

## NEONATAL NURSES' PERCEPTIONS OF TEAMWORK: A CROSS-SECTIONAL STUDY VNÍMANIE TÍMOVEJ PRÁCE NOVORODENECKÝMI SESTRAMI: PRIEREZOVÁ ŠTÚDIA

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### ABSTRACT

**Introduction:** Teamwork is vital for quality neonatal care and nurse well-being. In neonatal care units, nurses play a central role in team communication and coordination. Despite its importance, there is limited empirical evidence on how neonatal nurses perceive teamwork.

**Objective:** To explore neonatal nurses' perceptions of teamwork in selected public hospitals in Slovakia and to identify factors influencing their perceptions.

**Methods:** This quantitative, descriptive cross-sectional study was conducted with 133 neonatal nurses from four Slovak hospitals. Data were collected (Sept 2023 – Feb 2024) using the Slovak version of the Nursing Teamwork Survey (NTS) and analyzed through descriptive and inferential statistics.

**Results:** Nurses rated teamwork as optimal 50 – 75% of the time, with Shared Mental Model scoring highest. Teamwork perceptions differed by education, overtime, and job role, and correlated with experience, staffing, workload, satisfaction, and perceived care quality and safety. Job and teamwork satisfaction significantly predicted teamwork perception ( $p \leq 0.05$ ).

**Conclusion:** To enhance teamwork in neonatal units, nursing practice should prioritize supportive leadership, fair workload distribution, and structured communication. Fostering job satisfaction and ongoing team training can strengthen collaboration and improve care outcomes.

**Key words:** Acute care. Neonatal nurses. Nursing. Teamwork.

### ABSTRAKT

**Úvod:** Tímová spolupráca je nevyhnutná pre kvalitnú neonatologickú starostlivosť a celkovú pohodu sestier. Na neonatologických oddeleniach zohrávajú sestry kľúčovú úlohu v komunikácii a koordinácii tímu. Napriek ich dôležitosti existuje len limitované množstvo empirických dôkazov o tom, ako sestry vnímajú tímovú spoluprácu.

**Cieľ:** Zistiť, ako neonatologické sestry vnímajú tímovú spoluprácu vo vybraných štátnych nemocniciach na Slovensku a identifikovať faktory, ktoré ovplyvňujú ich vnímanie.

**Metódy:** Táto kvantitatívna, deskriptívna prierezová štúdia bola realizovaná so 133 neonatologickými sestrami zo štyroch slovenských nemocníc. Zber údajov prebiehal od (Sept 2023 – Feb 2024) prostredníctvom slovenskej verzie dotazníka Nursing Teamwork Survey (NTS). Údaje boli analyzované pomocou deskriptívnej a inferenčnej štatistiky.

**Výsledky:** Sestry hodnotili tímovú spoluprácu ako optimálnu v 50 – 75 % času, pričom najvyššie skóre dosiahlo Kolektívne zmýšľanie. Vnímanie tímovej práce sa líšilo podľa vzdelania,

nadčasov a pracovnej pozície a korelovalo s praxou, personálnym obsadením, pracovným zaťažením, spokojnosťou v práci a vnímanou kvalitou a bezpečnosťou starostlivosti. Spokojnosť s pracovnou pozíciou a tímovou spolupracou boli významnými prediktormi celkového vnímania tímovej práce ( $p \leq 0,05$ ).

**Záver:** Na zlepšenie tímovej spolupráce na neonatologických oddeleniach by mala ošetrovateľská prax uprednostniť podporné vedenie, spravodlivé rozdelenie pracovnej záťaže a štruktúrovanú komunikáciu. Podpora pracovnej spokojnosti a kontinuálne tímové vzdelávanie môžu posilniť spoluprácu a zlepšiť výsledky starostlivosti.

**Kľúčové slová:** Akútna starostlivosť. Neonatologické sestry. Ošetrovateľstvo. Tímová spolupráca.

### INTRODUCTION

Teamwork in neonatal care units (NCUs) is essential to high-quality care, particularly from the perspective of nurses, who are the primary providers of direct patient care. In these highly specialized environments, the survival of critically ill neonates depends on coordinated multidisciplinary collaboration (Edinger et al., 2022). Nurses play a central role, not only in delivering clinical care but also in coordinating with neonatologists, respiratory therapists, nutritionists, and social workers to ensure safe, timely, and comprehensive care. They serve as key communicators, relaying vital information among team members and families, which makes their contribution to team cohesion and communication critical (Masten et al., 2019). Their continuous bedside presence enables early detection of clinical changes, allowing for prompt interventions. Thus, nurses' ability to function effectively within a team is vital to both patient outcomes and overall team performance (Foster et al., 2024).

Although teamwork is critical in neonatal care units (NCUs), nurses often face significant barriers to effective collaboration. A primary challenge is communication, particularly in the fast-paced, high-

pressure environment of NCUs, where rapid decision-making can lead to misunderstandings or unclear care plans (Bell et al., 2023). Additionally, high workloads and staffing shortages contribute to fatigue and burnout, limiting nurses' ability to engage in collaborative care (Dall'Ora et al., 2020). Insufficient staffing further compounds these issues by reducing time for coordination and increasing the risk of errors. Despite these challenges, effective teamwork is consistently associated with improved outcomes, including fewer medical errors, better patient safety, and higher care quality (Bell et al., 2023). Collaborative problem-solving also enables more tailored and innovative neonatal care. From the nursing perspective, positive team dynamics marked by mutual respect, shared goals, and clear communication enhance job satisfaction, improve patient outcomes, and reduce burnout and staff turnover (Al-Harrasi, 2024). Fostering a collaborative team environment is thus vital not only for delivering high-quality neonatal care but also for sustaining the nursing workforce (Ediger et al., 2022). However, despite widespread recognition of its importance, there is limited empirical evidence on how neonatal nurses perceive teamwork in their specific clinical contexts particularly within the Slovak healthcare system. Understanding these perceptions is key to informing targeted strategies that enhance team effectiveness and care outcomes.

## AIM

A cross-sectional descriptive study aimed to explore neonatal nurses' perceptions of teamwork in selected public hospitals in Slovakia and to identify factors influencing their perceptions.

## SAMPLE

Five public hospitals with neonatal care units were invited to participate; four agreed to take part. Following written consent from hospital management, participants were recruited through convenience sampling. Eligible respondents included nurses and practical nurses, with informed consent as the sole inclusion criterion. Of the 240 distributed questionnaires, 133 were returned, yielding a response rate of 55.4 %. No questionnaires were excluded from the analysis.

## METHODS

The study adhered to the STROBE guidelines and received approval from the institutional Ethics

Committee [BLINDED FOR PEER REVIEW]. Data were collected between September 2023 and February 2024 using the validated Slovak version of the Nursing Teamwork Survey (NTS) (Kalisch et al., 2010; Kohanová et al., 2023). The NTS comprises 33 items across five subscales based on Salas' team model: Trust (7 items), Team orientation (9), Backup (6), Shared mental model (7), and Team leadership (4). Responses were rated on a 5-point Likert scale (1 = Rarely to 5 = Always), with higher scores indicating more positive perceptions of teamwork. The questionnaire also captured sociodemographic and workplace characteristics, as well as subjective assessments of care quality and patient safety (10-point Likert scale), and satisfaction with current position, job, and teamwork (5-point Likert scale). Questionnaires and collection boxes ensuring anonymity were distributed in paper form across participating units. They remained available for approximately one month, or longer based on agreements with nurse managers, to allow participation from all eligible nurses, including those on leave. Demographic data were handled in accordance with EU Regulation 2016/679 (GDPR) on personal data protection. Participation in the study was voluntary, and respondents provided implied consent by completing the questionnaire.

Data were analyzed using SPSS (version 25.0). Descriptive statistics (mean, SD, min., max., frequencies) were used to summarize the sample and the NTS instrument, following the original authors' guidelines (Kalisch et al., 2010). Missing data (0.5 – 0.6%) were minimal and handled by listwise deletion. The Kolmogorov-Smirnov test indicated non-normality ( $p \leq 0.05$ ), thus non-parametric tests were applied. Group differences in teamwork perceptions were assessed using the Kruskal-Wallis test, while associations with continuous variables were examined using Spearman's correlation. Multiple linear regression was performed to identify predictors of teamwork perception. Reliability analysis yielded a Cronbach's alpha of 0.827, indicating good internal consistency.

## RESULTS

The sample consisted of 133 nurses working in neonatal care units in selected hospitals in Slovakia (Table 1, 2).

### Overall perception of teamwork

Neonatal nurses in our study rated overall team-

**Table 1** Sample characteristics – categorical variables

Variables		N = 133	%
Education	Secondary vocational education	20	15.0
	Higher education	39	29.3
	Bachelor's degree	48	36.1
	Master's degree or higher	26	19.5
Job position	Practical nurse	6	4.5
	Nurse	47	35.3
	Nurse specialist	61	45.9
	Advanced practice nurses	13	9.8
	Nurse manager	6	4.5
Number of overtime hours	None	14	10.5
	Less than 12 hours	34	25.6
	More than 12 hours	85	63.9

**Table 2** Sample characteristics – ordinal variables

Variables	Min.	Max.	M	SD
Age	22	62	42.04	11.67
Professional experience in total	1	42	17.54	12.36
Professional experience in the current position	1	42	14.95	11.64
Perceived staffing adequacy	1	5	3.44	0.74
Number of patients on the last working shift	1	23	4.78	3.87
Number of admitted patients on the last working shift	0	7	1.93	2.16
Number of discharged patients on the last working shift	0	6	0.94	1.23
Satisfaction in the current position	1	5	3.41	0.73
Job satisfaction	1	5	3.74	0.73
Satisfaction with teamwork	1	5	3.42	0.92
Quality assessment	1	10	8.00	1.66
Overall patient safety level	1	10	8.48	1.70

**Legend:** Min. (minimal value), Max. (maximal value), M (mean), SD (standard deviation)

work as optimal between 50 and 75% of the time during their last shift ( $3.51 \pm 0.42$ ). The highest-rated teamwork dimension was Shared mental model ( $4.00 \pm 0.48$ ), followed by Backup ( $3.94 \pm 0.51$ ), Team leadership ( $3.74 \pm 0.79$ ), Trust ( $3.63 \pm 0.58$ ) and Team orientation ( $2.63 \pm 0.70$ ).

### Differences in teamwork perception based on categorical variables

Statistically significant differences were confirmed in the teamwork perceptions based on the education, the number of overtime hours, and job position ( $p \leq 0.05$ ). Nurses with secondary vocational education rated teamwork significantly higher ( $p = 0.010$ ), as well as those who had no overtime hours in the past three months ( $p = 0.038$ ). Regarding job position, practical nurses rated teamwork significantly better than other job categories ( $p = 0.039$ ).

### Association between teamwork perception and continuous variables

Statistically significant relationships were identified

between teamwork perceptions and several variables ( $p \leq 0.05$ ). The overall NTS score was negatively associated with the number of patients on the last shifts ( $r = -0.174$ ) and positively associated with job satisfaction ( $r = 0.267$ ), satisfaction with the current job position ( $r = 0.373$ ), satisfaction with teamwork ( $r = 0.506$ ), quality assessment ( $r = 0.479$ ) and overall patient safety level ( $r = 0.247$ ).

### Predictors of teamwork in neonatal care units

Multiple linear regression analysis was conducted to identify predictors of teamwork perceptions among neonatal nurses (Table 3). The average NTS score served as the dependent variable, with age, patient load, number of admissions and discharges, job satisfaction, teamwork satisfaction, perceived quality of care, and overall patient safety as independent variables. The model was statistically significant ( $R = 0.616$ ;  $R^2 = 0.379$ ; Adj.  $R^2 = 0.332$ ;  $F = 8.137$ ;  $p \leq 0.001$ ), explaining 33.2% of the variance in teamwork perceptions. Among the predictors, satisfaction with the current position

**Table 3** Predictors of the perceptions of teamwork among neonatal nurses (N = 133)

Variables	Perception of teamwork (mean score of the NTS) (R <sup>2</sup> = 0.379; Adj R <sup>2</sup> = 0.332; F = 8.137; p < 0.001)	
	β	p
(Constant)	-	< 0.001**
Age	-0.030	0.687
Number of patients on the last shift	0.124	0.111
Number of admitted patients on the last shift	-0.036	0.643
Number of discharged patients on the last shift	0.026	0.747
Satisfaction in the current position	0.185	0.045*
Job satisfaction	0.036	0.713
Satisfaction with teamwork	0.390	< 0.001**
Quality assessment	0.141	0.230
Overall patient safety level	0.066	0.549

**Legend:** β (Standardized Beta coefficient); p (significance): \* p ≤ 0.05; \*\*p < 0.001

(β = 0.185; p = 0.045) and satisfaction with teamwork (β = 0.390; p ≤ 0.001) were significant, indicating that higher satisfaction in these areas was associated with more positive teamwork perceptions.

## DISCUSSION

Neonatal nurses in this study reported a moderate level of teamwork, with optimal collaboration occurring 50 – 75 % of the time during their last shift. This aligns with findings from Australia, the United States, and Turkey (Costello et al., 2021; Kalisch et al., 2010; Taskiran Eskici et al., 2021). Among the five teamwork dimensions, Shared mental model received the highest rating, indicating effective information exchange and strong team cohesion. Conversely, Team orientation scored lowest, reflecting challenges in conflict resolution and feedback processes, a trend similarly observed in international and Slovak studies (Kalisch et al., 2010; Kohanová et al., 2023). These findings highlight the importance of structured communication, especially during shift handovers, to maintain continuity of care. The consistently low ratings in team orientation suggest a pressing need for targeted interventions to enhance feedback mechanisms and conflict resolution in neonatal care teams (Ediger et al., 2022).

Our findings identified several factors influencing teamwork perceptions, with education playing a key role (Abuhammad et al., 2024). Nurses with secondary education reported more positive views than university-educated peers, possibly due to their more practice-focused training. In contrast, university programs emphasize theory and autonomy, which may reduce team engagement (Bell et al., 2023). Targeted training such as collaborative care

models, simulation-based, and interprofessional education has been shown to improve teamwork skills and patient safety (Yousef et al., 2022). While initial training influences perceptions, ongoing development is crucial for sustaining effective collaboration.

Overtime hours influenced teamwork perceptions, with nurses working fewer overtime hours reporting more favorable views. This aligns with evidence linking long shifts to fatigue and burnout, which undermine team cohesion (Bragadóttir et al., 2023). High workloads, often due to staffing shortages, further strain communication. Slovakia's low nurse-to-population ratio (5.7 per 1,000) highlights the need to improve staffing (OECD, 2019).

Additionally, practical nurses reported more positive teamwork perceptions than registered nurses (RNs). This may reflect differences in educational focus and role expectations: practical nursing programs emphasize hands-on, collaborative training, while RN education often promotes theoretical knowledge and autonomous decision-making, potentially fostering a more individualistic approach (Masten et al., 2019). RNs may also experience greater administrative burdens and leadership demands, increasing stress and affecting their view of teamwork. As Bell et al. (2023) noted, navigating hierarchical structures and shifting team dynamics in NCUs can challenge collaboration. Addressing these gaps through interprofessional education and team-building interventions may enhance teamwork perceptions across all nursing roles and contribute to better outcomes and job satisfaction.

Satisfaction emerged as a key factor influencing neonatal nurses' perceptions of teamwork. Higher

levels of job and teamwork satisfaction were significantly associated with more positive teamwork perceptions, underscoring the role of a supportive work environment in fostering collaboration. In this study, both variables were also significant predictors of overall teamwork perceptions. This aligns with previous findings demonstrating that effective teamwork enhances job satisfaction, reduces burnout, and improves neonatal outcomes (Costello et al., 2021; Kalisch et al., 2010). A positive team atmosphere promotes nurse well-being and care quality, highlighting the reciprocal relationship between teamwork and job satisfaction (Bragadóttir et al., 2023). Additionally, nurses who perceived higher levels of patient safety also reported stronger teamwork, suggesting a bidirectional association between these factors (Boamah et al., 2017).

Staffing adequacy further influenced teamwork perceptions. Higher patient loads were associated with lower teamwork ratings, reinforcing the importance of maintaining optimal nurse-to-patient ratios in neonatal settings (Boamah et al., 2017; Rochefort et al., 2015). Excessive workloads impede communication, reduce coordination, and increase the risk of adverse outcomes. NICUs require continuous monitoring and interdisciplinary collaboration, making adequate staffing essential for both efficiency and safety. Chronic understaffing contributes to burnout, low satisfaction, and higher turnover, weakening team dynamics. In high-stress environments, overburdened staff are more prone to communication breakdowns and medical errors (Rochefort et al., 2015). To mitigate these risks, institutions must prioritize evidence-based staffing models, flexible scheduling, and policies that support safe nurse-to-patient ratios (Foster et al., 2025; Rochefort et al., 2015).

Several limitations should be acknowledged. The cross-sectional design and use of convenience sampling limit the generalizability of the findings beyond the studied population. The reliance on self-reported data introduces the potential for social desirability bias. Additionally, the study did not account for clustering effects related to unit type or hospital, which may have influenced the results.

## CONCLUSION

This study explored teamwork in NCUs of selected Slovak public hospitals from nurses' perspectives. Results show that mutual trust and clear communication are critical to effective teamwork, while

poor feedback, lack of respect, and conflict undermine it. Supportive leadership and flexible work environments further strengthen collaboration and care quality. To improve teamwork, management should address barriers, promote a positive team culture, and evaluate team functioning regularly.

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