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The Relationship Between Maternal Pain Levels and Satisfaction During Labor Among Women Giving Birth in Erbil, 2024-2025

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Abstract **Background and Aim:** Pain and satisfaction during labor are key indicators of the quality of maternal care. In Erbil, Iraq, there is limited research exploring how maternal pain levels influence satisfaction with childbirth. This study aimed to determine the relationship between maternal pain and satisfaction during labor among women giving birth in Erbil. **Methods:** This cross-sectional study was conducted at the Maternity Teaching Hospital in Erbil from December 1st, 2024, to February 15th, 2025, using a convenience sampling method. The questionnaire consisted of three parts: the first part collected demographic data, the second part assessed maternal satisfaction during labor and the third part measured pain using the Numeric Rating Scale (NRS). Data were analyzed using Stata version 12 (StataCorp LLC, College Station, TX). Pearson correlation analyses and multiple linear regression were conducted to assess the correlations between maternal pain, satisfaction and demographic variables. A p-value of less than 0.001 was considered statistically significant. **Results:** A total of 140 women participated in the study. The mean maternal pain score was 7.41±2.52, indicating a severe level of pain, while the mean satisfaction score was 12.36±6.54, reflecting a neutral level of satisfaction. Pearson correlation analysis showed a strong negative correlation between maternal pain and satisfaction ($r = -0.96$, $p<0.001$), suggesting that higher pain was associated with lower satisfaction. Multiple linear regression analysis confirmed that satisfaction was a significant predictor of maternal pain ($B = -0.37$, $p<0.001$), whereas demographic variables such as age, education, occupation, residential area, smoking, BMI and physical activity during pregnancy were not statistically significant predictors. **Conclusions:** There was a strong negative correlation between maternal pain and satisfaction during labor, indicating that increased pain significantly reduced satisfaction levels. It is recommended that policymakers and healthcare providers implement effective pain management strategies and enhance supportive care during labor to improve maternal satisfaction and overall childbirth experiences.

Key Words Maternal Pain, Satisfaction, Labor Experience, Childbirth, Nursing Care

INTRODUCTION

Childbirth constitutes one of the most profound physiological and psychological experiences in a woman's life, with pain serving as a central component of this process [1-3]. Labour pain is characterised as a complex, subjective and multidimensional experience influenced by a multitude of physiological, psychological, social and cultural factors [4-7]. The International Association for the Study of Pain defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage" [8]. During labour, this pain primarily arises from uterine contractions, cervical dilation and distension of the birth canal, resulting in one of the most intense pain experiences reported by women [4,9]. The management of labour pain has evolved significantly over time, transitioning from traditional cultural practices to contemporary pharmacological and non-pharmacological approaches [9]. Research indicates that between 70-80% of women report experiencing severe to excruciating pain during childbirth, thereby highlighting the universal nature of this experience across various cultures and healthcare settings [4,10]. Nevertheless, pain perception demonstrates considerable variability among individuals, with factors such as previous birth experiences, levels of anxiety, cultural expectations, preparation for childbirth and support systems significantly influencing how pain is experienced and interpreted [11,12].

Maternal satisfaction with the childbirth experience represents a critical aspect of perinatal care and is increasingly recognised as an important quality indicator in maternity services [13]. While pain intensity is an important factor, research consistently demonstrates that pain and satisfaction do not share a simple linear relationship [14]. Women may report high levels of pain yet still describe their birth experience as positive and satisfying when other factors, such as perceived control, supportive care, informed decision-making and respectful treatment, are present [15,16]. The relationship between pain management approaches and maternal satisfaction has been extensively studied in Western healthcare contexts; however, it shows considerable variation across different cultural and healthcare settings [17]. In particular, cultural values and expectations surrounding childbirth pain significantly impact both women's pain expression and their satisfaction with the experience [17,18]. Some cultures view pain as an essential and transformative element of childbirth, while others place a greater emphasis on pain relief as a priority [19]. These cultural perspectives influence institutional practices and the range of pain management options available to women.

Healthcare provider attitudes and practices regarding pain management also significantly impact maternal experiences [7,20,21]. The provision of continuous support during labour, whether from healthcare professionals, doulas or family members, has been consistently associated with reduced pain perception, lower intervention rates and higher satisfaction levels [22]. Furthermore, the quality of communication between women and their healthcare providers affects how pain is perceived and managed, with clear information and shared decision-making being crucial to positive experiences [23].

Physiologically, current understanding recognizes labor pain as serving important biological functions beyond simply signaling potential tissue damage [24]. Pain stimulates the release of endorphins and oxytocin, hormones that facilitate labor progression, maternal-infant bonding and postpartum recovery [25]. However, when pain becomes overwhelming or is accompanied by fear and anxiety, it can trigger a cascade of stress hormones that may interfere with labor progress and maternal well-being [26,27]. This physiological understanding has led to increased interest in non-pharmacological approaches that address not only pain sensation but also its emotional and cognitive dimensions [28].

In Erbil, Kurdistan Region of Iraq, childbirth practices have shifted significantly toward hospital-based deliveries, blending Western medical approaches with traditional Kurdish cultural values. Historically rooted in family-supported, minimally medicalized births, Kurdish customs continue to shape women's expectations around pain and satisfaction during labor. While maternal satisfaction is increasingly recognized as a vital outcome, limited research in Erbil has explored how pain levels influence satisfaction, highlighting the need for this study to examine their relationship within this unique cultural and healthcare context. Therefore, the present study aims to determine the relationship between maternal pain levels and satisfaction during labor among women giving birth in Erbil.

Research Question

Are there relationships between maternal pain levels and satisfaction during labor among women giving birth in Erbil?

METHODS

Study Design, Setting, Period and Sampling

This cross-sectional study was conducted at the Maternity Teaching Hospital in Erbil, Iraq. Data were collected using a convenience sampling method from December 1st, 2024, to February 15th, 2025.

Sample Size

The sample size was calculated with a 95% confidence interval, an estimated response distribution of 50% and a margin of error of 8.30%. Using the formula for an infinite population, a $Z\alpha/2$ value of 1.96 was determined. Although the initial sample size calculation was 135 participants, the final sample included 140 participants due to the availability of additional cases.

Inclusion/exclusion

The inclusion criteria for this study were women of any parity who gave birth at the Maternity Teaching Hospital in Erbil during the data collection period. Participants needed to be in the active labor phase, able to communicate effectively and willing to provide informed consent. Women with known psychiatric disorders, those undergoing elective cesarean section without labor or those who declined to participate were excluded from the study.

Study Tools and Data Collection

The questionnaire used in this study was composed of three main parts. The first part collected demographic data, including age group, level of education, occupation, residential area, smoking status, maternal BMI (kg/m^2) and physical activity during pregnancy. The second part included a self-structured tool consisting of 4 items designed to assess maternal satisfaction during labor. The third part utilized the Numeric Rating Scale (NRS) to measure maternal pain levels. The questionnaire was originally developed in English and then translated into Kurdish using the forward-backward translation method to ensure linguistic and conceptual accuracy. To verify the quality of the translation, the final Kurdish version was reviewed by ten nursing professors from various specialties. Data were collected through face-to-face interviews with participants who met the inclusion criteria. Each interview took approximately 10-15 minutes to complete.

Pilot Study

The study questionnaires were initially tested with a group of 15 patients who met the inclusion criteria, in order to evaluate the reliability and validity of the tools before conducting the main study. The pilot testing was conducted between the 1st of September and the 1st of October to assess internal consistency using Cronbach's alpha [29]. The satisfaction questionnaire demonstrated very good reliability, with a Cronbach's alpha of 0.88, while the Numeric Rating Scale (NRS) showed excellent reliability, with a Cronbach's alpha of 0.95. To ensure content validity, all tools were reviewed by a panel of ten nursing professors from various specialties. It is important to note that data obtained from the pilot study were excluded from the final analysis.

Measures

Sociodemographic Characteristics

The first section of the questionnaire contained sociodemographic and health-related data from participants. This included age group, level of education, occupation, residential area, smoking status, maternal Body Mass Index (BMI in kg/m^2) and physical activity during pregnancy.

Maternal Satisfaction Tool

Maternal satisfaction was evaluated using a self-structured questionnaire consisting of four items that assessed key aspects of the childbirth experience, including satisfaction with the overall birth experience, the comfort of the birth position used, the level of pain associated with the position and the progression of labor. Each item was rated on a 5-point Likert scale ranging from 1 (Highly Dissatisfied) to 5 (Highly Satisfied), resulting in a total score ranging from 4 to 20. Based on the total score, maternal satisfaction was categorized as follows: 0-10 as Dissatisfied, 11-15 as Neutral and 16-20 as Satisfied.

Numeric Rating Scale (NRS) for Pain

Maternal pain levels during labor were measured using the Numeric Rating Scale (NRS), a widely recognized and validated tool for pain assessment. Participants were asked to rate their pain on a scale from 0 to 10, where 0 indicated No Pain and 10 indicated the Worst Possible Pain. The scale provides a simple and effective method to quantify pain intensity. Pain levels were categorized as follows: 0 = No Pain, 1-4 = Mild Pain, 5-6 = Moderate Pain and 7-10 = Severe Pain.

Ethical Approval and Informed Consent

This study adhered to the ethical principles outlined in the Declaration of Helsinki and followed the guidelines of the Institutional Research Ethics Board. Ethical approval was obtained from the Ethics Committee of Hawler Medical University on the 2nd of June 2024 (Approval Number: 242). Oral informed consent was obtained from all participants prior to data collection, after explaining the purpose of the study and assuring them of the confidentiality and voluntary nature of their participation.

Statistical Analysis

Data were summarized and reported as frequencies and percentages for qualitative variables. Quantitative variables were presented as means and standard deviations. The data were weighted to the population and standardized according to WHO population estimates for 2000-2025 using survey analysis. The relationships between maternal pain and satisfaction were assessed using Pearson's correlation coefficient. The adjusted associations between these variables and other confounding factors were evaluated using multiple linear regression analysis. Data analysis was performed using Stata version 12 (StataCorp LLC, College Station, TX), with significance levels set at $p<0.001$.

RESULTS

Demographic and Clinical Characteristics

A total of 140 women participated in the study. The mean satisfaction score was 12.36±6.54, indicating a neutral level of satisfaction, while the mean maternal pain score was 7.41±2.52, reflecting severe pain. Most participants were aged 18-24 years (n = 68, 48.6%), with a mean age of 25.29±4.86. Regarding education, 36 (25.7%) were illiterate, followed by 30 (21.4%) who had completed primary school and only 12 (8.6%) had college or higher education. The vast majority were housewives (n = 127, 90.7%) and 97 (69.3%) resided in urban areas. In terms of smoking status, 119 (85.0%) were never-smokers. Nearly all participants were classified as overweight (n = 135, 96.4%), with a mean BMI of 33.11±4.04 kg/m^2, while only 5 (3.6%) were of normal weight. During pregnancy, 115 (82.1%) reported no physical activity and 22 (15.7%) engaged in walking. Regarding maternal pain levels, 70 (50.0%) experienced severe pain, 68 (48.6%) had moderate pain and only 2 (1.4%) reported mild pain. In terms of satisfaction, 67 (47.9%) were satisfied, 68 (48.6%) were dissatisfied and only 5 (3.6%) reported neutral satisfaction. Detailed demographics and other variables are presented in Table 1.

Correlation between Maternal Pain and Satisfaction

The analysis revealed a strong negative correlation between maternal pain levels and satisfaction during labor ($r = -0.96$, $p<0.001$), indicating that higher pain levels were significantly associated with lower satisfaction (Table 2).

Correlation between Maternal Pain, Satisfaction and Demographic Variables

Multiple linear regression analysis showed that satisfaction was the only significant predictor of maternal pain levels ($B = -0.37$, $p<0.001$), indicating that higher satisfaction was strongly associated with lower pain intensity during labor. Other variables-including age, level of education, occupation, residential area, smoking, maternal BMI and physical activity during pregnancy-were not statistically significant predictors, as all had p-values >0.05 and confidence intervals crossing zero (Table 3).

Table 1: Demographic and clinical characteristics of patients

No.	Variables	Characteristics n = 140	F	%
1	Age (year)	18-24	68	48.6
		25-30	46	32.9
		31-36	26	18.6
		Mean±SD 25.29±4.8		
2	Level of education	Illiterate	36	25.7
		Write and read	14	10
		Primary school graduated	30	21.4
		Secondary school graduated	35	25
		Institute graduated	13	9.3
		College and higher education	12	8.6
		Housewife	127	90.7
3	Occupation	Self-employed	9	6.4
		Government employee	3	2.1
		Student	1	0.7
		Urban	97	69.3
4	Residential area	Rural	31	22.1
		Suburban	11	7.9
		Camp	1	0.7
5	Smoking	Never-smoker	119	85
		Smoker	21	15
6	Maternal BMI (kg/m²)	Normal weight	5	3.6
		Overweight	135	96.4
		Mean±SD 33.11±4.04		
7	During pregnancy physical activity	None	115	82.1
		Walking	22	15.7
		Swimming	1	0.7
		walking and swimming	1	0.7
		Walking and stretching of pelvic area	1	0.7
		Mild Pain	2	1.4
8	Maternal pain levels	Moderate Pain	68	48.6
		Severe Pain	70	50
		Mean±SD 7.41±2.52		
9	Satisfaction levels	Dissatisfied	68	48.6
		Neutral	5	3.6
		Satisfied	67	47.9
		Mean±SD 12.36±6.54		

F: Frequency, %: Percentage, BMI: Body Mass Index, kg: Kilogram, m²: Square meter

Table 2: Correlation between maternal pain and satisfaction during labor among women giving birth in Erbil (n = 140)

Variables	Pearson correlation	Satisfaction	Maternal pain
Satisfaction	Correlation Coefficient	1	-0.96**
	Sig. (2-tailed)	-	p<0.001
	N	140	140
Maternal pain	Correlation Coefficient	-0.96**	1
	Sig. (2-tailed)	p<0.001	-
	N	140	140

**Correlation is significant at the 0.01 level (2-tailed)

Table 3: Final model of multiple linear regression for assessing the association between maternal pain, satisfaction, and demographic variables among women giving birth in Erbil

Variables	Coefficient standardized (B)	Coefficient unstandardized (B)	95% Confidence Interval		p-value
			Lower	Upper	
Age	-0.03	-0.02	-0.04	0.01	0.27
Level of Education	0.02	0.03	-0.06	0.11	0.52
Occupation	0.00	0.02	-0.36	0.39	0.93
Residential Area	-0.00	-0.01	-0.21	0.19	-0.92
Smoking	0.03	0.20	-0.17	0.58	0.29
Maternal BMI (kg/m²)	-0.01	-0.01	-0.04	0.03	0.73
During pregnancy physical activity	0.02	0.07	-0.11	0.25	0.47
Satisfaction	-0.95	-0.37	-0.39	-0.35	<0.001

Maternal Pain is the dependent variable, BMI: Body Mass Index, kg: Kilogram, m²: Square meter and Significance was set at p<0.001

DISCUSSION

The present study aimed to determine the relationship between maternal pain levels and satisfaction during labor among women giving birth in Erbil. Overall, the results revealed a strong negative correlation between maternal pain and satisfaction during labor, indicating that increased pain significantly reduced satisfaction levels among the participants.

Childbirth is a profound physiological and psychological event that impacts women's overall wellbeing and shapes their perception of the maternal healthcare system [1]. In Erbil, understanding the interplay between pain and satisfaction during labor is particularly crucial as it directly affects maternal health outcomes and future healthcare-seeking behaviors. Despite the universal nature of labor pain, there remains a notable gap in region-specific knowledge about how pain management influences maternal satisfaction in this specific cultural context. Additionally, limited research has explored the predictive factors of pain perception during labor in Kurdish populations. Given the importance of these details, we aimed to investigate the relationship between maternal pain levels and satisfaction during labor among women giving birth in Erbil.

The demographic profile of the study participants revealed that a large portion had minimal or no formal education, which represents a vulnerable subset of the maternal population in Erbil [30]. This educational distribution aligns with broader patterns observed in developing regions where access to education for women remains limited compared to global averages [31]. Limited education has been consistently associated with reduced awareness of pain management options and hesitancy to advocate for personal needs during healthcare encounters in international literature. This educational barrier potentially contributed to the participants' experience and interpretation of labor pain, as well as their expectations regarding pain relief during childbirth [32]. Moreover, the predominance of overweight classification among the participants reflects a growing public health concern in the region that mirrors global trends of increasing body mass index among women of reproductive age [23,33]. Research from various contexts has demonstrated associations between higher maternal weight and increased labor complications, including prolonged labor and higher intervention rates [34]. Although not statistically significant in our findings, these demographic characteristic warrants attention in comprehensive maternity care planning to address potential impacts on both pain perception and birthing experiences.

The majority of women in our study reported experiencing severe pain during labor, a finding that aligns with global literature indicating the intense nature of childbirth pain [4]. This high prevalence of severe pain suggests potential inadequacies in current pain management approaches within maternity facilities in Erbil. Similar findings have been reported in studies across developing countries where limited resources and traditional practices may influence pain management protocols [35]. The persistence of severe pain during labor highlights a critical area for improvement in maternity care services, requiring both enhanced pain relief options and increased sensitivity to maternal preferences.

The implementation of evidence-based pain management strategies has been shown to significantly improve maternal satisfaction in various healthcare settings worldwide [36]. However, contextual factors such as cultural beliefs about childbirth pain, healthcare provider attitudes and resource limitations may impede the adoption of effective interventions in the Erbil healthcare system. The gap between available knowledge on pain management and actual practice represents a significant challenge that requires targeted educational initiatives for both healthcare providers and expectant mothers**.** Our study revealed a clear and strong inverse relationship between maternal pain and satisfaction during labor, with satisfaction decreasing significantly as pain increased [37]. This correlation has been consistently demonstrated in international research, emphasizing pain as a central determinant of birthing experiences across diverse populations [38]. The strength of this relationship in our study suggests that pain management should be prioritized as a key component of quality improvement initiatives in maternity care in Erbil. The negative impact of unmanaged pain extends beyond the immediate birthing experience to potentially affect postpartum recovery, maternal-infant bonding and future childbearing decisions.

Interestingly, among all demographic and clinical variables assessed, only satisfaction emerged as a significant predictor of maternal pain levels [37]. This finding suggests a complex bidirectional relationship between pain and satisfaction that transcends other factors typically associated with pain perception [37,38]. Similar observations have been reported in studies investigating the multidimensional nature of pain during childbirth, where psychological and emotional aspects of care significantly influence pain experiences [1]. The implication of this finding is that interventions targeting overall satisfaction with care-including communication, respect and involvement in decision-making-may indirectly benefit pain management outcomes.

Despite the valuable insights provided by this study, several limitations should be acknowledged. The cross-sectional design limits our ability to establish causality in the relationship between pain and satisfaction. Additionally, the study was conducted in specific healthcare facilities in Erbil, potentially limiting the generalizability of findings to other settings or populations. Cultural and linguistic nuances in understanding and expressing pain may have influenced the measurement accuracy, despite efforts to use validated assessment tools. Future research should consider longitudinal designs to track the evolution of pain and satisfaction throughout the childbirth continuum and explore the effectiveness of targeted interventions in this specific population. Furthermore, qualitative approaches could provide deeper insights into the cultural dimensions of pain perception and satisfaction during childbirth in the Kurdish context.

CONCLUSIONS

There was a strong negative correlation between maternal pain and satisfaction during labor, indicating that increased pain significantly reduced satisfaction levels. It is recommended that policymakers and healthcare providers

implement effective pain management strategies and enhance supportive care during labor to improve maternal satisfaction and overall childbirth experiences. Addressing maternal pain through both pharmacological and non-pharmacological methods can play a crucial role in promoting positive birth outcomes. Training healthcare professionals to recognize and respond to women's comfort needs during labor is essential. Future research should explore specific interventions that can reduce pain perception while enhancing the emotional and psychological support women receive during childbirth.

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Conflicts of Interest
The authors declare no conflict of interest.

Ethical Statement
Ethical approval was obtained from the Ethics Committee of Hawler Medical University on the 2nd of June 2024 (Approval Number: 242).

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