

# Increasing institutional deliveries among antenatal clients: effect of birth preparedness counselling

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The World Health Organization recommends birth and emergency preparedness (BEP) as essential components of the Focused Antenatal Care model. The purpose of providing BEP messages to women during their antenatal visits is to increase the use of skilled attendance at childbirth. However, the effectiveness of this component has not yet been clearly established in routine contexts. This retrospective cohort study examined the association between exposing women to BEP messages during antenatal visits and the use of the skilled attendance at childbirth in two rural districts of Burkina Faso (Koupela and Dori). The study included 456 antenatal care users in 30 rural health centres in these two districts. Data were collected using modified questionnaires from the Johns Hopkins Program for International Education in Gynecology and Obstetrics and from demographic and health surveys. Logistic regression was performed with a model of generalized estimating equation to adjust for clustered effects. In the Koupela district, where the rate of institutional deliveries (80%) was relatively high, the use of BEP messages was not associated with an increase in institutional deliveries. In contrast, in the district of Dori, where the rate of institutional deliveries (47%) was lower, messages regarding danger signs [Adjusted Odds Ratio (AOR)=1.93; 95% Confidence Interval (CI): 1.07, 3.49] and cost of care (AOR=2.13; 95% CI: 1.09, 4.22) were associated with an increased probability of institutional births. Based on these results, it appears that birth and emergency preparedness messages provided during antenatal visits may increase the use of skilled attendance (increase the rate of institutional births) in areas where institutional births are low. Therefore, it is important to adapt the content of the messages to meet the particular needs of the users in each locality. Furthermore, BEP counselling should be implemented in health facilities.

**Keywords** Birth and emergency preparedness, skilled birth attendance, antenatal care, maternal health, Burkina Faso

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## KEY MESSAGES

- Birth and emergency preparedness messages provided to women during routine prenatal visits can contribute to increase the use of the skilled attendance at childbirth, in areas where this use is low.
- It is important to adapt the content of the birth and emergency preparedness messages to the needs of the users of each locality.

## Introduction

Maternal mortality continues to be a serious problem in Burkina Faso, as well as in several other sub-Saharan African countries. Based on the most recent estimates (WHO 2010a), in 2008, the number of maternal deaths per 100,000 live births was 560 (range 330–950). Compared with the 1990 level, the maternal mortality ratio has declined by only 1.8% per year. Thus, the country has been classified as having made ‘insufficient progress’ (WHO 2010a). The problem persists primarily due to insufficient skilled maternal care (Bullough *et al.* 2005; Hounton *et al.* 2009). In fact, skilled attendance at birth is recognized as the most important strategy for significantly reducing maternal mortality (Campbell *et al.* 2006; WHO 2005). In Burkina Faso, nearly half (46%) of all deliveries take place outside of health facilities, with no assistance from qualified health professionals (Howe *et al.* 2009). There are several factors underlying this phenomenon. Gabrysch and Campbell (2009) proposed a conceptual framework grouping the determinants of facility-based delivery into four categories—sociocultural factors, economic accessibility, physical accessibility and perceived need for skilled care.

Promoting skilled birth attendance is a priority axis of Burkina Faso’s national strategic plan to reduce maternal and neonatal mortality (Ministère de la santé du Burkina Faso 2006). This plan defines several interventions aimed to increase the use of skilled birth attendance at deliveries. In addition to increasing the supply of services and subsidies for obstetric care, the plan emphasizes educational interventions that can help reduce barriers to service utilization. Thus, the Focused Antenatal Care model was introduced as part of the routine package of maternal services. This new model, recommended by the World Health Organization (WHO), focuses on prenatal education, with the development of a Birth and Emergency Preparedness (BEP) plan as an essential component (WHO 2006). During routine prenatal visits, health personnel should discuss the use of skilled attendance for normal delivery and how to access emergency services if there are obstetric complications (WHO 2010b). The content of the BEP messages varies depending on the context and the woman’s personal situation. However, at a minimum, every woman should be informed about the signs of obstetric complications and how to respond to these signs, and should be advised to use skilled birth attendance at delivery (Stanton 2004). The use of BEPs as part of an effectively implemented plan of prenatal education has been strongly supported by the WHO, which has called upon health systems to achieve the ‘potential of prenatal care’ (WHO 2005). This educational component of prenatal care is expected to help significantly increase the demand for skilled birth attendance, especially where the use of prenatal services is relatively high. Indeed, since 2003, the proportion of pregnant women in Burkina Faso who had at least one prenatal visit reached 73% (INSD and ORC MACRO 2004). In the early 2000s, Burkina Faso, like many sub-Saharan African countries, introduced BEP counselling as part of the routine prenatal care standards (Chege *et al.* 2005; Nyarko *et al.* 2006). However, the effectiveness of BEP counselling as a component of routine prenatal care has not yet been clearly established. A randomized study in Nepal indicated that health education sessions in prenatal clinics,

including BEP counselling provided to pregnant women either alone or with their spouses, produced no change in the frequency of facility-based deliveries (Mullany *et al.* 2007). In Zimbabwe, Majoki *et al.* (Majoko *et al.* 2007) compared the new model of prenatal care, which involved fewer visits but added counselling to birth planning, to the standard model that did not include BEP education. The new model produced an increase in the rate of facility-based deliveries, but the association was not statistically significant [Odds Ratio (OR) = 1.70; CI 95%: 0.88, 3.10]. The positive and significant results found in the literature come from the evaluation of complex community-based interventions that included BEP education as a component. In India, a randomized study by Darmstadt *et al.* (2010) reported a modest but significant ( $P < 0.05$ ) difference between the intervention group (20.2%) and the control group (16.5%) in frequency of facility-based delivery following the implementation of a community-based package of services involving home-based BEP counselling. In Burkina Faso, a community mobilization and behaviour change communication programme that included BEP messages disseminated to women and their families showed a dramatic increase in the frequency of facility-based deliveries in the intervention area (Hounton *et al.* 2009). In addition, Moran *et al.* (2006) analysed the evaluation data from the Maternal and Neonatal Health pilot programme in the district of Koupela (Burkina Faso) and found that women who had saved money to pay for services were more likely to deliver in a health facility. In Nepal, pregnant women’s completion of at least one BEP procedure increased the likelihood of facility-based delivery by 45% (OR = 1.45; CI 95%: 1.30, 1.63 (Rosecrans *et al.* 2008). It should be noted that these last two studies did not test the effect of exposure to the intervention (BEP counselling), but rather the effect of carrying out one of the BEP procedures (saving money, identifying an emergency care facility, planning a means of transportation, etc.). In short, evaluations of some BEP pilot projects suggest positive effects on the use of skilled birth attendance. However, there have been few studies on the effectiveness of BEP programmes implemented as part of routine systems where there is little control over the behaviour of the implementation workers and of the beneficiaries (Victora *et al.* 2004). More specifically, it is important to know the effect of BEP counselling as a part of routine prenatal services because significant improvement in maternal and neonatal health can only be achieved through large-scale interventions in contexts that are not controlled (Darmstadt *et al.* 2005; Haws *et al.* 2007).

Therefore, the objective of this study was to examine whether BEP counselling provided to women in rural Burkina Faso during routine prenatal visits increased the probability of delivering in a health facility. This observational study estimated the effect of women’s exposure to BEP messages while controlling for known determinants of the use of skilled birth attendance. Given that BEP counselling includes a variety of messages transmitted to the women (i.e. information on danger signs, promotion of facility-based delivery, information on the cost of care, advice about transportation), the study looked at the independent effect of receiving each type of message on the decision to deliver in a health facility.

## Data and methods

### Study site

This study was carried out in two districts of Burkina Faso, Koupela and Dori, in the Centre-East and Sahel regions, respectively. Since 2001, these two districts have been United Nations Population Fund (UNFPA) intervention sites for reproductive health. Between 2001–5 and 2006–10, the UNFPA, through its co-operative programmes, invested in strengthening health care by constructing health centres, equipping maternity units and providing continuing education to health professionals in these districts (UNFPA 2006, 2009).

In 2008, the Dori district had approximately 283 600 inhabitants who were primarily of Peulh ethnicity, one regional hospital, and 28 health centres (CSPS). In this district, there was 1 nurse and midwife each for every 4541 people, and 1 mobile health officer and matron each for every 5502 people. The Koupela district had a population of 185 800 inhabitants who were mainly from the Mossi ethnic group, one district hospital, and 20 health centres (Ministère de la santé 2009). In this district, there was 1 nurse and midwife each for every 4422 people, and 1 mobile health officer and matron each for every 2925 people. The CSPSs provide primary health-care services, including prenatal care and assistance for normal deliveries. CSPS personnel consist mainly of nurses and assistant midwives. Very few CSPSs have state-certified midwives and none has a physician. The hospitals (regional and district) are referral facilities for the CSPSs. They have physicians and state-certified midwives and provide complete obstetric and neonatal emergency services, including caesareans and blood transfusions.

### Study design and participant selection

This was a retrospective cohort study. The data were obtained from surveys of women registered on prenatal lists in rural settings. We conducted two-level sampling: we selected CSPSs by drawing lots and then selected women who were users of these centres.

#### Selection of health centres

Across the two districts of the study, we selected 30 CSPSs located in rural settings. Hospitals and urban CSPSs were excluded from the study. The sample of 30 CSPSs was stratified by district, with allocations proportional to the total number of rural CSPSs in each district. Thus, the numbers of selected rural CSPSs were 18 in Dori (out of 27 rural CSPSs) and 12 in Koupela (out of 19 rural CSPSs). In each district, the subsample was randomly drawn.

#### Selection of women

The minimum number of women to be surveyed was estimated based on a multiple logistic regression analysis model. PASS software (Hintze 2007) was used to calculate the size of the sample. We found that a minimum sample of 416 participants was needed to detect an OR=2 for the strength of association between exposure to BEP counselling and facility-based delivery, with 80% power and 5% significance level. The rate of exposure to the intervention was considered to be 50%, and the correlation between the exposure variable and the control variable was considered to be moderate at 0.3. To take into

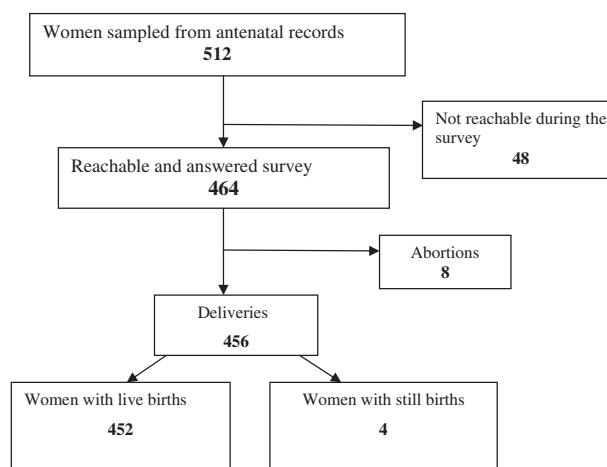


Figure 1 Flow of study participants

account the high risk of non-response, the sample size was increased by 20% (i.e.  $n=512$ ).

A sample of women was drawn from those using prenatal care at the 30 CSPSs from April 2008 to March 2009. To minimize respondent bias, we used the standard instrument of the Johns Hopkins Program for International Education in Gynecology and Obstetrics and we met the expected selection criteria. Indeed, it has been recommended to select women who gave birth in the last 12 months when measuring birth preparedness (JHPIEGO 2004b; Stanton 2004). Prenatal clients with expected delivery during the months of January, February or March 2009 met selection criteria. The surveys were conducted in May and June 2009. In each CSPS, the prenatal registers were examined to obtain a list of women whose expected due dates fell within the target period.

Across the 30 CSPSs, 2465 women were eligible for the study. The number of women eligible in each CSPS ranged from 48 to 159. A random sample of 512 women was drawn, allocating subsamples to each CSPS in proportion to its total number of eligible women. Thus, the number of women selected per CSPS ranged from 12 to 37. These women were traced for interviews at their homes. Only 48 women (9.4% of the 512 selected women) could not be traced (Figure 1).

### Data collection

The data were collected through structured interviews with the women. We extracted the interview questions from the standard instrument of JHPIEGO (2004b), which had previously been used to evaluate Burkina Faso's Maternal and Neonatal Health pilot programme (Moran *et al.* 2006). The extracted questions dealt with the place of delivery, exposure to the BEP messages at prenatal visits and variables related to perceived need. We added questions drawn from the standard questionnaire of the Demographic and Health Surveys (Institut National de la Statistique et de la Démographie & ORC MACRO 2004) to measure sociocultural variables and variables related to economic and physical accessibility.

A pilot survey was pre-tested at five CSPSs not selected for the study to validate the questionnaire.

Six health professionals (midwives and nurses) who had experience with similar surveys and did not work in the

selected CSPSs collected the data. These surveyors received 2 days of training and participated in pre-testing of the instruments. Each surveyor was responsible for five CSPSs and interviewing their prenatal clients. The principal investigator and two assistants with social science degrees supervised surveyors. In each CSPS, the surveyor developed the list of women to be located for home interviews. From the prenatal register, the surveyor obtained each woman's given and family names, their husband's given and family names, and their village and neighbourhood of residence. In the villages, the selected women were located with the help of resource persons (traditional midwives, community intermediaries, members of the health committee or administrative representatives). Verbal consent was obtained prior to conducting the interviews. The interviews were conducted with the women only. However, occasionally the women had to leave the room to consult with other family members on certain questions, such as questions about household goods.

### Ethics approvals

The Research Ethics Committee of the University of Montreal Faculty of Medicine and the Ethics Committee of the Ministry of Health in Burkina Faso approved the study.

### Measures

The dependent variable was 'use of skilled birth attendance at delivery'. By definition, skilled birth attendance requires skilled professionals and an appropriate environment that includes furnishings, drugs, sufficient equipment and an operational referral system (De Brouwere and Van Lerberghe 2001). Burkina Faso's health policy institutionalizes deliveries; officially, the public system does not provide assistance for home deliveries (Ministère de la santé du Burkina Faso 2004). Thus, in this study, the use of skilled birth attendance is defined as delivery in a health facility (health centre or hospital). This is a binary variable (delivery in an institution vs outside).

The independent variable was 'women's exposure to birth preparation information and counselling'. On the basis of the interviews, four binary variables were created to measure the components of this exposure variable: (1) information on danger signs during pregnancy (i.e. fever, severe headache, blurred vision, loss of consciousness, convulsions, swelling of the face, excessive fatigue, anemia, vaginal bleeding, reduction of or absence of foetal movements and smelly vaginal discharge) and during childbirth (i.e. fever, severe headache, excessive vaginal bleeding, foul-smelling vaginal discharge, convulsions, prolonged labour (>12 h) or retained placenta); (2) promotion of facility-based delivery; (3) information on the cost of facility-based deliveries and (4) advice on transportation. We retained these four key messages, which were applicable to the context of Burkina Faso. At prenatal visits, the care provider was expected to talk with the women about their personal situation and to provide practical advice that could help them access skilled birth attendance and emergency care in the case of any complications (WHO 2006).

### Control variables

In order to assess the independent effect of exposure to the messages, we introduced into the analysis predictive variables

of maternal-care utilization identified by other studies that could also act as confounding factors or as factors modifying the effect of receiving the messages. These variables were selected based on the conceptual framework proposed by Gabrysch and Campbell (2009), who grouped the determinants of facility-based delivery into four categories; sociocultural factors, perceived need, economic accessibility and physical accessibility. For this study, the sociocultural factors used were the woman's age, parity and level of education. Economic accessibility, defined as the woman's capacity to pay for services, was approximated by the economic level of her household. Household economic level is generally measured as a composite score of household assets (Say and Raine 2007). We documented the availability of radios, televisions, bicycles, motorcycles and cars, the means of supply of potable water, and the type of toilet. Among these items, only the availability of a motorcycle showed variability in our sample and was retained as an indicator of household economic level. Physical accessibility included distance from home to the nearest health facility and district of residence. Perceived need was defined as the women's total number of visits and the health problems reported during pregnancy or delivery. Problems during pregnancy included fever, severe headache, blurred vision, loss of consciousness, convulsions, facial oedema, excessive fatigue, anaemia, vaginal bleeding, reduced or absent foetal movement and/or foul-smelling vaginal secretions. Problems during delivery included fever, severe headache, excessive vaginal bleeding, foul-smelling vaginal secretions, convulsions, prolonged labour (>12 h) and/or placental retention.

### Data analyses

The data were entered into an Epidata data capture mask, then cleaned and analyzed with Stata 9 software. The descriptive analyses provided cross-tabulations accompanied by chi-square tests showing the association between facility-based delivery and each independent variable. Multiple logistical regressions were conducted to test associations between exposure to BEP messages and facility-based delivery, controlling for the effects of determinants of care utilization. To measure associations, we used adjusted odds ratios (AOR) with a 95% confidence interval. Given that the women (prenatal clients) were selected from within clusters (health centres), we used the generalized estimating equation (GEE) statistical model. The GEE model takes into account the fact that utilization behaviours may be correlated within clusters. This correlation was assessed and taken into account to estimate marginal parameters and their standard (Burton *et al.* 1998). To launch the logistical regressions with GEE models, we used the *xtee* command in Stata 9. The model assumed an 'exchangeable' correlation structure. Finally, a stratified analysis by district was carried out to reveal any potential heterogeneity of effects between the two study districts.

## Results

Figure 1 presents the flow of participants in the study. Among the 512 women selected from the prenatal lists, 464 (91%) were successfully enrolled and interviewed. The women not enrolled



had either moved outside the study districts ( $n=15$ ) or were reported as unknown by the resource persons ( $n=33$ ). Of the 464 respondents, eight reported having had interrupted pregnancies and were excluded from the study.

### Characteristics of respondents

Table 1 presents the distribution of the women according to sociocultural and economic characteristics, as well as physical accessibility and need. The vast majority of respondents were not educated, were between the ages of 20 and 35, and reported two to four births. Less than 40% of the women had access to a health facility within 5 km of their residence. Utilization of prenatal care was suboptimal; only 18% of respondents had undergone the four prenatal visits recommended by WHO.

### Exposure to BEP messages in the prenatal clinic

Reception of BEP counselling varied greatly according to the type of message (Table 2). The majority of respondents received recommendations regarding delivery in a health facility and danger signs. However, the rates on receipt of cost information and advice on transportation were low. The exposure to information varied greatly between the two study districts. Those using the health facilities in Koupela were much more exposed to each of the four messages than were those in Dori.

### Bivariate analyses: variation in the frequency of facility-based deliveries

For all women in the sample, the frequency of facility-based delivery was 60.5%. This frequency fluctuated considerably depending on the women's sociocultural characteristics, economic and physical accessibility factors, and factors related to women's perceptions of need (Table 3). Parity did not appear to be associated with assisted delivery. On the other hand, educated women were significantly more likely (77%) to deliver in a health facility than were those without education (59%). The availability of a motorcycle in the woman's household was associated with a higher probability of facility-based delivery. Distance to the nearest health facility was negatively associated with the use of facility-based delivery. Women living less than 5 km from a health facility had a higher probability (72%) of facility-based delivery than did women who had to travel 10 km (45%) to a health facility. There was a significant difference between the districts in terms of facility-based deliveries. Koupela has more health facilities and thus had a markedly higher frequency of facility-based deliveries than did Dori. Problems during pregnancy or labour did not appear to influence the probability of facility-based delivery. However, the number of prenatal visits had a strong positive effect on facility-based delivery.

For all respondents, the exposure to BEP messages positively influenced facility-based delivery (Table 4). Facility-based delivery was significantly higher among women who had been informed of danger signs, who were counselled to deliver in a health facility, and who were informed about the costs of delivery, compared with those who had not been exposed to these BEP messages. However, the relationship between the advice received and facility-based delivery was not homogeneous across the two study districts. In the Dori district, the

**Table 1** Distribution of women by sociocultural, economic, physical accessibility and need characteristics

Characteristics	Dori		Koupela		All	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Age (years)						
<20	45	16.9	13	6.8	58	12.7
20–35	190	70.7	142	75.8	332	72.8
>35	33	12.4	33	17.4	66	14.5
Parity						
1 birth	40	14.7	35	18.9	75	16.4
2–4 births	168	62.8	93	49.5	261	57.2
≥5 births	61	22.6	59	31.6	120	26.4
Education						
Not educated	249	92.5	163	87.4	412	90.4
Educated	20	7.5	24	12.6	44	9.6
Availability of a motorcycle in the household						
No motorcycle	200	74.4	112	60.0	312	68.4
One motorcycle or more	69	25.6	75	40.0	144	31.6
Distance from the home to the nearest health facility (km)						
<5	94	35.5	79	42.0	173	37.9
5–10	95	35.5	74	39.4	169	37.1
>10	79	28.9	35	18.6	114	25.0
Health problems reported during pregnancy						
No	200	75.9	162	87.4	362	79.4
Yes	69	24.1	25	12.6	94	20.6
Health problems reported during delivery						
No	212	75.9	164	87.4	376	82.5
Yes	57	24.1	23	12.6	80	17.5
Total number of antenatal visits						
One	39	14.7	4	2.2	43	9.4
Two	101	37.6	42	22.6	143	31.4
Three	99	36.8	88	46.8	187	41.0
Four visits or more	30	10.9	53	28.4	83	18.2
All respondents	269	100.0	187	100.0	456	100.0

receipt of these messages significantly influenced facility-based delivery, but this effect was not found in Koupela.

### Multivariate analyses: effects of exposure to messages

Table 5 presents the results of the multiple regression models estimating the associations between the receipt of key BEP messages and facility-based delivery, adjusting for the effects of known determinants. All the control variables are included in the models, except marital age due to collinearity with parity. For most of the predictors, the results concurred with those often reported in the literature. Parity, educational status and reported health problems were not significantly associated with seeking facility-based care for delivery. On the other hand, the availability of a motorcycle facilitated facility-based delivery. The negative effect of distance persisted: women residing more than 10 km from a health facility were 61% less likely to deliver in an institution than those who had to travel less than 5 km.

**Table 2** Distribution of women by exposure to BEP key messages

Variables	Dori		Koupela		All	
	%	n	%	n	%	N
Information on danger signs						
Yes	40.1	108	76.5	143	56.8	259
No	59.9	161	23.5	44	43.2	197
Promotion of facility-based delivery						
Yes	59.5	160	90.4	169	72.2	329
No	40.5	109	9.6	18	27.8	127
Information on the cost of facility-based delivery						
Yes	24.9	67	56.7	106	37.9	173
No	75.1	202	43.3	81	62.1	283
Advice on transportation						
Yes	7.8	21	18.7	35	12.3	56
No	92.2	248	81.3	152	87.7	400
Number of key messages received during antenatal visits						
0	23.4	63	4.3	8	14.7	67
1	34.2	92	15.5	29	25.9	118
2	30.1	81	28.9	54	29.5	135
3	11.2	30	36.4	68	22.7	104
4	1.1	3	15.0	28	7.3	32
All respondents	100	269	100	187	100	456

The number of prenatal visits remained strongly and positively associated with the use of skilled birth attendance. Women with three or more prenatal visits had a higher probability (OR=2.66; 95% CI: 1.69, 4.20) of delivering in a health facility than did women with fewer visits.

Multivariate models were used to estimate the independent effects of BEP messages, with the effects varying according to the type of message. For the two districts together, information on cost was strongly associated with facility-based delivery. Women who had received this message were more likely (AOR=2.04; 95% CI: 1.17, 3.25) to deliver in a health facility. However, the suggestion to deliver in a health facility and advice on transportation did not appear to have increased the probability of facility-based delivery.

In addition, the associations observed were heterogeneous between the two study districts. In the Dori district, the messages received regarding danger signs (AOR=1.93; 95% CI: 1.07, 3.49) and the costs of care (AOR=2.13; 95% CI: 1.09, 4.22) were significantly associated with a higher probability of facility-based delivery. In the Koupela district, no message was associated with facility-based delivery.

## Discussion

### Independent effects of BEP counselling

Our study investigated the effect of BEP counselling on facility-based delivery in two Burkina Faso districts. The BEP messages considered were information on danger signs; promotion of facility-based delivery; information on the cost of delivery and advice on transportation during labour and in cases of obstetric

**Table 3** Variation in institutional delivery rate by women's sociocultural, economic, accessibility and need characteristics

Characteristics	Respondents' Number	Institutional deliveries	
		%	P value
Age (years)			
<20	58	60.3	0.692
20–35	332	59.9	
>35	66	63.6	
Parity			
1 birth	75	66.7	0.447
2–4 births	261	58.6	
≥5 births	120	60.8	
Education			
Not educated	412	58.7	0.011
Educated	44	77.3	
Availability of a motorcycle in the household			
No motorcycle	312	55.1	<0.001
One motorcycle or more	144	72.2	
Distance from the home to the nearest health facility (km)			
<5	173	71.5	<0.001
5–10	169	65.6	
>10	114	44.8	
District of residence			
Dori	269	46.8	<0.001
Koupela	187	80.2	
Health problems reported during pregnancy			
No	362	60.7	0.989
Yes	94	60.6	
Health problems reported during delivery			
No	376	60.0	0.837
Yes	80	61.3	
Total number of antenatal visits			
One	43	25.6	<0.001
Two	143	46.9	
Three	187	71.7	
Four visits or more	83	77.1	
All respondents	456	60.5	–

emergency. The results showed that the four messages together did not significantly influence the use of skilled birth attendance. Taken separately, the two messages that did significantly influence the use of facility-based assistance in the Dori district were information on danger signs and on cost of care. Informing women about the signs of obstetric complications is important in preventing maternal mortality (Pembe *et al.* 2009). In developing countries, routine prenatal visits provide the best opportunities for improving women's knowledge about these signs (Perreira *et al.* 2002). Several studies have shown that prenatal education on signs of obstetric complications positively affects the use of skilled birth attendance (Nikiéma *et al.* 2009; Rosenthal 1979). The positive impact of cost of care

**Table 4** Variation in institutional delivery rate by exposure to BEP messages

	Institutional deliveries rates (%)		
	All	Dori	Koupela
Information on danger signs	**	*	ns
Yes	68.5	55.6	79.7
No	54.5	41.0	81.8
Promotion of facility-based delivery	**	*	ns
Yes	66.3	51.9	79.9
No	45.7	39.4	83.3
Information on the cost of facility-based delivery	**	*	ns
Yes	71.1	56.7	80.2
No	54.1	43.6	80.2
Advice on transportation	ns	ns	ns
Yes	64.3	52.4	71.4
No	60.0	46.4	82.2
All respondents	60.5	46.8	80.2

\*\* $P < 0.01$ , \* $P < 0.05$ , ns = no significance.

may be explained by the current political context regarding maternal health. A government strategy of subsidizing maternity services at 80% has been in place since 2007. A normal delivery, which used to cost patients USD 10 (Francs 4500), now costs USD 2 (FCFA 900) per patient, with the remainder covered by the State (Ministère de la santé 2006). However, the population has not been informed of this subsidy (Amnesty International 2009). When women were aware of this reduction, the number of deliveries in health centres increased significantly (Ridde *et al.* 2012). Prenatal sessions provide opportunities for women to be informed of this cost reduction. However, the proportion of women in this study who received cost information was low. It appears that care providers were reluctant to talk about cost of care with prenatal patients because the rates set by the Ministry of Health are not applicable to all patients. This is not surprising. Ridde *et al.* (2012) found that some health-care workers were concerned that patients who delivered in health-care facilities would spend in excess of the subsidy. In our study, nearly 28% (76/276) of the women who delivered in a health facility reported spending amounts that exceeded the official rate (data not presented).

The effect of cost information is also consistent with conclusions from pilot programme evaluations. An evaluation of the Maternal and Neonatal Health programme in Koupela found that saving to pay for services was the only BEP message associated with the use of facility-based birth attendance (JHPIEGO 2004a; Moran *et al.* 2006). Rosecrans *et al.* (2008) found that saving money was the BEP practice most commonly used by women, and that carrying out at least one BEP practice increased the probability of using skilled birth attendance by 45%. The money saved was used to pay not only for services but also for transportation during labour.

Advice on delivering in a facility and on transportation did not appear to influence facility-based delivery. The recommendation to deliver in a health facility was the message most often

received (72%) by the women. Thus, although this message was very common in prenatal counselling, it had little influence on utilization behaviour. The message on transportation was infrequently provided to women (12%) and therefore had no significant impact on utilization. In fact, this component of BEP counselling consisted of showing women the modes of transportation (i.e. health facility ambulance, vehicles or motorcycles) available to women in labour or in situations of obstetric emergency that some communities implemented specifically for pregnant women (OMS 2009; Skinner and Rathavy 2009). However, the two study districts did not have community-based systems, and ambulances were used only to evacuate cases of diagnosed complications from health centres to referral hospitals, not to transport women from their homes. The family organized transportation from the home to the health facility by whatever means available (motorcycle, bicycle, carts, etc.). Thus, health-care workers may not have considered it useful to provide information on means of transportation that was unavailable to these families.

### Heterogeneities between the two districts

In the Dori district, the messages regarding danger signs and costs had significant and substantial effects. However, in Koupela, none of the messages significantly affected the use of facility-based birth attendance. Thus, BEP counselling did not increase the likelihood of facility-based delivery in the Koupela district, even though it was in this district that women received the most counselling during prenatal visits. This result was unexpected. Although we did not find a statistically significant association between the receipt of birth preparedness messages and institutional delivery, it seems logical that BEP messages would affect a women's decision to deliver in a health facility in Koupela. On the other hand, when the OR is very close to 1, a larger sample size is needed to reach statistical significance. Because the current sample size was calculated to detect an OR of 2, this association would not be detected. We did find that the impact of antenatal care visits was particularly high (AOR = 5.99; 95% CI = 2.39, 14.01) in Koupela. This may be explained by the fact that this district was the site of the Maternal and Neonatal Health pilot programme. This programme piloted a series of interventions, including BEP counselling, from 2001 to 2004. The pre-post evaluation showed an increase in the percentage of facility-based deliveries from 46% to 60% ( $P < 0.05$ ), (JHPIEGO 2004a). Recently, utilization of maternal services has been stronger in Koupela than in any other districts in the country. In 2008, the rate of facility-based deliveries in Koupela was 79%, as opposed to 54% countrywide (Ministère de la santé 2009). This high rate may be due to several factors, including physical accessibility of health centres and the educational programmes previously implemented. It may be that as the rate of service utilization rises in an area, BEP counselling may no longer produce a marginal increase in that rate. Mullany *et al.* (2007) found a similar result in their randomized study of an urban hospital in Nepal. Prenatal BEP educational sessions for women alone or in couples did not significantly increase facility-based deliveries; the facility-based delivery rate surpassed 90% in both the intervention and control groups. Thus, some components of BEP counselling, such as promoting facility-based delivery and

**Table 5** Multivariate analysis of association between institutional delivery and exposure to BEP advice

Variables	Institutional delivery AOR (95% CI)		
	All	Dori	Koupela
Information on danger signs			
Yes	1.57 (0.97–2.55)	<b>1.93 (1.07–3.49)</b>	0.95 (0.32–2.77)
No	1	1	1
Promotion of facility-based delivery			
Yes	1.38 (0.59–3.23)	1.18 (0.66–2.12)	0.85 (0.16–3.42)
No	1	1	1
Information on the cost of facility-based delivery			
Yes	<b>2.04 (1.17–3.25)</b>	<b>2.13 (1.09–4.22)</b>	0.98 (0.39–2.44)
No	1	1	1
Advice on transportation			
Yes	0.76 (0.39–1.43)	1.23 (0.43–3.57)	0.97 (0.35–2.74)
No	1	1	1
Total number of antenatal visits			
1–2	1	1	1
≥3	2.66 (1.69–4.20)	2.11 (1.19–3.76)	5.99 (2.39–14.01)
Health problems reported during pregnancy			
No	1	1	1
Yes	1.50 (0.78–2.91)	1.34 (0.67–2.69)	1.50 (0.27–8.09)
Health problems reported during delivery			
No	1	1	1
Yes	1.09 (0.56–2.12)	1.08 (0.49–2.38)	2.77 (0.65–11.89)
Parity			
1 birth	1	1	1
2–4 births	0.89 (0.41–1.95)	1.28 (0.55–2.99)	0.58 (0.18–1.81)
≥5 births	0.66 (0.32–1.38)	0.54 (0.20–1.47)	1.33 (0.36–4.91)
Women education			
Not educated	1	1	1
Educated	1.42 (0.57–3.54)	2.07 (0.63–6.79)	3.52 (0.69–17.91)
Availability of a motorcycle in the household			
No motorcycle	1	1	1
One motorcycle or more	2.10 (1.10–3.82)	1.53 (0.77–3.04)	1.78 (0.75–4.25)
Distance from the home to the nearest health facility (km)			
<5	1	1	1
5–10	0.64 (0.35–1.18)	0.72 (0.36–1.43)	1.04 (0.41–2.60)
>10	0.39 (0.17–0.86)	0.17 (0.08–0.35)	1.05 (0.36–3.19)
District of residence			
Dori	1	–	–
Koupela	2.07 (1.09–3.92)		

providing information on cost, may be useful only in areas where these messages are relatively new to women and where utilization rates for skilled birth attendance are relatively low. Therefore, it would be useful to adapt the content of the BEP messages to the needs of users in each locality.

### Limitations of the study

This study has a number of methodological limitations. The first is inherent to retrospective cohort studies in which the

information (on exposure and on the dependent variable) is collected through self-reports. This may also lead to respondent bias. In particular, women who delivered in health facilities may have overstated their exposure to prenatal recommendations of facility-based delivery or to cost information because the interviews were conducted after their deliveries. This could cause an overestimation in the observed associations. However, when compared with previous studies on this subject, we feel that this study was less vulnerable to respondent bias because of the



relatively short recall time. The longest time between delivery and interview was 6 months, and the average was 3.8 months.

The second limitation concerns external validity. The sample consisted of women who delivered during the dry season in both study districts. In rural settings, the dry season is when health facilities experience the highest levels of use because of the greater ease of transportation. In the rainy season (June to September), roads often deteriorate, creating a major obstacle to reaching health centres. Thus, prenatal education on BEP may be more effective for deliveries in the dry season than in the rainy season. For this reason, our results may not generalize to all women regardless of the delivery period.

In addition, the differences in ethnic composition between the two districts may introduce behavioural differences related to using obstetric services during delivery. (Nikiema *et al.* 2008) found that sociocultural factors can significantly modify women's opportunities for negotiating resources for seeking health care in Burkina Faso.

Another factor that may affect the impact of BEP on facility-based deliveries is the manner in which the BEP information is presented. This factor should be a focus of future studies.

## Conclusion

This retrospective cohort study examined the association between BEP counselling provided to women and facility-based delivery in two rural districts in Burkina Faso. In the Dori district, where BEP counselling was a relatively recent component of prenatal visits and the rate of facility-based deliveries was low, two types of information—signs of obstetric complications and cost of care—were associated with increased utilization of facility-based birth attendance. However, in the Koupela district, where the rate of facility-based deliveries was already relatively high, BEP messages were not associated with increased facility-based deliveries. These findings have important implications for policies on BEP counselling. They indicate the importance of adapting the content of prenatal counselling to both the needs of the users as well as the level of health facility utilization in each locality.

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## Conflict of interest

None declared.

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