Development of the Labor Pain Relief Attitude Questionnaire for Pregnant Women (LPRAQ-p)

Lianne P Hulsbosch (l.p.hulsbosch@tilburguniversity.edu)  
Tilburg University

Ivan Nyklíček  
Tilburg University

Eva S Potharst  
University of Amsterdam

Myrthe GBM Boekhorst  
Tilburg University

Victor JM Pop  
Tilburg University

Research article

Keywords: Attitude, Labor pain relief, Epidural analgesia, Antenatal, Validation

DOI: https://doi.org/10.21203/rs.3.rs-55944/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License
Abstract

**Background:** Receiving epidural analgesia during labor can possibly have negative consequences for mother and child. Yet, the use of epidural analgesia rapidly increased in the Netherlands over the last decade. Since antenatal plans for labor pain relief have been related to epidural analgesia use during labor, the aim of the current study was to develop a Labor Pain Relief Attitude Questionnaire for pregnant women.

**Methods:** Three focus groups interviews were conducted with pregnant women, new mothers and caregivers and 13 candidate items were derived. Psychometric properties were tested with explorative factor analysis in sample I (N = 429) and a subsequent confirmatory factor analysis in a different sample II (N = 432).

**Results:** The explorative factor analysis suggested a two-factor seven-item solution: a ‘women's perception’ and ‘social environment’ subscale. The confirmatory factor analysis confirmed an excellent six-item model fit with appropriate internal consistency. Two-tailed t-tests showed that depressed women, women with pregnancy-related distress, nulliparous women and multiparous women with complications during previous delivery were more willing to use labor pain relief during pregnancy.

**Conclusions:** This study showed the Labor Pain Relief Attitude Questionnaire for pregnant women to be a valid instrument to evaluate attitude towards labor pain relief in pregnant women. Since high scores suggest low self-efficacy towards labor, this instrument may be a valuable screening instrument to indicate the women who may benefit from extra help and support during pregnancy and labor.

**Background**

Labor pain is an inevitable part of childbirth, and is one of the most severe types of pain a woman will endure in comparison to other painful experiences (1, 2). Labor pain consists of both visceral and somatic pain (3), and its severity is associated with the intensity, duration and frequency of the uterine contractions and increases with greater cervical dilatation (4, 5). Labor pain is a complex phenomenon involving sensory, emotional and cognitive factors (5). Especially the cognitive factor, i.e. the meaning attached to pain during labor and the expectations with regard to this pain, is crucial to how women experience labor, since it determines their coping behavior and the extent to which they can successfully adapt to labor pain (6).

Antenatal expectations of labor pain are important in how pregnant women wish to manage their pain in labor (7). However, it is difficult for pregnant women to imagine what labor pain would feel like, even for multiparous women it is difficult to recall the labor pain they already have experienced before (8). To avoid excessive pain in labor and to be able to cope with the pain, many women request epidural analgesia (EA) for pain relief during labor, which is often planned during pregnancy (9, 10). Several factors have been associated with the request for pain relief during labor, such as antenatal pain catastrophizing (11), antenatal fear of childbirth (12–14), external locus of control (15), prior epidural
(16) and nulliparity (10, 17). It is reasonable to believe that previous childbirth experiences also play a role, as well as depression, since depression has been associated with expectations for negative outcomes in general (18, 19). Besides these personal factors influencing a woman's decision to request for pain relief during labor, a woman's attitude towards labor pain relief is influenced by cultural background, antenatal caregivers and social environment such as partner, family and friends (4, 9).

Although pain intensity scores are lower in women who receive EA during labor, a recently updated Cochrane review provided insight in the adverse effects of EA (20). Women who receive EA are more likely to have a prolonged first and second stage of labor and an increased need for additional oxytocin (20). Hypotension, motor blockade, fever and urinary retention have been related to EA as well (20). EA was found to be associated with a heightened risk of instrumental delivery, but when only considering trials performed after 2005 this association was annihilated (20). However, a recent study found an association between the duration of exposure to EA during labor and non-spontaneous births (21).

In the Netherlands, the use of EA rapidly increased in the last decade to 21.5% (22), but is still low compared to other Western countries like Finland, Belgium and the USA (adjusted for parity, between 68.9% and 71.0%) (23). Considering this increase in EA rate and the possibly negative consequences EA may have, it is important to gain more inside into a woman's attitude towards labor pain relief. It is especially important to obtain this knowledge in the antenatal period, since antenatal plans for EA are highly associated with receiving EA during labor (9). Also, pregnant women who plan to have EA were found to receive EA earlier in labor than women who prefer to avoid pain relief (9). As far as we know, no questionnaire has been developed that measures a pregnant woman's attitude towards labor pain relief, following a strict methodological protocol including focus group interviews followed by explorative factor, reliability and confirmatory factor analyses (24). Therefore, the primary aim of the current study was to construct a Labor Pain Relief Attitude Questionnaire for pregnant women (LPRAQ-p). The secondary aim was to investigate the reliability, concurrent and construct validity of this new instrument.

**Methods**

**Procedure**

Three focus groups were formed to discuss issues relevant to a pregnant woman's attitude towards labor pain relief. The first group consisted of three nulliparous and three multiparous pregnant women, the second group of six midwives and six maternity nurses and the third group of six women who had recently given birth. All interviews were conducted under supervision of two staff members from the Medical and Clinical Psychology department of Tilburg University and were recorded. An expert panel evaluated the interviews, discussed possible candidate items and eliminated double items until a consensus was reached, resulting in 13 candidate items. The items were formatted on a five-point scale, ranging from 1 (‘completely disagree’) to 5 (‘fully agree’), with higher scores indicating more willingness towards using labor pain relief. The questionnaire was subsequently distributed and completed by women at 32 weeks of pregnancy, as part of a large population-based cohort study, the Holistic Approach
to Pregnancy and the first Postpartum Year (HAPPY) study, the design of which is published elsewhere (25). The HAPPY study was approved of by the Psychology Ethics Committee at Tilburg University (protocol number EC-2012.25) and reviewed by the Medical Ethical Committee of the Máxima Medical Centre Veldhoven. Written informed consent was obtained from all women included in the study.

**Participants**

Between December 2012 and December 2013, a total of 861 women who were included in the HAPPY study cohort completed the 13-item LPRAQ-p at 32 weeks of pregnancy. These 861 participants were randomly divided into two subsamples. Data of sample I (N = 429) were used to perform an exploratory factor analysis (EFA) and reliability analysis, and of sample II (N = 432) to conduct a confirmatory factor analysis (CFA). Both samples met the criteria of four to ten subjects per item with a minimum of 100 subjects to conduct factor analyses (24). Because the characteristics of the two samples were identical, the data of both samples were subsequently merged to determine the concurrent and construct validity.

**Measurements**

Besides the 13-item version of the LPRAQ-p, the women completed the Dutch version of the Edinburgh Depression Scale (EDS) (26) and the Tilburg Pregnancy Distress Scale (TPDS) (27) at 32 weeks of pregnancy. In addition, lifestyle features such as smoking (yes/no) and alcohol intake (yes/no) during pregnancy were obtained. Several parameters were collected at baseline at 12 weeks of pregnancy. Demographic and psychological characteristics included age, level of education (low or medium/high (high = Bachelor’s or Master’s degree)), having a paid job (yes/no), living with a partner (yes/no) and depressive episode earlier in life (yes/no). Obstetric parameters included parity (primiparous/multiparous), unplanned pregnancy (yes/no) and problems with previous delivery (yes/no).

**EDS** The Dutch version of the EDS measured symptoms of depression during pregnancy. This 10-item questionnaire is validated in both postpartum (28, 29) and pregnant women(26). A cut-off score of 10 has been described in the third trimester (26). Total scores range from 0 to 30, with higher scores indicating more depressive symptoms. The EDS is a reliable instrument to screen for depressive symptoms in each trimester of pregnancy, with Cronbach’s alpha’s being .82, .83 and .84 per trimester respectively (26).

**TPDS** Worry symptoms about pregnancy and delivery were measured using the 11-item negative affect (TPDS-NA) subscale of the TPDS (27). The TPDS-NA subscale consists of three subcomponents, of which one was used in the current study, namely the 5-item subcomponent regarding worries about delivery (27, 30). The total score of the TPDS-NA subscale ranges from 0 to 33, with higher scores reflecting higher levels of pregnancy-related distress. The TPDS has been shown to be a valid and reliable instrument in Dutch pregnant women, with a Cronbach’s alpha of .81 for the TPDS-NA (27, 30). In a review, the internal consistency and structural validity of the TPDS were evaluated as excellent (31).

**Statistical methods**
Statistical analyses were performed using the Statistical Package for Social Sciences (SPSS version 24, IBM, Chicago IL, USA). CFA was carried out using AMOS (version 24, IBM, Chicago, IL, USA).

**Factor analyses** EFA was performed on the full 13-item version of the LPRAQ-p in sample I. A principal component analysis with scree plot was used to select factors for retention. Factor loadings above .40 were considered important. Items that loaded on more than one dimension were retained when the difference exceeded .20. Internal consistency was assessed by Cronbach's alpha for the total scale and possible subscales derived from factor analysis.

Subsequently, CFA was performed on the remaining items of the LPRAQ-p in sample II to test the stability of the factor structures found with EFA. The comparative fit index (CFI), normed fit index (NFI), Tucker-Lewis Index (TLI), and the root mean square error of approximation (RMSEA) were assessed to evaluate model fit. Excellent model fit can be assumed with a CFI $\geq 0.80$, NFI $\geq .80$, TLI $\geq 0.80$, and RMSEA $\leq 0.05$ with an appropriate lower bound set at 0.04 (32, 33).

**Concurrent and construct validity** Concurrent validity was tested by correlating the LPRAQ-p with previously validated measures: the EDS, the TPDS-NA and the worries about delivery subcomponent of the TPDS-NA (Pearson's $r$ correlations, two-tailed). Construct validity of the LPRAQ-p was examined using hypothesis testing by comparing its scores in various subgroups of women during pregnancy. First, it was examined by using the cut-off score of 10 for the EDS. The cut-off score for the TPDS-NA was defined as the corresponding percentile with the cut-off of 10 for the EDS. Two-tailed $t$-tests were used to analyze differences in mean scores on the LPRAQ-p between the two groups of women scoring above the cut-off for both the EDS and the TPDS-NA. Second, differences in mean scores on the LPRAQ-p were examined using a two-tailed $t$-test between nulliparous and multiparous women, and between multiparous women who reported complications during previous delivery and multiparous women who reported no complications.

The following hypotheses were tested: (i) depressed women (EDS $\geq 10$) and women with pregnancy-related distress (TPDS-NA $\geq$ cut-off) will have higher scores on the LPRAQ-p than women who do not score above cut-off on these questionnaires, (ii) nulliparous women will score higher on the LPRAQ-p compared to multiparous women, (iii) multiparous women without serious complications during a previous delivery will have lower scores on the LPRAQ-p compared to those with complications.

**Results**

**Factor analyses**

The women in samples I and II had similar characteristics (Table 1). All items were normally distributed in sample I. Items 2 and 5 were eliminated based on face validity. The Kaiser-Meyer-Olkin index was greater than .60 (.80) and the Bartlett's test of sphericity value was significant ($p < .001$). The scree plot suggested a two-factor solution with a total explained variance of 47.4%, with a 'women's perception' factor and a 'social environment' factor (Table 2). The component correlations between the two factors
were found to be smaller than .30 (.04) with direct oblimin rotation, therefore varimax rotation was used. Items 4 and 6 loaded on both factors with a difference smaller than .20 and were therefore eliminated. Reliability analyses showed a Cronbach's alpha of .79 for the six-item women's perception subscale, which increased to .84 after deletion of items 1 and 3. The three-item social environment subscale had a Cronbach's alpha of .60, and the total seven-item LPRAQ-p had a Cronbach's alpha of .77.

Subsequently, CFA was performed on the seven-item LPRAQ-p in the second sample, and showed a moderate model fit (CFI = .97, NFI = .95, TLI = .95, RMSEA = .08, lower bound = .05). However, item 7 showed poor standardized residual co-variances. After removing this item, a two-factor structure with six items showed an excellent model fit (CFI: .99, NFI: .98, TLI: .99, RMSEA: .02, lower bound: .01). EFA with varimax rotation was repeated in sample II on the six-item LPRAQ-p, again resulting in a two-factor structure explaining 65.9% of the variance (Table 3). The Cronbach's alpha was .78 for the three-item women's perception subscale, .67 for the three-item social environment subscale, and .75 for the total LPRAQ-p. The items were recoded from 1-5 to 0-4, with total scores ranging from 0 to 24. Higher scores indicated greater willingness for primary pain relief at the start of labor.

**Concurrent and construct validity analyses**

For concurrent and construct validity analyses, both samples were merged (N = 861). Skewness and kurtosis values showed a normal distribution of the 6-item scale. As shown in Table 4, total EDS scores were significantly associated with the total labor pain relief attitude scores ($r = .133, p < .001$) as well as with the scores on the women's perception subscale ($r = .134, p < .001$) and social environment subscale ($r = .076, p = .025$), all small effect sizes. The TPDS-NA subscale scores and the worries about delivery subcomponent scores were significantly associated with the total pain relief attitude scores (TPDS-NA, $r = .223, p < .001$; TPDS-NA worries about delivery, $r = .250, p < .001$; both small to medium effect sizes). The TPDS-NA and worries about delivery scores were also significantly associated with the women's perception subscale scores (TPDS-NA, $r = .243, p < .001$; TPDS-NA worries about delivery, $r = .267, p < .001$; both small to medium effect sizes) and social environment subscale scores (TPDS-NA, $r = .104, p = .002$; TPDS-NA worries about delivery, $r = .125, p < .001$; both small effect sizes).

Next, construct validity was assessed by hypothesis testing. In the third trimester of pregnancy, 125 (14.5%) of the 861 women scored above the EDS cut-off score ($EDS \geq 10$), categorized as depression. These depressed women had significantly higher attitude towards labor pain relief scores, compared to women without depression (Mean (SD) = 7.4 (4.2) and Mean (SD) = 6.2 (3.6) respectively, $t(156) = -3.00, p = .003$, Cohen's $d = .31$, small effect size).

The cut-off score of the TPDS-NA subscale was defined at the 86th percentile of third trimester pregnant women, which resulted in a cut-off score of 11. In total, 141 (16.4%) women scored above the TPDS-NA cut-off score, categorized as pregnancy-related distress. Women with pregnancy-related distress scored significantly higher on the LPRAQ-p, compared to women without pregnancy-related distress (Mean (SD)
Nulliparous women scored significantly higher on the LPRAQ-p compared to multiparous women (Mean (SD) = 6.7 (3.6) and Mean (SD) = 6.1 (3.7) respectively, t(845) = 2.29, p = .022, Cohen's $d = .16$, small effect size). Of the sample of pregnant women, 402 were multiparous. These women were asked for possible complications during a previous delivery. A total of 245 women (62.5%) reported no complications: group 1. Sixty-nine women (17.6%) reported complications regarding poor progression of labor (such as delayed dilation phase, secondary Caesarean section, use of ventouse or forceps and fetal hypoxia): group 2. Seventy-eight women (19.9%) reported miscellaneous complications (such as prolonged second stage of labor, primary Caesarean section and fetus in breech position): group 3. When comparing attitude towards labor pain relief scores between group 1 and 2, women who reported no complications had a significantly lower score (Mean (SD) = 5.8 (3.8) and Mean (SD) = 7.1 (3.7) respectively, t(312) = -2.57, $p = .01$, Cohen's $d = .35$, small effect size).

Discussion

The current study aimed to develop and validate a questionnaire that measures a pregnant woman's attitude towards labor pain relief. The LPRAQ-p was developed based on the outcome of focus group interviews. Subsequent validation analyses using EFA and CFA showed that the six-item LPRAQ-p has good psychometric properties: a two-factor structure with acceptable to good internal consistency and excellent model fit.

A Cronbach's alpha between .60 and .70 indicates an acceptable level of reliability and a Cronbach's alpha between .70 and .80 a good level (34). Both the women's environment subscale and the total LPRAQ-p have good reliability scores (all above .75), while the social environment subscale has acceptable reliability scores (above .60). It must be noted that a recommended Cronbach's alpha of $\geq .70$ has been described as well(24). However, Cronbach's alpha is very sensitive to the number of items and especially in an ultra-short scale this cut-off of .70 can be regarded as arbitrary (35).

Results showed that the LPRAQ-p consists of two subscales, including a women's perception subscale. Two items of this subscale refer to beliefs a woman can have towards the outcome of receiving EA: the belief that she feels more self-confident during labor (item 9) and performs much better (item 10) with EA. Remarkably, the confidence women have in their ability to cope with labor is of major importance to how they perceive pain during labor (36, 37). This self-efficacy for labor has been related to decreased pain perception during labor (38, 39). This could imply that a woman's belief of not being able to cope with labor without EA involves an enhanced pain perception during labor, which increases the request for EA even further. Indeed, confidence in the ability to cope with labor has been related to decreased pain medication use during labor (40). The third item of the women's perception subscale comprises a general belief towards pain in labor (item 12), and addresses how women anticipate labor pain. Women can approach labor as a medical event with risks or as a normal and natural process (41). When viewing
labor as a medical event, it is more likely that women wish to eradicate the pain with EA. However, when women view labor as a natural process they are more willing to embrace the pain, which enhances the coping ability (42–44). An interesting paradox in these women is that despite its challenging nature, they need the pain because it facilitates birth and therefore the joy and happiness of meeting their baby (45).

The second subscale of the LPRAQ-p is the social environment subscale, containing two partner items and one item concerning family and friends. Item 8 involves the influence of the anticipated partner's needs during labor. For a partner, the major challenge during labor is to see his loved one suffering from pain (46), which can make the partner feel frustrated and helpless (47). However, being helpful is what a woman in labor needs most from her partner (48). Receiving EA has been associated with decreased partner anxiety and stress and an increased partner support and helpfulness during labor (49). This implies that a woman may be more willing to ask for labor pain relief for both her partner's wellbeing and her own need of support. The other two items of the social environment subscale refer to influences of the attitudes towards labor pain relief of respectively the partner (item 11), and family and friends (item 13). Interestingly, a previous study found that a partner's preference for EA was related to receiving EA, while a partner's preference for labor without EA had no effect (16). In addition, being encouraged by family and friends to ask for EA was reported as a reason that women were more willing to request labor pain relief during pregnancy (16). Moreover, family members and friends with children can influence childbirth expectations by providing stories about their own childbirth experiences (41, 50). Especially the stories regarding bad experiences may enhance a woman's willingness to ask for labor pain relief (41).

With regard to concurrent validity, the LPRAQ-p and its subscales were significantly correlated with symptoms of depression, pregnancy-related distress and worries about delivery. Moreover, regarding construct validity, depressed women and women with pregnancy-related distress were found to have significantly higher scores on the LPRAQ-p. These findings correspond to previous studies reporting an association between antenatal fear of childbirth and request for labor pain relief (12–14). Fear of childbirth has been related to fear of pain (51) and lower childbirth self-efficacy (52), and both seem to be important factors in a woman's attitude towards labor pain relief. This also applies to negative experiences provided by others, which has been related to fear of childbirth as well (53). Furthermore, a link between fear of childbirth and negative mood has been reported (53), which may explain our results regarding depression. Moreover, depression has been related to expectations for negative outcomes in general (18, 19). It could be speculated that depressed women are more likely to approach labor as a medical event with risks, with greater willingness to suppress the pain.

Furthermore, with regard to construct validity, nulliparous women were more willing to request labor pain relief, which was also reported in previous studies (10, 17). It is likely that multiparous women have more confidence in their ability to cope with labor, because they succeeded in giving birth before. Indeed, a recent study found that multiparous women reported higher childbirth self-efficacy scores compared to nulliparous women (52). Multiparous women with a history of complications during a previous delivery were more likely to request labor pain relief. These women can have expectations that something similar will happen during the next delivery (41). This may contribute to an enhanced childbirth fear (54) and
likelihood of approaching labor as a medical event (41), and could therefore increase the preference for a pain free delivery.

A major strength of the current study relates to the fact that the development of the LPRAQ-p was based on direct input from pregnant women, new mothers and obstetric caregivers using focus group interviews. Other strengths include the large sample size and the performance of both EFA and CFA in different samples to validate the questionnaire. A limitation of the current study is that the participants were white Dutch women, while in the Netherlands up to 25% of the women have a migration background (11% Western and 14% non-Western)(55). Since cultural background influences a woman's attitude towards labor pain relief (4, 9), it is important to re-evaluate the psychometric properties of the LPRAQ-p in women of other ethnic groups. Also, the number of highly educated women was slightly higher in the current study compared to the national figures (65% versus 55%) (56), which may limit the generalizability of the results. With regard to the t-tests, mostly small effect sizes were found, which suggests that possible differences should be interpreted with caution.

What is the possible relevance of using this instrument? During the focus group interviews, it was identified that self-efficacy for labor seems to be an important part of attitude towards labor pain relief. This could imply that pregnant women with high scores on the LPRAQ-p can be viewed as women with low self-efficacy for labor. During pregnancy, an obstetric caregiver could advise these women to participate in a childbirth education course in order to strengthen their self-efficacy. Confidence to cope with labor has indeed been related to knowledge of labor and practical coping skills (57). Future research should investigate which childbirth education programs are most suitable for women with higher attitudes towards labor pain relief, and whether these programs are effective in reducing EA rates. Knowing which women score high on this questionnaire could also help obstetric caregivers to decide upon offering continuous support during labor (provided by the partner, a family member, friend or doula) (58). Continuous support is most helpful when it is provided by someone who is calm and trusted, with an accepting attitude and the ability to give a positive meaning to the pain (59). According to a recent Cochrane review, women who had continuous support during labor were less likely to receive EA (58).

**Conclusions**

The current study showed that the six-item LPRAQ-p is a short, valid and user-friendly instrument with good psychometric properties. The LPRAQ-p may be a valuable screening instrument during pregnancy, to screen for women who may benefit from extra help and support during pregnancy and labor, in order to potentially reduce EA rates and its possible negative consequences for both mother and child.

**Abbreviations**

CFA: confirmatory factor analysis; CFI: comparative fit index; EA: epidural analgesia; EDS: Edinburgh Depression Scale; EFA: exploratory factor analysis; HAPPY: Holistic Approach to Pregnancy and the first Postpartum
Declarations

Ethics approval and consent to participate

The HAPPY study was approved of by the Psychology Ethics Committee at Tilburg University (protocol number EC-2012.25) and reviewed by the Medical Ethical Committee of the Máxima Medical Centre Veldhoven. Written informed consent was obtained from all women included in the study.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Authors’ contributions

Material preparation and data collection were performed by VP. Hypotheses were generated by LH and VP. Data analyses were performed by LH and VP, and monitored by IN. The first draft of the manuscript was written by LH and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Acknowledgments

We would like to thank all the midwives for their contribution in recruiting participants and the participating women for their collaboration.

References
1. Beigi NM, Broumandfar K, Bahadoran P, Abedi HA. Women's experience of pain during childbirth. Iran J Nurs Midwifery Res. 2010;15(2):77-82.

2. Melzack R. The myth of painless childbirth (the John J. Bonica lecture). Pain. 1984;19(4):321-37.

3. Rowlands S, Permezel M. Physiology of pain in labour. Baillieres Clin Obstet Gynaecol. 1998;12(3):347-62.

4. Labor S, Maguire S. The Pain of Labour. Rev Pain. 2008;2(2):15-9.

5. Lowe NK. The nature of labor pain. Am J Obstet Gynecol. 2002;186(5 Suppl Nature):S16-24.

6. Escott D, Slade P, Spiby H. Preparation for pain management during childbirth: the psychological aspects of coping strategy development in antenatal education. Clin Psychol Rev. 2009;29(7):617-22.

7. Lally JE, Murtagh MJ, Macphail S, Thomson R. More in hope than expectation: a systematic review of women's expectations and experience of pain relief in labour. BMC Med. 2008;6:7.

8. Lally JE, Thomson RG, MacPhail S, Exley C. Pain relief in labour: a qualitative study to determine how to support women to make decisions about pain relief in labour. BMC Pregnancy Childbirth. 2014;14:6.

9. Goldberg AB, Cohen A, Lieberman E. Nulliparas' preferences for epidural analgesia: their effects on actual use in labor. Birth. 1999;26(3):139-43.

10. Schytt E, Waldenstrom U. Epidural analgesia for labor pain: whose choice? Acta Obstet Gynecol Scand. 2010;89(2):238-42.

11. Veringa I, Buitendijk S, de Miranda E, de Wolf S, Spinhoven P. Pain cognitions as predictors of the request for pain relief during the first stage of labor: a prospective study. J Psychosom Obst Gyn. 2011;32(3):119-25.

12. Adams SS, Eberhard-Gran M, Eskild A. Fear of childbirth and duration of labour: a study of 2206 women with intended vaginal delivery. BJOG. 2012;119(10):1238-46.

13. Logtenberg SLM, Verhoeven CJ, Oude Rengerink K, Sluijs AM, Freeman LM, Schellevis FG, et al. Pharmacological pain relief and fear of childbirth in low risk women; secondary analysis of the RAVEL study. BMC Pregnancy Childbirth. 2018;18(1):347.

14. Sitras V, Saltyte Benth J, Eberhard-Gran M. Obstetric and psychological characteristics of women choosing epidural analgesia during labour: A cohort study. PLoS One. 2017;12(10):e0186564.

15. Heinze SD, Sleigh MJ. Epidural or no epidural anaesthesia: relationships between beliefs about childbirth and pain control choices. J Reprod Infant Psyc. 2003;21(4):323-33.

16. Harkins J, Carvalho B, Evers A, Mehta S, Riley ET. Survey of the Factors Associated with a Woman's Choice to Have an Epidural for Labor Analgesia. Anesthesiol Res Pract. 2010.

17. Hueston WJ, McClain RR, Manseld CJ, Rudy M. Factors associated with the use of intrapartum epidural analgesia. Obstet Gynecol. 1994;84(4):579-82.

18. Haaga DA, Dyck MJ, Ernst D. Empirical status of cognitive theory of depression. Psychol Bull. 1991;110(2):215-36.
19. Lewinsohn PM, Larson DW, Muñoz RF. The measurement of expectancies and other cognitions in depressed individuals. Cogn Ther Res. 1982;6:437–46.

20. Anim-Somuah M, Smyth RM, Cyna AM, Cuthbert A. Epidural versus non-epidural or no analgesia for pain management in labour. Cochrane Database Syst Rev. 2018;5:CD000331.

21. Garcia-Lausin L, Perez-Botella M, Duran X, Mamblona-Vicente MF, Gutierrez-Martin MJ, Gomez de Enterria-Cuesta E, et al. Relation between Length of Exposure to Epidural Analgesia during Labour and Birth Mode. Int J Environ Res Public Health. 2019;16(16).

22. Perined. Jaarboeken Zorg in Nederland. 2018 [Available from: https://www.perined.nl/producten/publicaties/jaarboeken]. Accessed 8 June 2020.

23. Seijmonsbergen-Schermers AE, van den Akker T, Rydahl E, Beeckman K, Bogaerts A, Binfa L, Frith L, Gross MM, Misselwitz B, Hálfdánsdóttir B, Daly D, Corcoran P, Calleja-Agius J, Calleja N, Gatt M, Vika Nilsen AB, Declercq E, Gissler M, Heino A, Lindgren H, de Jonge A. Variations in use of childbirth interventions in 13 high-income countries: A multinational cross-sectional study. PLoS Med. 2020;17(5).

24. Kline P. The Handbook of Psychological Testing. London: Routledge; 1993.

25. Truijens SE, Meems M, Kuppens SM, Broeren MA, Nabbe KC, Wijnen HA, et al. The HAPPY study (Holistic Approach to Pregnancy and the first Postpartum Year): design of a large prospective cohort study. BMC Pregnancy Childbirth. 2014;14:312.

26. Bergink V, Kooistra L, Lambregtse-van den Berg MP, Wijnen H, Bunevicius R, van Baar A, et al. Validation of the Edinburgh Depression Scale during pregnancy. J Psychosom Res. 2011;70(4):385-9.

27. Pop VJ, Pommer AM, Pop-Purceleanu M, Wijnen HA, Bergink V, Pouwer F. Development of the Tilburg Pregnancy Distress Scale: the TPDS. BMC Pregnancy Childbirth. 2011;11:80.

28. Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. Br J Psychiatry. 1987;150:782-6.

29. Pop VJ, Komproe IH, van Son MJ. Characteristics of the Edinburgh Post Natal Depression Scale in The Netherlands. J Affect Disord. 1992;26(2):105-10.

30. Boekhorst M, Beerthuizen A, Van Son M, Bergink V, Pop VJM. Psychometric aspects of the Tilburg Pregnancy Distress Scale: data from the HAPPY study. Arch Womens Ment Health. 2020;23(2):215-9.

31. Evans K, Spiby H, Morrell CJ. A psychometric systematic review of self-report instruments to identify anxiety in pregnancy. J Adv Nurs. 2015;71(9):1986-2001.

32. Browne MW, Cudeck R. Alternative Ways of Assessing Model Fit. Sociol Method Res. 1992;21(2):230-58.

33. Hu LT, Bentler PM. Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. Psychol Methods. 1998;3(4):424-53.

34. Hulin C. Can a reliability coefficient be too high? J Consum Psychol. 2001;10(1-2):55-6.
35. Rammstedt B, Beierlein C. Can't We Make It Any Shorter? The Limits of Personality Assessment and Ways to Overcome Them. J Individ Differ. 2014;35(4):212-20.

36. Lowe NK. Explaining the Pain of Active Labor - the Importance of Maternal Confidence. Res Nurs Health. 1989;12(4):237-45.

37. Lowe NK. Critical Predictors of Sensory and Affective Pain during 4 Phases of Labor. Journal of Psychosomatic Obstetrics and Gynecology. 1991;12(3):193-208.

38. Crowe K, von Baeyer C. Predictors of a positive childbirth experience. Birth. 1989;16(2):59-63.

39. Wuitchik M, Hesson K, Bakal DA. Perinatal predictors of pain and distress during labor. Birth. 1990;17(4):186-91.

40. Manning MM, Wright TL. Self-efficacy expectancies, outcome expectancies, and the persistence of pain control in childbirth. J Pers Soc Psychol. 1983;45(2):421-31.

41. Fenwick J, Hauck Y, Downie J, Butt J. The childbirth expectations of a self-selected cohort of Western Australian women. Midwifery. 2005;21(1):23-35.

42. Callister LC, Vehvilainen-Julkunen K, Lauri S. Giving birth. Perceptions of Finnish childbearing women. MCN Am J Matern Child Nurs. 2001;26(1):28-32.

43. Lundgren I, Dahlberg K. Women's experience of pain during childbirth. Midwifery. 1998;14(2):105-10.

44. Whitburn LY, Jones LE, Davey MA, Small R. Women's experiences of labour pain and the role of the mind: An exploratory study. Midwifery. 2014;30(9):1029-35.

45. Van der Gucht N, Lewis K. Women's experiences of coping with pain during childbirth: a critical review of qualitative research. Midwifery. 2015;31(3):349-58.

46. Chandler S, Field PA. Becoming a father. First-time fathers' experience of labor and delivery. J Nurse Midwifery. 1997;42(1):17-24.

47. Chapman LL. Expectant fathers and labor epidurals. MCN Am J Matern Child Nurs. 2000;25(3):133-8.

48. Nichols MR. Paternal perspectives of the childbirth experience. Matern Child Nurs J. 1993;21(3):99-108.

49. Capogna G, Camorcia M, Stirparo S. Expectant fathers' experience during labor with or without epidural analgesia. Int J Obstet Anesth. 2007;16(2):110-5.

50. Tarkka MT, Paunonen M. Social support and its impact on mothers' experiences of childbirth. J Adv Nurs. 1996;23(1):70-5.

51. Sjogren B. Reasons for anxiety about childbirth in 100 pregnant women. Journal of Psychosomatic Obstetrics and Gynecology. 1997;18(4):266-72.

52. Schwartz L, Toohill J, Creedy DK, Baird K, Gamble J, Fenwick J. Factors associated with childbirth self-efficacy in Australian childbearing women. BMC Pregnancy Childbirth. 2015;15:29.

53. Melender HL. Experiences of fears associated with pregnancy and childbirth: a study of 329 pregnant women. Birth. 2002;29(2):101-11.
54. Saisto T, Ylikorkala O, Halmesmaki E. Factors associated with fear of delivery in second pregnancies. Obstet Gynecol. 1999;94(5 Pt 1):679-82.

55. StatLine. Bevolking; geslacht, leeftijd, generatie en migratieachtergrond, 1 januari. 2020 [Available from: https://opendata.cbs.nl/statline/#/CBS/nl/dataset/37325/table?fromstatweb]. Accessed 24 June 2020.

56. StatLine. Bevolking; onderwijsniveau; geslacht, leeftijd en migratieachtergrond. 2020 [Available from: https://opendata.cbs.nl/statline/#/CBS/nl/dataset/82275NED/table?fromstatweb]. Accessed 24 June 2020.

57. Walker B, Erdman A. Childbirth education programs: the relationship between confidence and knowledge. Birth. 1984;11(2):103-8.

58. Bohren MA, Hofmeyr GJ, Sakala C, Fukuzawa RK, Cuthbert A. Continuous support for women during childbirth. Cochrane Db Syst Rev. 2017(7).

59. Whitburn LY, Jones LE, Davey MA, McDonald S. The nature of labour pain: An updated review of the literature. Women Birth. 2019;32(1):28-38.

Tables
### Table 1
Characteristics of two samples of third trimester pregnant women (N = 861).

|                      | Sample I (N = 429) | Sample II (N = 432) |
|----------------------|--------------------|---------------------|
| **Demographics**     |                    |                     |
| N                    | 429                | 432                 |
| %                    |                    |                     |
| Age                  | 30.2 (3.5)         | 30.2 (3.7)          |
| Range                | 20–40              | 19–43               |
| High level of education | 273 (65.6)        | 272 (65.1)          |
| Paid job             | 377 (90.2)         | 393 (93.3)          |
| Living with partner  | 413 (98.6)         | 418 (99.1)          |
| **Pregnancy related**|                    |                     |
| Multiparity          | 199 (46.9)         | 205 (48.5)          |
| Unplanned pregnancy  | 23 (5.5)           | 27 (6.4)            |
| Problems with previous delivery | 71 (17.0) | 81 (19.2) |
| **Lifestyle features**|                     |                     |
| Smoking at 32 weeks  | 15 (3.5)           | 15 (3.5)            |
| Alcohol intake at 32 weeks | 14 (3.3) | 13 (3.0) |
| **Psychological features** |                 |                     |
| Depression earlier in life | 67 (16.1) | 59 (14.0) |
| EDS at 32 weeks      | 5.0 (4.1)          | 5.0 (4.2)           |
| TPDS-NA at 32 weeks  | 6.7 (4.6)          | 6.6 (4.6)           |
| TPDS-NA worries about delivery at 32 weeks | 2.8 (2.7) | 2.5 (2.4) |

Note: SD, standard deviation; High level of education, Bachelor’s or Master’s degree; EDS, Edinburgh Depression Scale; TPDS-NA, Negative Affect subscale of the Tilburg Pregnancy Distress Scale.
Table 2
Two-factor solution from explorative factor analysis (EFA) with varimax rotation in 429 (sample I) women who completed the 13-item LPRAQ-p.

|                      | Factor I | Factor II |
|----------------------|----------|-----------|
|                      | women’s perception | social environment |
| Eigenvalue            | 3.4      | 1.8       |
| Percentage of variance explained | 30.7 | 16.7 |
| 1. Pain relief makes me feel like I am not fully in control during labor | .66 |
| 2. Pain is part of the labor process |
| 3. Pain relief during labor means that medication is administered, which can affect my baby | .45 |
| 4. The fact that receiving medication for pain relief means that I have to give birth in the hospital, keeps me from asking for it | .45 | −.33 |
| 5. I think too little attention is paid to the possible pros and cons of pain relief | .70 | 0.27 |
| 6. Pain during labor will strengthen the bond with my baby | .50 | −.37 |
| 7. Because my pregnancy has already had a big impact on my body, I think it is normal to ask for pain relief | .72 | |
| 8. I also ask for pain relief because of my partner |
| 9. I am convinced that if I get pain relief, I will feel much more self-confident during labor | .72 | 0.44 |
| 10. Pain relief will help me perform much better during labor | .72 | .34 |
| 11. My partner plays an important role in the decision to ask for pain relief during labor | .65 |
| 12. Pain during labor is outdated | .67 | .33 |
| 13. My (social) environment (friends, relatives) plays an important role in the decision to ask for pain relief during labor | .65 |

Note: Items 2 and 5 were eliminated based on face validity. To retain items (bold, n = 9) a cut-off score of item loading of .40 was used and a minimum difference of .20 if an item had two loadings. Total explained variance is 43%.
Table 4
Correlation matrix with the six-item Labor Pain Relief Attitude Questionnaire for pregnant women (LPRAQ-p) and the third trimester symptoms of depression, pregnancy-related distress and worries about delivery (N = 861).

|          | 1. LPRAQ-p | 2. LPRAQ-p: women’s perception | 3. LPRAQ-p: social environment | 4. EDS | 5. TPDS-NA | 6. TPDS-NA worries about delivery |
|----------|------------|--------------------------------|--------------------------------|--------|------------|----------------------------------|
| 1. LPRAQ-p | 1          |                                |                                |        |            |                                  |
| 2. LPRAQ-p: women’s perception | 1          | 0.86***                        | 0.76***                        | 0.13***| 0.22***    | 0.25***                          |
| 3. LPRAQ-p: social environment | 0.33***    | 1                              | 0.13***                        | 0.24***| 0.26***    |                                  |
| 4. EDS    | 0.08*      | 0.10**                         | 1                              | 0.51***| 0.41***    |                                  |
| 5. TPDS-NA| 1          | 0.87***                        |                                |        |            |                                  |
| 6. TPDS-NA worries about delivery | 0.01       |                                |                                |        |            |                                  |

Note: *p < .05, **p < .01, ***p < .001 (two-tailed).

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Additionalfile1.pdf