

## ORIGINAL ARTICLE

# Giving sleep position advice in pregnancy: Will we make women anxious?

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**Background:** There is now robust evidence that when women settle to sleep on their back in late pregnancy (>28 weeks) they are at increased risk of stillbirth. Therefore, there are several stillbirth prevention programs worldwide that have begun advising pregnant women to adopt a side position when settling to sleep in late pregnancy. However, some hold concerns that giving women information about sleep position and stillbirth risk may make them anxious.

**Aim:** This study aimed to determine what influences how 'safe sleep' messages are perceived by pregnant women and if there is anxiety associated with receiving this message.

**Materials and Methods:** An online survey of 537 Australian women ( $n = 97$  were 'currently pregnant'). The survey examined participant's views regarding sleep position messages, type of information source as well as participant characteristics such as general anxiety and their fetal health locus of control (FHLC).

**Results:** Our findings suggest that the FHLC may influence how health messaging regarding sleep in pregnancy is perceived and acted upon. We have also shown a subset of pregnant women may feel anxiety associated with the sleep position in pregnancy message. This may not be related to history of anxiety, but rather to their higher 'internal' FHLC, ie those who reflect a greater sense of personal agency over fetal health.

**Conclusions:** Our findings suggest most women will perceive information about settling into sleep position as informative rather than anxiety provoking. Therefore, maternity care providers should not be overly concerned about provoking anxiety when providing this information.

**KEYWORDS**

pregnancy messaging, Fetal Health Locus Of Control, sleep position

## INTRODUCTION

Maternity care providers generally take care to avoid provoking maternal anxiety in pregnancy because it is associated with adverse birth outcomes.<sup>1,2</sup> However, with the emergence of

maternal settling-to-sleep position being one potential modifiable risk factor for stillbirth,<sup>3</sup> it is timely to examine if giving messages about ways to reduce risk of stillbirth will raise anxiety and if health beliefs might affect the way these messages are received and acted upon.

Note corresponding author's current address is different from where the research was conducted.

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The Fetal Health Locus of Control (FHLC) scale was developed in 1986 to 'facilitate the prediction of identifiable antecedent factors contributing to compliance with health-related recommendations during pregnancy'<sup>4</sup> (p.814). The scale consists of three subscales, assessing whether respondents consider their own behavioural choices ('Internal'), the behavioural advice of health professionals ('Powerful Others'), or that of chance ('Chance'), is responsible for their unborn baby's health. Several studies have demonstrated the scale's utility for determining the effectiveness of different types of health messaging in pregnancy.<sup>5,6</sup>

The research question for this study was: what influences how 'safe sleep' messages are perceived by pregnant women and is there is any anxiety associated with receiving this message?

## MATERIALS AND METHODS

An online survey was hosted on SurveyMonkey, open in July and August, 2014 (data downloaded on August 26, 2014). Please note, the survey was administered when left-sided sleep was recommended as the safest sleeping position, before the work which now suggests either side is safe.<sup>3</sup>

### Survey design

The survey consisted of demographic questions including age, country of residence, education, pregnancy history, and model of care for those indicating that they were currently or previously pregnant.

Following the demographic questions, participants were asked to read and respond to a short vignette about 'Jenny' (see Figure 2). The vignette content was based on research regarding sleep position, available at the time.<sup>7</sup> They were able to choose from a series of adjectives including *anxious* and *informed*, for what they thought Jenny's strongest feeling would be. They were then provided with the same series of words to choose what their own response might be.

Respondents also indicated whether they had pre-existing knowledge about sleeping on the left side during pregnancy, and were asked to identify a range of sources from where they had heard the message (Figure 2).

We then posed two questions taken from the Antenatal Risk Questionnaire<sup>8</sup> aimed at determining general anxiety and worry, namely: 'Have you ever had two weeks or more when you felt particularly worried, miserable or depressed?' (yes/no), and 'How true is the following statement a reflection of you...I consider myself to be a general worrier?' (1 = very true, 5 = not at all true).

The final section of the survey was for those who were currently or previously pregnant. They were asked to complete the 18-item FHLC scale.<sup>4</sup> These respondents were also asked to rate on five-point Likert scales, how seriously they perceived the message of left-sided sleep to be and how anxious they felt about sleeping on their left side.

### Sampling

Convenience sampling<sup>9</sup> was used to recruit from community (local libraries, community centres, and the participating university) via advertised flyers containing a 'tear off' survey website link. Snowball sampling<sup>9</sup> was also encouraged by asking participants to forward on the website link to other potential participants through their social networks.

It was estimated that 150 participants would be needed to provide sufficient power ( $1-\beta = 0.80$ ) to detect between a small to large effect size ( $d = 0.41-1.47$  from Wulandari et al.<sup>6</sup>), at a significance level of 0.05.<sup>10</sup>

### Data analysis

Responses were imported from the survey platform to Jamovi version 1.6.18.0 for analysis.<sup>11</sup> There were 537 survey respondents. Dropout through the progression of the survey and final numbers for analyses in each section are shown in the Consort Diagram (Figure 1). After excluding those with missing data for the first vignette, there were 462 respondents in the dataset. Of these respondents, 97 were currently pregnant, 259 had previously been pregnant, and 106 had never been pregnant.

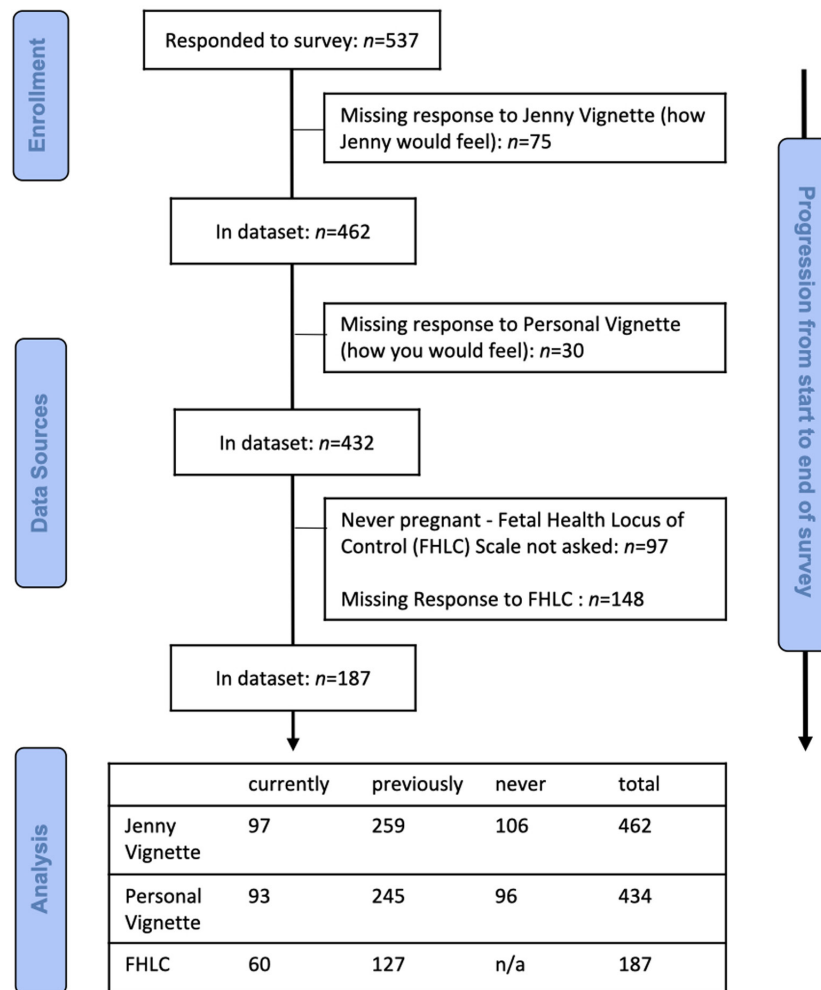
Analysis of variance (ANOVA) was used to compare age and 'general worrier' scores between currently, previously, and never pregnant groups.  $\chi^2$  tests were used to examine differences in the proportion of respondents reporting a history of feeling worried, miserable, or depressed for at least two weeks. Independent samples *t*-tests were conducted to compare how seriously they perceived left-sided settling-to-sleep messaging, how anxious they were about it during their current/most recent pregnancy, and FHLC subscale scores between those who were currently, and those who were previously pregnant.

Binary logistic regression models were run with dependent variables of endorsement of the top four responses to the vignette, *informed*, *concerned*, *anxious*, and *worried* (one model for each adjective, yes/no), and independent variables of the focus of the vignette ('You'/Jenny) and pregnancy history (currently, previously, never).

Finally, Pearson *r* correlations were conducted to examine relationships between perceived seriousness of the message, feeling anxious about sleeping on the left, *Internal*, *Powerful Others*, and *Chance* FHLC scores, being a 'general worrier' and history of feeling depressed, miserable, or anxious.

### Ethical considerations

Human research ethics approval was sought and gained from the University of South Australia's Human Research Ethics Committee, approval number 0000033096. The survey was anonymous. A participant information sheet was embedded into the first page of



**FIGURE 1** Consort diagram illustrating data flow from respondent survey commencement, through to number of observations for analysis for each variable.

the survey. Consent was indicated when the participant pressed the 'I agree' button to commence the survey.

## RESULTS

### Participants

Respondents were mainly from Australia (90%), with the remainder from New Zealand (4%), and other countries including Scotland, Italy, and the United States. The majority of the sample had undertaken tertiary education, with 45% holding undergraduate university, or technical and further education (TAFE) qualifications and 21% holding postgraduate university qualifications. Care provision for those who were currently pregnant was split between private obstetrician/consultant care (44.5%) midwife led care (31%) and shared care with a general practitioner (GP) (23%), and 36% were nulliparous.

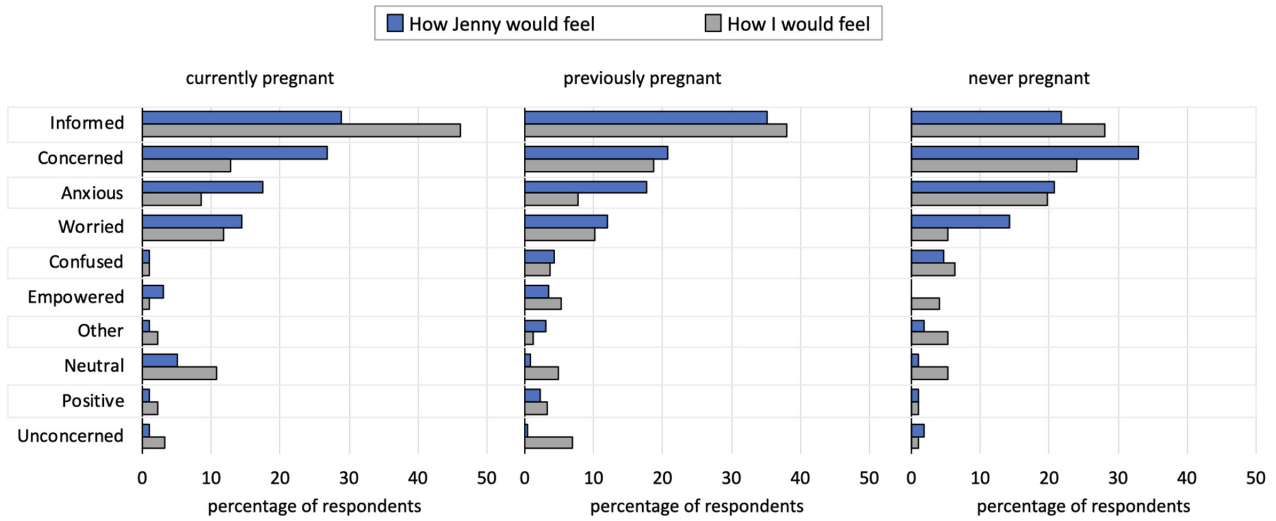
The mean age of respondents was 30.1 years ( $\pm 8.9$ ). Those who were currently (mean = 29.4  $\pm$  5.2 years) or previously pregnant (mean = 33.3  $\pm$  9.4 years) had a higher mean age than those who had never been pregnant (mean = 23.6  $\pm$  6.5 years,  $F_{2,287,5} = 85.4$ ,

$P < 0.001$ ). The proportion of respondents reporting a history of feeling worried, miserable, or depressed for at least two weeks was lower for those who were currently (43.1%) or previously pregnant (55.6%) than those who had never been pregnant (77.2%,  $\chi^2 = 22.9$ ,  $P < 0.001$ ). Reported and general worry scores indicated stronger endorsement of being a 'general worrier' for those reporting they had never been pregnant (mean = 2.5  $\pm$  1.2,  $F_{2,189,9} = 5.34$ ,  $P \leq 0.006$ ) compared to those who were currently (mean = 2.9  $\pm$  1.1) and previously pregnant (mean = 2.9  $\pm$  1.1). There were no significant differences in perceived seriousness or anxiety associated with left-sided sleep, or in FHLC control subscale scores between those who were currently pregnant compared with those who were previously pregnant.

### Response to message comparing 'Jenny' vignette with personal response

After reading Jenny's vignette (Figure 2), participants were asked how Jenny might feel. The top four responses were *informed*, *concerned*, *anxious*, and *worried*. For those reporting no pregnancy history, the most endorsed reaction to Jenny's vignette

Jenny is in the last three months of her very first pregnancy. She hears that if a woman sleeps on her back during the last three months of her pregnancy, then it is possible that the enlarged uterus can place pressure upon a large blood vessel and limit blood flow to the placenta. This may prevent oxygen from being delivered to the unborn baby. Jenny then also hears that a woman should perhaps instead maintain sleep on her left side, as this may allow for a greater amount of oxygen to be delivered to the unborn baby.



**FIGURE 2** Response to vignettes. Response to vignettes for how Jenny would feel vs how I would feel. The results are compared, display split by pregnancy history (currently, previously, never pregnant).

was *concerned* whereas for those who were currently or previously pregnant, the most endorsed reaction was *informed*. When asked to imagine the vignette applying to themselves personally, respondents more strongly endorsed *informed*, rather than the other reactions.

The differences in proportions between vignette responses to ‘How I would feel’ compared with ‘How Jenny would feel’ for the top four responses (*informed*, *concerned*, *anxious*, and *worried*) are displayed in Figure 2. A higher proportion of respondents felt they would feel *informed* and for Jenny, proportions were higher for *concerned*, *anxious*, and *worried*. The odds of responding that the person in the vignette would feel *informed*, were 36% higher when the reference person was themselves, rather than Jenny ( $P = 0.036$ ). Compared to those who had never been pregnant, the odds of reporting that the person would feel *informed* were approximately 80% higher ( $P < 0.01$ ) (Figure 3). The odds of responding that Jenny would feel *concerned* or *anxious*, were 29% and 49% lower, respectively, when the reference person was themselves, rather than Jenny ( $P < 0.05$ ). Compared to those who had never been pregnant, the odds of reporting that Jenny would be *concerned* or *anxious* were lower for those with pregnancy experience, and this was statistically significant for those who had previously been pregnant ( $P < 0.05$ ).

### Response to message relationship with locus of control

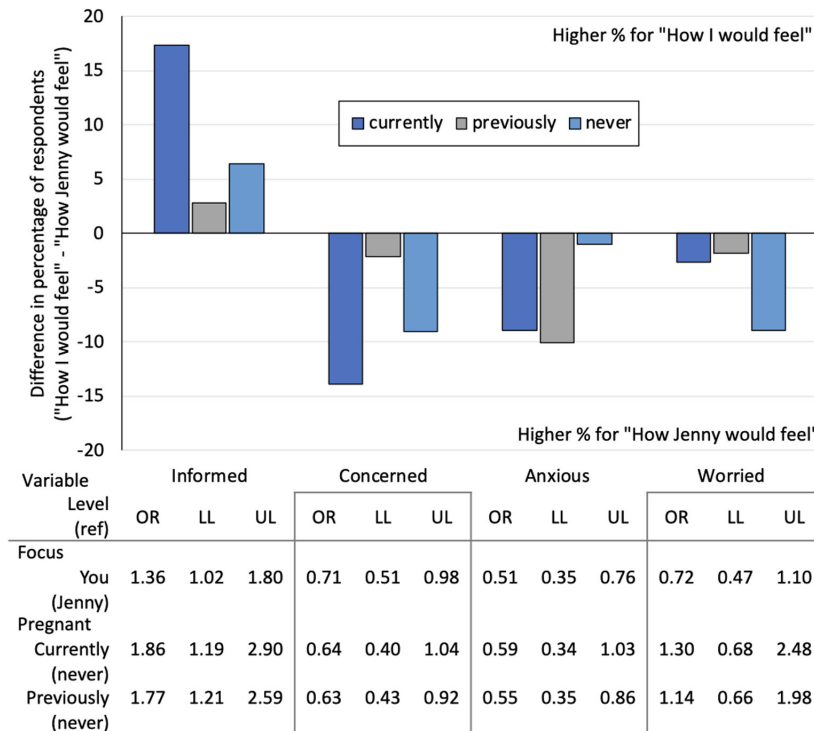
For those who were currently or previously pregnant, half of respondents reported they perceived messages about sleeping

on their side as very serious or serious and 22% reported they were very anxious or anxious about it during their most recent pregnancy. Higher Internal FHLC and higher Chance FHLC was associated with higher perceived seriousness and anxiousness but was not related to being a general worrier. Higher Powerful Others FHLC scores were related to higher general worrier scores (Figure 4).

## DISCUSSION

Our findings suggest that FHLC may influence how health messaging regarding sleep in pregnancy is perceived and acted upon. We have also shown a subset of pregnant women may feel anxiety associated with the sleep position in pregnancy message. Interestingly this may not be related to history of anxiety, but rather may be related to their higher ‘internal’ FHLC, meaning that provoking a level of concern in this group probably assists in uptake of the message. We also noted that our participants were more likely to endorse feelings of anxiety about sleep-on-side messages in relation to hypothetical others rather than themselves.

The FHLC scale assesses whether a pregnant woman perceives her own behavioural choices as being personally responsible for the health of her unborn baby. For example, research based on this scale suggests that women who score higher on the ‘internal’ subscale are more likely to engage in health behaviours such as physical exercise<sup>12</sup> or taking iron supplements.<sup>6</sup> Our findings suggest that women who score higher on the ‘internal subscale’ are also more likely to choose a side settling-to-sleep position at the end of



**FIGURE 3** Response to vignettes. Upper panel shows the difference in the proportion of respondents endorsing each of the top four adjectives (informed, concerned, anxious, worried), comparing ‘How I would feel’ with ‘How Jenny would feel’. Lower panel displays odds ratios (OR), and 95% confidence interval lower limits (LL) and upper limits (UL) for binary logistic regression models specifying endorsement of each adjective (yes/no) as the dependent variable, and independent variables of the focus of the vignette (‘You’/‘Jenny’) and pregnancy history (currently, previously, never). The reference level for each variable is provided in brackets.

pregnancy but that receiving this message may make this subset of women feel anxious. However, it is not known if women with an internal FHLC also feel anxious about all other health messaging during pregnancy such as avoiding soft cheese to prevent listeriosis or alcohol to prevent fetal alcohol spectrum disorder. It seems unlikely that safe sleep messaging would be more anxiety provoking than any other messaging routinely delivered in pregnancy; however, further research is warranted to determine if this is the case.

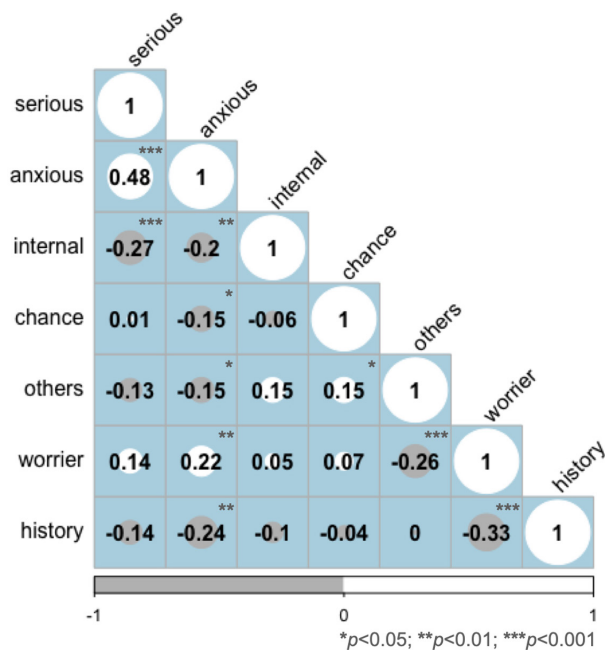
Previous research has demonstrated that women who consider their unborn baby’s health lies largely under the care of ‘Powerful Others’ such as their maternity care provider, are more likely to be influenced by their provider’s advice. For example, an online survey study of 223 women with a history of primary caesarean section reported that participants were more likely to agree with their physician and undergo a planned repeat elective caesarean delivery if they scored higher on the ‘Powerful Others’ subscale.<sup>13</sup> Participants in this subgroup were also more likely to endorse ‘general worry’. Further research is needed to explore links between reliance on advice from ‘Powerful Others’ and general worry.

Finally, those women who consider their unborn baby’s health is due to that of fate (assessed via the ‘Chance’ subscale) may be harder to reach with health messaging. For example, Ashford and Raynes<sup>5</sup> surveyed 210 participants to determine how the FHLC scale influenced their antenatal behaviours. They reported that women who experienced preterm birth and those who smoked

during pregnancy scored significantly higher on the ‘Chance’ subscale than those who had term infants. This suggests that messaging for women who consider that fate plays a major role in their pregnancy outcome may consider there is little they can do to change their pregnancy outcome. They therefore should be provided with clear messages that taking action, such as going to sleep on their side from 28 weeks, has been shown to be an effective way to reduce the risk of adverse pregnancy outcomes.

It can be assumed that imagining how someone else might feel and imagining how you might feel in the same situation might be the identical form of perspective taking.<sup>14</sup> In this study we have demonstrated that this is not necessarily the case. When our participants were faced with a choice about how an imagined other might feel regarding the sleep-on-side message, there was far greater endorsement of ‘anxiety’ with respect to another but ‘informed’ with respect to self. While further research is needed with respect to this finding, it suggests that while the sleep-on-side messaging might seem to be anxiety provoking to some it is more often seen as informative to the woman herself. Care should therefore be taken when withholding this information from pregnant women for fear of provoking anxiety because this may only be the perspective of the information giver rather than the person receiving the information.

Our findings suggest that when maternity care providers give information about ‘safe’ sleep position in pregnancy it is important



**FIGURE 4** Correlogram. Displays correlation matrix for perceived seriousness (serious, 1 = very) and anxiety related to left-sided sleep (anxious, 1 = very), Internal, Chance, And Powerful Others (others) Fetal Health Locus Of Control (54 = highest score), general worrier rating (worrier, 1 = very true) and history of feeling worried, miserable, or depressed for at least two weeks (history) for respondents who were currently or previously pregnant. Size of the circles represents the strength of the correlation, with positive relationships in white and negative relationships in grey.

to consider the pregnant woman's FHLC as this will influence how she perceives and acts upon this messaging. Maternity care providers should be aware there is a distinct difference between how safe sleep messages are perceived by the message sender and the message receiver with the later more likely to perceive these as informative. Further research into ways to inform women about the importance of sleep position taking into account their FHLC is warranted.

## LIMITATIONS

The data were collected in 2014 and since then recommendations regarding safe sleep position in pregnancy have changed. However, the age of the data is unlikely to have consequences for the interpretation of findings related to the study question. Also, these findings may provide a historical baseline for evaluation studies of initiatives involving health messaging in pregnancy.

Another potential limitation is the composition of the sample because there is a different proportion of highly educated survey respondents than may be found in the general population. While this is a typical demographic for surveys of this type, some caution should be taken when generalising results to other demographic groups.

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