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# CENTERING PREGANCY- AFRICA: A PILOT OF GROUP ANTENATAL CARE TO ADDRESS MILLENIUM DEVELOPMENT GOALS

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## Abstract

**Background—**Severe health worker shortages and resource limitations negatively affect quality of antenatal care (ANC) throughout sub-Saharan Africa. Group ANC, specifically



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None of the authors of this manuscript have any conflict of interest to disclose that might influence the work described here including employment, consultancies, stock ownership, honoraria, etc.

CenteringPregnancy (CP), may offer an innovative approach to enable midwives to offer higher quality ANC.

**Objective—**Our overarching goal was to prepare to conduct a clinical trial of CenteringPregnancy – Africa (CP-Africa) in Malawi and Tanzania. In Phase 1, our goal was to determine the acceptability of CP as model for ANC in both countries. In Phase 2, our objective was to develop CP-Africa session content consistent with the Essential Elements of CP model and with national standards in both Malawi and Tanzania. In Phase 3, our objective was to pilot CP-Africa in Malawi to determine whether sessions could be conducted with fidelity to the Centering process.

**Setting—**Phase 1 and 2 took place in Malawi and Tanzania. Phase 3, the piloting of two sessions of CP-Africa, occurred at two sites in Malawi: a district hospital and a small clinic.

**Design—**We used an Action Research approach to promote partnerships among university researchers, the Centering Healthcare Institute, healthcare administrators, health professionals and women attending ANC to develop CP-Africa session content and pilot this model of group ANC.

**Participants—**For Phases 1 and 2, members of the Ministries of Health, health professionals and pregnant women in Malawi and Tanzania were introduced to and interviewed about CP. In Phase 2, we finalized CP-Africa content and trained thirteen health professionals in the Centering Healthcare model. In Phase 3, we conducted a small pilot with 24 pregnant women (12 at each site).

**Measurements and Findings—**Participants enthusiastically embraced CP-Africa as an acceptable model of ANC healthcare delivery. The CP-Africa content met both CP and national standards. The pilot established that the CP model could be implemented with process fidelity to the 13 Essential Elements. Several implementation challenges and strategies to address these challenges were identified.

**Key Conclusions—**Preliminary data suggest that CP-Africa is feasible in resource-constrained, low-literacy, high-HIV settings in sub-Saharan Africa. By improving the quality of ANC delivery, midwives have an opportunity to make a contribution towards Millennium Development Goals (MDG) targeting improvements in child, maternal and HIV-related health outcomes (MDGs 4, 5 and 6). A clinical trial is needed to establish efficacy.

**Implications for Practice—**CP-Africa also has the potential to reduce job-related stress and enhance job satisfaction for midwives in low income countries. If CP can be transferred with fidelity to process in sub-Saharan Africa and retain similar results to those reported in clinical trials, it has the potential to benefit pregnant women and their infants and could make a positive contribution to MGDs 4, 5 and .6.

### Keywords

Antenatal care; Group care; Sub-Saharan Africa; Millennium Development Goals

## Introduction

Progress towards the Millennium Development Goals 4, 5 and 6 targeting improvements in child, maternal and HIV-related health outcomes remains a formidable global challenge, especially in low income countries (PMNCH, 2006). Antenatal care (ANC) is the entry point for many evidence-based interventions designed to improve these health outcomes (WHO/UNICEF, 2004; Bergsjø and Villar 1997). In low income countries, where morbidity and mortality burdens are greatest, nearly all antenatal care (ANC) is delivered by midwives. Therefore, midwives offering ANC can make a major contribution toward achieving the Millennium Development Goals (MDGs). This is especially true in sub-Saharan Africa

where half of all child and maternal deaths and 75% of mother-to-child HIV transmission infections occur (Kinney et al., 2010; UNAIDS, 2012).

After the World Health Organization reviewed the evidence and conducted a randomized clinical trial (Bergsjø and Villar, 1997; Majoko et al. 2007; Munjanja et al. 1996; Villar and Bergsjø, 1997; WHO, 2001), nearly all African countries have changed their antenatal standard of care from a 10-visit model to Focused Antenatal Care (FANC), a 4-visit, patient-centered model. The resources originally used for 10 visits were expected to be reallocated toward in high quality of care since the FANC model has fewer visits. However, with only 3% of the global health workforce, ANC in sub-Saharan Africa struggles to balance a severe healthworker shortage and responses to the HIV epidemic against quality of care (WHO, 2006; Anyangwe and Mtonga, 2007; Kumar, 2007).

Studies from Malawi, Tanzania, Uganda and Zimbabwe document the urgent need to improve the quality of ANC (Conrad et al., 2012; Lungu et al., 2011; Magoma et al., 2011; Magoma et al., 2010; Sarker et al., 2010; von Both et al., 2006). Midwives spend a third of the time needed to properly conduct a FANC visit and often omit basic components of care (von Both et al. 2006; Mathole et al. 2004). Less than 40% of women have their blood pressure measured and an average of only 1.5 minutes of health education is provided over the course of all ANC visits (von Both et al. 2006; Nikiema et al. 2009; Conrad et al. 2012; Gross et al. 2011). While important, the integration of initial HIV testing, counseling and referral into ANC as first steps in prevention of mother-to-child transmission (PMTCT), have increased demands on healthworkers' time and the amount of time that women spend getting access to ANC services (Sweeney et al., 2012). Based on a review of the sub-Saharan literature, Ferguson et al. (2012) found that less than 20% of the women testing positive for HIV received appropriate treatment. The reasons for the attrition cascade are complex, but Nyamtema et al. (2012) and Penfold et al. (2013), show that the absence of essential supplies accounts for many failures to provide recommended services, including initial HIV testing.

Such quality gaps may, at least partially, explain why ANC return rates are low. Although more than 90% of pregnant women attend clinic at least once during pregnancy, less than half attend all four visits. When women skip remaining visits, the services that were not received at the first visit are lost opportunities to provide essential and referral services that may not have been available (Darmstadt et al., 2008; Ferguson et al., 2012; PMNCH, 2006; Watson-Jones et al., 2012). To address these lost opportunities, researchers and policy makers have called for innovative approaches to reconceptualize the delivery of ANC in health care continuums (PMNCH, 2006; Watson-Jones et al., 2012). This paper reports on the preliminary research that was conducted in Malawi (Southern Africa) and Tanzania (East Africa) that allowed us to establish if group antenatal care would be an acceptable and feasible model for use in these low-income countries.

## Background

### Innovative Group Care ANC

Group care has been identified as an innovative model for delivering effective healthcare, including ANC (Ford et al., 2001; Litt et al., 1997; Trento et al, 2008). The most well-established group ANC model is CenteringPregnancy (CP) and its success results from a combination of evidence-based effectiveness, efficient use of personnel, and a well-defined model of Essential Elements that can be replicated across sites (Rising et al., 2004). CP was developed in the United States in the mid-1990s by Rising, an American nurse-midwife, who became frustrated with short individual ANC visits. She felt that she repeated the same

basic health promotion information to each woman, but lacked the time for in-depth discussion (Rising, 1998).

After a first visit, where standard services are offered, women are invited to receive complete ANC with the same CP group of 8–12 women with similar expected delivery dates (Rising et al. 2004). In the first 30 minutes each woman conducts self-assessment (e.g., weight gain over time, blood pressure) and sees the midwife for a brief one-on-one clinical assessment and discussion of her results. Then the group gathers to discuss general health questions and pregnancy experiences. The session content is planned and reflects gestational age, but discussion is flexible and incorporates issues that women want to bring up (Rising, 1998; Rotundo, 2011). This model of care, called CP because it puts the women and their pregnancy experiences at the center of care, proved to be highly satisfying to both women and providers, and is expanding rapidly in the United States of America (USA).

CP is the only evidence-based group model of ANC. There is a substantial body of research documenting improved outcomes. There have been two randomized clinical trials (RCTs) of CP conducted in the USA. The first trial (n = 1047) compared CP, CP+ (which included HIV prevention), and an individual care control group, for low income, predominately African American women. Both CP groups had a 33% risk reduction for preterm delivery with a 41% reduction among African Americans (Ickovics et al., 2007). Both CP groups also had more health-related knowledge, higher breastfeeding initiation rates and satisfaction with care (Ickovics et al., 2007), and the CP+ group had more condom use and fewer repeat pregnancies at six months postpartum (Kershaw et al., 2009). The second trial took place in the USA military. Health services are provided for free and high-quality of care is offered to personnel and spouses. This trial (n=322) did not find a reduction in prematurity, but the CP group was six times more likely to receive the recommended number of visits and client satisfaction was nearly five times as high (Kennedy et al., 2011). Additional studies in the USA, using quasi-experimental, case-control and retrospective cohort designs, have also found positive outcomes associated with CP, including lower preterm birth rates (Grady & Bloom, 2004; Ickovics et al., 2003; Kovarik et al., 2009; Picklesimer et al., 2012; Tandon et al., 2012), higher knowledge (Baldwin, 2006), higher rates of breastfeeding initiation (Grady & Bloom, 2004; Klima et al., 2009) and higher satisfaction and more prenatal care visits (Klima et al., 2009). In nearly all these studies, participants were socioeconomically disadvantaged and/or adolescents. The preponderance of evidence suggests that CP may have more impact on birth outcomes for disadvantaged groups which may make it an appropriate strategy for reducing health disparities within the USA and potentially globally.

The CP group format also offers a way to make effective use of ANC midwives' time. A single midwife plus an assistant (e.g., nursing aide, community health worker, or health surveillance aid) can provide 2 hours of care, education and support for 12 women at each ANC visit and still maintain an average practitioner-to-client time of 10 minutes per woman. In one study CP allowed clinics to serve up to twice as many women in the same time and reduced personnel costs (Cox et al., 2006), while in another setting the model was cost-neutral with groups of 8 women (Moodley et al., 2011).

The positive impacts of CP derive from the group process which enhances learning, promotes healthy behavior change, builds women's sense of control over their own health, develops a supportive network, and creates a collaborative midwife-client relationship through continuity of care (Klima et al., 2007; Manant and Dodgson, 2011; Novick et al., 2013; Rising et al., 2004). A strength of the CP model of care is that it has clear guidelines for replication with fidelity. As identified by Rising (2011), it is the Centering process, rather than specific content or number of sessions, that is central to the CP model. In 2006, Rising established the non-profit Centering Healthcare Institute (CHI) to provide training,

consultation and site certification to ensure process fidelity in new sites and support expansion of the model to other health needs such as CenteringParenting. Secondary analysis of the lckovics et al. clinical trial (2007) documented that higher fidelity to the Centering process (measured as facilitative leadership and participant engagement) was associated with greater reductions in preterm birth (Novick et al., 2013).The Centering group method is summarized by the thirteen Essential Elements which indicate process fidelity (Table 1).

### Envisioning CP-Africa

Our review of the CP model led us to consider CP as a promising innovation that might address the challenging conditions faced by low-resource countries with high HIV prevalence in sub-Saharan Africa. CP is process driven and does not require new technologies. The CP model has begun to spread internationally, with feasibility and pilot studies in the developed countries of Canada (McNeil et al., 2013) and the Netherlands (Rijnders et al., 2012). At present, however, no quantitative outcomes are available for these studies. An extensive search of databases has located only one published study of group ANC in a developing country. Jafari et al. (2012) conducted a study of over 600 women from 14 health centers randomized to group or individual care. They found that group care was associated with significantly fewer preterm births, higher birthweights, and more exclusive breastfeeding, continued breastfeeding and contraceptive use at two months postpartum. Although this study cites CP research (Jafari et al., 2012), they did not consult with CHI and it is not clear whether they implemented CP with adherence to the 13 Essential Elements. We have not located any published study of group ANC in Africa.

If CP can be adapted with fidelity to all 13 Essential Elements and to the ANC context in sub-Saharan Africa, this paradigm shift might enable midwives to offer higher quality ANC so that midwives could make a significant contribution to global efforts to achieve the MDGs. Our team of doctorally prepared midwives and social scientists, with practice and research experience in Malawi, Tanzania and the USA, worked to develop CenteringPregnancy-Africa (CP-Africa). We piloted it in preparation for a clinical trial. This paper reports the preliminary work that established the acceptability and feasibility of CP-Africa in Malawi and Tanzania. The objectives of the study were to:

1. Determine the acceptability of CP as an ANC healthcare model;
2. Develop CP-Africa content consistent with national standards of both countries and inclusive of the Essential Elements of CP; and
3. Conduct a small feasibility pilot in Malawi to determine whether sessions could be conducted with fidelity to the centering process.

## Methods

The development and piloting of CP-Africa was guided by principles of Action Research, an approach often used to guide change in health systems (Moore et al., 2012; Reason & Bradbury, 2001). This approach provided us with a practical strategy to iteratively incorporate perspectives from researchers, members of the ministries of health, health practitioners, the Centering Healthcare Institute, and pregnant women. Throughout, we used Ethnographic Rapid Assessment, a methodological approach that focuses on finding answers relevant to a particular problem, usually using detailed notes and not requiring verbatim transcription of qualitative data (Bentley et al., 1988; Gittelsohn, 1998; Schrimshaw, 1987). Our work occurred in three phases reflecting our three objectives.

In Phase 1, our objective was to determine whether CP group ANC was an acceptable and feasible format. To determine this, we presented the conceptual and scientific data about the CP model to members of the Ministries of Health, health administrators and professionals, and pregnant women from rural and urban contexts in both countries. We then asked participants to describe their initial impressions and level of enthusiasm to try this model in their respective countries or ANC clinics.

In Phase 2, we collaboratively developed CenteringPregnancy – Africa (CP-Africa). Via teleconference and email, we regularly communicated and exchanged ideas that would allow us to develop the context-specific content that met all of the Ministry of Health requirements in both countries and integrated the Essential Elements of CP. We then translated the two CP-Africa sessions into *Chichewa*, a national language in Malawi, using a modified consensus-based translation process (e.g., Stewart et al. 2009; Fujiwara et al. 2010) to preserve conceptual meaning.

In Phase 3 and with funding from the Chicago Developmental Center for AIDS Research, we conducted a pilot of these two CP-Africa sessions in Malawi. To do so, a Centering Healthcare Institute trainer conducted a 2-day training workshop. Health professionals from two sites (district hospital and a small clinic) located approximately 25 miles outside of Lilongwe, Malawi participated in the training. All available and willing ANC health professionals at these two facilities were eligible. Participants included one administrator, six midwives, and four community healthworkers, called health surveillance assistants (HSAs) in Malawi. Because all education beyond primary school occurs in English in Malawi, we conducted the training in English.

At their respective health facilities, the CP trained health professionals then piloted the following two sessions: 1) pregnancy-related concerns and healthy practices and 2) HIV, sexually transmitted infections (STIs), and partner communication. Twelve pregnant women attending ANC at each site were recruited, with a total sample of 24 women. Participation was based on availability and willingness to attend the two CP-Africa sessions over two days. Pregnant women received a small allowance to cover their transportation costs because these were additional ANC visits.

Data were obtained from direct and systematic observations of the training of health professionals and implementation of two CP-Africa sessions. Data were also obtained from separate focus groups with health professionals and the pregnant women (Barbour & Schostak, 2005; Hardon et al., 2001; Hughes & DuMont, 1993). To determine if fidelity of centering process could be maintained (Vonderheid et al., 2008), observations were collected independently by the researchers and two additional research assistants fluent in *Chichewa*. After the CP training and each CP-Africa session, health professionals were interviewed in English and pregnant women participants were interviewed in *Chichewa* (Barbour and Schostak, 2005; Schensul et al., 1999). Using a semi-structured interview guide, we asked both groups about clarity of the material, comfort with the group process, and feelings about specific aspects of the session. We asked providers if CP-Africa would work in their setting and to identify potential difficulties. Researchers' observations and field notes were combined into a single dataset after the training and each session. The collated observations and summaries of field notes were formally coded, followed by confirmation of the coding strategy and reliability checks (Bertrand et al. 1992). The team then categorized the codes into themes about fidelity, acceptability, feasibility and implementation challenges of CP-Africa. Finally, we organized pilot results around the 13 Essential Elements of CP to evaluate process fidelity (Table 1).

Ethical clearance for this research was obtained from the University of Illinois at Chicago, University of Malawi College of Medicine Research and Ethics Committee (COMREC) and the Tanzanian Commission for Science and Technology (COSTECH). In each phase of the research, all participants gave signed informed consent before data collection proceeded. None of the healthworkers or pregnant women refused to participate or withdrew from the pilot. HIV status was not asked about and did not present any ethical issues.

## Results

From Phase 1 interviews conducted in Malawi and Tanzania, administrators, midwives, assistants, and women described the CP group model of healthcare delivery as acceptable and innovative and identified a number of advantages. One midwife said that to give health messages once to twelve women simultaneously was preferable to delivering the same messages twelve times or not at all. Another midwife said, CP *"will work well here. [Clients] will be together at the same time, socializing [among] themselves and having the same experience."* An administrator pointed out that CP could increase healthcare utilization by increasing positive experiences. She hypothesized that it might motivate women to return for their other ANC visits and encourage delivery with a skilled birth attendant. Everyone interviewed described CP-Africa as an effective way to increase health promotion and they could envision CP-Africa working in their settings. In sum, our Phase 1 results showed that group healthcare delivery was an acceptable format for ANC delivery. Members of the Malawian and Tanzanian ministries of health, health professionals and women were enthusiastic and encouraged our team to pursue this research.

In Phase 2, we began to develop the CP-Africa content. After several months of communications among researchers and the Centering Healthcare Institute, we developed a facilitator guide with context-appropriate content and activities that did not assume literacy among participants or require special equipment or new resources. Our adjustments incorporated more activities about HIV and PMTCT. Our African collaborators then worked with their respective ministries of health to verify that CP-Africa met or exceeded minimum content requirements and standards of care. By the end of Phase 2, we had developed a CP-Africa guide that was both consistent with national standards of both countries and would support the group process as outlined by the 13 Essential Elements.

In Phase 3, we piloted CP-Africa in Malawi. Below we present the results that show that CP-Africa is acceptable and can be conducted with fidelity to the 13 Essential Elements necessary for group processes to take place (Table 1). We also describe several implementation challenges that should be addressed before CP-Africa can be tested for efficacy and rolled out on a larger scale.

### Essential element 1: Facilitative leadership style

Facilitative leadership creates an environment that allows group members to share thoughts and experiences and work collaboratively to problem-solve. After training, but before implementation of the two CP-Africa sessions, midwives had reservations about whether women would adjust to the interactive style since a didactic approach is typically used in educational and healthcare settings. A midwife said, "*I was thinking, how will we make the woman start?*"

We observed that health workers were able to facilitate groups after only two days of training. Women rapidly adjusted to facilitative leadership as evidenced by their willingness to share personal stories and experiences and offer advice to other women in the group. When the facilitators added to the discussion, we also noted that the tone of voice, reinforced through body language, was more conversational and less instructional. In

interviews, facilitators told us that they recognized the women's transition to open discussion. One midwife said, *"They changed some. They started talking."* In field notes, we also wrote that women relaxed within 30–40 minutes and once they grasped how the CP-Africa would be carried out, there were smiles, laughing, and discussions with other women. Discussion was not dependent on the facilitators and did not always go back through the group facilitator. One co-facilitator said that she was really happy when the last woman finally spoke up in the discussion. We noted that women and facilitators were even more comfortable with CP-Africa on the second day even though the topics were more sensitive (sexually transmitted infections and HIV). The women also noticed the difference in style of health promotion education. In comparing CP-Africa discussions to the lecture style used at a typical ANC, one woman said, *"They taught us with patience…and explained everything bit by bit…They gave everyone a chance to talk."* Women reported that, for the first time, they felt comfortable speaking with midwives about sensitive issues. Women described CP-Africa as *"relaxed"* in comparison to *"rushed"* ANC.

### Essential Element 2: The group is conducted in a circle

Facilitative leadership is partially supported by conducting groups in a circle, a seating arrangement that allows for visual contact with every other person in the group. One challenge identified was finding a space accommodating a circle of 12 women and 2 co-facilitators. The hospital had a room that was available several times during the week. The clinic, however, did not, but for the pilot we were able to use a vacant staff house. The clinic typically solves their need for extra space by utilizing churches, schools, or village offices; the clinic administrator also identified a waiting room that could be used in afternoons

### Essential Element 3: There is stability of group leadership

Continuity of care is an important aspect of CP that is not commonly practiced in sub-Saharan Africa. Therefore, accommodations to protect the facilitators' time and ensure that group facilitators remain consistent from session to session need to be addressed. Administrators felt confident that this could be incorporated into existing roster scheduling practices. However, some of the midwives were skeptical and were concerned that chronic staff shortages might still result in interruptions. No interruptions occurred during the pilot.

### Essential Elements 4 & 5: Group size is optimal to promote the process; composition of the group is stable but not rigid

The CP model promotes social support by providing 2 hours of care to the same group of 8–12 women throughout their pregnancies. However, both women and facilitators recognized that developing a group registration system and changing norms about scheduling would be a challenge. At recruitment, we asked women to return on a specific day and time; on the first day, the woman arrived at 7:30am anticipating a long wait. On the second day we observed that women arrived shortly before the scheduled time, which suggests that women can adjust to appointment-like scheduling. All 24 women attended both sessions, but how easily women will adjust to ANC appointments as regular practice remains unclear. Women noted advantages to appointments since their waiting time would be reduced. To facilitate the shift to ANC appointments, healthworkers identified the importance of working with the hospital's community advisory committee and community leaders in their catchment area to publicize the new model of care.

In addition to scheduling, health professionals explained that the stability of the group may be affected by seasonality. Seasonal rains can prevent travels; during heavy rains an easy and safe passage of some waterways may not be possible. The peak seasonal farming workloads could also be problematic. Much of the planting of crops is tightly timed; some women may feel compelled to plant crops instead of attending ANC. However, some

women liked the idea of holding groups in the afternoon so they could keep the morning free for other activities.

## Health Assessment

### Essential Elements 6 &7: Health assessment takes place in group space and participants are involved in self-care activities

The first 30 minutes of group time is devoted to self-assessments and a one-on-one exam with the midwife. While the exam itself is private, it takes place in group space. Based on our observations and interviews, there was no embarrassment or difficulties that arose from being seen by a midwife within group space.

Simple self-assessments, conducted and recorded by pregnant women, represent a key innovation of the CP model. Midwives were initially concerned that women would not be able to conduct self-assessments which include measuring their own height, weight, and blood pressure. Women and facilitators were surprised at how easy it was for women to learn self-assessments and we observed that they also helped one another. The women described how the self-assessments made them feel confident and proud. They pointed out that they could now see for themselves how the equipment worked and where the information were recorded. A midwife said, "*I was surprised by their ability. Today I found out that women were capable and eager*" Health professionals pointed out that they typically measure blood pressure manually and that women would not be able to take measures in this way if the automatic kits were unavailable or broken; therefore the type of equipment may be a barrier to carrying out some of the self-assessments at some sites.

## Education

### Essential Element 8: Each session has an overall plan

Group care allows facilitators to assess women's existing knowledge about several topics, address misconceptions and tailor the content based on identified needs and what comes up during discussion. For example, as part of a nutrition activity, facilitators learned that women defined "nutritious foods" as store bought foods; facilitators had the opportunity to clarify that this was not true and were able to emphasize the nutritious qualities of locally-available and grown foods. One midwife said, *"women were happy to find out the local vegetables were cheaper and nutritious"*

After conducting an activity to illustrate transmission of sexually transmitted infections (STls), facilitators were surprised by the ensuing discussion. A midwife said that women reported that *"most of the time they do not go to the hospital, they just got treated at home. Some were saying that they did not know we have treatment for STIs…They believed STIs were treated with local medicine…So we told them we have treatment"* The open discussion about local medicine surprised the facilitators, as patients rarely mention their usage in biomedical settings for fear of stigmatization. Importantly, through this respectful discussion, women learned that local medicines might alleviate their symptoms of STIs, but that these medicines may not cure STIs. As one woman said, *"we have learned today that we should be going to the hospital [to treat STIs]."*

### Essential Element 9: Attention is given to core content; emphasis may vary

The facilitators were able to adapt to the flexibility of the group process. For example, they recognized the group's need for more information about HIV. After HIV educational information was presented by the facilitators, the group proceeded to have a rich discussion about HIV transmission and the importance of testing. A woman describing the STI/HIV discussion said the facilitators *"have explained to us very clearly … about HIV."* Overall,

facilitators enjoyed their role in group. They said that lecturing on similar topics made them feel ineffective and ignored by clients whereas the facilitative approach made them feel effective since they were sure women understood the messages. A midwife who had been practicing for more than two decades summarized this theme when she said, *"We normally do not have time to listen to such stories. We just give them instructions, do this, do this and do this… But, they don't do what we tell them…In such a discussion, they are learning and are able to see why we are saying [this]*."

## Support

### Essential Element 10, 11 & 12: Group conduct honors contributions of each member, involvement of support people is optional, and opportunities for socialization are provided

The social aspect of the sessions, which emphasizes equality, respect, and support among all group members, is a critical part of the CP model. Over the course of the two sessions, it became clear that the discussions and sharing of personal stories created bonds among the women. As one woman said, *"We were happy to meet again"* One woman said, *"We are learning from each other and we reminded each other of many things"* They pointed out that learning came from the sharing of experiences and problems. Another woman said, *"Being my first pregnancy, I have learned how to approach my husband"*

We specifically asked women and healthworkers to comment on whether HIV status would matter in a CP-Africa group. Both agreed that HIV positive and negative women need to learn the same things. A woman pointed out that the activities would be especially helpful for one with HIV and said that, *"an HIV positive woman needs to learn about the kinds of foods that will make her body healthy"* CP may even help to reduce stigma around HIV. Another participant said, *"If one has HIV, we will be encouraging and supportive of her"*

Women were particularly struck by the positive interactions with group facilitators. As one participant said, *"We* danced with *them [the* facilitators*]*." At the second session, we noted that women had bonded as they worked together to write a song reflecting this aspect of their CP-Africa experience:

Centering group, we belong

When walking, centering group we belong

When showing our pride, centering we belongs

When dancing, centering we belong

## Evidence-based practice and ongoing evaluation of outcomes

### Essential Element 13: Ongoing evaluation of outcomes

Evaluating whether health outcomes for participants were better in CP-Africa than in individual care is beyond the scope of this pilot. However, we evaluated the feasibility of tracking outcomes in future work. Current ANC practice is to record all attendees' information in a single, large, stationary book; therefore to link delivery records, also kept in a separate book organized by date and not by patient, to any one woman is nearly impossible. Most ANC clinics produce clinic-level outcome data through the laborious hand-tallying. In lieu of accessible clinic-level individual records, it is the woman who is responsible for her own ANC record; she carries this document with her to each ANC visit. Modifications to the current system would be needed to track outcomes of CP.

## Discussion

Our preliminary research and small pilot established that CP-Africa can be implemented with fidelity to the 13 Essential Elements. This new model for ANC delivery was feasible and acceptable to administrators, providers and pregnant women. All were excited and energized by what CP-Africa offered as an ANC experience. As a group model of care, the productivity of each midwife is maximized, as each would be able to provide a two-hour group visit while maintaining average time of 10 minutes per client. This is the approximate time observational studies have documented for ANC in various countries in sub-Saharan Africa (Conrad et al., 2011; Magoma et al., 2011; von Both et al., 2006). There is only one other published study of group ANC in a low resource country (Jafari et al., 2012), and that study did not address process fidelity.

Our collaborative action research approach facilitated full understanding of the model by the providers and women. Providers and administrators were able to offer practical solutions to challenges they identified. It is important to point out that many of the system challenges are similar to those experienced the USA (Klima et al., 2009). CHI has addressed many system-wide change issues in the USA through their site certification process. Our Malawi pilot also confirmed the importance of including CP-Africa training for administrators. Including administrators in training will increase their support of facilitators and will help our team envision solutions before the program is fully implemented.

## Discussion

### Implications for Practice and Achieving MDGs 4, 5, and 6

CP-Africa provides an innovative strategy that has the potential to improve the quality of ANC despite severe staffing shortages. If CP-Africa can achieve efficacy results similar to those reported in the USA, it would benefit childbearing women, their children and families and thus make a substantial contribution toward meeting the targets of MGDs 4, 5 and 6. CP-Africa's improved quality of care also might also have an indirect benefit on the health care system and quality of ANC by increasing midwives' job satisfaction and reducing burnout and resignations (Gerein et al., 2006; Nabirye et al., 2011; van der Doef et al., 2012).

Currently, preterm birth is the leading cause of neonatal deaths and the second leading cause of death in children under 5 globally (Lawn et al., 2012; March of Dimes, 2012). Over 60% of preterm births occur in Africa and South Asia (March of Dimes, 2011). A reduction in premature births, like that found in multiple studies in the USA (Grady & Bloom, 2004; Ickovics et al., 2003; Ickovics et al, 2007; Kovarik et al., 2009; Picklesimer et al., 2012; Tandon et al., 2012), would make a substantial contribution to MDG 4, which aims to reduce mortality for children under age five. Many preventable infant deaths are also linked to malnutrition. It is estimated that 13% of under five deaths are related to suboptimal infant feeding practices (Black et al., 2008; Caulfield et al., 2004; Jones et al., 2003). Evidence from the USA showed that the CP model was associated with improved breastfeeding rates (Grady & Bloom, 2004; Ickovics, 2007; Klima, 2009). The only other study conducted in a low income country reported both reduced prematurity and increased breastfeeding (Jafari et al., 2007), further supporting the promise of group ANC like CP-Africa.

The CP model is also associated with increased ANC attendance rates and higher satisfaction with care (Ickovics, 2007; Kennedy et al. 2011; Klima, 2009). Retaining women for repeated ANC visits is especially important in the African context because supply shortages mean that many interventions associated with improved maternal and child health outcomes are missed at a single visit. These missed opportunities include HIV and syphilis

screening and treatment, prevention and/or treatment of preeclampsia, intermittent presumptive treatment of malaria and tetanus toxoid immunization (Darmstadt et al., 2008; Knippenberg et al., 2005). If CP-Africa significantly increases return ANC visits, a reduction in missed opportunities would have a positive impact on all three MDGs. Reductions in the number of missed opportunities for HIV testing and referral for PMTCT could decrease perinatal transmission by reducing new HIV infections (Brown et al., 2011; Conrad et al., 2012; PMNCH, 2006; Watson-Jones et al., 2012; WHO/UNICEF, 2004). Higher satisfaction and more frequent contacts with the health system during pregnancy might also increase delivery at a health facility with a skilled birth attendant, a key intervention to address MDG 5 to reduce maternal mortality and morbidity.

There is also some evidence that the CP model can have an impact on women's sexual risk reduction. The only study in the USA that included HIV and STI prevention found an increase in reported condom use and fewer STIs and repeat pregnancies at 6 months postpartum (Ickovics, 2008; Kershaw et al., 2009). The Iran study also found increased uptake of family planning (Jafari et al., 2007). Similar outcomes would have an important impact on MDG 6 by reducing new HIV infections and on MDGs 4 and 5 by reducing rapid repeat pregnancy.

### Limitations

There are numerous limitations to a small study. Although our sample size was a major limitation, the consistency across participants suggests that the results were quite robust. The most important limitation was our lack of funding to conduct a small pilot in both countries. However, conversations between Leshabari and Kaponda confirmed similarities between these two health systems and ANC contexts. Another issue is that our pilot consisted of two sessions held on separate days in the same week rather than over the course of pregnancy and throughout the seasons. While it is important to document that individual sessions can be carried out with fidelity, the next step would be to test the entire CP-Africa ANC model over the course of pregnancy. Similarly, suggested strategies and solutions to challenges need to be assessed in everyday practice.

## Conclusions

Our formative research showed that women, practitioners, and administrators found CP-Africa to be an acceptable format for the delivery of ANC. Given the potential benefits of CP-Africa for pregnant women and their infants, a randomized trial is urgently needed to test whether this model can be implemented on a larger scale and if it would be effective in improving health outcomes in sub-Saharan African countries. This trial would establish whether CP-Africa can be efficacious when implemented with fidelity to the process under the reduced visit schedule of FANC. Further research would also be valuable. Health-system specific operations research would also be valuable in testing alternative approaches to addressing system-level challenges to implementing CP-Africa. If CP-Africa results to be effective, this model might improve the health of women and infants in low-resource countries and thus move sub-Saharan Africa closer to the targets of MDGs 4, 5 and 6.

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## Table 1

Results Related to Process to CenteringPregnancy

| Essential Elements | | Pilot | Potential Challenges |
|---|---|---|---|
| **Grou p Healthcare Delivery** | | | |
| 1 | A facilitative leadership Style is used | After 2 days of training, providers "got it." They would have liked more time to practice these skills in training, but we observed that they were able to apply the skills to lead the CP-Africa sessions. | Important to ensure adequate training and practice for providers since usual education and health promotion model is didactic lecture. Administrators need to be included to allow for organizational adjustments. |
| 2 | The group is conducted In a circle | At the sites where the pilot was conducted we were able to use movable chairs. Other group care models have been conducted in circles while sitting on the ground. | Some health facilities have fixed long benches so sites may have to adjust to what is available. |
| 3 | There is stability of group leadership | This was not problematic in the pilot. Community health workers, as co-facilitators, $_{A}$ could provide stability. They are less likely to be called away for medical emergencies. | Providers may have difficulties May be difficult for providers to have uninterrupted time, especially in small clinics. |
| 4 | Group size is optimal to promote the process | This was not problematic in our pilot | Pressures from worker shortages and overcrowding could lead to enlarging beyond the ideal size |
| 5 | The composition of group is stable but not rigid | Unproblematic in pilot; all women attended both sessions | Attendance may be affected by seasonality. |
| **Health Assessment** | | | |
| 6 | Health assessment takes place within the group space | Assessment in group space was acceptable to providers and clients. Women learned quickly and helped each other expressing pride in their accomplishment. | No challenges identified |
| 7 | Participants are involved in self-care activities | Despite low literacy, women were able to conduct and record these measures successfully. More literate women helped those who could not write. | No challenges identified |
| **Education** | | | |
| 8 | Each session has an overall plan | The CP-Africa content exceeded the minimum requirements of the Ministries of Health and FANC. | Under the FANC model, there will be fewer opportunities to review content. |
| 9 | Attention is given to the core content; emphasis may vary | Providers were surprised at how much content was covered when free discussion was encouraged. They were able to gauge women's knowledge level and easily moved between teaching and discussion when necessary. | Since didactic approaches are more common, facilitators may have to be reminded about the centering approach to avoid falling back into a purely teaching mode of communication. |
| **Support** | | | |
| 10 | Group conduct honors the contributions of each member | Occurred clearly in pilot; contributions of group members were valued by participants and facilitators. | No challenges identified |
| 11 | Involvement of family support people is optional | This will vary by group. In our study one group voted that it was better to not include others. The other group did not discuss this option. | Family support people are not usually included at ANC. If groups choose to include other members, there may be space issues. |
| 12 | Opportunity for socialization within the group is provided | Socialization occurred before, during, and after sessions. | No challenges identified |
| **Evidence-based Practice** | | | |
| 13 | There is ongoing evaluation of outcomes | ANC facilities already collect birth statistics; if type of ANC received can be noted on reports this should be feasible. | No individual records are kept at the site, so modifications will be needed to link type of ANC with birth outcomes in order to track the relationships between type of care and health outcomes. |