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The Interaction Between Individualized Developmental Care Knowledge, Job Motivation, and Job Satisfaction Among Neonatal Nurses: A Cross-Sectional Study

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Abstract

Objective

This study aims to investigate how neonatal nurses' knowledge and attitudes toward individualized developmental care influence their job motivation and job satisfaction.

Material and Method

This cross-sectional study included 98 neonatal nurses working in Neonatal Intensive Care Units (NICUs) of two hospitals in eastern of Türkiye. Data were collected using the Individualized Developmental Care Knowledge and Attitude Scale, the Nurses' Job Motivation Scale, and the Minnesota Satisfaction Questionnaire. Descriptive statistics, t-tests, ANOVA, Pearson correlation, and logistic regression analyses were conducted.

Results

A significant positive correlation was observed between job motivation and job satisfaction ($p < 0.001$). Regression analysis revealed that NICU work experience, work schedule, individualized developmental care knowledge perception, and job motivation were significant predictors of job satisfaction. Gender significantly influenced individualized developmental care knowledge and attitudes ($p = 0.014$), while job motivation was affected by education level, satisfaction with NICU work, and previous training on individualized developmental care ($p < 0.05$).

Conclusion

Neonatal nurses demonstrated moderate-to-high levels of knowledge and positive attitudes toward individualized developmental care, along with moderate job motivation and satisfaction. Higher job motivation was associated with greater job satisfaction. Findings highlight the need for structured training programs to enhance individualized developmental care knowledge application and policies to optimize work schedules.

Keywords: Individualized Developmental Care, Neonatal Nurses, Job Motivation, Job Satisfaction, Nursing Workforce, Neonatal Intensive Care Unit (NICU)

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Introduction

Individualized developmental care (IDC) is critical for neonates. It is used to protect their neurological system, ensure their physiological stability and reduce negative effects on them (1). Inappropriate environments and care practices cause preterm newborns to experience short- and long-term complications, posing a great risk for morbidity and mortality (2). Individualized developmental care includes various concepts and interventions such as kangaroo care, appropriate positioning, sound and light control, and a family-centered care approach for term and preterm newborns in neonatal intensive care units (NICUs) (3,4).

Because of the nurse-centered nature of IDC, nurses play a critical role in developmental care practices (5). While IDC has become standard practice in NICUs, its implementation varies widely among intensive care units (ICUs) (6). For example, Zhang et al. (2016) reported that Chinese neonatal nurses did not consistently apply IDC due to a high number of patients (7). Çağlar et al. (2019) also stated that Turkish neonatal nurses had knowledge about IDC but could not apply it sufficiently (8).

Care environments are constantly changing. The key to improving nurses' job satisfaction and performance is to help them build job motivation (9). High motivation and satisfaction have a significant impact on employee performance and productivity (10). In fact, Şantaş, Işık, and Çilhoroz (2018) showed that job motivation has an impact on life satisfaction (11). Therefore, to optimize the quality of care, we need to evaluate nurses' perceptions of job motivation and job satisfaction. (12). Another study focusing on nurses found a strong association between job satisfaction and job motivation (13). It has also been documented that job satisfaction has a positive effect on job motivation (14). In other words, they reported that job satisfaction increased employee motivation. We think that job satisfaction affects job motivation, while providing IDC-based care to NICU infants contributes to job motivation and job satisfaction. Therefore, in this study, the knowledge and attitudes of neonatal nurses regarding IDC, their job motivation, and job satisfaction were investigated. To our knowledge, no prior study has simultaneously examined neonatal nurses' knowledge and attitudes toward individualized developmental care alongside their job motivation and job satisfaction. While earlier research has explored these concepts independently, the present study offers a novel perspective by integrating developmental care practices with occupational factors that influence nursing performance. This multidimensional approach addresses a gap in the literature and provides new insights into how IDC competencies may be linked to nurses' motivation and satisfaction within NICU settings.

Material and Method

Research Design

This cross-sectional study adopted a descriptive and correlational research design.

Participants and Sample

The study population consisted of neonatal nurses working in the neonatal intensive care units (NICUs) of two hospitals in a provincial center in eastern of Türkiye. The inclusion criteria required participants to actively provide direct care to preterm neonates and be willing to participate in the study. Nurses who did not meet these criteria or declined participation were excluded. The total number of NICU nurses across both hospitals was 138. Given the relatively small population size, random sampling was not feasible; therefore, all eligible nurses were approached for participation. Ultimately, 98 nurses met the inclusion criteria and completed the study, representing a participation rate of 71%.

To determine whether the sample size was sufficient for statistical analyses, a post hoc power analysis was conducted using G*Power 3.1.9.7. The logistic regression analysis required an estimated sample size to detect a moderate effect size (OR = 2.5), at 0.80, and a significance level of 0.05 (15, 16). Given the final sample size of 98, the achieved power for detecting significant relationships among key predictors in the regression model was calculated at 0.83, indicating sufficient statistical power to yield robust results. The sample size was also deemed appropriate for correlation and t-test analyses, further ensuring the reliability and validity of the study's findings.

Instrument

Data collection was conducted using a descriptive information form, the Individualized Developmental Care Knowledge and Attitude Scale (IDCKAS), the Nurses Job Motivation Scale (NJMS), and the Minnesota Satisfaction Questionnaire (MSQ).

Descriptive Information Form

The Descriptive Information Form was developed by the researchers to gather sociodemographic and professional characteristics of the participants. It contained 12 items addressing age, gender, marital status, having children, educational background

(health vocational high school, associate degree, or bachelor's or higher), work schedule (day shift, night shift, or both), total years of general work experience, years of NICU-specific experience, number of patients cared for per day, satisfaction with working in the NICU, previous experience with training on individualized developmental care (IDC), and self-perceived adequacy of IDC knowledge.

Individualized Developmental Care Knowledge and Attitude Scale (IDCKAS)

The Individualized Developmental Care Knowledge and Attitude Scale (IDCKAS) was developed by Akça and Kurudirek (17). It consists of 34 items rated on a four-point Likert-type scale (4=Regularly, 3=Frequently, 2=Sometimes, and 1=Never). No items are reverse-scored. Scale includes four subscales. It comprises four subscales: (1) Nursing Care, (2) Family-Centered Care, (3) Creating a Healing Environment, and (4) Individualized Developmental Care Practices. Higher scores indicate greater knowledge and increasingly positive attitudes toward individualized developmental care. The original scale reported a Cronbach's alpha coefficient of 0.937 (17), which was determined as 0.967 in the present study.

The Nurses' Job Motivation Scale (NJMS)

The Nurses' Job Motivation Scale (NJMS) was developed by Engin and Çam (18). The instrument comprises 25 items rated on a three-point Likert-type scale (1=Disagree, 2=Somewhat agree, 3=Agree). No items are reverse-scored. The total score ranges from 25 to 75, with higher scores indicating greater job motivation. The original scale has a Cronbach's alpha value of 0.855 (18), while it was calculated as 0.927 in the present study.

Minnesota Satisfaction Questionnaire (MSQ)

The Minnesota Satisfaction Questionnaire (MSQ) was developed by Weis et al. (1967) (19) and adapted into Turkish by Baycan (1985) (20). The scale consists of 20 items rated on a five-point Likert-type scale (1=Not satisfied at all to 5=Very satisfied). No items are reverse-scored. The scale has two subscales: (1) intrinsic job satisfaction (12 items) and (2) extrinsic job satisfaction (8 items). The total score ranges from 20 to 100, with higher scores indicating higher job satisfaction. The original scale has a Cronbach's alpha score of 0.77 (20), whereas it was determined as 0.946 in the present study.

Data Collection

Data collection was conducted between August and December 2024 in two neonatal intensive care units (NICUs) in a provincial center in eastern of Türkiye. Before data collection, the researchers provided all eligible nurses with a detailed explanation of the study's objectives, methodology, and ethical considerations. Nurses were allowed to ask questions to ensure informed participation. Both written and verbal informed consent were obtained from those who consented voluntarily to participate in the study. The data were collected using self-administered questionnaires that included the Descriptive Information Form, Individualized Developmental Care Knowledge and Attitude Scale (IDCKAS), Nurses Job Motivation Scale (NJMS), and Minnesota Satisfaction Questionnaire (MSQ). The questionnaires were distributed in paper format during working hours, and nurses were provided with a quiet and private space to complete them. Each participant took approximately 20 minutes to complete the forms. To minimize response bias, researchers ensured confidentiality by instructing participants not to write their names or other identifiable information on the forms. Additionally, completed questionnaires were collected in sealed envelopes to further protect anonymity. All data collection procedures adhered to ethical guidelines, including voluntary participation and the right to withdraw at any time without consequences.

Data Analysis

All statistical analyses were conducted using IBM SPSS Statistics v.25. Descriptive statistics, including frequencies, percentages, means, standard deviations, and minimum-maximum values, were used to summarize sociodemographic characteristics and scale scores. Normality of the data was assessed using skewness and kurtosis values, with the acceptable range of ±1.5. Independent samples t-tests and one-way analysis of variance (ANOVA) with post hoc tests were performed to compare scale scores based on sociodemographic variables. Pearson's correlation analysis was used to assess the associations among nurses' knowledge and attitudes toward individualized developmental care, job motivation, and job satisfaction. To determine the predictors of job satisfaction, a multiple logistic regression analysis was conducted, adjusting for significant sociodemographic and work-related factors. The goodness-of-fit was evaluated using the Hosmer-Lemeshow test, and the explanatory power of the model was assessed through Cox & Snell R^2 and Nagelkerke R^2 values. Statistical significance was set at $p < 0.05$ for all analyses.

Results

The sociodemographic characteristics of the nurse participants are shown in Table 1. The mean age of participants was 29.98±5.92 years. The majority were female (57.1%) and single (59.2%). A significant

proportion (65.3%) did not have children. Most participants (61.2%) held a bachelor's degree or higher. The overwhelming majority (83.7%) were assigned to rotating day and night shifts. A slight majority (55.1%) reported being satisfied with working in NICUs. While 61.2% had more than five years of general work experience, 57.1% had worked in NICUs for less than five years, indicating recent transitions into NICU-specific roles. A majority (55.1%) had received prior training on individualized developmental care, yet nearly half (48%) felt they did not have sufficient knowledge regarding IDC (Table 1).

The mean scores of the nurse participants on the administered scales, and their respective Cronbach's alpha reliability coefficients, are presented in Table 2. The mean scores for the IDCKAS (range: 68–136), NJMS (range: 25–75), and MSQ (range: 1–4.85) were 110.17 ± 19.32, 53.23 ± 10.88, and 2.83 ± 0.85, respectively (Table 2). These scores suggest that participants had a moderate-to-high level of knowledge and attitude toward individualized developmental care, moderate to high job motivation, and moderate-level job satisfaction. All three scales demonstrated excellent internal consistency, with Cronbach's alpha values of 0.967 (IDCKAS), 0.927 (NJMS), and 0.946 (MSQ), indicating high reliability. The NJMS and MSQ scores reinforce the interpretation of moderate-to-high motivation and satisfaction levels, which align with earlier findings that 55.1% of participants reported being satisfied with NICU work (Table 2).

The distribution of scale scores by sociodemographic characteristics is shown in Table 3. Female participants had significantly higher IDCKAS scores than male participants ($p = 0.014$). A statistically significant difference was found in NJMS scores according to education level ($p = 0.049$). Post hoc analysis indicated that participants with a bachelor's degree or higher had significantly higher NJMS scores than those with an associate degree ($p < 0.05$). Participants who were satisfied with working in NICUs had significantly higher NJMS scores than those who were not ($p = 0.008$). Additionally, participants who had received prior training on IDC had significantly higher NJMS scores than those who had not ($p = 0.010$). Marital status was also associated with job satisfaction, as married participants scored significantly higher on the MSQ than single participants ($p = 0.023$). Participants who were satisfied with working in NICUs had significantly higher MSQ scores than those who were not ($p < 0.001$). Participants who had received prior training on IDC had significantly higher MSQ scores than those who had not ($p < 0.001$). Additionally, participants who perceived themselves as sufficiently knowledgeable about IDC had significantly higher MSQ scores than those who did not ($p = 0.001$). No statistically significant differences were found in IDCKAS, NJMS, or MSQ scores based on general work experience, NICU-specific work experience, or work schedules ($p > 0.05$) (Table 3).

The relationship between the mean scores of the participants on the IDCKAS, NJMS, and MSQ is given in Table 4. A moderate and significant positive correlation was found between NJMS and MSQ scores ($r = 0.597$, $p < 0.001$), indicating that higher job motivation was associated with greater job satisfaction. No significant correlation was found between IDCKAS and NJMS ($r = 0.094$, $p = 0.359$) or between IDCKAS and MSQ ($r = 0.006$, $p = 0.956$) (Table 4).

The multiple logistic regression analysis identified several significant predictors of job satisfaction among NICU nurses (Table 5). Nurses with greater general work experience (>5 years) were significantly less likely to report dissatisfaction compared to those with ≤5 years of experience (OR = 0.138, 95% CI = 0.04, 0.48, $p = 0.003$). Similarly, nurses with >5 years of NICU-specific experience were more likely to report job satisfaction than those with ≤5 years of NICU experience (OR = 3.210, 95% CI = 1.45, 9.08, $p = 0.008$). Work schedule was also a significant predictor; nurses working exclusively night shifts were

Table 1 Sociodemographic Characteristics (n=98)

Characteristics	**Min-Max**	**Mean ± SD**
Age (year)	20-52	29.98±5.92
Number of patients cared for per day	1-8	4.57±1.21
Gender	**n**	**%**
Male	42	42.90
Female	56	57.10

Table 1 continued Sociodemographic Characteristics (n=98)

Characteristics	n	%
Marital status		
Married	40	40.80
Single	58	59.20
Having children		
Yes	34	34.70
No	64	65.30
Education (degree)		
Health vocational high school	24	24.50
Associate	14	14.30
Bachelor's or higher	60	61.20
Work schedules		
Day	14	14.30
Night	2	2.00
Both day and night	82	83.70
Satisfaction with working in the NICU		
Yes	54	55.10
No	44	44.90
Work experience in general (year)		
≤5	38	38.80
>5	60	61.20
Work experience in the NICU (year)		
≤5	56	57.10
>5	42	42.90
Having received information or training on IDC before		
Yes	54	55.10
No	44	44.90
Knowing enough about IDC		
Yes	51	52.00
No	47	48.00

NICU: Neonatal Intensive Care Unit; IDC: Individualised Developmental Care; Min: Minimum; Max:Maximum SD: Standard Deviation

Table 2 Scale scores and Cronbach's alpha coefficients (n=98)

Scales	Scores (Min-Max)	Mean ± SD	Cronbach's Alpha
IDCKAS	68-136	110.17 ± 19.32	0.967
NJMS	25-75	53.23±10.88	0.927
MSQ	1-4.85	2.83±0.85	0.946

IDCKAS: Individualized Developmental Care Knowledge and Attitude Scale, NJMS: Nurses Job Motivation Scale, MSQ: Minnesota Satisfaction Questionnaire

Table 3 The distribution of scale scores by sociodemographic characteristics (n=98)

Characteristics	IDCKAS Mean±SD	NJMS Mean±SD	MSQ Mean±SD
Gender			
Male	104.66±20.93	52.28±9.34	2.84±0.83
Female	114.30±17.06	53.94±11.94	2.82±0.88
t	-2.509	-0.746	0.069
p	**0.014***	0.458	0.945
Marital status			
Married	112.37±20.04	55.72±11.11	3.07±0.86
Single	108.65±18.83	51.51±10.47	2.67±0.82
t	0.936	1.906	2.312
p	0.352	0.060	**0.023***
Having children			
Yes	109.55±18.75	54.64±11.16	3.03±0.94
No	110.50±19.75	62.48±10.74	2.72±0.79
t	-0.228	0.936	1.739
p	0.820	0.352	0.085
Education (degree)			
Health vocational high school[1]	109.45±20.17	53.70±9.54	3.01±0.81
Associate[2]	110.00±22.17	46.71±15.05	2.57±1.07
Bachelor's or higher[3]	110.50±18.61	54.56±9.86	2.82±0.81
F	0.025	3.115	1.205
p	0.975	**0.049***	0.304
Post Hoc		3>2	
Work schedules			
Day	112.50±17.11	57.21±14.67	3.18±0.89
Night	113.50±16.26	52.50±7.77	3.05±0.07
Both day and night	109.69±19.88	52.57±10.16	2.76±0.85
F	0.154	1.094	1.510
p	0.858	0.339	0.226
Satisfaction with working in the NICU			
Yes	111.46±18.46	55.83±11.51	3.18±0.80
No	108.59±20.42	50.04±9.20	2.41±0.73
t	0.730	2.702	4.910
p	0.467	**0.008***	**0.000***
Work experience in general (year)			
≤5	108.13±20.09	54.47±8.39	2.97±0.70
>5	111.46±18.86	52.45±12.20	2.74±0.94
t	-0.831	0.972	1.351
p	0.408	0.334	0.180
Work experience in the NICU (year)			
≤5	108.48±18.80	54.23±8.31	2.84±0.73
>5	112.42±19.99	51.90±13.57	2.82±1.01
t	-1.001	0.981	0.081
p	0.320	0.330	0.936
Having received information or training on IDC before			
Yes	109.50±21.39	55.75±10.68	3.22±0.79
No	111.00±16.62	50.13±10.41	2.35±0.67
t	-0.390	2.620	5.778
p	0.697	**0.010***	**0.000***
Knowing enough about IDC			
Yes	112.27±18.11	55.27±10.75	3.10±0.82
No	107.89±20.50	51.02±10.69	2.54±0.80
t	1.123	1.961	3.346
p	0.264	0.053	**0.001***

t: independent samples t-test; F: one-way analysis of variance (ANOVA); *p<0.05. IDCKAS: Individualized Developmental Care Knowledge and Attitude Scale, NJMS: Nurses Job Motivation Scale, MSQ: Minnesota Satisfaction Questionnaire

Table 4 The relationship between the mean scores of the participants on the IDCKAS, NJMS and MSQ (n=98)

Scales		IDCKAS	NJMS	MSQ
IDCKAS	r	1		
	p			
NJMS	r	0.094	1	
	p	0.359		
MSQ	r	0.006	0.597**	1
	p	0.956	0.000	

r: Pearson's correlation coefficient, ** Correlation is significant at the 0.01 level. IDCKAS: Individualized Developmental Care Knowledge and Attitude Scale, NJMS: Nurses Job Motivation Scale, MSQ: Minnesota Satisfaction Questionnaire

Table 5 Predictors of Job Satisfaction Among NICU Nurses Using Logistic Regression Analysis (n=98)

Variables	Adjusted Odds Ratio	95% Confidence Interval	Wald Statistic	df	p-value
Gender (Reference: Male)	1.928	0.52, 7.13	0.919	1	0.338
Marital Status (Reference: Single)	0.274	0.07, 1.12	3.107	1	0.078
Education Level (Reference: Bachelor's or Higher)					
Health Vocational High School	5.742	0.69, 47.61	2.740	1	0.098
Associate Degree	3.857	0.89, 16.64	3.506	1	0.061
General Work Experience (Reference: ≤5 years)	0.138	0.04, 0.48	9.072	1	**0.003***
NICU Work Experience (Reference: ≤5 years)	3.210	1.45, 9.08	7.120	1	**0.008***
Work Schedule (Reference: Day shift)					
Night Shift	7.980	2.10, 34.80	4.011	1	**0.041***
Both Day & Night	4.215	1.80, 12.67	5.008	1	**0.026***
Number of Patients Cared for per Day	0.719	0.40, 1.30	1.244	1	0.265
Received IDC Training (Reference: No)	0.958	0.23, 4.06	0.004	1	0.952
IDC Knowledge Perception (Reference: No)	3.442	1.05, 10.45	4.211	1	**0.039***
NJMS (Job Motivation Score)	1.052	1.01, 1.11	4.001	1	**0.047***
MSQ (Job Satisfaction Score)	0.915	0.87, 0.97	9.575	1	**0.002***
Constant	130.420	-	2.650	1	0.104

*p<0.05; Model Fit: Hosmer-Lemeshow Test, $\chi^2(8) = 7.851$, $p = 0.448$; Cox & Snell $R^2 = 0.407$; Nagelkerke $R^2 = 0.545$; Percentage of correct classification = 74.5%. The cut-off value was set at 0.50.

7.98 times more likely to report satisfaction than those working only day shifts (OR = 7.980, 95% CI = 2.10, 34.80, p = 0.041). Additionally, nurses working both day and night shifts were 4.215 times more likely to report satisfaction than those with exclusively day shifts (OR = 4.215, 95% CI = 1.80, 12.67, p = 0.026). Perceived knowledge of individualized developmental care (IDC) was another significant factor, with nurses who considered their IDC knowledge sufficient being 3.442 times more likely to be satisfied than those who did not (OR = 3.442, 95% CI = 1.05, 10.45, p = 0.039). Furthermore, job motivation (NJMS) also predicted job satisfaction; nurses with higher motivation scores were approximately 1.05 times more likely to report job satisfaction for each point increase in NJMS. (OR = 1.052, 95% CI = 1.01, 1.11, p = 0.047). Job satisfaction levels measured by the MSQ were also highly significant; with each point increase in MSQ score, nurses were approximately 1.09 times less likely to report dissatisfaction. (OR = 0.915, 95% CI = 0.87, 0.97, p = 0.002). Other demographic factors, such as gender, marital status, education level, number of patients cared for per day, and prior IDC training, did not show statistically significant associations with job satisfaction (p > 0.05).

Discussion

In this study, neonatal nurses' knowledge and attitudes towards IDC, job motivation, and job satisfaction levels, their interrelationships, and influencing factors were evaluated. The findings were discussed in line with the literature. Since the neonatal intensive care unit is a vital setting for sustaining the lives of vulnerable newborns, it is very important to evaluate the developmental care practices, work motivation, and job satisfaction of neonatal nurses to improve the quality of health care (21).

According to the World Health Organization's 2020 data, 13.4 million babies were born prematurely (22). Soleimani et al. (2020) concluded that developmental care in NICUs has a significant impact on the mental and motor development of preterm neonates (23). Tripathi and Dusing (2015) emphasized that preterm neoates are at a higher risk for neurodevelopmental delay (especially, cognitive development) between the ages of 1-18 years than term neoates (24). Therefore, NICU nurses should possess comprehensive knowledge of IDC. Konukbay, Çiftçi, and Yıldız (2022) reported that while neonatal nurses knew about IDC, they had less positive attitudes and behaviors about it (25). Çağlar et al. (2019) found that neonatal nurses knew about IDC but did not put it into practice sufficiently. Ceylan and Kahraman (2023) determined that neonatal nurses had a good level of developmental competence but did not put IDC into practice enough (8). It was also reported that although nurses knew IDC, this knowledge was not at the desired level (5). More than half of our participants had received information or training on IDC before (55.1%). Half of our participants believed that they knew enough about IDC (52%). Our participants had a mean IDCKAS score of 110.17 ± 19.32, indicating that most neonatal nurses know about IDC and care about it for neonatal development.

Nurses play a critical role in the effective execution of IDC (8). In another study, it was found that male nurses had lower IDC knowledge, attitude, and behavior scores than female nurses (26). Our male participants also had a significantly lower mean IDCKAS score than their female counterparts. Although the findings of the two studies show similar results in terms of gender, it is impossible to attribute gender and knowledge, and attitude towards individualized developmental care to a reason with the current findings. Therefore, more research is warranted to investigate the causal relationship between gender and IDC.

Motivational factors in nursing depend on demographic characteristics and opportunities/resources (10). Yeşilçınar et al. (2020) focused on ICU nurses and reported two critical findings (27). First, gender, education, unit, and type of work do not affect their job motivation. Second, total hours worked and liking one's job affect their job motivation (27). Abu Yahya et al. (2019) reported that nurses' motivation depends on gender and work experience (10). Baljoon, Banjar and Banakhar (2018) concluded that nurses' job motivation was affected by personal (age, work experience, education, and administrative position) and organizational factors (empowerment, job involvement, pay and financial benefits, supervision, promotion, contingent rewards, supportive relationships, communication, and the nature of work) (28). In our study, nurses' work motivation was affected by their educational status, satisfaction with working in the neonatal intensive care unit, and receiving information or training on individualized care. The reason for the different results may be due to the individual characteristics of the nurses in the study, different research questions, and different working areas. In addition, it was determined that work motivation was at a moderate level in studies conducted with nurses (11,27). In our study, it was determined that nurses' work motivation was at a moderate level. In this respect, the results of this study support previous studies.

One's perceptions and feelings about one's job define job satisfaction (29). Therefore, determining the factors

affecting job satisfaction is crucial for improving the quality of health services (30). Aytekin and Yilmaz Kurt (2014) found that neonatal nurses had a moderate level of job satisfaction (31). They also reported that neonatal nurses' education, work experience, job position, relationships with coworkers, and managers affected their job satisfaction. Our participants had a moderate level of job satisfaction, which was also affected by marital status, satisfaction with working in the NICU, receiving education or training on IDC, and adequacy of knowledge about IDC. Considering the negativities related to parameters such as working conditions of nurses, economic issues, and the number of patients cared for, it can be interpreted as an encouraging result that nurses' job satisfaction was found to be at a moderate level. The variation in the factors influencing job satisfaction across studies may be attributed to differences in research design, scope, and timing.

Our results showed a moderate positive correlation between job motivation and job satisfaction. However, there was no correlation between knowledge and attitude towards IDC and job motivation or job satisfaction. Baş et al. (2017) also reported a correlation between job satisfaction and job motivation (32). Advances in technology have made access to information more immediate and widespread (33). Therefore, it is not surprising that our participants had substantial knowledge about IDC and demonstrated positive attitudes towards it. However, this finding showed that their knowledge and attitude toward IDC did not affect their job motivation and job satisfaction. It is not enough for nurses to be knowledgeable about IDC and have a positive attitude towards it. They should also know how to translate that knowledge and attitude into practice to develop IDC-based care plans for preterm neonates. From this point of view, it can be predicted that nurses' behaviors related to IDC may affect their job motivation and job satisfaction. Therefore, future studies should examine both nurses' knowledge and attitude towards IDC and its relationship with their job satisfaction and job motivation. However, the prerequisite for nurses to plan the care of preterms in line with the principles of individualized developmental care is, of course, to have positive knowledge and attitudes regarding individualized developmental care. In this respect, our results are valuable for researchers and clinicians.

The multiple logistic regression analysis identified key factors influencing job satisfaction among NICU nurses, aligning with previous studies on professional experience, work schedules, knowledge perception, and motivation (34,35). Nurses with longer general and NICU-specific work experience reported higher job satisfaction, supporting prior research that links professional tenure to greater self-efficacy, confidence, and reduced workplace stress (36,37). Work schedule was another significant factor, with night shift nurses reporting higher satisfaction compared to those working only day shifts. This finding contrasts with studies that associate night shifts with fatigue and burnout (38). However, some studies suggest that night shifts provide greater autonomy and fewer workplace disruptions, potentially contributing to job satisfaction (39,40). Nurses working rotating shifts also reported higher satisfaction, possibly due to workload variety and scheduling flexibility (41). Additionally, perceived knowledge of individualized developmental care (IDC) was associated with higher job satisfaction. This supports the findings that self-assessed competency enhances professional confidence and reduces stress (42,43). Structured IDC training has been shown to improve job engagement and care quality, further reinforcing this relationship (44). Higher motivation has also been linked to lower burnout rates and stronger workplace commitment in NICU settings (45,46). These findings underscore the importance of targeted interventions to enhance job satisfaction, including experience-based career development programs, optimized work schedules, and structured IDC training. Future studies should explore the long-term effects of these interventions to improve retention and well-being among NICU nurses.

Strengths and Limitations

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design restricts causal inferences, as the relationships observed between job motivation, job satisfaction, and IDC knowledge reflect associations rather than clear cause-and-effect relationships. Second, the study was conducted in only two hospitals within a single provincial center in eastern Turkey, limiting the generalizability of the findings to broader national or international NICU settings with different institutional policies, staffing structures, and patient loads. Third, the reliance on self-reported measures introduces potential response bias, as participants may have provided socially desirable answers regarding their knowledge, motivation, and satisfaction levels. Additionally, while job satisfaction was found to be influenced by perceived IDC knowledge, the study did not assess the actual implementation of IDC practices, which could provide a more objective measure of knowledge application. Another limitation is the relatively small sample size (n=98), which, despite achieving sufficient statistical power, may not capture the full diversity of experiences among NICU

nurses. Furthermore, although logistic regression identified significant predictors of job satisfaction, unmeasured variables such as workload intensity, institutional support, and psychological well-being may also play a role, necessitating further research using mixed methods. Future studies should incorporate longitudinal designs, multi-center sampling, and qualitative methods to provide deeper insights into the factors influencing NICU nurses' motivation, satisfaction, and professional development.

Despite these limitations, the study possesses several notable strengths. To our knowledge, it is the first study to simultaneously examine neonatal nurses' knowledge and attitudes toward individualized developmental care (IDC), job motivation, and job satisfaction in a single model, thereby addressing a significant gap in the literature. Furthermore, the study employed validated instruments with excellent internal consistency, and its focus on a real-world NICU environment enhances its practical relevance for workforce policy and nurse development programs. These strengths position the study as a valuable foundation for designing future interventions that target both professional education and work environment optimization in NICU settings.

Conclusion

This study revealed that neonatal nurses' job satisfaction is closely linked to their perceived knowledge of individualized developmental care (IDC), job motivation, and work-related factors such as NICU experience and flexible scheduling. Although prior IDC training alone did not impact satisfaction, nurses who felt knowledgeable reported higher satisfaction, highlighting the value of practical and applicable training. Interestingly, night shift nurses reported higher satisfaction, pointing to the possible benefits of increased autonomy. These findings emphasize the need for targeted training, supportive scheduling, and motivation-enhancing policies to improve nurse satisfaction and neonatal care outcomes.

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Conflict of Interest Statement
The authors have no conflicts of interest to declare.

Ethical Approval
The study was approved by the Non-Interventional Clinical Research Ethics Committee of Gaziantep Islam Science and Technology University (Meeting Date:21.05.2024, Decision No: 425.38.08). Permission was obtained from the hospitals where the study was conducted (Document ID: E-54355720-800-608935 and E-50817530-771-249095164). Authorization was received from the developers to use the scales in the study. All nurses were briefed on the research purpose and procedure. Written and verbal informed consent was obtained from all participants. This study was conducted to the principles outlined in the Declaration of Helsinki.

Consent to Participate and Publish
Written informed consent to participate was obtained from all participants included in the study.

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Data are available on request due to privacy or other restrictions.

Artificial Intelligence Statement
The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript, nor for the creation of images, graphics, tables, or their corresponding captions.

Authors Contributions
KA: Conceptualization; Methodology; Formal analysis; Investigation; Validation; Visualization; Supervision; Writing-original draft; Writing-review & editing.

VC: Conceptualization; Methodology; Data curation; Formal analysis; Investigation; Resources; Validation; Writing-review & editing.

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References

1. Heidelise A, Gloria BM. The newborn individualized developmental care and assessment program (NIDCAP) with kangaroo

mother care (KMC): Comprehensive care for preterm infants. Curr Womens Health Rev 2011;7(3):288-301.
2. Klein V, Koenig-Zores C, Dillenseger L, et al. Changes of infant- and family-centered care practices administered to extremely preterm infants during implementation of the NIDCAP program. Front Pediatr 2021;9:718813.
3. Gad GI, El Kholy NEEMEDM, Rabie DEAEH. Developmental care implementation on preterm neonates in Ain Shams University Pediatric Hospitals: An interventional study. QJM 2021;114(Suppl 1):hcab113.053.
4. Lee HN, Park JH, Cho H. Developmentally supportive care among neonatal intensive care unit nurses in South Korea: Knowledge, perceived importance, perception, and perceived competence. Adv Neonatal Care 2023;23(3): E94-E100.
5. Baghlani R, Hosseini M-B, Safaiyan A, Alizadeh M, Arshadi Bostanabad M. Neonatal intensive care unit nurses' perceptions and knowledge of newborn individualized developmental care and assessment program: A multicenter study. Iran J Nurs Midwifery Res 2019;24(2):113-7.
6. Burke S. Systematic review of developmental care interventions in the neonatal intensive care unit since 2006. J Child Health Care 2018;22(2):269-86.
7. Zhang X, Lee S-Y, Chen J, Liu H. Factors influencing implementation of developmental care among NICU nurses in China. Clin Nurs Res 2014;25(3):238-53.
8. Çaglar S, Dur S, Sönmez Düzkaya D, et al. Profiles and interventions on individualized developmental care of neonatal nurses in Turkey. JAREN 2019;5(2):132-40.
9. Göktepe N, Yalçın B, Türkmen E, et al. The relationship between nurses' work-related variables, colleague solidarity, and job motivation. J Nurs Manag 2020;28(3):514-21.
10. Abu Yahya O, Ismaile S, Allari RS, et al. Correlates of nurses' motivation and their demographic characteristics. Nurs Forum 2019;54(1):7–15.
11. Şantaş F, Şantaş G, Kaya M. Meslektaş dayanışması ve iş motivasyonu: Hemşirelere yönelik bir alan araştırması. Ankara Hacı Bayram Veli Univ Iktisadi Idari Bil Fak Derg 2024;25(3):933–54.
12. Dor A, Halperin O. Nurses' job satisfaction and motivation: Patients' and nurses' perceptions. J Biosci Med 2022;10(6):110–20.
13. alimul hidayat A, Sukadiono, Agustin R, et al. Correlation between nurses' job satisfaction and motivation, and nurses' performance in Indonesia: A cross-sectional study in Soewandi Hospital. Adv Sci Lett 2017;23:12518–20.
14. Erlina Y, Kusnanto K, Mishbahatul E. The relationship of work motivation with nurse job satisfaction factors: A systematic review. STRADA J Ilm Kesehat 2021;10(1):1101–7.
15. Cohen J. CHAPTER 9 - F tests of variance proportions in multiple regression/correlation analysis. In: Cohen J, editor. Statistical power analysis for the behavioral sciences. 2nd ed. New York: Academic Press; 1977. p. 407–53.
16. Faul F, Erdfelder E, Lang A-G, et al. G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behav Res Methods 2007;39(2):175–91.
17. Akça K, Kurudirek F. Development of the Individualised Developmental Care Knowledge and Attitude Scale. Appl Nurs Res 2023;72:151697.
18. Engin E, Çam Mo. Hemşire iş motivasyonu ölçeği: Geçerlik güvenirlik. Ege Univ Hemşirelik Fak Derg 2016;32(3):1–13.
19. Weiss DJ, Dawis RV, England GW. Manual for the Minnesota Satisfaction Questionnaire. Minnesota Stud Vocat Rehabil 1967. https://doi.org/10.1037/t05540-000
20. Baycan F. Analysis of some aspects of job satisfaction in people working in different groups [master's thesis]. İstanbul: Boğaziçi University; 1985.
21. Eskandari Kootahi Z, Yazdani N, Parsa H, et al. Professional values and job satisfaction of neonatal intensive care unit nurses and influencing factors: A descriptive correlational study. Int J Afr Nurs Sci 2023;18:100512.
22. Ohuma EO, Moller AB, Bradley E, et al. National, regional, and global estimates of preterm birth in 2020, with trends from 2010: a systematic analysis. Lancet 2023;402(10409):1261–71.
23. Soleimani F, Azari N, Ghiasvand H, et al. Do NICU developmental care improve cognitive and motor outcomes for preterm infants? A systematic review and meta-analysis. BMC Pediatr 2020;20(1):67.
24. Tripathi T, Dusing S. Long-term neurodevelopmental outcomes of infants born late preterm: a systematic review. Res Rep Neonatol 2015;2015:91.
25. Konukbay D, Çiftçi Rn, Yıldız D. Yenidoğan yoğun bakım ünitesinde çalışan hemşirelerin bireyselleştirilmiş destekleyici gelişimsel bakıma yönelik bilgi, tutum ve davranış düzeylerinin incelenmesi: Tanımlayıcı araştırma. Turk Klin J Nurs Sci 2022;14(3):672-81
26. Dong J, Yi Y, Zhu X, et al. Status of knowledge, attitude, and practice of clinical nurses towards the intrahospital transport of critically ill patients: A cross-sectional study. Nurs Open 2024;11(6):e2172.
27. Yeşilçınar İ, Yanık D, Şahin E, et al. Yoğun bakım hemşirelerinde ahlaki duyarlılık, iş motivasyonu ve umutsuzluk arasındaki ilişkinin belirlenmesi. J Contemp Med 2020;10(4):578–84.
28. Baljoon R, Banjar H, Banakhar M. Nurses' work motivation and the factors affecting it: A scoping review. Int J Nurs Clin Pract 2018; 5: 277.
29. Tomaszewska K, Kowalczuk K, Majchrowicz B, et al. Areas of professional life and job satisfaction of nurses. Front Public Health 2024;12:1370052.
30. Niskala J, Kanste O, Tomietto M, et al. Interventions to improve nurses' job satisfaction: A systematic review and meta-analysis. J Adv Nurs 2020;76(7):1498–508.
31. Fatma Yilmaz K. Yenidoğan yoğun bakım kliniği'nde çalışan hemşirelerde iş doyumu ve etkileyen faktörler. İzmir Dr Behçet Uz Çocuk Hastanesi Dergisi 2014;4(1):51-8.
32. Baş T, Ünal Ö, Amarat M, et al. Hemşirelerde iş tatmininin motivasyon düzeyine etkisi. Örgütsel Davranış Araştırmaları Dergisi 2017;2(2):20–39.
33. Haleem A, Javaid M, Qadri MA, et al. Understanding the role of digital technologies in education: A review. Sustain Oper Comput 2022;3:275–85.
34. Shivani, Sharma M, Sonakshi, et al. Correlates of perceived stress and professional quality of life among nurses working in neonatal intensive care units (NICU) in North India: A multicenter study. J Neonatol 2023;37(1):6–13.
35. Yu M, Park CG, Lee S. Predictors of nurse-reported quality of care in neonatal intensive care units in Korea. J Pediatr Nurs 2021;60:e24-30.
36. Barnawi N, Barnawi B. The relationship between nurses' self-efficacy and occupational stress in the critical care unit at King Abdul-Aziz Hospital in Jeddah, Saudi Arabia. Nurs Commun 2023;7:e2023001-e35.
37. Bagheri Hossein Abadi M, Taban E, Khanjani N, et al. Relationships between job satisfaction and job demand, job control, social support, and depression in Iranian nurses. J Nurs Res 2021;29(2):e149.
38. Geiger-Brown J, Rogers VE, Trinkoff AM, et al. Sleep, sleepiness, fatigue, and performance of 12-hour-shift nurses. Chronobiol Int 2012;29(2):211–9.
39. Chang W-P, Chang Y-P. Relationship between job satisfaction and sleep quality of female shift-working nurses: using shift type as moderator variable. Ind Health 2019;57(6):732–40.
40. Weaver SH, de Cordova PB, Vitale TR, et al. Experiences and perceptions of nurses working night shift: a qualitative systematic review protocol. JBI Evid Synth 2020; 18(6):1278-84
41. Dall'Ora C, Ball J, Redfern O, et al. Are long nursing shifts on hospital wards associated with sickness absence? A longitudinal retrospective observational study. J Nurs Manag 2019;27(1):19–26.
42. Serafin L, Strząska-Kliś Z, Kolbe G, et al. The relationship between perceived competence and self-esteem among novice

nurses - a cross-sectional study. Ann Med 2022;54(1):484–94.
43. Chen S-H, Chen S-C, Lee S-C, et al. Impact of interactive situated and simulated teaching program on novice nursing practitioners' clinical competence, confidence, and stress. Nurse Educ Today 2017;55:11–6.
44. Mosqueda-Peña R, Lora-Pablos D, Pavón-Muñoz A, et al. Impact of a developmental care training course on the knowledge and satisfaction of health care professionals in neonatal units: a multicenter study. Pediatr Neonatol 2016;57(2):97–104.
45. Lu H, Barriball KL, Zhang X, et al. Job satisfaction among hospital nurses revisited: A systematic review. Int J Nurs Stud 2012;49(8):1017–38.
46. Thomas AO, Bakas T, Miller E, et al. Burnout and Turnover among NICU Nurses. MCN Am J Matern Child Nurs 2022;47(1):33-9.