skills, resources and barriers so for purposes of entering the data, these types of questions were separated into three separate questions. Also, each blank box from the PRECEDE-PROCEED flow diagram (Figure 2) was also treated as a separate question. Using this approach, each group answered 19 questions. The six groups each with the 19 questions were entered into the QSR International's NVivo 12 qualitative data analysis software (35) program as six separate cases.

Auto-coding was used to screen for duplications and errors as well as confirming number of participants self-identifying role and location of practice. Review of each showed that only one of the groups was comprised of all midwives. All other groups showed a mix of midwives and physicians. Word frequency query was performed on the midwife group and compared to all other groups to identify differences.

Next the responses to all questions were hand coded and separated by best fit into categories of predisposing, reinforcing and enabling factors. As an objective guide for hand coding and best fit, descriptions of predisposing, reinforcing and enabling factors were obtained from the literature (Table 3). Word frequency responses to all questions and to the subcategories of predisposing, reinforcing and enabling factors was performed two ways. A first run word frequency query was performed using "exact word matches" and second run word frequency query was next performed using "with synonyms" (35).

Chapter 4 Results

STUDY POPULATION

Thirty-three participants attended the two-day conference that was held in Cusco, Peru in February 2017. Twenty-eight participated in the focus group session. All participants provided healthcare to pregnant women in the areas in and surrounding Cusco, Peru.

DESCRIPTIVE DATA

Participants self-identified their specific healthcare provider role as; 15 midwives, 9 physicians (level of expertise not queried), and 4 unspecified. Participants identified they worked at different healthcare locations (Table 4) that were located 6 – 1100 kilometers from the location in which this conference was given (36). Hobbies included reading, television, dance, travel and swimming. A description of overall types of phrases used in answer to the questions on the questionnaire are listed in Table 5. Focus group selection was by convenience. Participants chose their own groups. All groups had both physicians and midwives, except for group 4 where only midwives were noted.

OUTCOME DATA

In addition to the description of the responses, word frequency queries are performed. The first word frequency query was performed for the group comprised of only midwives (Group 4) and it was compared to the word frequency query of all other groups combined. Group 4 (only midwives) did mention the term midwife more often in answering the questionnaire than the other groups combined (2.76 vs 0.91%). This appeared the only difference. When the word frequency query was performed a second

time and expanded to associated specialized words all the groups appeared to have a similar focus in describing changes that would improve quality of life, Table 6. Given the group responses appeared similar, all data was combined for the next set of queries.

The word frequency query for all the combined data using an exact word match followed by performing the synonym match is listed in Table 7 and Figures 3 and 4 respectively. The words health, postpartum, hemorrhage, center and lack all occurred most frequently during the exact word match. These were also words used by participants in combination with responses suggesting lack or need of resources. Likewise, the participants had been prompted by the lecture to consider postpartum hemorrhage which appeared more frequently in exact word matching of responses. When the word frequency query was expanded to synonyms the same issue with health, postpartum and hemorrhage appeared but in addition, education came to the forefront. The term "lack" was noted in both queries and may result from the way participants recorded their responses as they described the lack of any resource (staff, access, equipment, education).

The results of the word frequency queries for enabling, predisposing and reinforcing factors (Table 8) provide more detailed information in the synonym query for each factor. Education is a frequently noted term as an enabling and predisposing factor and agrees with the findings from the broader word query applied to all the data combined. The term lack again shows up frequently and could represent a true lack of resources or is influenced by the nature of the question prompting the use of this term in the answer. Communities, family and intercultural terms were highlighted as reinforcing factors and differs from the broader wonder frequency query (Figure 4). In the word

query of all the data, communities did not stand out as a frequent item. However, hand coding the data under factors allowed the importance of communities as a reinforcing factor to be identified.

MAIN RESULTS

Twenty-eight of the conference participants, separated into six focus groups participated in the focus group session. Overall and in general, this group of physicians and midwives together identified education and training, and lack of resources at health centers affecting postpartum hemorrhage and maternal quality of life. However, the participant responses were broadly expressed and did not clearly fall under enabling, predisposing or reinforcing factors. Hand coding the responses to each factor (enabling, predisposing, reinforcing) and repeating word frequency queries highlighted more details. There might have a bias in the questionnaire design leading participant to answer using the term "lack" in reference to resources and health center or it may have indicated a true reference to lack of certain social determinants. However, additional factors were also noted such as education, anemia, intercultural issues, family and community as being important in affecting the quality of life for pregnant women.

Overall, education of both patients and healthcare providers was highlighted as important factors to help decrease poor outcomes such as postpartum hemorrhage and improve quality of life for pregnant women in the Cusco area.

Chapter 5 – Discussion

SUMMARY

The concepts of a logic model were easily introduced at a conference to participants and provided us an opportunity to understand elements and factors this specific population felt were important in driving changes to improve quality of life, and in this particular example, decrease postpartum hemorrhage. Education and training were identified as factors that could facilitate change. The community and family were also identified.

KEY RESULTS

The results from this modified focus group with questionnaire using PRECEDE-PROCEED phases one to three suggest education, training, skills, care management, family and community are predisposing, reinforcing and enabling factors that would be important to address in affecting behavioral and systems level changes to influence improvements in healthcare, reduce maternal mortality, and improve quality of life. Appreciating these as important factors for this community's needs for change, guides us as collaborators to tailor our outreach efforts in continuing to provide conferences and simulations in a culturally appropriate manner.

STRENGTHS AND LIMITATIONS

Strengths of this study include collaboration with the Ministry of Health to create a conference format that addressed requested needs. Conference agenda later built in discussions of difficult cases as submitted by the participants. The collaboration continues and has expanded to other locations in Peru.

The structure of the first conference agenda was a strength for the focus group activity. Questions and answers followed every lecture and the simulation also took place before the focus group. Both activities allowed participants to interact with and become comfortable with each other. This would have increased the interaction during the focus group. This is support by the focus group session extending past the allotted time. The use of facilitators to circulate amongst groups to keep the conversation moving and clarify questions strengthened the process and purpose.

Limitations include this is a modified focus groups, with convenience sampling both for conference attendance and self-selection into focus groups. Sampling bias will occur both for conference attendance and focus group participation and results of this pilot will not be applicable to the general population. This was a pilot study. The questions on the questionnaire have not been validated and in some cases included compound questions that could bias the response. Strictly adhering to single open-ended questions may have yielded different results. Focus group responses were by group consensus and some individual ideas may not have been listed or conveyed. The Ministry of Health had essentially identified phases 1 and 2 of the PRECEDE-PROCEED model so this study began with phase 3. This could have created a biased sample. The focus group questions were aligned with postpartum hemorrhage, which also introduced bias in the answers. Lecture and review of postpartum hemorrhage a short time before the focus group session may have influenced responses. Economic growth in Peru is an external confounder in Peru which will influence access, education and health centers.

INTERPRETATION

Few studies have been identified in Obstetrics and Gynecology that utilized the Precede-Proceed model (28-32). Nahid et al. (30) used the Precede Proceed model when conducting focus groups in search of barriers of employing skin-to-skin contact after birth. The data collected from the focus groups was utilized in designing a 120-item questionnaire. After confirmatory factor analysis and reliability testing the questionnaire was reduced to 82 questions and demonstrated three constructs that aligned with the Precede Proceed model. These three constructs included predisposing, enabling and reinforcing factors and identified gaps in midwife education, support for skin-to-skin contact and availability of services and preparation to enact the activity (30).

Futura et al explored the complexity of health behaviors in refugee camps in Sudan using a PRECEDE-PROCEED framework. As healthcare providers, many of us would view female genital cutting, home delivery and no family planning as risky health behaviors leading to adverse outcome. However, Futura et al, by using an approach do flush out predisposing, reinforcing and enabling factors and found a very different perspective for the Sudanese women (31). Two studies by de Jersey and colleagues (28,29) used phase three of the PRECEDE-PROCEED framework to aid in development of a survey and assessment of factors for gestational weight gain between normal versus overweight pregnant women. Though intentions for a healthy weight were the same, the overweight women faced more barriers to success and thus had an increased gestational weight gain compared to the normal group (28,29).

In an assessment of cardiovascular disease, Li et al. describe their use of the Precede Proceed model for a needs assessment to guide plans for community health

promotion. Li focused on the five phases and used surveys, focus groups and available health data (37). Phase one and two identified health problems and data gathering, phase three focused on determinants and phase four on the factors that were predisposing, enabling and reinforcing (37). During this study Li identified the major community health problem was cardiovascular disease and moved to implement projects to improve care using the determinants they identified. Most importantly, in their conclusion, they reference an important tenet on implementing new programs; "A health program cannot be based upon what we, as professionals, decide the public does or does not know about a specific issue" (37,38).

A comparison or my findings for factors identified as predisposing, reinforcing and enabling to those of comparable articles are listed in Table 9. Similarities between the findings in this study and the literature include education as both a predisposing (30,32,39) and enabling (30,32) factor and community involvement as a reinforcing factor (32,39). Health and Center was a frequently noted word in my study and I considered this frequency a result of the structure of the questionnaire and promoting in the questions. However, health care and health centers are also mentioned in the referenced articles (30,32,39) suggesting and may be more valid than originally considered. Finally, repeating themes include education of some component in healthcare, communities and cultural awareness and center access.

Maternal and child health often run parallel to each other, which means we can expect similar disparities between the two. Maternal mortality has decreased in Peru and similar trends have been noted for Neonatal Mortality Rates (NMR). However, what has not improved is a disparity in NMR between Peruvian districts. Huicho and colleagues

(23) used multiple agency and survey sources and were able to tease out the NMR in the Cusco area. From 2003-2009 the NMR changed from 15.12 to 9.09 per 1,000 live births to 14.73 per live births in 2012. The poorest rural areas demonstrated increased NMR compared to urban areas and out of 24 districts, Cusco ranked 18. (23). Leadership has been proactive and political efforts have improved maternal and child health by encouraging prenatal care and delivery with a skilled birth attendant. Both activities have been shown to be associated with decreases in maternal and child mortality (23). Our study demonstrated awareness and need for increasing skilled attendants and prenatal care. Postpartum hemorrhage was one of their main concerns and asks for lectures in simulations during the conferences.

To varying degrees influences from individuals, families and communities may impact factors that affect health and this may vary by locality. Giuliani et al looked as various factors and considered that age, education, employment, wanting a pregnancy and increased parity were individual factors. The family influence involved overall household income and community influence included a rural or urban location for the family home, poverty levels, ethnicity and infrastructure (40). Giuliani et al. (40) first teased out what influenced attending any prenatal visit and second what influenced the frequency of visits after this decision had been made. Several low income countries were compared and it was no surprise they confirmed rural poverty, low income, low education, undesired pregnancy, ethnic beliefs and poor infrastructure, to varying degrees negatively impacted a first prenatal visit and subsequent visits. What was interesting however, is increasing parity was linked with decreasing number of prenatal visits and held up across regions studied without the variation noted in the other variables. Though my study was not

designed to analyzed differences between the regions, the participants from our focus groups in Peru identified many of the elements Giuliani has mentioned (40). Skilled birth attendants, or lack thereof was also identified by our participants. Coinciding with our findings is review by Munabi-Babigumira et al, where they identified the attitudes and beliefs possessed by birth attendants affected care to pregnant women (41). Also, their level of education and skill, supportive work environment , communication and adequacy of health care infrastructure all affected the ability to provide care (41). Our survey also identified similar factors such as skilled birth attendants.

To expand on this notion that infrastructure and a supportive work setting can impact care, Delobelle and colleagues (42) relied on the PRECEDE-PROCEED framework to guide a pilot project to create a "Health Promoting Hospital" (42). This was a concept that would integrate and promote wellness within the healthcare hospital environment with additional hopes that the wellness behavior changes would positively affect the community. Hospital focus groups were conducted to obtain a needs assessment and support from key leadership was obtained. Positive changes supporting wellness of healthcare workers within the work environment worked. The health and wellness positively improved for staff and spilled over to patients as well as the community. In our study, the three factors that were prominent were postpartum, center and education. Continuing to support centers and include education could help the health systems further decrease the maternal mortality rate. The Delobelle study (42) is a good example of the robust use of focus groups to specifically identify behavioral and environmental changes that benefit a hospital and its surrounding community.

GENERALIZABILITY

This study has identified factors that can affect behavior, systems and quality of life. The participants were from a select population. Postpartum hemorrhage was topic of interest and many of the focus group questions were framed in this context. Also, this was a pilot project and focus group questions would need further validation and alterations. Given this, the study could not be generalized to a larger or different population. Also, the qualitative analysis used was not necessarily meant to be generalizable but to uncover deeper issues, contexts, people and the interactions among them. This project does provide support for the importance of investigating specific characteristics of a population targeted for outreach collaboration.

Table 1. Literature for PRECEDE-PROCEED in Obstetrics

Search step	Search Phrase	Number of articles
1	PRECEDE-PROCEED	183
2	Global Health	39551
3	Developing Countries	69802
4	International Cooperation/or Internationality	153378
5	Health Status Disparities/ or Healthcare Disparities	22971
6	Health Services Accessibility	(99366
7	Maternal Health Services/ or exp Maternal Health/ or exp Maternal Welfare	(47994
8	Maternal Mortality	9369
9	Pregnancy Complications	393894
10	Pregnancy	831173
11	2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10	1145192
12	1 and 11	25
13	limit 12 to 28 English language	23

Table 2. Questionnaire for focus groups

Opening questions:
Tell us who you are, where you see patients and what you most enjoy doing when you are not working. During pregnancy, what have you seen that threatens the life of the mother or infant? What does the community want or need to help care for pregnant women and their children?
Díganos quién es usted, dónde ve a los pacientes y qué es lo que más le gusta hacer cuando no está trabajando. Durante el embarazo, ¿qué has visto que amenaza la vida de la madre o del bebé? ¿Qué es lo que la comunidad desea o necesita para ayudar a cuidar a las mujeres embarazadas ya sus hijos?
Questions for the Precede-Proceed Model Postpartum hemorrhage:
How would decreasing postpartum hemorrhage improve health of the mother? What increases the risk of a postpartum hemorrhage? How does the environment contribute to the risk of postpartum hemorrhage? What personal attitudes, beliefs influence or prevent postpartum hemorrhage? Is there any feedback or education that could influence a reduction in postpartum hemorrhage? What are the skills, resources and barriers to affecting changes in postpartum hemorrhage?
¿Cómo disminuiría la hemorragia postparto mejoraría la salud de la madre? ¿Qué aumenta el riesgo de una hemorragia postparto? ¿Cómo contribuye el medio ambiente al riesgo de hemorragia postparto? ¿Qué actitudes personales, creencias influyen o previenen la hemorragia postparto? ¿Cuáles son las habilidades, los recursos y las barreras para afectar los cambios en la hemorragia postparto? ¿Hay algún tipo de retroalimentación o educación que pueda influir en la reducción de la hemorragia postparto?

Table 3. Guide used to sort questionnaire responses to Predisposing, Reinforcing and Enabling constructs.

Predisposing	Reinforcing	Enabling
Knowledge	Repetition	Environmental factors
Beliefs	Social support	Regulations
Values	Peer groups	Laws
Attitudes	Healthcare personnel	Healthcare plans
Priorities	Leaders	Available services
Skills	Decision makers	Access to resources
Self confidence	Rewards	Skills
Perceptions	Feedback	Barriers to the behavior
Motivation to change	Lifestyles	
Early childhood experience		

Adapted from; Green LW and Kreuter MW. (2005) Health Program Planning: An Educational and Ecological Approach, 4th edition. McGraw-Hill, New York. Bartholomew LK, Markham C, Mullen P, Fernandez ME. Planning Models for Theory-Based Health Promotion Interventions. Health Behavior. Theory, Research and Practice. 5th eds. 2015 John Wiley and Sons, Inc

Nahid F, Tavafian S, Heidarzadeh M et al. The Mother-Newborn Skin-to-Skin Contact Questionnaire (MSSCQ): development and psychometric evaluation among Iranian midwives. BMC Pregnancy and Childbirth 2014,14:85

Table 4. Locations of Health Centers listed by Focus Group Participants

HEALTH CENTERS LISTED BY FOCUS GROUP AND NUMBER OF PARTICIPANTS AT EACH CENTER			
Anta	1	Calca	1
Urumba	1	Palmoreal	1
Kiteni	1	Quelouno	1
San Jeronimo	2	Belenpampa	10
Camisea	1	Quebrada	1
Espinar	1	Lorena	2
Ocougato	1	Paucartambo	1
Sicuani	1	Pisac	1
San Juan De Kirimsi	1	Not specified	5
San Sebastian	1	Richardi	1

Table 5. Summary of answers by participants for focus group questions.

Identified as life threatening to mother or infant	
Anemia	Lack of education
Preeclampsia	No prenatal care
Urinary tract infection	Late entry to care
Teenage pregnancy	Transportation
Hemorrhage	Geographic location
Malnutrition	No family support
Beliefs	Low self esteem
Parasites	Machismo
Hypertension	Fear of Cesarean section
Intrauterine growth restriction	Violence
Community Needs	
Education	Intercultural exchange and approaches
Prenatal care	Social programs
Special services for home emergencies	Specialized care and prevention campaigns
Gender equality	Access
Postpartum Hemorrhage is decreased by	
Prevention	Quality of life
Early diagnosis and management	
Postpartum Hemorrhage is increased by	
Anemia	Multiparity
Lack of prenatal care	Lack of iron supplementation
Accessibility	Late diagnosis
Education	Population beliefs
Short intergestational period	Teen pregnancy
Herbs for labor	Malnutrition
Environmental contributes to the risks of Postpartum Hemorrhage by	
Infrastructure	Hospital delivery
Training	Community agents
Accessibility, long distance to care	
Personal Attitudes and Beliefs to Prevent Postpartum Hemorrhage	
Early prenatal care	Herbs
Placental traction with wool yarn	
Skills, Resources or Barriers Affecting Changes in the rate of Postpartum Hemorrhage	
Language	Quality of service
Access	Human resources
Training	Home visits
Educate staff	Educate patients
Early diagnosis, stabilize, refer	Beliefs

Table 6. Word frequency query comparing group 4 with all other groups

Group	Word Frequency Query – exact matches	Weighted %	Details
Groups 1,2,3,5,6	Health	4.17	None
	Postpartum	3.30	None
Group 4	Health	6.63	None
	Changes	3.87	None
Group	Word Fequency Query – with specializations	Weighted %	Details
Groups 1,2,3,5,6	Status	5.04	Atony, care, climate, confidence, equality, esteem, first, gestation, health, hygiene, identification, lack, level, need, poverty, predisposition, pregnancy, problem, quality, respect, sanitation, status, union, want, way
	Changes	4.00	Abortion, adjustment, age, approach, birth, brace, change, changes, contribute, correct, decrease, delivery, educate, enjoy, exchange, flow, full, gain, help, improve, increase, influence, know, labor, level, precipitate, pressure, promote, provide, recovery, reduction, return, section, see, service, stabilize, stop, strengthen, sulfate, transfer, transport, transportation, travel, union, water, weight, work
Group 4	Health	6.91	Health, sanitary
	Changes	5.84	Access, adjustment, age, birth, changes, clean, contribute, educate, enjoy, help, improve, influence, migration, provide, reach, reduction, see, service

Group 4, midwives only
All other groups, mixed physician and midwives

Table 7. Word frequency query all data combined, exact word match versus synonym groupings

Exact word match	Weighted %	Synonym match	Details	Weighted %
Health	4.51	Health	Health, sanitary, well	4.86
postpartum	3.66	Postpartm	postpartm	3.66
hemorrhage	3.58	Hemorrage	hemorrhage	3.58
center	2.26	education	Educate, education, educational, teaching, trained, training	3.04
lack	2.10	center	Center, centers	2.96

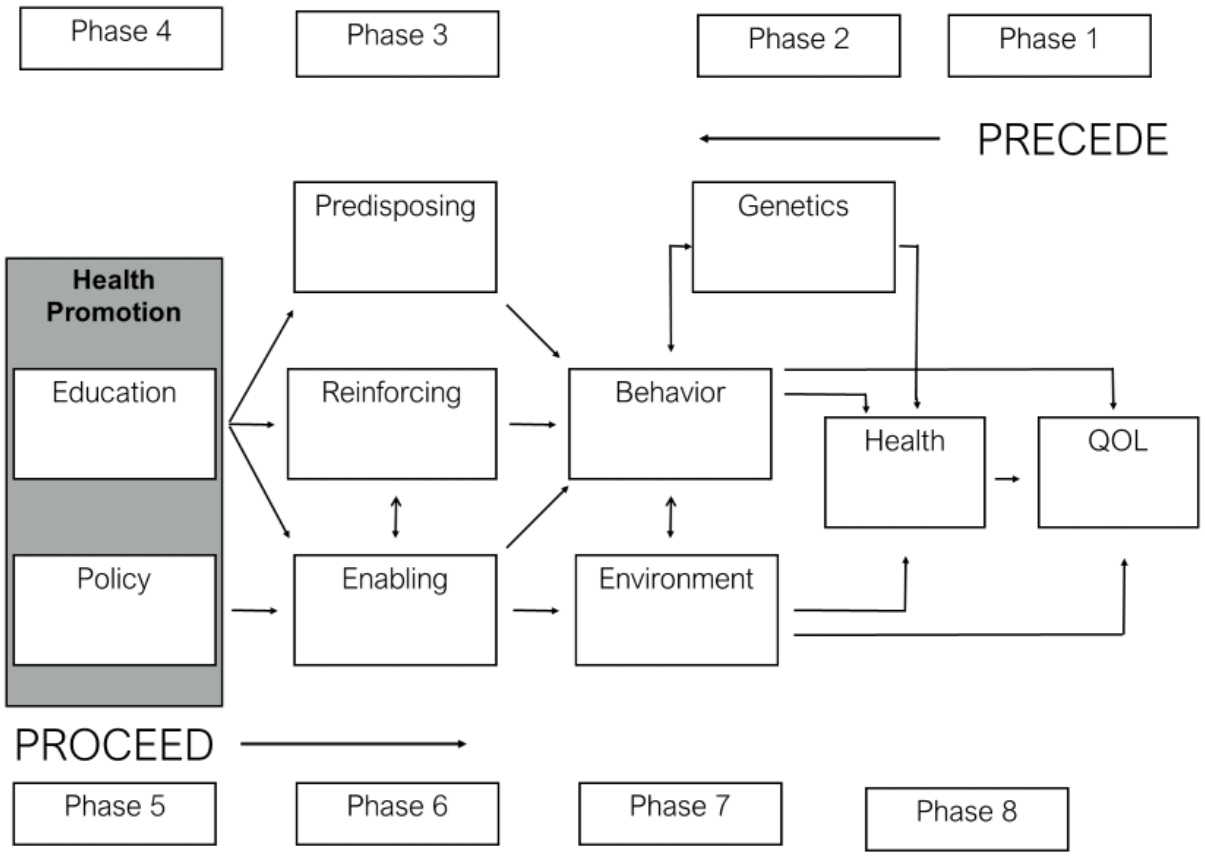
Table 8. Word frequency query, after coding data into Enabling, Predisposing , Reinforcing factors. Exact wording verus synonym grouping.

	Exact word match	Weighted %	Synonym	Details	Weighted %
Enabling	Lack	6.23	Education	Educate, education, teacing, trained, training	8.22
	Health	5.67	Health	Health, sanitary, well	6.94
	Educate	2.27	Lack	Lack	6.23
	Education	2.27	Centers	Center, centers	3.68
	Inaccessibility	2.27	Good	Good, skilled, skills, well	2.97
Predisposing	Anemia	5.05	Educate	Educate, education, teacing, trained, training	8.52
	Lack	2.84	Anemia	Anemia	5.05
	Use	2.84	Use	Conumption, use	3.15
	Educate	2.52	Lack	Lack	2.84
	Education	2.52	Herbs	Herbs	2.52
Reinforcing	Intercultural	3.20	Care	Care, management	4.00
	Lack	3.20	Community		3.20
	Work	3.20	Family	Family, home	3.20
	Community	2.40	Intercultural		3.20
	Family	2.40	Lack		3.20

Table 9. Comparison of Predisposing, Enabling and Reinforcing factors in this study compared to the literature.

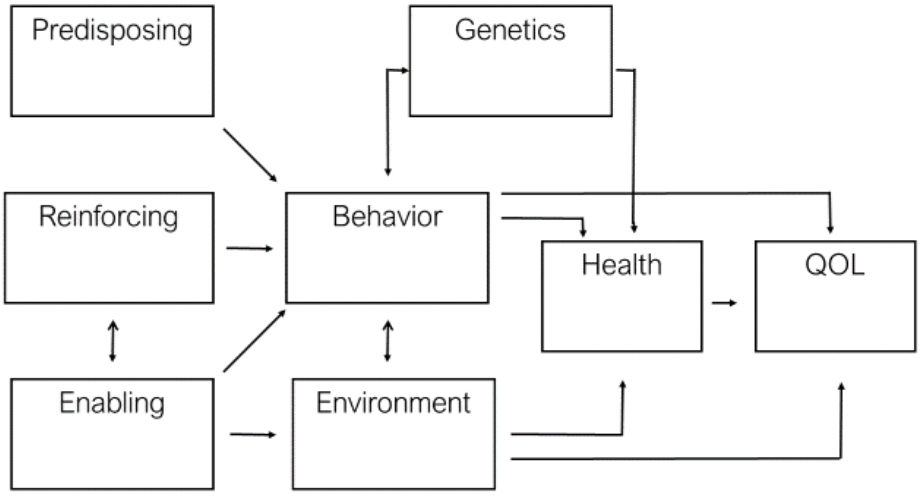
Study	Predisposing	Enabling	Reinforcing	Quality of Life
Kang J et al.	Communication with physician, language barriers, little education, low socioeconomic status, smoking, exercise, alcohol use	Patient access to payor sources (Medicare, Medicaid and private insurance) and access to ethnic physicians	Low social support, religion	Individual respondents believed quality of life was good
Nahid F et al.	Provider attitude for a health care initiative, education of the provider	Healthcare preparedness to engage in a healthcare initiative, Patient education and request to initiate a healthcare activity	Provider encouragement to patient for a health care initiative, Provider self-motivation, Provider self-satisfaction	
Ashwell H et al.	Community involvement, lack of education and health awareness, gender bias	Quality of health services, Community Health education, Healthcare access, time to care and cost	Improved health, community recognition and pride in health, increased provider autonomy, increased provider skill and knowledge,	
Our study	Education, anemia, consumption use, lack of any resource, herbs	Education, health and sanitary conditions, lack of any resources, health centers, good skills	Care management, communities, families, intercultural awareness, lack of any resource.	

Figure 1. PRECEDE-PROCEED MODEL



Adapted from; Green LW and Kreuter MW. (2005) Health Program Planning: An Educational and Ecological Approach, 4th edition. McGraw-Hill, New York. Bartholomew LK, Markham C, Mullen P, Fernandez ME. Planning Models for Theory-Based Health Promotion Interventions. Health Behavior. Theory, Research and Practice. 5th eds. 2015 John Wiley and Sons, Inc

Figure 2. Blank Phases 1-3 PRECEDE-PROCEED for focus group sessions



Adapted from; Green LW and Kreuter MW. (2005) Health Program Planning: An Educational and Ecological Approach, 4th edition. McGraw-Hill, New York. Bartholomew LK, Markham C, Mullen P, Fernandez ME. Planning Models for Theory-Based Health Promotion Interventions. Health Behavior. Theory, Research and Practice. 5th eds. 2015 John Wiley and Sons, Inc

Figure 3. Word Cloud, from all combined data, exact word matching.

Figure 4 Word Cloud, all combined data from synonym matching.

References

1) WHO. http://gamapserver.who.int/gho/interactive_charts/mdg5_mm/atlas.html, 4/13/17 Global Causes of Maternal Death: A WHO Systematic Analysis.

2) Weitzman A. The effects of women's education on maternal health: Evidence from Peru. Social Science & Medicine 180 (2017) 1-9.

3) The Global Strategy for Women's Children's and Adolescent Health, 2016-2030. Every Woman Every Child. 2015. (http://globalstrategy.everywomaneverychild.org/pdf/EWEC_globalstrategyreport_200915_FINAL_WEB.pdf, accessed 4/13/2017.

4) *Trends in maternal mortality: 1990 to 2015: Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva: World Health Organization; 2015. Available from: http://www.who.int/reproductivehealth/publications/monitoring/maternalmortality-2015/en/.*

5) A Case Study: Impact of Maternal Health in Peru. Author not listed. Care.org. 2010). https://www.care.org/sites/default/files/documents/Peru-Case-Study.pdf
6) Say L, Chou D, Gemmill A et al. Global Causes of Maternal Death: a WHO systematic analysis. Lancet Global Health. 2014;2(6): e323-e333.

7) The U.S. Government and Global Health. Key Facts. Henry J Kaiser Family Foundation. Published: Jan 31, 2019. https://www.kff.org/global-health-policy/fact-sheet/the-u-s-government-and-global-health/

8) 7 Charities Helping Moms – Motherly. https://www.mother.ly/lifestyle/7-charities-helping-moms, by Charlene. Accessed March 2019.

9) https://imoutreach.org

10) http://hispaniolamedicalcharity.org

11) https://projecttvd.org

12) https://grantspace.org/resources/knowledge-base/number-of-nonprofits-in-the-u-s/

13) http://data.foundationcenter.org/#/foundations/all/nationwide/total/list/2014

14) https://www.gatesfoundation.org/What-We-Do/Global-Development/Maternal-Newborn-and-Child-Health

15) Green LW and Kreuter MW. (2005) Health Program Planning: An Educational and Ecological Approach, 4th edition. McGraw-Hill, New York.

16) Bartholomew LK, Markham C, Mullen P, Fernandez ME. Planning Models for Theory-Based Health Promotion Interventions. Health Behavior. Theory, Research and Practice. 5th eds. 2015 John Wiley and Sons, Inc

17) https://www.who.int/en/news-room/fact-sheets/detal /maternal-mortality. February 19, 2018.)

18) https://www.who.int/reporductivehealth/publications/monitoring/full-infographic.pdf?ua=1

19) Countdown to 2015 Maternal, Newborn and Child Survival. Peru May2013.Https://countdoown2015mnch.org/documents/2013Report?Peru_Accountability_Profile_2013.pdf

20) https://www.who.int/gho/maternal_health/countries/per.pdf?ua=1. Accessed 3/24/2019

21) Maternal mortality in 1990-2015 WHO, UNICEF, UNFPA, World Bank Group, and United Nations Population Division Maternal Mortality Estimation Inter-Agency Group PERU.

22) Castro A, Savage V, Kaufman H. Assessing equitable care for Indigenous and Afrodescendant women in Latin Americad. Rev Panam Salud Publicad. 2015;38(2):96-109.

23) Huicho L, Huayana-Espinoza C, Herrera-Perez E, Guzman J et al. Examining national and district-level trends in neonatal health in Peru through an equity lens: a success story driven by political will and societal advocacy. BMC Public Health 2016, 16 (suppl 2):796.

24) Hoover J. Foreign aid success in Peru. Care Blog. https:/www.care.lrg/blog/foreign-aid-success-Peru. Accessed March 2019.

25) The FEMME Project in Peru: Partnership for Improved Health – Care.https://www.care.org/sites/default/files/documents/MH-2007-Peru-VfV.pdf May 2007.

26) Gobierno Regional de Cusco. Dirección Regional de Salud Cusco Dirección Ejecutiva de Inteligencia Sanitaria. Boletín de Vigilancia en Salud Pública / EPI, Vol. XIX – Nº 15, 2019, page 8. http://www.diresacusco.gob.pe/inteligencia/epidemiologia/boletines.htm

27) Chomba E, Carlo W, Gouda S, et al. Effects of Essential Newborn Care Training on Fresh Stillbirths and Early Neonatal Deaths by Maternal Education. Neonatology 2017;111:61-67.

28) De Jersey S, Mallan K, Callaway L et al. A cross sectional comparison of predisposing, reinforcing and enabling factors for lifestyle health behaviors and weight gain in healthy and overweight pregnant women. Maternal Child Health J. 2017;21:626-635.

29) De Jersey S, Mallan K, Callaway L et al. Prospective relationships between health cognitions and excess gestational weight gain in a cohort of healthy and overweight pregnant women. J Acad Nutr Diet. 2017;117:1198-1209.

30) Nahid F, Tavafian S, Heidarzadeh M et al. The Mother-Newborn Skin-to-Skin Contact Questionnaire (MSSCQ): development and psychometric evaluation among Iranian midwives. BMC Pregnancy and Childbirth 2014,14:85.

31) Futura M and Mori R. Factors affecting women's health-related behaviors and safe motherhood: A qualitative study from a refugee camp in eastern Sudan. Health Care for Women International. 2008;29:884-905.

32) Ashwell H and Barclay L. A retrospective analysis of a community=based health program in Papua New Guinea. Health Promotion International. 9009;24 (2): 140-148.

33) Focus Groups. A Practical Guide for Applied Research 4th eds. Sage Publications Inc. Thousand Oaks, CA. 2009.

34) Gill P, Stewart K, Treasure E, Chadwick. Methods of data collection in qualitative research: interviews and focus groups. British Dental Journal 2008;204:291-295.

35) NVivo qualitative data analysis software; QSR International Pty Ltd. Version 12, 2018

36) https://moon.com/maps/south-america/peru/

37) Li Y, Cao J, Lin H et al. Community health needs assessment with precede-proceed model: a mixed methods study. BMC Health Services Research 2009;(9):181

38) Yep M, Berzins S, Paddington D. Development of an early psychosis public education program using the Precede-Proceed model. Health Education Research 2007,22(5):639-647

39) Kang JH, Han HR, Kim KB, Kim MT. Barriers to care and control of high blood pressure in Korean-American elderly. Ethnicity and Disease 2006;16(1):145-51.

40) Guliani H, Sepehri A, Serieux J. Determinants of prenatal care use: evidence from 32 low income countries across Asia, Sub-Saharan Africa and Latin America Health Policy and Planning 2014;29:589-602.

41) Munabi-Babigumira S, Glenton C, Lewin S et al. Facotrs that influence the providion of intrapartum and postnatal care by skilled birth attendants in low and middle income countries: a qualitative evidence synthesis (Review). Cochrane Database of Systematic Reviews 2017; 11.

42) Delobelle P, Onya H, Langa C et al. Advances in health promotion in Africa: promoting health through hospitals. Global Health Promotion 2010; Supp (2): 33-36.

Vita

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