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## Impact on perceived postnatal support, maternal anxiety and symptoms of depression in new mothers in Nepal when their husbands provide continuous support during labour

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## ABSTRACT

**Background:** when a husband provides continuous support during his wife's labour, his presence is considered effective in reducing her dissatisfaction with the childbirth process. The impact of this on the postnatal well-being of a new mother, however, is not clear.

**Objective:** to examine the impact on postnatal support, maternal anxiety and symptoms of depression experienced by new mothers in Nepal when their husband supported them continuously during labour.

**Method:** the study involved 231 Nepali women, of whom 77 were supported continuously by their husbands, 75 by female friends, and 79 were not supported by any companion during childbirth. They were contacted at six to eight weeks post partum, when postpartum support questionnaires, a state-trait anxiety inventory and the Edinburgh postnatal depression scale were administered. Structural equation modelling was conducted.

**Findings:** observations showed that continuous support from a husband during his wife's labour was related to a greater degree of postnatal support than those who were not supported by their husband during labour ( $\beta=0.23$ ,  $p<0.001$ ). Similarly, the more the women considered they were being supported, the less likely they were to experience maternal anxiety ( $\beta=-0.52$ ,  $p<0.001$ ), which in turn was associated with a lower level of depression ( $\beta=0.43$ ,  $p<0.001$ ). These findings were consistent, even after adjustments for the effect of female support during the postnatal period.

**Conclusion:** the study suggests that continuous support from husbands during labour has a direct impact on the perceived postnatal support, and an indirect impact on anxiety and depression in new mothers in Nepal.

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## Introduction

Women in many cultures experience transient periods of depression and an increased feeling of loneliness, anxiety and unhappiness after childbirth. Young and first-time mothers who have just given birth are more vulnerable to emotional disturbances of this type (Power and Parke, 1984; Giakoumaki et al., 2009). Past studies have reported approximately 13–15% prevalence of depression (O'Hara and Swain, 1996; Gavin et al., 2005) and 3–43% for anxiety (Glasheen, 2010) in new mothers in western countries. Although the rates of anxiety and depression have not been well documented in Nepal as the uptake of

postnatal care per se is very low (Dhakal et al., 2007), previous studies among urban Nepalese women have found similar rates of depression (12%) (Nepal et al., 1999; Regmi et al., 2002). Without a proper support system, women who experience these problems are placed at increasing risk of experiencing future episodes of depression. As a result, their infants and younger children are more likely to suffer from a variety of adverse effects, including insecurity with their mothers, developmental delay and difficulties in socialisation (Feldman et al., 2009; Bagner et al., 2010; Glasheen et al., 2010). However, support for women with these problems in Nepal is overlooked because limited resources are allocated to reducing the maternal mortality rate. It is therefore important to explore cost-effective approaches to enhancing the emotional well-being of new mothers during the postnatal period. One possible approach may be to encourage husbands (male partners) to provide continuous labour support (hereafter referred as CLS) when health-care facilities are used to give birth.

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## Background

In Nepal, still more than 80% births take place at home without skilled professional attendance resulting in high maternal deaths (Department of Health Services (DoHS), 2007). Thus pregnant women are continuously encouraged to give birth at health-care facilities. Giving birth in health-care facilities has reduced the risks associated with childbirth (DoHS, 2007; Ministry of Health (Nepal), New Era, & ORC Macro, 2007), but it has ultimately brought a decline in the area of social support for labouring women. It is because, inside public health-care facilities, neither a labouring woman is allowed to have a birth companion nor a nurse midwife is available to provide CLS to a labouring woman due to limited human resources.

CLS is non-medical support (i.e. physical, emotional and information-based), provided on a continuous one-to-one basis to a woman in labour throughout the process of childbirth, usually by a female companion. Studies have demonstrated that CLS has contributed to a reduction in the caesarean rate, as well as the amount of analgesia used during childbirth (Hodnett et al., 2011). As such, in a country like Nepal, where resources are constrained and where limited medical intervention is allowed, CLS is considered effective in promoting spontaneous vaginal births and women's satisfaction with the childbirth process.

There is also evidence that women who receive labour support from a female friend/relative at childbirth tend to experience greater levels of maternal support, lower levels of anxiety and fewer symptoms of depression at six to eight weeks post partum than those who do not receive this type of support at childbirth (Scott et al., 1999; Campbell et al., 2007). More interestingly, the literature suggests that CLS from a husband could produce even better postnatal outcomes than CLS from a female friend. This is because husbands play a major role in giving their wife physical and emotional support during the postnatal period (McVeigh, 2000). Previous research suggests that attendance at childbirth offers husbands an opportunity to prepare themselves for being responsible parents, and that it encourages father-child bonding (Gungor and Beji, 2007). Moreover, CLS helped husbands to understand the childbirth process, as well as the physical and emotional needs of their wife during childbirth (Sapkota et al., 2012b). An even more important finding is that CLS helped husbands understand the positive effects their support had on their wife during labour (Sapkota et al., 2012b). These findings indicate that CLS could help increase a husband's sensitivity towards his wife's needs as a new mother, and help them to understand the importance of their support. As a result, CLS from husbands is believed to increase their active engagement in postnatal support (Power and Parke, 1984). Consequently, new mothers will receive a greater level of postnatal support, which cannot be offered in the same way from a female companion who lives with them.

However, the positive impact is not limited to the level of postnatal support provided by husbands. On the contrary, the effect is believed to extend to the postnatal maternal well-being of new mothers. The previous study showed that emotional support provided by partners/husbands reduced anxiety in new mothers after childbirth (Stewart et al., 2003; Lemola et al., 2007). This is because a husband is physically and emotionally close to his wife in the period after their baby is born. As such, any lack of support on his part will make her feel insecure, and contribute to her anxiety (Power and Parke, 1984). Reducing maternal anxiety is crucial, because pregnant women and new mothers who suffer from anxiety are more likely to progress to postnatal depression (Ross et al., 2003; Skouteris et al., 2009). In other words, some postnatal maternal anxiety and depression can be prevented if the level of postnatal support from husbands is increased (Ho-Yen

et al., 2007; Moss et al., 2009) as a result of their involvement in CLS.

CLS from husbands is an inexpensive, yet effective measure for increasing postnatal support and decreasing maternal anxiety and depression experienced by new mothers. It is therefore considered to have a beneficial effect on new mothers in Nepal. However, past studies have not compared the impact on a new mother's postnatal support and emotional well-being when her husband acts as her birth companion as opposed to when a female companion takes on the role.

In Nepal, the majority of the population is Hindu, which involves a hierarchical caste system. Moreover, the Hindu concept of purity/impurity has kept the role of husbands during childbirth to a minimum. At the time of childbirth, women are kept in seclusion because of their impure vaginal discharge. During childbirth and the postnatal period, they are therefore attended by female friends/relatives (Manandhar, 2000) in both facility and community-based childbirths. This practice means that husbands are unaware of, and insensitive to the needs of new mothers after they have given birth, and it leaves new mothers more vulnerable to poor emotional well-being.

However, this type of traditional practice has been fading away in urban society in Nepal. This is mainly due to a recent trend where increasing numbers of couples are geographically isolated from their female family members when they leave home in search of a job and an education. Moreover, socio-cultural beliefs and values of the urban society have been changing due to an exposure of the young population to western ideologies (Department of Health Services (DoHS), 2007; Calabiano and Castiglioni, 2008). With such changes in the society, social roles of the husbands during the childbirth have also been increased. This has resulted more husbands becoming actively involved in the childbirth process, and has precipitated this study to examine the effects on the well-being of a new mother in Nepal when she receives CLS from her husband during labour.

The aim of this study was therefore to examine the impact on postnatal support, anxiety and symptoms of depression experienced by new mothers in Nepal at six to eight weeks post partum, when they had received CLS from their husband. The study also aimed to examine the difference in effect when a woman received CLS from her husband as opposed to a female friend, or when she had no birthing companion at all. The following hypotheses were derived from the above discussion, and are illustrated in Fig. 1 as a study framework. However, this study was only about women giving birth in a health-care facility, and these hypotheses may not be applicable to women giving birth at home.

**Hypothesis 1.** At six to eight weeks post partum, women who receive CLS from their husbands report a higher level of postnatal support than those who receive CLS from a female friend, or those who receive no CLS at all. This impact is evident even after controlling for the effects of female support at home.

**Hypothesis 2.** The level of perceived postnatal support is negatively related to the level of postnatal maternal anxiety experienced by new mothers at six to eight weeks post partum.

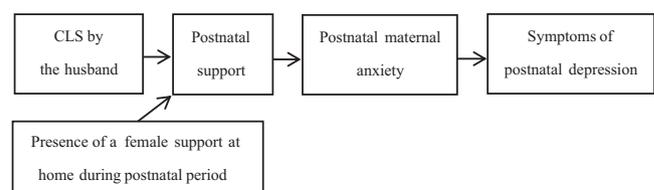


Fig. 1. Study framework.

**Hypothesis 3.** The level of postnatal maternal anxiety is positively correlated with the level of postnatal symptoms of depression in new mothers at six to eight weeks post partum.

This is the follow-up study for a research project which initially examined the impact on the physiological and psychological outcomes for new mothers in a public maternity hospital in Kathmandu when the women received CLS from their husband. Part of the finding has already been published elsewhere (Sapkota et al., 2012a).

## Methods

### Setting and participants

This study was carried out in the Paropakar Maternity and Women's Hospital (PMWH), a central level referral hospital in obstetrics and gynaecology, located in Kathmandu, Nepal. The participants were married women who were admitted to the PMWH to give birth to their baby from February to April, 2011. After screening the women for the eligibility criteria, 314 women were approached and asked to participate. However, five of these women declined to be interviewed after the birth of their baby, without giving any reasons for their withdrawal. Another 11 women who were supported both by their husband and a female friend during childbirth were excluded from the study. This left a total of 298 women, out of which 231 (77.5%) remained in the follow-up interview conducted at six to eight weeks post partum (women who received CLS from their husband ( $n=77$ ), women who received CLS from a female companion ( $n=75$ ) and women who received no CLS ( $n=79$ ). See Fig. 2).

### Eligibility criteria

Women were assessed for their eligibility for participation in the study using a pre-defined set of criteria. Primigravida women (aged between 18 and 35 years) with singleton pregnancy at full term gestation (37–42 weeks), and no history of obstetric, medical or psychological problems were screened first for eligibility. Then, women residing within 90 minutes of the hospital by public transportation were recruited for participation in the study, as they were more likely to attend a postnatal medical examination. However, women were excluded from the study if they elected for a caesarean section, had cervical dilatation of more than four centimetres at the time of admission, or were

destined for induction and augmentation. Additionally, women whose husbands were not living with them at the time of recruitment due to other commitments, for instance, working abroad were excluded.

### Recruiting procedure

Women were screened for their eligibility criteria at the time of admission after they had been examined by their attending doctors. Those who fulfilled the eligibility criteria were approached for their participation in the study while they were in the admission room. All the women were in the latent phase of labour when written, informed consent was obtained.

### Allocation procedure

Women were allocated to the birthing or the delivery unit group based on the availability of beds in the birthing unit (where a support person was allowed throughout) at the time when per-vaginal examination confirmed four centimetres of cervical dilatation. In the birthing unit, a companion was assigned (either their husband or a female family member/relative/neighbour) according to their own preference. The birth companions at the time of their admission to the birthing unit were individually instructed by a nurse midwife on providing continuous support to their labouring women.

The women allocated in the delivery unit group were first taken to the antenatal care unit until the cervix was fully dilated (10 cm). Thereafter, they were transferred to the delivery room to give birth to their baby. The support person (either their husband or a female friend) was occasionally present during the first stage of labour, but they were not allowed to be present at the birth.

### Data collection

The background characteristics of the participants were obtained when they were contacted within 48 hours of childbirth. After this, the participants were contacted at six to eight weeks post partum when they visited the postnatal/immunisation clinic. For those who failed to attend the postnatal clinics, the contact was made over the phone at a time convenient to them. In the follow-up contact, a background questionnaire, STAI (state anxiety), postnatal support questionnaire and Edinburgh Postnatal Depressive Scale (EPDS) were administered. It took an average of 30 minutes to complete the follow-up data collection.

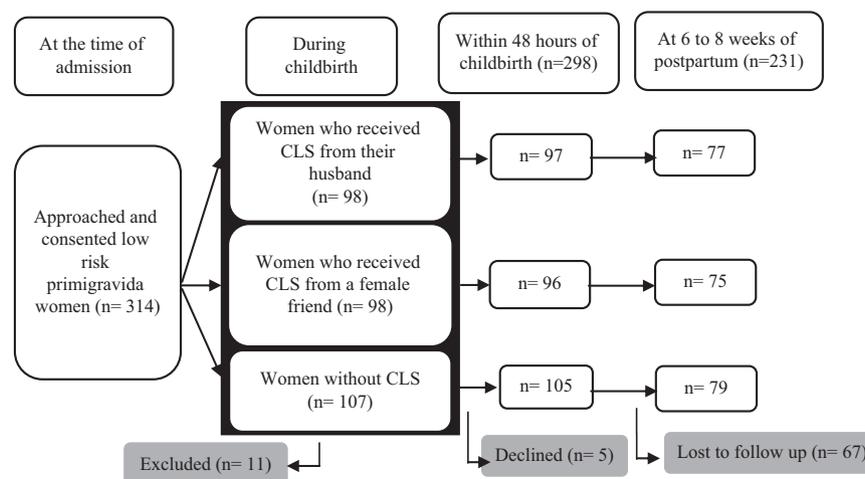


Fig. 2. Flow of the subjects' in three groups in the study.

## Measures

### Background characteristics

A background questionnaire was developed and used to collect the background characteristics of the women and their husbands. It involved household characteristics, antenatal, intrapartum (for example, length of labour, type of labour, mode of delivery, duration of hospitalisation at the time of childbirth) and postnatal characteristics during a postnatal period. Information was also collected on the presence of a female support person at home.

### Postnatal support

The Postpartum Support Questionnaire (PSQ) was developed by Logsdon (Logsdon et al., 1996; Logsdon and Usui, 2006) to measure how 'important' particular support behaviour is to a new mother, as well as the actual 'support' she receives during a postnatal period. In this study, women were only asked to rate how much support they received during the postnatal period, using the Nepali version of the PSQ. The scale consists of 34 items, which are rated on a scale of 0–7. Total scores range from 0 to 238, with higher scores indicating a greater level of support. The internal consistency of the Nepali version of the PSQ was evaluated by calculating Cronbach's alpha. A Cronbach's alpha score of 0.92 was obtained in this study.

### Postnatal maternal anxiety

Maternal-state anxiety symptoms in the new mothers were measured by administering the State-Trait Anxiety Inventory for Adults (STAI-AD), originally developed by Spielberger et al. (1983). The scale consists of two subscales: one to measure state-anxiety level and another for trait anxiety. Each of the subscales has 20 statements which evaluate how a respondent feels about herself 'right now, at this moment', on a scale ranging from 1 to 4. The total scores in each subscale vary from 20 to 80, with higher scores indicating a higher level of anxiety. In this study, the state-anxiety subscale in the Nepali version of the STAI-AD was administered at six to eight weeks post partum as a measure of postnatal maternal anxiety. The Cronbach's alpha score for the Nepali version of the STAI (the state subscale) used in this study was 0.85.

### Symptoms of postnatal depression

The Edinburgh Postnatal Depression Scale (EPDS) is a 10-item, self-rating questionnaire commonly used to screen for symptoms of postnatal depression (Cox et al., 1987; Beck, 2001). Each question has four alternative answers (between 0 and 3). Higher scores indicate a greater level of depression. This scale has been used and validated in many cultures and languages, including Nepalese (Eberhard-Gran et al., 2001; Nepal et al., 1999; Regmi et al., 2002). Since the EPDS includes three items which evaluate a level of anxiety, they were excluded from the study to avoid duplicating measures used in the STAI-AD. The Cronbach's alpha score for the Nepali version of the EPDS, which included seven items, was 0.64.

### Ethical procedure

The study was approved by the Ethical Committee of Hiroshima University Graduate School of Health Sciences, and the Nepal Health Research Council.

### Data analysis

The final analysis included data for 231 women who completed the follow-up study. The study outcomes were compared

between the three groups using a  $\chi^2$  test for categorical outcome variables and an ANOVA, followed by a post-hoc test with Bonferroni's correction. All these analyses were carried out with SPSS for Windows, version 18.0. The hypotheses were tested by Structural Equation Modelling (SEM), using AMOS (version 18.0). The fitness of the model was evaluated by a  $\chi^2$  test, the adjusted goodness of fit index (AGFI), a comparative fit index (CFI), and the root-mean square error of approximation (RMSEA) (Ho, 2006).

In all the analyses, the significance was set at  $\alpha < 0.05$  (2-tailed test) except the post-hoc analysis with Bonferroni's correction, where the alpha level was set at 0.017 (0.05/3) to reduce the chance of making a Type 1 error.

## Findings

Of the 231 women, 51.1% had completed their follow-up data collection at the time of their visit to the postnatal clinic and/or to the immunisation clinic. The rest (48.9%) were contacted and completed the questionnaires over the phone. When compared by the type of support person present at childbirth, no statistical differences were observed in the characteristics of women and their mode of contact.

### Background characteristics

The women in this study were young (overall mean years =  $21.79 \pm 2.69$ ), and more than 50% were from a nuclear family. In general, no statistical differences were observed between the groups in terms of any of the background characteristics of the women (their husbands, their household characteristics or their antenatal and postnatal characteristics). However, two intrapartum variables (length of labour and rate of spontaneous labour) were significantly different between the groups ( $p < 0.01$ ). These two variables were controlled during the first attempt to fit the hypothesised model using SEM. Table 1 provides details of these background characteristics of the women measured against the type of support person present at childbirth.

In addition, we compared the background characteristics of the women who were lost to follow-up ( $n=67$ ) with those who attended the follow-up data collection at six to eight weeks post partum. Women who attended the follow-up had more monthly family income than those lost to follow-up. Moreover, they and their husbands were more likely to have kept their pregnancy appointments than their counterparts who were lost to follow-up. These differences are discussed in a later section.

### Outcomes

#### Postnatal support

The ANOVA showed that the mean postnatal support scores as measured by PSQ differed significantly between the women in the three groups ( $F(2, 228)=6.59, p < 0.01$ ). The post-hoc test with Bonferroni's correction demonstrated that the women who had received CLS from their husbands at childbirth reported higher postnatal scores than those who had not received any support during childbirth (PSQ mean  $\pm$  SD:  $144.47 \pm 36.77$  versus  $121.58 \pm 45.81, p < 0.01$ ) (see Table 2).

#### Postnatal maternal anxiety

The result of the ANOVA showed that the mean score for state-anxiety at six to eight weeks post partum was significantly different between the groups ( $F(2, 228)=3.60, p < 0.05$ ). The post-hoc analysis with Bonferroni's correction demonstrated that the women who had had CLS from their husbands reported a lower level of anxiety than those who had not received CLS during childbirth. However, this difference did not reach the significance level of  $p > 0.017$  (Table 2).

**Table 1**  
Comparison of the background characteristics among the groups.

Variables	Women with the husband at childbirth (n=77)	Women with a female friend at childbirth (n=75)	Women without any companion at childbirth (n=79)
<i>Women's characteristics</i>			
Women's age: mean (SD)	22.03 (3.09)	21.80 (2.63)	21.54 (2.30)
Years of marriage: mean (SD)	1.52 (0.74)	1.61 (0.82)	1.87 (1.75)
Women with love marriage (%)	51.9	57.3	62.0
Women with more than 10 years of schooling (%)	44.2	40.0	29.1
Number of women reporting housewife (%)	80.5	86.7	86.1
<i>Husband's characteristics</i>			
Husband's age: mean (SD)	26.29 (5.44)	25.19 (3.71)	25.31 (3.82)
Husband with more than 10 years of schooling (%)	39.0	41.3	39.2
Husband working in managerial and professional position (%)	18.2	13.3	15.2
<i>Household characteristics</i>			
Family monthly income mean (SD) in Rupees*	15,946.67 (8687.74)	14,268.66 (8318.00)	13,761.19 (10,000.14)
Women belong to Hinduism (%)	63	57	63
Women reported to be Brahman/Chettri (%)	44.2	52.0	39.2
Women in a nuclear family (%)	68.8	54.7	55.7
<i>Antenatal and intrapartum characteristics</i>			
Husband accompanied to ANC clinic (%)	66.2	53.3	65.8
Mean length of labour (mean in minutes (SD))†	664.96 (203.78)	778.51 (241.84)	804.09 (225.31)
Women with spontaneous labour (%)	93.5	92.0	77.2
Women giving birth to the female baby (%)	36.4	41.3	48.1
<i>Postnatal characteristics</i>			
Days of hospitalisation: mean (SD)	2.40 (2.66)	1.88 (1.81)	2.41 (2.31)
Women reported of having complication (%)	16.9	8.0	7.6
Women reported of having problems to the baby (%)	16.9	10.7	17.7
Presence of a female support at home during postnatal period(%) <sup>a</sup>	75.3	84.0	74.7
<i>Maternal anxiety (within 48 hours of childbirth)</i>			
State-anxiety: mean (SD)	30.09 (8.14)	33.27 (7.99)	32.99 (7.84)
Trait anxiety: mean (SD)	31.38 (7.37)	33.95 (7.18)	33.90 (7.54)

<sup>a</sup> A female support denoted the support received from a new mother's mother-in-law/sister-in-law (57.8%), mother/sister (35.0%), female member of the relation (3.9%) and female maid (3.3%) and this variables was coded dichotomously (Yes/No). All the women in this study reported to be married.

There were no significant differences in the baseline characteristics among the groups except mean length of labour ( $p < 0.01$ ) and rate of spontaneous labour ( $p < 0.01$ ).

\* Had some missing values; 1 UK Pound = 140.25 Nepalese Rupees.

**Table 2**  
Group comparisons: postnatal support, and anxiety and depressive symptoms.

Variables	Women with the husband at childbirth (n=77)	Women with a female friend at childbirth (n=75)	Women without any companion at childbirth (n=79)	F (df1, df2)* p values
Postnatal support PSQ: mean ± SD	144.47 ± 36.77	130.68 ± 35.06	121.58 ± 45.82	6.59 (2, 228) p=0.029
	P= 0.099		P= 0.466	
Postnatal maternal anxiety STAI: mean ± SD	31.86 ± 6.85	32.77 ± 6.28	34.87 ± 8.29	3.60 (2, 228) p=0.029
	P= 1.000		0.220	
Depressive symptoms EPDS†: mean ± SD	3.38 ± 2.82	3.97 ± 2.84	4.15 ± 2.76	1.62 (2, 228) p=0.200
	P= 0.574		P= 1.000	
	P= 0.258			

\* Results from ANOVA.

† Three items that measures the level of anxiety were excluded.

### Symptoms of postnatal depression

The overall mean score for the EPDS was  $3.84 \pm 2.81$ . No statistical differences were observed in the mean EPDS scores between the three groups ( $F(2, 228)=1.62, p=0.20$ ). We examined the last (10th) item in the EPDS separately. This measures suicidal feelings in the participants, and we found no significant difference between the groups ( $p=0.75$ ).

### Testing the hypotheses

First, the study framework indicated in Fig. 1 was fitted using structural equation modelling, while controlling for the effects of the length and type of labour (see Model 1 in Fig. 3). The effects of these control variables were not significant, however, and the fitness of the model was not good either, as indicated by  $\chi^2(14)=35.933, p=0.001, AGFI=0.912, CFI=0.894, RMSEA=0.083$ . As a consequence, the model was refitted after dropping the length and type of labour (see Model 2 in Fig. 3). This model fit well. The  $\chi^2$  for this model was not significant ( $\chi^2(6)=6.933, p=0.327$ ), suggesting an adequate fit to the data. Both GFI and CFI were close to 1.0 ( $AGFI=0.971, CFI=0.995$ ), indicating a very good fit (Ho, 2006). Similarly, RMSEA was below 0.08 ( $RMSEA=0.026$ ), which also indicated a good fit (Cudeck and Browne, 1993). Overall, the model accounted for 26% of variance in explaining postnatal support, and 27% and 18% of the variances in explaining anxiety and symptoms of depression in a new

mother at six to eight weeks post partum respectively. This was therefore retained as the final model.

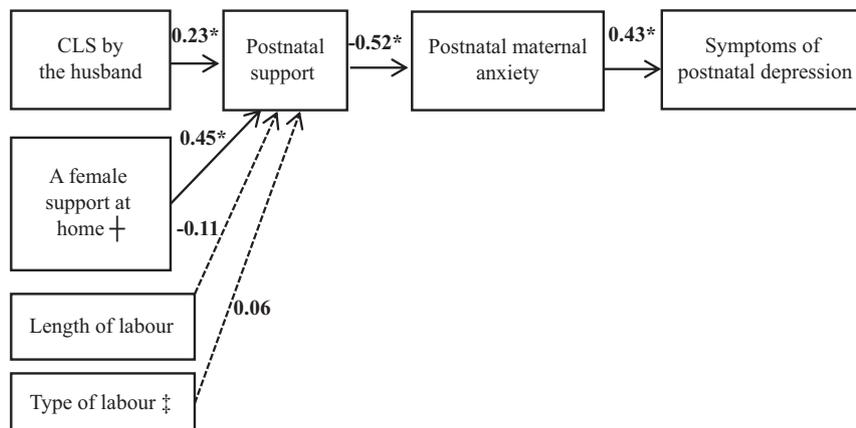
The final model showed that the presence of female support at home during the postnatal period had a significant impact on the degree of postnatal support perceived by the new mothers ( $\beta=0.45, p < 0.001$ ). The results also indicated that the women who had received CLS from their husband perceived a greater level of postnatal support than those who had not received CLS from their husband ( $\beta=0.23, p < 0.001$ ). The impact on postnatal support when women received CLS from their husband was evident even after controlling for the effect of female support at home. These results therefore support the first hypothesis. Similarly, the model showed that if the new mothers perceived a greater level of postnatal support, they were more likely to experience a lower level of anxiety ( $\beta=-0.52, p < 0.001$ ). This finding supported the second hypothesis. In addition, the model showed that a lower level of postnatal anxiety was related to fewer symptoms of postnatal depression, which supports the third hypothesis.

### Discussion

The purpose of this study was to examine the impact on postnatal support, maternal anxiety and depression experienced

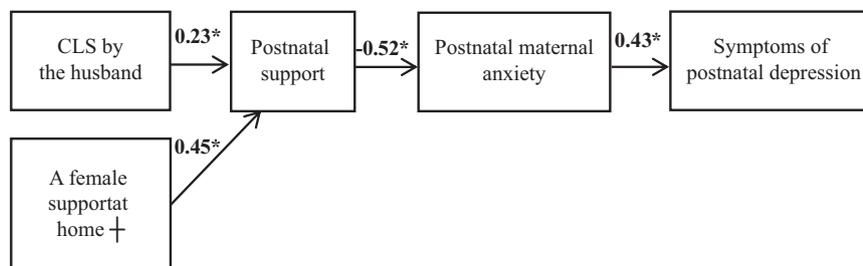
#### Model 1

$\chi^2=35.933$  (df= 14),  $p=0.001$ ,  $AGFI=0.912$ ,  $CFI=0.894$ ,  $RMSEA=0.083$



#### Model 2

$\chi^2=6.933$  (df= 6),  $p=0.327$ ,  $AGFI=0.971$ ,  $CFI=0.995$ ,  $RMSEA=0.026$



\* $p < 0.001$

Note: † Presence of a female support at home during postnatal period (coded Yes= 1, No=0)

‡ Dichotomous variable (spontaneous labour = 1, induced/augmented labour=0).

CLS: Continuous labour support

Fig. 3. Structural Equation Models showing the impact of CLS by husbands on postnatal support, maternal anxiety and symptoms of postnatal depression.

by new mothers at six to eight weeks post partum when their husband provided CLS, compared to women who received CLS from a female friend, and women who received no CLS at all. The results showed that the women who had received CLS from their husbands perceived greater levels of support during the postnatal period than those who had not received this support from their husbands. Moreover, mothers who received more postnatal support were less likely to experience anxiety at six to eight weeks post partum. In addition, these lower levels of anxiety were associated with fewer symptoms of depression.

The impact on the level of postnatal support perceived by the new mothers when they received CLS from their husband can be explained in two ways. First, where a woman's husband was physically present in a labour and delivery room, this gave him an opportunity to become involved in the care of his wife and baby while they were in the hospital (Scott et al., 1999; Wolman et al., 1993; Campbell et al., 2007). This involvement may have strengthened the husband's attachment to his wife and baby, which contributed to his extended involvement in their care during the postnatal period. Secondly, where a husband was physically present during childbirth, doctors/midwives may have been encouraged to include him in formal and informal discussions on how to care for the new mother and her baby. This type of discussion would have helped the husband to understand the different needs of a new mother, and it may have motivated him to continue providing care after his wife and baby were discharged from the hospital.

On the other hand, the results of SEM indicated that women who did not receive CLS from their husband tended to perceive lower levels of postnatal support. Moreover, the results of the ANOVA revealed that, in cases where the husband was not present during childbirth, the women reported significantly lower levels of support than where the husband was present. This may be because the women who did not receive CLS from their husband may have had no opportunity to discuss the experience or the more difficult aspects of childbirth with their husband during the postnatal period (Czarnocka and Slade, 2000; Green and Baston, 2003). The woman's husband may therefore have been unaware of her needs, and may not have given his wife sufficient postnatal support. Although not statistically significant, the results of the ANOVA also suggested that mothers who were given CLS by a female friend considered themselves to have had less support than those who had received CLS from their husband. Wolman et al. (1993) argued that to promote the emotional well-being of a new mother, the same person who was present at childbirth should remain in constant touch with the new mother to support her during the postnatal period. However, in this study, in the case of the women who were supported by a female friend at childbirth, their husband (who was not present during childbirth) or a new female supporter may have taken charge of their care after they were discharged from the hospital. As a result, the new mother could not share her experience with anyone who was aware of what she had gone through during childbirth. This may partly explain why women who were supported by a female friend during childbirth reported a lower level of postnatal support than those who had received CLS from their husband. Unfortunately, the present study did not differentiate the support received from a husband and the support received from other sources (for example, in-laws, friends) when the amount of postnatal support received by mothers was measured using PSQ. Further studies are required to clarify why women who did not receive CLS from their husband perceived lower levels of postnatal support than their counterparts who received this type of support.

Another important finding was that the presence of female support at home during the postnatal period was associated with

greater levels of postnatal support perceived by the new mothers (Fig. 3). Moreover, the impact was twice as great as cases where women had received CLS from their husband. This suggests that, when it comes to postnatal care for a new mother and baby, a female companion at home provides better support to young Nepalese mothers than their husband. This may be because first-time fathers lack confidence in how to take care of their wife and baby, so the new mothers had to seek support from female companions who had experience in child-rearing (VaRG, 1999; Manandhar, 2000; Mullany, 2006).

The results of the SEM also demonstrated that, where CLS was provided by husbands, the impact on postnatal maternal anxiety was mediated by perceived postnatal support. Furthermore, the results showed that the level of postnatal maternal anxiety was directly related to levels of postnatal depression in the new mothers. These findings suggest that CLS administered by husbands has indirect effects on the maternal emotional well-being of a new mother at six to eight weeks post partum. The perception of postnatal support may have given the new mother the feeling that she was being cared for and loved by her husband and other members of the family. This type of feeling may have acted as a protection against anxiety (Cohen and Wills, 1985) and ultimately reduced symptoms of depression in the new mothers (Stewart et al., 2003). This relationship highlights the importance of husbands' support during childbirth on the emotional well-being of new mothers during the postnatal period. However, to have more women benefit from this effect their husbands need to be educated to take an active role not only during childbirth but also from the time of conception through the postnatal period in Nepal. But this is challenging in the Nepalese context where husbands are not generally welcomed inside the antenatal clinics and labour rooms (Mullany, 2006). Therefore, adopting the policy to encourage and include husbands together with their pregnant wives during pregnancy and childbirth appointments is also required.

#### Limitations

There were a number of limitations to this study. First, we did not assign the subjects to the three groups randomly. Instead, it was done according to the availability of beds in the birthing unit where a support person was allowed. Secondly, the women were allowed to choose their labour companion. This may have increased the likelihood that women who had supportive husbands chose them as opposed to another type of companion. Thirdly, it should be noted that this study was conducted in a health-care facility with a sample of first-time expectant mothers, the majority of whom were Hindu, and whose educational qualification was higher than the national average (MOHP (Nepal), 2007). Moreover, in this study, 22.5% of the women were lost to follow-up. These women tended to have a lower family income and a record of attending fewer pregnancy appointments with their husbands. According to Patel et al. (2002) and Husain et al. (2006), these groups of women are more likely to receive a lower level of postnatal support and suffer from poor emotional well-being than the others. In this study, the impact of *lost-to-follow-up* may be considered minimum, since there were no significant statistical differences between the number of women lost in each group (Fig. 2) or between their background characteristics. To examine further the effect on the maternal well-being of new mothers when husbands provide CLS, additional studies are required based on a more rigorous study design and under different context not represented in this study.

#### Conclusion

Our findings suggest that CLS from husbands is associated with an increase in the postnatal support perceived by first-time

Nepali mothers. Furthermore, this perceived postnatal support was associated with reduced maternal anxiety, which in turn was related to lower levels of depression in new mothers at six to eight weeks post partum. This finding can be used to highlight the importance of CLS from husbands on postnatal support and on the emotional well-being of a new mother in urban Nepal, and in other countries with a similar social context. However, further research is needed to understand why CLS provided by husbands contributes to an increase in the level of postnatal support perceived by their wife.

### Conflict of interest statement

None declared.

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