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**Can an Integrated Obstetric Emergency Simulation Training Improve Person-Centered Maternity Care? Results from a Pilot Study in Ghana**

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150 word PAA Abstract

Person-centered maternity care (PCMC) is maternity care that is responsive and respectful to women's needs and values. It is a key dimension of quality capturing the experience dimensions of care. Poor PCMC contributes to high maternal mortality directly, as well as indirectly through decreased demand for services. While there is growing recognition of the importance of PCMC to maternal and child health outcomes, few evidence-based interventions exist on how to improve it. In this paper, we present the evaluation results of a pilot study in a rural district in Northern Ghana. The intervention was an integrated simulation-based provider training to improve PCMC and to better identify and manage obstetric and neonatal emergencies. The evaluation, based on surveys at baseline (N=215) and endline (N=318) with recently delivered women, showed improvements in PCMC scores as well as on the domains of dignity and respect, communication and autonomy, and supportive care.

## **Introduction:**

Person-centered maternity care (PCMC) is recognized as key to improving maternal and neonatal health outcomes. [1–3]. PCMC is a key dimension of quality of care capturing the experience or interpersonal dimensions of care [4–6]. PCMC emphasizes being responsive and respectful to women and their families' preferences, needs, and values. [4, 7]. Key to PCMC is dignity and respect, communication and autonomy, and supportive care [4, 8, 9]. These are highlighted in the recently released World Health Organization (WHO) recommendations for a positive childbirth experience, which calls for effective communication, respectful maternity care (RMC), companionship during labor and childbirth, and continuity of care throughout labor and birth [10]. Although we consider RMC a subset of PCMC, RMC is often described very broadly to capture all the domains of PCMC. For example, in the WHO recommendations, RMC is described as “care organized for and provided to all women in a manner that maintains their dignity, privacy and confidentiality, ensures freedom from harm and mistreatment, and enables informed choice and continuous support during labor and childbirth” [10]. We therefore used PCMC and RMC interchangeably in this project. Mistreatment or disrespect and abuse during childbirth represent poor PCMC. Growing evidence globally has highlighted poor PCMC in health facilities, and its negative effects on health seeking behavior and maternal and neonatal health outcomes [3, 2, 1, 11, 12].

While there is growing recognition of the importance of PCMC to maternal and neonatal health outcomes, there is limited evidence on how to improve it. Studies in Africa, including Kenya, Tanzania, Sudan, and South Africa, have suggested that multi-component interventions have the potential to improve various aspects of PCMC including reducing disrespect and abuse [13–17]. These interventions include different components such as training health care providers in values and attitudes transformation and communication skills; setting up quality improvement teams; monitoring disrespect and abuse; staff mentorship; improving privacy in wards; improving staff conditions; maternity open days; community workshops; dispute resolution; counseling community members who experience disrespect and abuse; making provision for complaints; and educating women on their rights [18]. However, the heterogeneous and complex nature of these multi-component intervention packages limits their feasibility and scalability in the context of limited resources. A recent systematic review on effectiveness of respectful care policies concluded that while multicomponent interventions appear to reduce some aspects of disrespect and abuse, the sustainability of the demonstrated effect over time is unclear, and the intervention components with the greatest impact have not been identified. Thus, there is a need for rigorous research to refine the optimum approach to deliver and achieve RMC in all settings [18].

Notably, these prior interventions were solely focused on improving RMC [13, 14]. Disrespectful care, however, does not exist in isolation; it often emerges in the process of providing highly stressful emergency care. Thus, interventions that address RMC (or PCMC) in the context of providing stressful clinical care may be the most effective ways of improving it. Highly realistic clinical simulation training provides this unique opportunity to be responsive and respectful to women's needs in a meaningful context, while mimicking the stressful emergency clinical environment that may contribute to disrespectful care. The potential effect of such a training is likely greater than the combined effect of standalone trainings on only clinical skills or PCMC. However, no studies to our knowledge have explicitly used this integrated simulation approach to improve PCMC and documented the effect of the intervention on PCMC. Thus, as part of a pilot study in Ghana to improve intrapartum quality of maternal and newborn care, we explicitly integrated concepts of PCMC into a simulation-based provider training, and evaluated the effect of the training on PCMC based on women's reports of the care they received at the intervention facilities before and after the intervention. In this paper we present the results from the evaluation of the pilot project.

## **Study site**

The project was implemented in the East Mamprusi district in the Northern Region of Ghana. The Northern Region of Ghana, which has the highest maternal and infant mortality rates, also has the lowest rate of facility-based births at 35% [19]. Mistreatment during childbirth is a key factor driving low facility delivery rates [2, 20]. The East Mamprusi district is a rural district with a population of about 121,000. The district has 13 health facilities, with approximately 114 providers, including four medical doctors, 88 nurses, 12 midwives, and 22 community health nurses. Seven of the facilities conduct deliveries, including one mission hospital serving as the district referral hospital, four health centers, and two smaller Community-based Health Planning and Services (CHPS) compounds. Collectively, these seven facilities oversee more than 5000 births per year (*Unpublished PREMAND project data*). This pilot focused on implementation at the five highest volume delivery facilities in the district, which were the referral hospital and four health centers.

## **Intervention**

We used provider trainings based on the methodology developed by [PRONTO International](#) : a low-tech, highly-realistic simulation and team training with facilitated debriefing, to improve identification and management of obstetric and neonatal emergencies and team functioning. [21]. The training has been evaluated in several limited-resource settings and shown to improve provider knowledge and skills, cultural humility, self-efficacy, and patient outcomes [22–24]. The PRONTO training kit, the PRONTOPack, includes a hybrid birth simulator called a PartoPants™ (a modified pair of surgical scrubs with anatomical landmarks necessary for delivery) worn by a patient actress (one of the female providers). The patient actress brings the patient to the center of the care and allows for direct discussion about patient experiences. Although PRONTO has always emphasized RMC prior to the current intervention, the PRONTO curriculum did not directly focus on RMC principles. In this project, we integrated RMC concepts into the curriculum and simulation scenarios in a deliberate way, and piloted it in Northern Ghana. The curricular integration process and the feasibility and acceptability of the study are described in detail elsewhere (*cite integration paper depending on status and reduce this section*) and summarised here.

The curriculum for the training included five simulation scenarios and associated knowledge reviews and skills stations capturing seven priority topics identified during a stakeholder meeting, plus interactive teamwork and communication activities. The topics were normal birth practices and evidence-based maternity care, immediate newborn evidence-based care, neonatal Resuscitation, obstetric hemorrhage, pre-eclampsia/ eclampsia, sepsis, and preterm labor and birth. All simulations emphasized treating women with dignity and respect, communicating with them, respecting their autonomy, and supporting them in whatever way they needed including encouraging birth companions. In addition, simulation scripts had prompts for certain behaviors from the patient actress: for example, *if providers did not introduce themselves*, the patient actress asked “*who are you?*”, and *if providers did not explain what they were doing or found from examinations*, she asked “*what are you doing to me?*” or “*how is my baby?*” Simulations were followed by a debriefing session facilitated by the trainers to engage participants in guided self-analyses of their performance in the clinical management of the case as well as on their interactions with the patient. During each debrief, the patient actress who was one of the providers was also asked to reflect on how she was treated during the simulation.

In addition, we included one simulation with a sole focus on RMC. This simulation involved a patient who initially refused to open her legs for examinations and then insisted on delivering in a squatting position. This simulation was followed by a debrief that emphasized RMC elements, such as how to communicate with patients who do not fit into perceived notions of cooperation (“difficult patients”) to prevent verbal and physical abuse, and responding to women’s desires for birthing in alternative positions. This simulation was paired with a knowledge review, including a video to help providers understand the relevance of RMC and to demonstrate what RMC may look like in their setting. The

providers also engaged in an interactive activity on RMC to help them understand and internalize the needs of women during childbirth.

Twenty-two providers from the intervention facilities first participated in a two-day training facilitated by three PRONTO trainers at a location close to the referral hospital in April 2017. Six providers who participated in the first training were then invited to a two-day Simulation Facilitator Training (SFT) led by the PRONTO trainers. The SFT curriculum focused on how to run simulations and facilitate debriefs. The goal of the SFT was to equip the participants with the knowledge and skills to become effective simulation facilitators to serve as trainers for the district. These new trainers then led an additional two-day provider training, with support from the experienced PRONTO trainers, for 21 providers from the surrounding districts as well as other providers from the intervention district who had not participated in the first training. This training involved the same content as the first provider training and enabled the local facilitators to gain confidence to facilitate simulations and moderate debriefing sessions during planned refresher trainings. The local facilitators then continued to conduct refresher trainings each month at the intervention facilities. A total of four refreshers lasting about three-hours each were conducted in each facility over the intervention period between June 2017 and October 2017.

## METHODS

### Data collection

To evaluate the effect of the training on PCMC we conducted exit interviews with recently delivered women in the five intervention facilities before and after the intervention. Women were eligible if they were aged 15-49 years and delivered in the preceding 8 weeks. The interviews were conducted in the local languages (Mampruli and Kokomba), in private spaces at the health facilities and in the homes of women. Interviews were all structured using paper-based questionnaires, and later entered into the REDCap portal on a computer. The Baseline survey was conducted in March and April 2017 just before the initial provider training and the endline conducted in November of 2017, 6 months after the initial provider training and 1 month after the last refresher. A total of 268 and 320 women were interviewed at baseline and endline, respectively. We restricted the analytic sample to women who delivered in the intervention facilities and had complete information on the PCMC scale variables (N=215 for baseline and 318 endline). All participants provided written informed consent. The study was approved by the ethics review boards of University of California, San Francisco and the Navrongo Health Research Center in Ghana and deemed exempt from ongoing review by the IRB at the University of Michigan.

### Measures

**Dependent variable:** The main dependent variable was the PCMC score measured with the PCMC scale. The PCMC scale was initially validated in Kenya and India, and shown to have high content, construct, and criterion validity and with good internal consistency reliability (described in detail elsewhere). [4, 8] The original scale has 30 items with three sub-scales for dignity and respect (DR), communication and autonomy (CA), and supportive care (SC). Each item has a 4-point frequency response option—0: “no, never,” 1: “yes, a few times,” 2: “yes, most of the time,” and 3: “yes, all the time.” Minor modifications were made to the wording of a question during pretesting in Ghana. Exploratory factor analysis using both the baseline and endline data supported a three-factor structure with a single dominant factor. Three items (time to care, delivery support, and crowding), however, had low loadings (<0.1) in the one factor structure analysis. Thus, we decided to exclude these 3 items from the scale. We also excluded three items on availability of water, electricity, and perception of enough staff since the intervention did not include improvements to infrastructure or number of providers. This analysis is therefore based on a 24-item version of the PCMC scale. The items excluded were all part of the supportive care subscale, decreasing the number of items in that subscale from 15 in the original scale to 9 items in the 24-item version used here. The dignity and respect and communication and autonomy subscales have 6 and 9 items respectively, similar to those in the original scale. The full 24-item scale and sub-scales have good

internal consistency reliability, with Cronbach's alpha of 0.9 for the full scale and over 0.7 for the sub-scales (table 2). We summed items in the full scale and sub-scales (with negative items reverse coded) to generate PCMC and sub-scale scores. The range of scores in the sub-scales differ because of the different number of items in each. Thus, to put them in the same range for comparison across domains, the scores are rescaled by dividing the average score over the maximum possible score for the scale and subscales and multiplied by 100, so that each has a range from 0 (worst possible care) to 100 (best possible care). In addition to the scale scores, we present the results on the individual items to highlight specific changes and to be able to compare to the broader literature on RMC/disrespect and abuse.

**Independent variable:** The key independent variable is the time of data collection in relation to the intervention, with options as baseline (before the intervention) or endline (after the intervention).

**Control variables:** We collected data on various factors that might explain the observed relationship between the dependent or independent variables through their associations with them. These included demographic variables such as age, parity, and marital status and measures of socioeconomic status such as education, employment, household wealth, and partner's education and occupation. We also included variables to capture complications, antenatal attendance, and facility and provider characteristics. These variables have been shown in previous studies to be associated with PCMC, [25] and could differ for the baseline and endline samples.

### **Analysis**

We first examined the distribution of variables for the baseline and endline samples using descriptive and bivariate analysis (cross tabulations and chi-squared for categorical variables and t-tests and ANOVA for continuous variables). Next, we examined the distributions of the individual PCMC items using chi-squared test to assess differences between the baseline and endline responses. We then generated the PCMC and subscale scores and examined mean differences in PCMC at the baseline and endline using two-sample t-tests. Finally, we conducted multivariate linear regressions to examine the differences in scores at baseline and endline when other potential predictors are controlled for. We included all variables that were associated with PCMC in the bivariate models or which had strong theoretical rationale for inclusion in the multivariate models.

The data are hierarchical, with clustering at the facility level. When clustering is not accounted for in hierarchical data, the standard errors are underestimated, and there is a higher chance of finding significant differences, when in fact the differences are not significant. [26, 27] Multilevel analysis is recommended to account for clustering, but there is a lack of clear guidance on how many units are required at the group level to warrant multi-level models. [27–29]. Because there were only 5 facilities, we decided to use fixed effects models with facility included as a predictor. We however also run sensitivity analysis using multivariate multilevel linear regression models with random intercepts at two levels—individual (level 1) and facility (level 2). We used STATA 15 for the analysis and a p-value of <0.05 was taken as statistically significant.

## **RESULTS**

### **Demographic characteristics of respondents**

Table 1 shows the demographic characteristics of respondents for the baseline and endline samples. There were small but statistically significant differences in the characteristics of women interviewed in the baseline and endline. For example, women in the endline were more likely to be younger and primiparous (average age was 27 years and 31% primiparous in the baseline compared to average age of 30 years and 19% primiparous in the endline). Also compared to women in the baseline, women in

endline were slightly more educated and literate, from wealthier households, and their partners had more education.

==Table 1==

### **Distribution of PCMC variables**

The distribution of the individual PCMC items are shown in Table 2 by domain (full set of results in appendix 2). But for a few exceptions, the responses on most of the individual items point to higher PCMC received by women in the endline compared to those at baseline.

*Dignity and Respect:* Only 12% of women at baseline felt they were treated with respect all the time, and 8% felt they were treated in a friendly manner all the time compared to 64% and 65% respectively at endline. Also, the proportion who felt their privacy was ensured all the time increased from 61% at baseline to 76% at endline. Surprisingly, the proportion reporting some form of verbal or physical abuse increased: from 12% at baseline to 23% at endline for verbal abuse and 4% to 11% at endline for physical abuse.

*Communication and autonomy:* At baseline, 87% of women reported providers never introduced themselves to them, and 43% reported providers never called them by their names, compared to 60% at and 20% respectively at endline. Also, over 50% reported providers did not explain the purpose of examinations, procedures, or medications at baseline compared to less than 25% at endline; and 43% reported providers never asked for permission before examinations and procedures at baseline, compared to 11% at endline. Forty-one percent of women in the baseline reported they never felt like they were involved in their care and 59% did not feel they could adopt a birthing position of their choice during delivery at baseline compared to 16% and 31% % respectively at endline.

*Supportive care:* 37% of women at baseline reported providers never talked to them about how they were feeling compared to 17% at endline; and only 11% felt providers did their best to control their pain all the time at baseline compared to 46% at endline. Also, 17% felt providers took the best care of them all the time at baseline compared to 61% at endline. Women were more likely to be allowed to have labor companions at endline than at baseline: 32% reported they were never allowed to have a companion during labor at baseline compared to 10% at endline.

==Table 2==

The mean PCMC scores on the full scale and sub-scales are shown in Table 3. To enable comparison across the domains, we show the rescaled scores—scores shown as a fraction of the total possible score on that domain (putting each score between 0 and 100)—in Figure 1. The average rescaled PCMC score increased from 50 at baseline to 72 at endline, a relative increase of 43%. Scores on the sub-scales also increased between baseline and endline: from 76 to 87 for DR (15% relative increase), 31 to 58 for CA (87% relative increase) and 52 to 75 for SC (45% relative increase). PCMC scores increased between baseline and endline in all facilities (appendix 2).

==Table 3==

==Figure 1==

The differences between the baseline and endline scores remain significant in the multivariate analysis shown in table 4. Controlling for several potential confounders, the endline PCMC score is about 18

points higher than the baseline scores. Net of other factors, the difference between the baseline and endline scores for DR, CA, and SC are 2.4, 7.7, and 7.4 respectively. The results are essentially the same in the multilevel analysis. The multivariate analysis also shows that PCMC is in general higher in the health centers than in the referral hospital. In addition, PCMC differs by various factors including age, parity, household wealth, employment, partner's education and employment, and religion (see appendix 3 for full model).

==Table 4==

## DISCUSSION

In this paper we present the evaluation results of an integrated, high-fidelity obstetric emergency simulation training to improve quality of care including PCMC. We found that PCMC reported by women in the endline was substantially higher than that reported at baseline. The highest change was in the domain of communication and autonomy, where the score almost doubled. The findings suggest that integrated high-fidelity simulation training has the potential to improve PCMC in developing settings. It adds to the growing research suggesting that interventions targeting RMC can lead to improvements in RMC. Specifically, it highlights that an emphasis on PCMC/RMC in the context of broader quality of care initiatives may have great potential to improve women's childbirth experiences.

Prior studies to improve PCMC have not used the PCMC scores used in this work, but examined the incidence of any disrespect and abuse as the outcome. A recent systematic review of these studies found that there is moderate certainty evidence that multi-component RMC interventions could increase women's experiences of good quality care and of respectful care, and reduce experiences of disrespect and abuse [18]. These studies also reported decreases in specific attributes including physical abuse, non-dignified care, lack of privacy, neglect and abandonment with RMC interventions. The evidence on these were graded as low certainty evidence except for the evidence on physical abuse which was graded as moderate certainty.

The greatest changes in our study were in the domains of communication and autonomy. A potential reason for this is that the PRONTO training has an emphasis on team work and communication and all simulations and debriefings included various elements of provider-provider and provider-patient communication. The training also emphasized patient autonomy with emphasis on asking for consent and patient preference for delivering in an alternative position. One provider even shared a picture after the training for how she had been able to assist a woman deliver in her preferred position, which was on a sheet on the floor instead of the delivery bed. Supportive care was also emphasized in the form of having a birth companion in all simulations. In debriefings, however, discussion of constraints of having a companion in the delivery room (e.g. privacy when two women are delivering at the same time), led to compromises of at least allowing companions during labor, where they could provide support not only to the woman, but also to the provider. These challenges of providing continuous support are described in detail elsewhere.[30]

A surprising finding was the increase in reports of verbal and physical abuse, despite the increase in reports of being treated with respect. Similar to our findings, some prior studies have found contradictory effects when examining individual aspects of disrespect and abuse. For example, two of the prior studies assessing effects of RMC interventions documented apparent increases in verbal abuse [18]. One potential reason for our finding is that, while treating women with dignity and respect was emphasized in the training, verbal and physical abuse never actually occurred in the simulations. Thus, there was no opportunity for discussion of abuse in the debriefings—except for after the simulation with a “difficult patient” in which facilitators were able to bring up the issue of abuse in the context of how providers

might respond when they deem a patient as difficult. Prevention of abuse was therefore not reinforced in the training.

Other reasons for the higher rates of abuse at endline may be related to reporting. First, reports of abuse may have increased from baseline to endline because of greater awareness and higher expectations from increasing media attention on the issue of disrespect and abuse during childbirth. Second, literate and more educated women may be more likely to perceive provider actions as abusive due to higher expectations of care: across both baseline and endline, 25% of women with college education reported verbal abuse, compared to 16% of those with no education; and 13% of those who could read and write reported physical abuse compared to 6% of those who could not write. Endline respondents were more likely to be educated and literate, thus, the higher rates of reports of abuse at endline than baseline. The difference for physical abuse is not significant when other factors are controlled for but verbal abuse is still marginally significant.

The effects observed should be considered in the light of the fact that this study did not include any effort to change existing infrastructure (such as lack of screens for privacy) or to address systemic issues (such as inconsistent electricity, lack of supplies) that might make practicing in this setting difficult for providers. Such issues, while important to maintaining a motivated workforce that can in turn provide high-quality, respectful care, are beyond the scope of training-based interventions but are crucial to creating sustainable change.

There are a number of limitations to this study. First, funding limitations precluded our recruitment of a control group, thus it is possible that other external factors could account for the results given the increasing interest in PCMC globally. There were however, no other specific activities targeting PCMC in the intervention district during the project period, thus we believe the training accounts for most of the effects. Second, not all providers in the intervention facilities were exposed to both the initial trainings and refreshers due to workforce turnover. The observed effect could therefore be smaller than the potential effect of the intervention. Third, given the short timeline for the intervention and evaluation (6 months), we are unable to assess long-term sustainability. In addition, the evaluation data presented are based on cross-sectional surveys with different groups of women, meaning that other factors that affect reporting of women's experiences could explain some of the results. However, given that the findings are significant after controlling for other potential predictors, it is not likely that these other factors can explain all of the observed associations. It was also not possible to conduct longitudinal data collection from the same group of women as the same women were unlikely to receive maternity care within the project period. Because the data are based on self-reporting, social desirability and recall bias are potential issues. However, self-reports are a valid source for assessing people's experiences as their interpretation of the event may be more likely to affect their response to the encounter than what actually happened. Additionally, the use of a validated multidimensional scale helps to reduce bias based on responses to individual items. Finally, the findings may not be generalizable to other settings given unique aspects of the study district. Nonetheless, we believe this intervention could be adapted to many low-resource settings.

## **Conclusion**

This is among the few studies to assess the effects of an intervention on PCMC in SSA and to our knowledge the first to do this in the context of a clinical simulation training. These findings highlight the feasibility and potential effectiveness of such approaches to improving PCMC. The findings suggest that integrated trainings that give providers the opportunity to learn, practice, and reflect on their provision of PCMC in the context of providing stressful emergency care has the potential to improve PCMC in developing settings. Incorporating such trainings into pre-service and in-service training of providers may advance global efforts to promote PCMC. Future research is needed to more rigorously evaluate the effect of the intervention on not just PCMC, but also on other maternal and neonatal health outcomes such as



health seeking behaviors, morbidity, and mortality. Longer and larger-scale studies to assess sustainability and scaling mechanisms and cost-effectiveness studies are also needed. Such research would provide stronger evidence to advocate for government uptake for scalability and sustainability.

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**Table 1: Sample Distribution**

	<i>Baseline</i>		<i>Endline</i>		<i>Diff p-value</i>
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	
<b>Intervention facility</b>					0.00
Referral Hospital	37	17.2	100	31.4	
Health center 1	51	23.7	54	17	
Health center 2	39	18.1	66	20.8	
Health center 3	56	26	60	18.9	
Health center 4	32	14.9	38	11.9	
Total	215	100	318	100	
Age: Mean (SD)	214	29.6 (6.8)	318	27.1 (6.8)	0.00
Parity: Mean (SD)	212	3.3 (1.9)	317	3.4 (6.2)	0.87
Postpartum length: Mean (SD)	215	3.2 (2.5)	318	4.1 (2.4)	0.00
Current marital status					0.37
Single	4	1.9	6	1.9	
Partnered/Cohabiting	9	4.2	22	6.9	
Married	202	94	288	90.6	
Widowed	0	0	2	0.6	
Total	215	100	318	100	
Highest education					0.05
No school/Primary	157	73	205	64.5	
Post-primary/vocational/Secondary	55	25.6	100	31.4	
College or above	3	1.4	13	4.1	
Total	215	100	318	100	
Literacy: writing					0.00
No, cannot write	156	72.6	203	63.8	
Yes, but with some difficulty	52	24.2	63	19.8	
Yes, Very well	7	3.3	52	16.4	
Total	215	100	318	100	
Employed					0.01
No	191	89.3	304	95.6	
Yes	23	10.7	14	4.4	
Total	214	100	318	100	
Household wealth quintile					0.00
Poorest	62	30.2	73	23.1	
Poorer	57	27.8	106	33.5	
Middle	80	39	103	32.6	
Richer	5	2.4	26	8.2	
Richest	1	0.5	8	2.5	
Total	205	100	316	100	
Partner's education					0.01
No school/Primary	156	73.2	184	58.8	
Post-primary/vocational/Secondary	34	16	79	25.2	
College or above	18	8.5	39	12.5	
No Partner	5	2.3	11	3.5	
Total	213	100	313	100	
Delivery Provider type					0.00
Nurse/Midwife	184	85.6	245	77	
Doctor	12	5.6	10	3.1	
Medical Officer	6	2.8	19	6	
Non-skilled attendant	10	4.7	1	0.3	
1plus skilled providers	3	1.4	43	13.5	
Total	215	100	318	100	

Notes: P-value indicates significance of difference between baseline and endline. Totals less than 215 for baseline and 318 for endline indicates number missing on total analytic sample

**Table 2: Distribution of items in PCMC scale (Cronbach's alpha for 24 items = 0.91)**

	<u>Baseline</u>	<u>Endline</u>
	% responding	“No, never
<b><i>Dignity and Respect subscale (Cronbach's alpha= 0.75)</i></b>		
1. Did the doctors, nurses, or other staff at the facility treat you with respect?	6.0	3.8
2. Did the doctors, nurses, and other staff at the facility treat you in a friendly manner	4.7	4.1
3. During examinations in the labor room, were you covered up with a cloth or blanket or screened with a curtain so that you did not feel exposed?	3.3	2.5
4. Do you feel like your health information was or will be kept confidential at this facility?	4.7	0.9
5. Did you feel the doctors, nurses, or other health providers shouted at you, scolded, insulted, threatened, or talked to you rudely?	88.4	77.0
6. Did you feel like you were treated roughly like pushed, beaten, slapped, pinched, physically restrained, or gagged?	96.3	88.7
<b><i>Communication and Autonomy subscale (Cronbach's alpha= 0.83)</i></b>		
1. During your time in the health facility did the doctors, nurses, or other health care providers introduce themselves to you when they first came to see you?	87.4	60.1
2. Did the doctors, nurses, or other health care providers call you by your name?	42.8	19.8
3. During the delivery, do you feel like you were able to be in the position of your choice?	59.1	30.2
4. Did you feel you could ask the doctors, nurses or other staff at the facility any questions you had?	52.6	23.6
5. Did you feel like the doctors, nurses or other staff at the facility involved you in decisions about your care?	41.4	15.7
6. Did the doctors, nurses or other staff at the facility speak to you in a language you could understand?	5.6	1.3
7. Did the doctors, nurses or other staff at the facility ask your permission/consent before doing procedures on you?	43.3	10.4
8. Did the doctors and nurses explain to you why they were giving you any medicine?	57.7	22.3
9. Did the doctors and nurses explain to you why they were doing examinations or procedures on you?	59.5	24.5
<b><i>Supportive Care subscale (Cronbach's alpha= 0.82)</i></b>		
1. Did the doctors and nurses at the facility talk to you about how you were feeling?	36.7	17.0
2. Do you feel the doctors or nurses did everything they could to help control your pain?	20.5	14.8
3. Did you feel the doctors, nurses or other staff at the facility took the best care of you?	2.3	3.5
4. Did you feel you could completely trust the doctors, nurses or other staff at the facility with regards to your care?	4.2	1.6
5. When you needed help, did you feel the doctors, nurses or other staff at the facility paid attention?	16.3	7.2
6. Did the doctors, nurses or other staff at the facility try to understand your anxieties?	36.7	12.6
7. Were you allowed to have someone you wanted (outside of staff at the facility, such as family or friends) to stay with you during labor?	31.6	10.1
8. Thinking about the wards, washrooms and the general environment of the health facility, will you say the facility was very clean, clean, dirty, or very dirty? (% responding very dirty)	0.0	0.6
9. In general, did you feel safe in the health facility?	6.5	1.3
10.		
N	215	318

**Table 3: PCMC scale and sub-scale scores**

	Baseline (N=215)			Endline (N=318)			Score difference	% change
	Mean	SD	Rescaled score	Mean	SD	Rescaled score		
PCMC score	35.9	6.3	49.9	51.5	12.9	71.6	15.6	43.43
Dignity and respect score	13.6	2.4	75.7	15.7	3.3	86.9	2.02	14.81
Communication and autonomy score	8.3	3.2	30.8	15.6	6.5	57.7	7.26	87.26
Supportive Care score	14	3.5	51.7	20.3	5.1	75.1	6.32	45.26

Notes: The maximum score depends on the number of items in the scale or sub-scale and is equal to 3\* number of items (as each item is on a scale of 0 to 3).

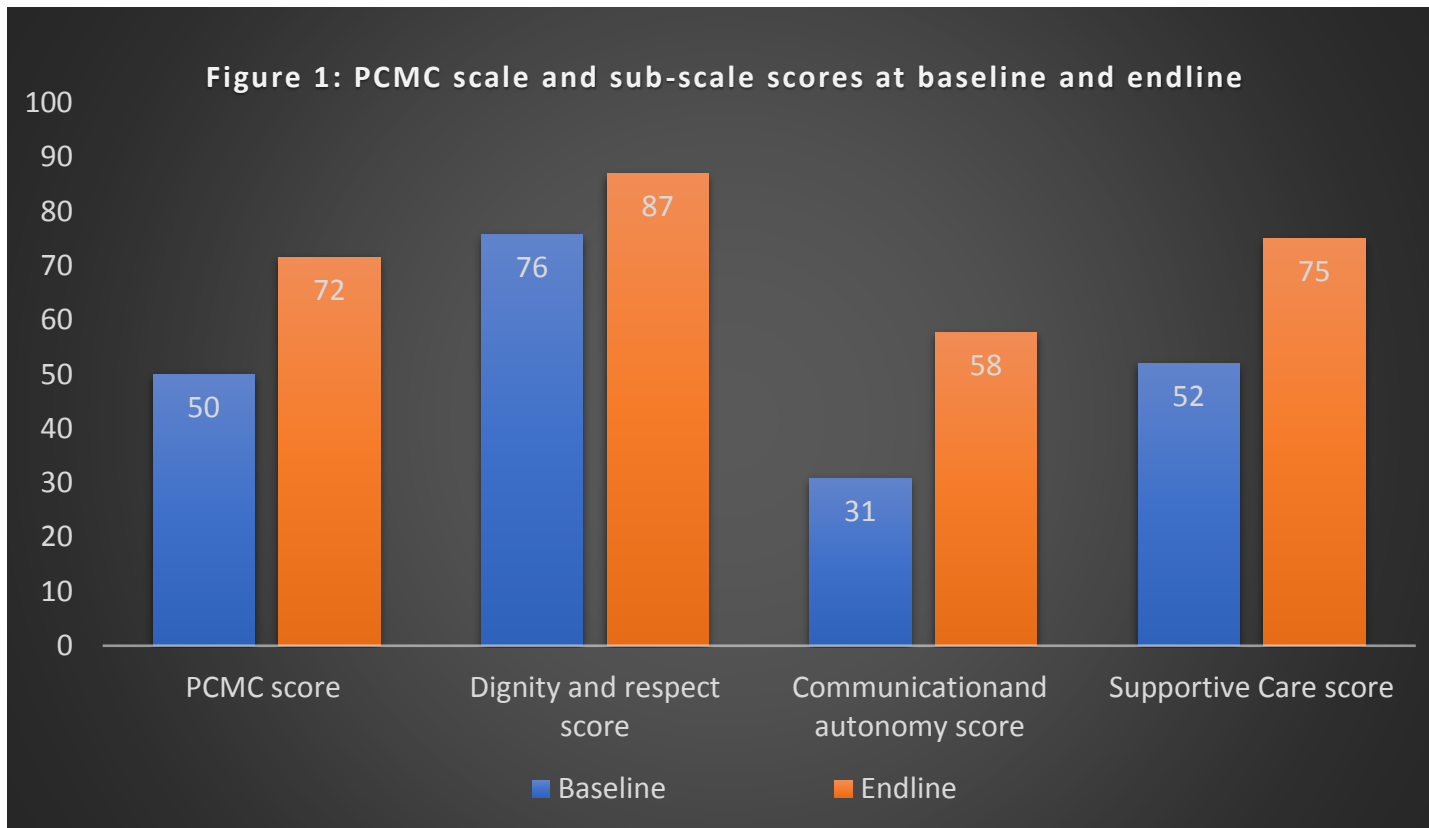
The Full PCMC scale therefore has range of scores from 0 to 72 for the 24-item scale.

Dignity and respect sub-scale has a range of scores from 0 to 18.

Communication and autonomy sub-scale has a range of scores from 0 to 27.

Supportive care sub-scale has a range of 0 to 27

The rescaled score is the mean divided by maximum possible score times 100, so ranges from 0 to 100 for all



Notes: These are the rescaled scores, so the range for each is from 0 to 100. The differences are statistically significant ( $p < 0.001$ )

**Table 4: Multivariate regression of PCMC and subscale scores on Timing of interviews, controlling for potential confounders (N=499)**

	<i>PCMC score</i>		<i>Dignity and respect score</i>		<i>Communication and autonomy score</i>		<i>Supportive Care score</i>	
	<i>Coef.</i>	<i>95% CI</i>	<i>Coef.</i>	<i>95% CI</i>	<i>Coef.</i>	<i>95% CI</i>		
<b>Endline (ref=Baseline)</b>	17.6***	[15.6 19.6]	2.42***	[1.83 3.01]	7.76***	[6.76 8.76]	7.43***	[6.59 8.28]
Constant	24.2***	[13.6 34.8]	9.82***	[6.65 13.0]	6.94*	[1.57 12.3]	7.44**	[2.92 12.0]

Notes: \* p<0.05 \*\* p<0.01 \*\*\* p<0.001

Model controls for facility, age, parity, marital status, literacy, household wealth, occupation, partner's education and occupation, insurance status, complications, prior facility delivery, timing and frequency of antenatal care, position and sex of delivery provider, religion, tribe, and timing of interviews



### Appendix 1: Sample Distribution

	<i>Baseline</i>		<i>Endline</i>		<i>Diff p-value</i>
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	
<b>Intervention facility</b>					0.00
Referral Hospital	37	17.2	100	31.4	
Health center 1	51	23.7	54	17	
Health center 2	39	18.1	66	20.8	
Health center 3	56	26	60	18.9	
Health center 4	32	14.9	38	11.9	
Total	215	100	318	100	
Age					0.00
15 to 19 years	11	5.1	48	15.1	
20 to 29 years	102	47.7	156	49.1	
30 to 48 years	101	47.2	114	35.8	
Total	214	100	318	100	
Current marital status					0.37
Single	4	1.9	6	1.9	
Partnered/Cohabiting	9	4.2	22	6.9	
Married	202	94	288	90.6	
Widowed	0	0	2	0.6	
Total	215	100	318	100	
Parity					0.04
1	40	18.9	97	30.8	
2	48	22.6	60	19	
3	38	17.9	54	17.1	
4	29	13.7	37	11.7	
5 to 9	57	26.9	67	21.3	
Total	212	100	315	100	
Highest education					0.05
No school/Primary	157	73	205	64.5	
Post-primary/vocational/Secondary	55	25.6	100	31.4	
College or above	3	1.4	13	4.1	
Total	215	100	318	100	
Literacy: writing					0.00
No, cannot write	156	72.6	203	63.8	
Yes, but with some difficulty	52	24.2	63	19.8	
Yes, Very well	7	3.3	52	16.4	
Total	215	100	318	100	
Literacy: reading					0.00
No, cannot read	160	74.4	201	63.2	
Yes, but with some difficulty	47	21.9	67	21.1	
Yes, Very well	8	3.7	50	15.7	
Total	215	100	318	100	
Employed					0.01
No	191	89.3	304	95.6	
Yes	23	10.7	14	4.4	
Total	214	100	318	100	
Self or household member work in health facility					0.00
No	196	91.6	262	82.4	
Yes	18	8.4	56	17.6	
Total	214	100	318	100	
Household wealth quintile					0.00
Poorest	62	30.2	73	23.1	
Poorer	57	27.8	106	33.5	
Middle	80	39	103	32.6	
Richer	5	2.4	26	8.2	

Richest	1	0.5	8	2.5	
Total	205	100	316	100	
Current occupation					0.00
Agricultural labor	99	46.3	58	18.2	
Casual labor	4	1.9	13	4.1	
Salaried worker	4	1.9	12	3.8	
Self-employed in petty trade	44	20.6	56	17.6	
Self-employed small-scale industry	13	6.1	24	7.5	
Homemaker	49	22.9	153	48.1	
Other	1	0.5	2	0.6	
Total	214	100	318	100	
Partners occupation					0.00
Agricultural labor	141	65.9	133	42.1	
Casual labor	4	1.9	15	4.7	
Salaried worker	20	9.3	34	10.8	
Self-employed in petty trade	8	3.7	24	7.6	
Self-employed small-scale industry	26	12.1	76	24.1	
Unemployed	7	3.3	15	4.7	
Other	4	1.9	11	3.5	
No Partner	4	1.9	8	2.5	
Total	214	100	316	100	
Partner's education					0.01
No school/Primary	156	73.2	184	58.8	
Post-primary/vocational/Secondary	34	16	79	25.2	
College or above	18	8.5	39	12.5	
No Partner	5	2.3	11	3.5	
Total	213	100	313	100	
Has health insurance					0.49
No	6	2.8	6	1.9	
Yes	209	97.2	312	98.1	
Total	215	100	318	100	
Delivery Provider type					0.00
Nurse/Midwife	184	85.6	245	77	
Doctor	12	5.6	10	3.1	
Medical Officer	6	2.8	19	6	
Non-skilled attendant	10	4.7	1	0.3	
1plus skilled providers	3	1.4	43	13.5	
Total	215	100	318	100	
Delivery provider sex					0.15
Male	11	5.1	31	9.7	
Female	201	93.9	285	89.6	
Both	2	0.9	2	0.6	
Total	214	100	318	100	
Postpartum length					0.00
less than 5weeks	154	71.6	177	55.7	
5 weeks or more	61	28.4	141	44.3	
Total	215	100	318	100	
Had any complications					0.03
No	108	50.2	130	40.9	
Yes	107	49.8	188	59.1	
Total	215	100	318	100	
Prior facility delivery					0.05
No	59	27.4	113	35.5	
Yes	156	72.6	205	64.5	
Total	215	100	318	100	
Timing of first antenatal visit					

First trimester	164	76.6	220	69.2	0.24
Second trimester	44	20.6	90	28.3	
Third Trimester	4	1.9	6	1.9	
No ANC	2	0.9	2	0.6	
Total	214	100	318	100	
Number of antenatal visits					0.36
No ANC	2	0.9	2	0.6	
Less than 4	15	7	27	8.5	
4 or 5	64	30	74	23.4	
6 plus	132	62	213	67.4	
Total	213	100	316	100	
Ethnicity					0.09
Mampruli	102	47.4	175	55	
Other	113	52.6	143	45	
Total	215	100	318	100	
Religious affiliation					0.01
Muslim	161	75.9	261	82.6	
Christian	51	24.1	46	14.6	
Other religion	0	0	8	2.5	
No religion	0	0	1	0.3	
Total	212	100	316	100	

Notes: P-value indicates significance of difference between baseline and endline. Totals less than 215 for baseline and 318 for endline indicates number missing on total analytic sample

**Appendix 2: Distribution of PCMC Items**

	<i>Baseline</i>		<i>Endline</i>		p-value
	No.	%	No.	%	
<b><i>Dignity and Respect</i></b>					
Did the doctors, nurses, or other staff at the facility treat you with respect?					0.000
0 No, never	13	6	12	3.8	
1 Yes, a few times	72	33.5	26	8.2	
2 Yes, most of the time	105	48.8	77	24.2	
3 Yes, all the time	25	11.6	203	63.8	
Did the doctors, nurses, and other staff at the facility treat you in a friendly manner					0.000
0 No, never	10	4.7	13	4.1	
1 Yes, a few times	75	34.9	27	8.5	
2 Yes, most of the time	112	52.1	71	22.3	
3 Yes, all the time	18	8.4	207	65.1	
During examinations in the labor room, were you covered up with a cloth or blanket or screened with a curtain so that you did not feel exposed?					0.003
0 No, never	7	3.3	8	2.5	
1 Yes, a few times	15	7	14	4.4	
2 Yes, most of the time	63	29.3	56	17.6	
3 Yes, all the time	130	60.5	240	75.5	
Do you feel like your health information was or will be kept confidential at this facility?					0.000
0 No, never	10	4.7	3	0.9	
1 Yes, a few times	50	23.3	11	3.5	
2 Yes, most of the time	66	30.7	61	19.2	
3 Yes, all the time	89	41.4	243	76.4	
Did you feel the doctors, nurses, or other health providers shouted at you, scolded, insulted, threatened, or talked to you rudely?					0.001
0 Yes, many times	4	1.9	27	8.5	
1 Yes, a few times	6	2.8	23	7.2	
2 Yes, once	15	7	23	7.2	
3 No, never	190	88.4	245	77	
Did you feel like you were treated roughly like pushed, beaten, slapped, pinched, physically restrained, or gagged?					0.005
0 Yes, many times	0	0	8	2.5	
1 Yes, a few times	2	0.9	16	5	
2 Yes, once	6	2.8	12	3.8	
3 No, never	207	96.3	282	88.7	
<b><i>Communication and Autonomy</i></b>					
During your time in the health facility did the doctors, nurses, or other health care providers introduce themselves to you when they first came to see you?					0.000
0 No, none of them	188	87.4	191	60.1	
1 Yes, a few of them	9	4.2	60	18.9	
2 Yes, most of them	17	7.9	40	12.6	
3 Yes, all of them	1	0.5	27	8.5	
Did the doctors, nurses, or other health care providers call you by your name?					0.000
0 No, never	92	42.8	63	19.8	
1 Yes, a few times	32	14.9	88	27.7	
2 Yes, most of the time	19	8.8	68	21.4	

3 Yes, all the time	72	33.5	99	31.1	
Did the doctors and nurses explain to you why they were doing examinations or procedures on you?					0.000
0 No, never	128	59.5	78	24.5	
1 Yes, a few times	42	19.5	50	15.7	
2 Yes, most of the time	36	16.7	79	24.8	
3 Yes, all the time	9	4.2	111	34.9	
Did the doctors and nurses explain to you why they were giving you any medicine?					0.000
0 No, never	124	57.7	71	22.3	
1 Yes, a few times	52	24.2	54	17	
2 Yes, most of the time	32	14.9	55	17.3	
3 Yes, all the time	7	3.3	138	43.4	
Did you feel you could ask the doctors, nurses or other staff at the facility any questions you had?					0.000
0 No, never	113	52.6	75	23.6	
1 Yes, a few times	49	22.8	83	26.1	
2 Yes, most of the time	48	22.3	74	23.3	
3 Yes, all the time	5	2.3	86	27	
Did the doctors, nurses or other staff at the facility speak to you in a language you could understand?					0.000
0 No, never	12	5.6	4	1.3	
1 Yes, a few times	28	13	19	6	
2 Yes, most of the time	84	39.1	59	18.6	
3 Yes, all the time	91	42.3	236	74.2	
Did the doctors, nurses or other staff at the facility ask your permission/consent before doing procedures on you?					0.000
0 No, never	93	43.3	33	10.4	
1 Yes, a few times	56	26	33	10.4	
2 Yes, most of the time	47	21.9	61	19.2	
3 Yes, all the time	19	8.8	191	60.1	
Did you feel like the doctors, nurses or other staff at the facility involved you in decisions about your care?					0.000
0 No, never	89	41.4	50	15.7	
1 Yes, a few times	72	33.5	80	25.2	
2 Yes, most of the time	35	16.3	81	25.5	
3 Yes, all the time	19	8.8	107	33.6	
During the delivery, do you feel like you were able to be in the position of your choice?					0.000
0 No, never	127	59.1	96	30.2	
1 Yes, for a short time	38	17.7	57	17.9	
2 Yes, most of the time	44	20.5	83	26.1	
3 Yes, all the time	6	2.8	82	25.8	
<b><i>Supportive Care</i></b>					
Did the doctors and nurses at the facility talk to you about how you were feeling?					0.000
0 No, never	79	36.7	54	17	
1 Yes, a few times	96	44.7	70	22	
2 Yes, most of the time	39	18.1	91	28.6	
3 Yes, all the time	1	0.5	103	32.4	
Did the doctors, nurses or other staff at the facility try to understand your anxieties?					0.000
0 No, never	79	36.7	40	12.6	
1 Yes, a few times	91	42.3	71	22.3	
2 Yes, most of the time	31	14.4	61	19.2	
3 Yes, all the time	14	6.5	146	45.9	

Do you feel the doctors or nurses did everything they could to help control your pain?					0.000
0 No, never	44	20.5	47	14.8	
1 Yes, a few times	73	34	61	19.2	
2 Yes, most of the time	75	34.9	65	20.4	
3 Yes, all the time	23	10.7	145	45.6	
When you needed help, did you feel the doctors, nurses or other staff at the facility paid attention?					0.000
0 No, never	35	16.3	23	7.2	
1 Yes, a few times	74	34.4	48	15.1	
2 Yes, most of the time	85	39.5	68	21.4	
3 Yes, all the time	21	9.8	179	56.3	
Did you feel the doctors, nurses or other staff at the facility took the best care of you?					0.000
0 No, never	5	2.3	11	3.5	
1 Yes, a few times	46	21.4	20	6.3	
2 Yes, most of the time	127	59.1	92	28.9	
3 Yes, all the time	37	17.2	195	61.3	
Were you allowed to have someone you wanted (outside of staff at the facility, such as family or friends) to stay with you during labor?					0.000
0 No, never	68	31.6	32	10.1	
1 Yes, a few times	42	19.5	74	23.3	
2 Yes, most of the time	36	16.7	63	19.8	
3 Yes, all the time	69	32.1	149	46.9	
Did you feel you could completely trust the doctors, nurses or other staff at the facility with regards to your care?					0.000
0 No, never	9	4.2	5	1.6	
1 Yes, a few times	47	21.9	24	7.5	
2 Yes, most of the time	112	52.1	82	25.8	
3 Yes, all the time	47	21.9	207	65.1	
Thinking about the wards, washrooms and the general environment of the health facility, will you say the facility was very clean, clean, dirty, or very dirty?					0.000
0 Very dirty	0	0	2	0.6	
1 Dirty	9	4.2	7	2.2	
2 Clean	180	83.7	95	29.9	
3 Very clean	26	12.1	214	67.3	
In general, did you feel safe in the health facility?					0.000
0 No, never	14	6.5	4	1.3	
1 Yes, a few times	35	16.3	8	2.5	
2 Yes, most of the time	92	42.8	97	30.5	
3 Yes, all the time	74	34.4	209	65.7	
<b><i>Items in 30-item PCMC scale excluded from 24-item scale</i></b>					
How did you feel about the amount of time you waited? Would you say it was					0.004
0 Very long	6	2.8	34	10.7	
1 Somewhat long	30	14	30	9.4	
2 Somewhat short	84	39.1	112	35.2	
3 Very short	95	44.2	142	44.7	
Were you allowed to have someone you wanted to stay with you during delivery?					0.000
0 No, never	150	69.8	231	72.6	
1 Yes, a few times	19	8.8	53	16.7	
2 Yes, most of the time	38	17.7	13	4.1	
3 Yes, all the time	8	3.7	21	6.6	

Thinking about the labor and postnatal wards, did you feel the health facility was crowded?					0.000
0 Yes, all the time	10	4.7	89	28	
1 Yes, most of the time	52	24.2	32	10.1	
2 Yes, a few times	105	48.8	125	39.3	
3 No, never	48	22.3	72	22.6	
Was there water in the facility?					0.000
0 No, never	3	1.4	4	1.3	
1 Yes, a few times	51	23.7	24	7.5	
2 Yes, most of the time	101	47	51	16	
3 Yes, all the time	60	27.9	239	75.2	
Was there electricity in the facility?					0.000
0 No, never	0	0	1	0.3	
1 Yes, a few times	25	11.6	3	0.9	
2 Yes, most of the time	60	27.9	46	14.5	
3 Yes, all the time	130	60.5	268	84.3	
Do you think there was enough health staff in the facility to care for you?					0.000
0 No, never	19	8.8	4	1.3	
1 Yes, a few times	114	53	23	7.2	
2 Yes, most of the time	71	33	75	23.6	
3 Yes, all the time	11	5.1	216	67.9	
Total	215	100	318	100	

**Appendix 3: Multivariate regression of PCMC and subscale scores on Timing of interviews, controlling for potential confounders**

	<i>PCMC score</i>			<i>Dignity and respect score</i>			<i>Communication and autonomy score</i>			<i>Supportive Care score</i>		
	<i>Coef.</i>	<i>95% CI</i>		<i>Coef.</i>	<i>95% CI</i>		<i>Coef.</i>	<i>95% CI</i>			<i>95% CI</i>	
<b>Endline (ref=Baseline)</b>	17.6***	[15.6	19.6]	2.42***	[1.83	3.01]	7.76***	[6.76	8.76]	7.43***	[6.59	8.28]
<b>Intervention facility</b>												
Referral Hospital	0	[0	0]	0	[0	0]	0	[0	0]	0	[0	0]
Health center 1	1.77	[-1.07	4.62]	0.063	[-0.79	0.92]	1.12	[-0.33	2.57]	0.59	[-0.63	1.81]
Health center 2	11.2***	[8.42	14.0]	1.95***	[1.11	2.79]	4.90***	[3.48	6.32]	4.35***	[3.16	5.55]
Health center 3	6.69***	[3.93	9.44]	0.67	[-0.16	1.49]	2.33**	[0.93	3.74]	3.69***	[2.51	4.87]
Health center 4	6.07***	[2.76	9.38]	2.00***	[1.00	2.99]	-0.1	[-1.78	1.58]	4.17***	[2.76	5.59]
Age in years	0.16	[-	0.32]	0.036	[-	0.085]	0.061	[-0.022	0.14]	0.064	[-	0.13]
		0.0032			0.013					0.0063		
Currently married	-0.6	[-4.73	3.54]	-0.95	[-2.20	0.29]	0.22	[-1.88	2.32]	0.14	[-1.63	1.91]
Parity	-0.21*	[-0.39	-	-0.0012	[-	0.052]	-0.14**	[-0.23	-	-0.075	[-0.15	0.00081]
		0.037]			0.054			0.047]				
Literate	3.80*	[0.62	6.99]	-0.21	[-1.17	0.75]	2.71**	[1.08	4.33]	1.3	[-0.061	2.67]
Household wealth quintile												
Poorest	0	[0	0]	0	[0	0]	0	[0	0]	0	[0	0]
Poorer	0.84	[-1.44	3.12]	0.33	[-0.36	1.01]	0.31	[-0.85	1.47]	0.2	[-0.78	1.18]
Middle or higher	2.48*	[0.14	4.82]	0.51	[-0.19	1.22]	1.19	[-	2.38]	0.78	[-0.22	1.78]
							0.0043					
Current occupation												
Agricultural labor	0	[0	0]	0	[0	0]	0	[0	0]	0	[0	0]
Casual labor	-0.33	[-5.40	4.74]	-0.3	[-1.83	1.22]	-0.045	[-2.63	2.54]	0.016	[-2.16	2.19]
Salaried worker	-1.81	[-7.56	3.94]	0.97	[-0.75	2.70]	-1.18	[-4.11	1.74]	-1.6	[-4.06	0.86]
Self-employed in petty trade	-2.69*	[-5.24	-0.13]	-0.0027	[-0.77	0.77]	-1.96**	[-3.26	-0.65]	-0.73	[-1.82	0.36]
Self-employed in small scale industry	-0.13	[-3.91	3.64]	0.63	[-0.51	1.76]	0.13	[-1.80	2.05]	-0.89	[-2.50	0.73]
Unemployed/homemaker	-	[-7.03	-2.05]	-0.41	[-1.16	0.34]	-	[-3.65	-1.12]	-1.74**	[-2.81	-0.68]
	4.54***						2.39***					
Other	6.66	[-7.47	20.8]	-0.72	[-4.96	3.53]	2.47	[-4.72	9.66]	4.91	[-1.14	11.0]
Partner's education												
No school/Primary	0	[0	0]	0	[0	0]	0	[0	0]	0	[0	0]
Vocational/Secondary	1.65	[-0.70	4.00]	0.51	[-0.19	1.22]	0.46	[-0.73	1.66]	0.67	[-0.33	1.68]
College or above	-5.50*	[-10.4	-0.56]	-1.16	[-2.65	0.32]	-2.1	[-4.61	0.42]	-2.24*	[-4.35	-0.12]
No Partner	0.89	[-9.60	11.4]	0.023	[-3.13	3.18]	-0.36	[-5.70	4.98]	1.23	[-3.27	5.73]
Partners occupation												
Agricultural labor	0	[0	0]	0	[0	0]	0	[0	0]	0	[0	0]
Casual labor	-3.64	[-8.29	1.01]	-1.73*	[-3.12	-0.33]	-0.85	[-3.22	1.51]	-1.06	[-3.05	0.93]



Salaried worker	4.9	[-0.16	9.95]	0.8	[-0.72	2.32]	1.69	[-0.88	4.26]	2.41*	[0.24	4.57]
Self-employed in petty trade	-2.03	[-5.66	1.59]	-0.45	[-1.54	0.64]	-0.23	[-2.08	1.61]	-1.35	[-2.91	0.20]
Self-employed in small scale industry	-0.49	[-2.93	1.96]	-0.14	[-0.88	0.59]	-0.23	[-1.48	1.01]	-0.11	[-1.15	0.94]
Unemployed/homemaker	1.91	[-2.77	6.59]	1.24	[-0.17	2.65]	-0.018	[-2.40	2.36]	0.69	[-1.31	2.70]
Other	-0.74	[-6.21	4.72]	-0.13	[-1.77	1.52]	0.27	[-2.51	3.05]	-0.89	[-3.23	1.46]
No Partner	-3.38	[-14.7	7.94]	-1.72	[-5.12	1.69]	-0.55	[-6.31	5.22]	-1.12	[-5.97	3.73]
Delivery Provider type												
Nurse/Midwife	0	[0	0]	0	[0	0]	0	[0	0]	0	[0	0]
Doctor/Medical Officer	-0.68	[-4.00	2.64]	-0.023	[-1.02	0.97]	-1.07	[-2.76	0.62]	0.41	[-1.02	1.83]
Non-skilled attendant	-1.09	[-6.89	4.72]	-0.48	[-2.22	1.26]	-1.35	[-4.30	1.60]	0.75	[-1.74	3.23]
Iplus skilled providers	-5.65**	[-9.05	-2.25]	-1.65**	[-2.67	-0.63]	-2.46**	[-4.20	-0.73]	-1.54*	[-3.00	-0.083]
Delivery Provider sex												
Male	0	[0	0]	0	[0	0]	0	[0	0]	0	[0	0]
Female	-1.66	[-5.25	1.93]	0.57	[-0.51	1.65]	-2.01*	[-3.84	-0.18]	-0.22	[-1.76	1.31]
Both	5.27	[-4.53	15.1]	1.34	[-1.61	4.29]	0.94	[-4.06	5.93]	3	[-1.20	7.20]
Has health insurance	3.5	[-2.76	9.76]	2.12*	[0.24	4.00]	0.57	[-2.61	3.76]	0.81	[-1.87	3.49]
Had a complication	1.56	[-0.19	3.31]	0.37	[-0.16	0.89]	0.38	[-0.51	1.27]	0.81*	[0.063	1.56]
Prior facility delivery	0.84	[-1.42	3.10]	0.36	[-0.31	1.04]	0.044	[-1.11	1.19]	0.43	[-0.54	1.40]
Self or family work in health facility	-1.65	[-4.31	1.01]	-0.73	[-1.53	0.074]	0.46	[-0.90	1.81]	-1.38*	[-2.52	-0.24]
Timing of first antenatal visit												
First trimester	0	[0	0]	0	[0	0]	0	[0	0]	0	[0	0]
Second trimester	1.58	[-0.40	3.56]	0.17	[-0.42	0.77]	0.78	[-0.23	1.78]	0.63	[-0.22	1.48]
Third Trimester/No ANC	-2.48	[-8.97	4.02]	0.4	[-1.56	2.35]	-2.64	[-5.95	0.66]	-0.23	[-3.01	2.55]
Four plus ANC visits	0.84	[-2.47	4.15]	-0.36	[-1.35	0.64]	0.35	[-1.34	2.03]	0.85	[-0.57	2.27]
Ethnicity												
Mampruli	0	[0	0]	0	[0	0]	0	[0	0]	0	[0	0]
Other	-1.64	[-3.60	0.31]	-0.072	[-0.66	0.52]	-1.62**	[-2.61	-0.63]	0.05	[-0.79	0.89]
Religious affiliation												
Muslim	0	[0	0]	0	[0	0]	0	[0	0]	0	[0	0]
Christian	-0.48	[-2.97	2.01]	-0.0069	[-0.76	0.74]	-0.44	[-1.71	0.83]	-0.03	[-1.10	1.04]
Other	5.94	[-0.068	11.9]	1.45	[-0.36	3.26]	3.26*	[0.20	6.32]	1.23	[-1.34	3.81]
Postpartum length	0.019	[-0.33	0.37]	-0.019	[-0.12	0.087]	0.012	[-0.17	0.19]	0.026	[-0.12	0.18]
Constant	24.2***	[13.6	34.8]	9.82***	[6.65	13.0]	6.94*	[1.57	12.3]	7.44**	[2.92	12.0]
R-squared	0.57			0.31			0.54			0.55		
N	499			499			499			499		

Notes: 95% confidence intervals in brackets \* p<0.05 \*\* p<0.01 \*\*\* p<0.001

