

RESEARCH ARTICLE

Practice Environment and Mental Well-Being Among Hospital Nurses: The Mediating Role of Work Engagement

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Introduction: Supporting the mental well-being (MWB) of health-care professionals has become a critical priority in the context of global nursing shortages and increasing psychosocial demands. While previous research has established links between work environment, engagement, and MWB, empirical evidence from Hungary remains limited.

Aim: This study examined the relationships between the nursing practice environment (NPE), work engagement (WE), and MWB among Hungarian hospital nurses.

Methods: A cross-sectional online survey was conducted among 232 hospital nurses using the Practice Environment Scale of the Nursing Work Index (PES-NWI), the Utrecht Work Engagement Scale (UWES-9), and the WHO-5 Well-Being Index. Pearson correlations and mediation analysis were applied to explore associations between variables while controlling for gender and work-related characteristics.

Results: A favorable NPE was significantly associated with higher levels of WE ($r = .37, p < .001$) and MWB ($r = .46, p < .001$). WE showed a strong positive relationship with MWB ($r = .74, p < .001$). Mediation analysis indicated that the total effect of the NPE on MWB was significant ($B = 15.00, p < .001$), and WE partially mediated the relationship between NPE and MWB (indirect effect: $B = 7.89, 95\%$ bootstrap CI [5.27, 10.43]).

Conclusions: The findings underscore the importance of the workplace environment as a key organizational resource that is positively associated with nurses' WE and MWB. Although the cross-sectional design precludes causal inferences, these findings provide support for considering organizational strategies aimed at strengthening the NPE as a potential target for supporting nurse engagement and MWB.

Keywords: mediation analysis, nurses, practice environment, mental well-being, work engagement

Introduction

The global healthcare system is facing a critical shortage of nurses, with projections indicating a deficit of millions of professionals by 2030 (World Health Organization, 2025). This shortage, combined with high turnover rates, burnout, and psychological distress, poses a serious threat to the sustainability of healthcare systems as well as the quality and safety of patient care (Al Maqbali, 2026). Nurses are frequently exposed to substantial job demands, including heavy workloads, emotional strain related to patient care, and persistent understaffing, all of which may negatively affect their psychological well-being and professional performance (Delgado et al., 2017). Consequently, identifying factors that may support nurses' mental health and enhance work engagement has become an important priority in healthcare research and workforce management (Chiminelli-Tomás et al., 2025). Among these factors, the nursing practice environment represents a key organizational determinant of both employee and patient outcomes. A supportive practice environment, characterized by adequate staffing, effective leadership, professional autonomy, and strong interprofessional collaboration, has been consistently associated in the literature with higher job satisfaction, improved retention, and better patient safety outcomes (Swiger et al., 2017). In contrast, unfavorable working conditions, such as excessive workload and insufficient managerial support, are linked to emotional exhaustion, increased burnout, and a higher intention to leave the profession (Ni et al., 2023). In addition to organizational characteristics, individual-level factors, such as work engagement, also play an important role in nurses' occupational well-being. Work engagement is generally defined as a positive, fulfilling, work-related state of mind related to vigor, dedication, and absorption (Xue et al., 2023). Nurses with higher levels of engagement tend to be more energetic, more committed to their work, and more resilient when facing workplace challenges (Han, 2023).

In its conceptualization of mental health, the World Health Organization (WHO, 2022) places mental well-being at its core, describing it as a state that enables individuals to cope with the stresses of life, realize their abilities, learn and work well, and contribute to their communities. Poor mental health among nurses has been linked to increased absenteeism, reduced job performance, and higher turnover rates, ultimately undermining the resilience of healthcare systems (Alharbi et al., 2025). Therefore, understanding how organizational and individual factors jointly influence mental well-being is essential for developing effective interventions aimed at supporting the nursing workforce. The theoretical framework of the present study is the Job Demands–Resources (JD–R) model (Bakker & Demerouti, 2007; Demerouti et al., 2001). According to the model, job resources foster work engagement and contribute to positive occupational outcomes through a motivational process (Schaufeli & Bakker, 2004). Previous nursing studies applying the JD–R framework have similarly demonstrated positive associations between work-related resources and engagement among nurses (Othman et al., 2017; Xue et al., 2023). The JD–R model proposes two broad psychological processes. The health impairment process explains how excessive job demands may contribute to strain and adverse health outcomes, whereas the motivational process suggests that job resources enhance work engagement and subsequently promote positive outcomes such as mental well-being and job satisfaction (Bakker & Demerouti, 2007, 2017). The present study does not aim to test the full JD–R model. Instead, it examines only the motivational pathway by focusing on the relationships among nursing practice environment, work engagement, and mental well-being. Within this framework, the nursing practice environment can be conceptualized as an important job resource, while work engagement represents a motivational pathway through which job resources may be linked to positive psychological outcomes (Bakker & Demerouti, 2007; Keyko et al., 2016). In this context, work engagement may act as an important mediating process linking the nursing practice environment to nurses' mental well-being. Previous studies have demonstrated that supportive nursing practice environments are positively associated with higher levels of work engagement among nurses (Ni et al., 2023; Wang & Liu, 2015). Organizational resources such as leadership support, autonomy, and adequate staffing may foster motivation and work engagement by providing nurses with the support and resources needed to perform their work effectively. A supportive practice environment may also strengthen nurses' sense of professional competence, control over their work, and organizational support, thereby facilitating both work engagement and positive mental well-being. Work engagement has also been associated with positive psychological outcomes, including life satisfaction, mental well-being, and reduced psychological distress (Morales-García et al., 2024). These findings suggest that work engagement may function as a motivational component through which organizational resources show a positive association with higher mental well-being. Although these associations have been widely examined in international research, empirical evidence from Hungary remains limited. Existing Hungarian studies have primarily focused on specific organizational and psychological constructs. For instance, Siket Ujváriné et al. (2020) investigated the impact of organizational climate on the intention to remain in the nursing profession. Rozmann et al. (2025) reported that workload related to insufficient staffing was an important

occupational stressor and that higher perceived stress was associated with poorer sleep quality among Hungarian nurses. In a hospital-based study in southwestern Hungary, Cseh et al. (2021) showed that workplace climate and organizational characteristics were associated with overall life satisfaction, while social appreciation was significantly related to depressive symptoms. The authors also noted that these outcomes could not be attributed to the work environment alone. Furthermore, Soósne Kiss et al. (2024) reported that persistent occupational stressors contribute to burnout among midwives. While these studies demonstrate that related organizational and psychological variables have been examined in Hungary, research investigating the combined relationships between the nursing practice environment, work engagement, and mental well-being among hospital nurses remains limited. On a broader scale, systematic reviews also highlight the relative scarcity of research integrating these specific constructs. Chiminelli-Tomás et al. (2025) identified only 14 eligible studies using the PES-NWI with burnout and/or engagement outcomes, with only two assessing work engagement. Examining these integrated relationships among hospital nurses in Hungary may therefore contribute valuable evidence from a context that remains underrepresented in the literature.

The aim of this study was to examine the relationships between the nursing practice environment, work engagement, and mental well-being among Hungarian nurses.

Based on the existing literature, the following hypotheses were formulated:

H₁: A more favorable nursing practice environment is positively associated with mental well-being.

H₂: A more favorable nursing practice environment is positively associated with work engagement.

H₃: Work engagement mediates the relationship between nursing practice environment and mental well-being.

Methods

Participants and Data Collection

An online survey was conducted in the summer of 2025. Participants were recruited via social media platforms, using a convenience sampling approach. Inclusion criteria required participants to be at least 18 years of age and to have a minimum of one year of work experience as a nurse in a hospital setting. The survey was administered using the EvaSys system, which complies with the European Union General Data Protection Regulation and ensures secure data handling. At the beginning of the questionnaire, participants were provided with detailed information about the purpose, procedures, and ethical considerations of the study, after which their informed consent was obtained. Participation was entirely voluntary, and respondents were informed that they could withdraw from the survey at any time without any consequences. No personally identifiable information was collected, ensuring the anonymity and confidentiality of all participants. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval for the study was obtained from the Regional Research Ethics Committee (BORS-11/2025).

The initial sample consisted of 254 hospital nurses with a mean age of 41.22 years ($SD = 9.03$). The majority of participants were female (93.1%) and employed in public healthcare institutions (70.6%). Most respondents worked rotating shifts (57.5%) and had substantial professional experience ($M = 16.93$ years, $SD = 9.88$). Participants represented eight counties across Hungary. Of the 254 returned questionnaires, four respondents did not report their work schedule. In addition, two participants working permanent night shifts and ten participants reporting “other” work schedules were excluded due to insufficient sample sizes for reliable estimation in the subsequent analyses. Furthermore, six questionnaires were excluded due to substantial missing data. Consequently, the final analytical sample consisted of 232 nurses, and all analyses were conducted using this sample. The final sample remained predominantly female (93.1%) and the demographic composition was largely consistent with the initial sample. Demographic and professional characteristics of the participants are presented in [Table 1](#).

Table 1. Demographic and Professional Characteristics of Nurses ($N = 232$)

Characteristics		Nurses	
$M (SD)$ (min – max), frequency		N	%
Sample size		232	100.0
Gender	Females	216	93.1
	Males	16	6.9
Age in years		40.86 (9.08) (22 – 56)	
Residence	City	84	36.2
	Town	76	32.8
	Village / rural area	72	31.0
Marital status	With parents	8	3.4
	Alone	50	21.6
	With partner	170	73.3
	M/D	4	1.7
Education	Secondary	8	3.4
	Nursing	214	92.2
	BSc or higher	10	4.3
Work experience as a nurse in years		17.14 (9.79) (1 – 37)	
Work schedule	Day shift	86	37.1
	Rotating shift	146	62.9
Hospital	Public	164	70.7
	Private	4	1.7
	University clinic	12	5.2
	Other	50	21.6
	M/D	2	0.9

Note. M/D = Missing Data. The “other” category includes heterogeneous institutional settings that could not be classified into the predefined categories.

Measurements

Sociodemographic variables included gender, age, work experience as a nurse and work shifts.

Utrecht Work Engagement Scale (UWES-9)

Work engagement was measured using the 9-item Utrecht Work Engagement Scale (UWES-9), originally developed by Schaufeli et al. (2002, 2006). The UWES conceptualizes work engagement as a positive, fulfilling, work-related psychological state comprising three core dimensions: vigor, dedication, and absorption. Vigor is characterized by high levels of energy and mental resilience while working, dedication refers to being strongly involved in one's work and experiencing a sense of significance, enthusiasm, and pride, whereas absorption involves being fully concentrated and happily engrossed in one's work. Schaufeli et al. (2006) demonstrated that the scale can be interpreted as a unidimensional construct, particularly when the aim is to assess overall work engagement rather than its specific components. In the present study the total score was used, as it was considered methodologically more appropriate and parsimonious.

Items were rated on a 7-point Likert-type scale ranging from 0 (never) to 6 (always/every day), where higher scores indicate higher levels of work engagement. The UWES-9 has been widely used in international healthcare research and has demonstrated good psychometric properties across various occupational and cultural contexts. A Hungarian version of the UWES-9 has previously been examined among Hungarian employees (Salamon et al., 2021); however, its psychometric properties have not been specifically validated in a sample of nurses. Therefore, a translated and culturally adapted Hungarian version was used in the present study. The scale demonstrated excellent internal reliability in my sample, with a Cronbach's alpha coefficient of .90.

From the perspective of the JD–R model, organizational resources embedded in the nursing practice environment may foster work engagement, which in turn contributes to positive psychological outcomes. Thus, work

engagement may represent an important mediating process through which favorable practice environments are associated with nurses' mental well-being (Morales-García et al., 2024; Wang & Liu, 2015).

Practice Environment Scale of the Nursing Work Index (PES-NWI)

The perceived *nursing practice environment* was assessed using the Practice Environment Scale of the Nursing Work Index (PES-NWI), originally developed by Lake (2002). In this study, the shortened version (PES-5) was applied (Lake et al., 2024). This instrument covers five key domains of the nursing practice environment: nurse participation in hospital affairs, nursing foundations for quality of care, nurse manager ability and leadership, staffing and resource adequacy, and collegial nurse–physician relations. The PES-5 consists of one item representing each domain, rated on a 4-point Likert scale from 1 (strongly disagree) to 4 (strongly agree), with higher scores indicating a more favorable perceived practice environment. The scale provides the organizational conditions under which nurses deliver care. Within the JD–R framework, these organizational characteristics may function as job resources that promote motivation, engagement, and psychological well-being. No formally validated Hungarian version is currently available; therefore, in the present study, a translated and culturally adapted version was used. The questionnaire showed acceptable internal consistency in my sample, with a Cronbach's alpha of .71, which meets the commonly recommended threshold for acceptable reliability. The shortened version was selected because it retains the core domains of the original instrument while reducing respondent burden and was therefore considered suitable for assessing the overall practice environment.

WHO-5 Well-Being Index

Mental well-being was assessed using the World Health Organization Well-Being Index, a brief, self-administered questionnaire that evaluates subjective well-being over the previous two weeks (Topp et al., 2015; WHO, 1998). The WHO-5 focuses on five positively phrased items assessing positive mood (good spirits, relaxation), vitality (being active, waking up rested), and general interest in life. Each item was rated on a 6-point Likert scale ranging from 0 (at no time) to 5 (all of the time). The raw score (0–25) is typically multiplied by 4 to provide a final score from 0 to 100, where higher scores represent better mental well-being. The instrument has been widely used and validated across different populations. For this research, the Hungarian validation provided by Susánszky et al. (2006) was applied (it should be noted, however, that Susánszky reported a 0–3 scale rather than the original 0–5 scale). In this sample, the scale showed strong internal consistency with a Cronbach's alpha coefficient of .90.

Translation of Questionnaires

Since the UWES-9 and PES-NWI had not previously been validated for Hungarian nursing populations, a formal translational process was conducted in accordance with internationally accepted guidelines for the cross-cultural adaptation of self-report measures (Beaton et al., 2000; Wild et al., 2005). This multi-stage process included independent forward translations by bilingual experts, followed by a reconciliation phase to resolve discrepancies and produce a single version. This version was then subjected to independent back-translation into the original language by translators blind to the original scales to ensure accuracy. Finally, an expert panel review was conducted to ensure semantic, idiomatic, experiential, and conceptual equivalence between the source and target instruments.

Data Analysis

Data analysis was performed using IBM SPSS Statistics version 31.0. Descriptive statistics (means, standard deviations, frequencies, and percentages) were used to summarize demographic characteristics and scale scores. The internal consistency of the scales was assessed using Cronbach's alpha coefficients. Normality of the continuous variables was evaluated using Q-Q plots, as well as skewness and kurtosis values. The skewness values ranged from -0.54 to 0.10, while the kurtosis values ranged from -1.25 to -0.15. Since all values fell well within the acceptable range of ± 1.5 , and given the relatively large sample size, parametric tests were applied.

Relationships among work engagement, practice environment, and well-being were assessed using Pearson correlation coefficients. Work experience and work schedule were included as covariates because previous research has suggested that occupational characteristics related to career duration and shift work may influence nurses'

work engagement and psychological well-being (e.g., Sarıköse & Göktepe, 2022). Age was not included in the multivariate analyses because it showed a strong correlation with work experience, indicating potential multicollinearity and redundancy. The mediation analysis was conducted using PROCESS macro 5.0 (Model 4) with 5,000 bootstrap samples to examine whether work engagement (M) explains the association between practice environment (X) and mental well-being (Y), controlling for work experience, work schedule (as a dummy variable where day shift = 0, rotating shift = 1) and gender (males = 0, females = 1). The a, b, and c' paths were estimated, and the indirect effect was tested using bias-corrected bootstrap confidence intervals. The model was specified as a cross-sectional, theory-driven association model; accordingly, no temporal or causal interpretation is implied. Unstandardized (B) coefficients are reported together with standard errors, t-values, and 95% confidence intervals.

Results

Associations Among Study Variables

Pearson correlation analyses indicated significant associations among the main study variables, as presented in Table 2. Perceived nursing practice environment was moderately associated with work engagement and mental well-being. Work engagement demonstrated a strong positive relationship with mental well-being, suggesting that higher levels of engagement were closely associated with better mental well-being. Regarding the control variables, work experience showed a small but significant negative association with work engagement, whereas its association with mental well-being was not statistically significant. Age was strongly correlated with work experience but was not significantly associated with the primary study variables.

Table 2. Pearson Bivariate Correlations Among Study Variables

	<i>M (SD)</i>	1	2	3	4	5
Nursing practice environment	2.77 (0.64)	1	–	–	–	–
Work engagement	5.38 (0.91)	.37***	1	–	–	–
Well-being	63.03 (20.42)	.46***	.74***	1	–	–
Work experience	17.14 (9.79)	.04	–.23***	–.12	1	–
Age	40.86 (9.08)	.11	–.14	–.06	.75***	1

Note: Data are presented as *M*, *SD* (Mean, Standard Deviation); (*N* = 232).

****p* < .001

Mediation Analysis

The model tested whether work engagement (M) mediated the relationship between nursing practice environment (X) and mental well-being (Y). The complete mediation results are presented in Table 3, and a visual summary of the model is shown in Figure 1. Although work engagement and mental well-being were strongly correlated, they represent conceptually distinct constructs measuring different aspects of psychological functioning: Work engagement reflects a work-related motivational state, whereas mental well-being refers to general psychological health. Additionally, to assess potential multicollinearity between the constructs, collinearity diagnostics were performed. The Variance Inflation Factor (VIF) for all predictors was well below the conservative threshold of 2.5 (with a VIF of 1.25 for work engagement). The results indicated that a more favorable nursing practice environment was significantly associated with higher work engagement. In turn, work engagement was positively associated with mental well-being. The indirect effect of nursing practice environment on mental well-being through work engagement was statistically significant ($B = 7.89$, $Boot\ SE = 1.33$, 95% bootstrap CI [5.27, 10.43]). Because the bootstrap confidence interval did not include zero, the mediation effect was considered significant. The direct effect of practice environment on mental well-being remained significant after accounting for work engagement ($B = 7.11$, $SE = 1.44$, $p < .001$), indicating partial mediation. The total effect of nursing practice environment on mental well-being was also significant ($B = 15.00$, $SE = 1.81$, $p < .001$).

Among the covariates, gender was significantly associated with mental well-being, with female nurses showing higher scores than male nurses ($B = 10.09$, $SE = 3.41$, $p = .003$). Gender was not significantly associated with work engagement ($p = .117$). Work experience was significantly and negatively associated with work engagement

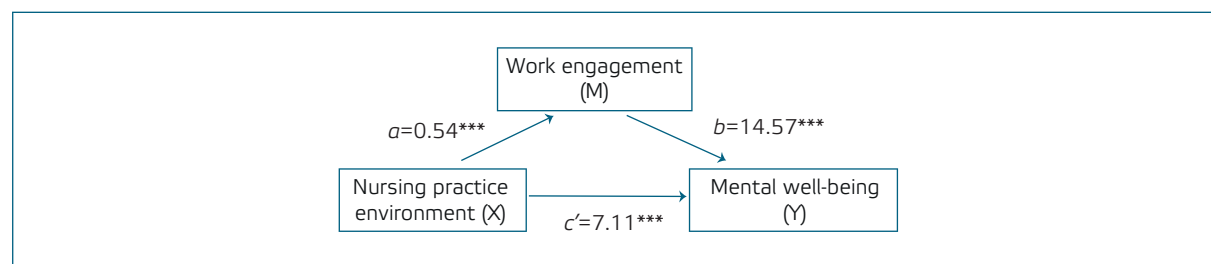
($B = -0.02$, $p < .001$), whereas work experience and work schedule were not significantly associated with mental well-being in the full model (both $p > .05$). Given the substantial gender imbalance in the sample (93.1% female), the gender-related findings should be interpreted with caution, as the small number of male participants ($n = 16$) may have limited the precision of these estimates.

Table 3. Direct, Indirect, and Total Effects from the Mediation Analysis ($N = 232$)

Model / Path / Predictor	Outcome variable	B	SE	t	95% CI	p
Total Effect Model – path c: $R^2 = .27$, $F_{(4, 227)} = 20.61$, $p < .001$						
Nursing practice environment (X)	Mental well-being (Y)	15.00	1.81	8.29	[11.43, 18.57]	< .001
Work experience		−0.30	0.13	−2.36	[−0.54, −0.05]	.019
Gender		15.08	4.63	3.25	[5.95, 24.21]	.001
Work schedule		3.06	2.54	1.21	[−1.95, 8.07]	.230
Mediation Model – path a: $R^2 = .20$, $F_{(4, 227)} = 14.42$, $p < .001$						
Path a Nursing practice environment (X)	Work engagement (M)	0.54	0.08	6.38	[0.37, 0.71]	< .001
Work experience		−0.02	0.01	−3.98	[−0.03, −0.01]	< .001
Gender		0.34	0.22	1.58	[−0.09, 0.77]	.117
Work schedule		0.06	0.12	0.46	[−0.18, 0.29]	.643
Mediation Model – path b and c': $R^2 = .61$, $F_{(5, 226)} = 70.50$, $p < .001$						
Path c' Nursing practice environment (X)	Mental well-being (Y)	7.11	1.44	4.94	[4.28, 9.94]	< .001
Path b Work engagement (M)	Mental well-being (Y)	14.57	1.03	14.09	[12.54, 16.61]	< .001
Work experience		0.04	0.09	0.47	[−0.14, 0.23]	.637
Gender		10.09	3.41	2.96	[3.37, 16.80]	.003
Work schedule		2.26	1.86	1.21	[−1.41, 5.92]	.226
		Effect	BootSE		95% bootstrap CI	
Mediation Model – path ab (indirect effect) X → M → Y		7.89	1.33	–	[5.27, 10.43]	–

Note. B = unstandardized regression coefficient; SE = standard error; CI = 95% confidence interval (belongs to the unstandardized coefficient); $Boot SE$ = bootstrap standard error; 95% bootstrap CI = bias-corrected 95% bootstrap confidence interval based on 5,000 bootstrap samples. Gender was coded as 0 = male and 1 = female, work schedule was coded as 0 = day shift and 1 = rotating shift. Results are based on Hayes' PROCESS macro (Model 4, Version 5.0) using 5,000 bias-corrected bootstrap samples.

Figure 1. Mediation Model Showing the Direct and Indirect Effects of Nursing Practice Environment on Mental Well-Being Through Work Engagement



Note. Full model $R^2 = .61$; $p < .001$, Indirect effect = 7.89, 95% CI [5.27, 10.43]. Values represent unstandardized regression coefficients (B). Covariates: work experience, work schedule, gender.

Discussion

This study examined the relationships between the nursing practice environment, work engagement, and mental well-being among Hungarian hospital nurses, with a particular emphasis on the mediating role of work engagement. Overall, these findings are consistent with the assumptions of the JD–R model, suggesting that organizational resources are closely associated with both motivational processes and well-being indicators in nursing populations (Othman et al., 2017; Xue et al., 2023). This study extends previous research by providing empirical evidence on nurses' mental well-being within the Hungarian healthcare context. Consistent with prior research, my results suggest that a more favorable practice environment is positively associated with both work engagement and mental well-being (Kohnen et al., 2023). The overall nursing practice environment, which encompasses various organizational features (Lake et al., 2024), functions as an essential job resource associated with nurses' subjective work experiences (Kamppila et al., 2026; van Kraaij et al., 2025; Labrague et al., 2022). Within the JD–R framework, work engagement is positioned as a proximal motivational state that co-occurs with job resources and is closely linked to mental well-being. Therefore, it represents a theoretically coherent construct that may statistically account for the observed association between the nursing practice environment and mental well-being. Nurses who perceive their practice environment as supportive are therefore more likely to report higher levels of engagement and better psychological functioning. Work engagement emerged as a statistical mediator in the present model. The strong association observed between work engagement and mental well-being is consistent with the study of Han (2023) and Gao et al. (2024), suggesting that positive work-related psychological states, such as vigor, dedication, and absorption, are closely associated with indicators of well-being among nurses. Importantly, Gao et al. (2024) examined occupational well-being rather than the WHO-5 measure of mental well-being used in the present study. Notably, the bivariate correlation between these two variables was remarkably high. While such a substantial statistical overlap could raise questions regarding conceptual redundancy, it is theoretically and practically meaningful within this population. Work engagement represents a highly context-specific, work-related state of mind, whereas mental well-being captures a broader, global psychological state. In the demanding context of Hungarian healthcare, this strong link observed between these constructs suggests that nurses' work-related motivational experiences are closely associated with their overall mental well-being. Therefore, despite the statistical proximity, treating work engagement as a conceptually distinct construct remains relevant for analysis, although the high correlation observed in this sample suggests a substantial overlap that warrants cautious interpretation regarding their independence. Importantly, the mediation analysis demonstrated that work engagement statistically accounted for part of the association between the practice environment and mental well-being, while the direct effect remained significant, indicating partial mediation. Notably, the final model explained 61% of the variance in mental well-being, underscoring the combined importance of organizational and individual-level factors. While structural characteristics of the work environment are critical, their association with mental well-being is statistically consistent with differences in work engagement. In this sense, work engagement can be interpreted not merely as a potential outcome of favorable working conditions, but as an intervening psychological state that aligns with the relationship between organizational resources and mental health indicators. This points to the importance of integrating structural and psychological dimensions within a single analytical framework. From a nursing management perspective, these findings have important practical implications. They suggest that attention to the nursing practice environment and work engagement may be relevant when considering nurses' mental well-being. Organizational strategies aimed at strengthening job resources and addressing unfavorable working conditions may therefore represent relevant targets for future intervention research. This interpretation is consistent with the JD–R framework, which emphasizes the role of job resources in motivational processes and employee well-being and describes organizational assessment and job redesign as potential approaches for optimizing job demands and resources (Bakker & Demerouti, 2017). Consequently, the present findings, together with the broader literature, support considering systemic, resource-oriented approaches as part of a comprehensive strategy to create an enabling environment for sustained engagement.

With regard to control variables, work experience showed a small but significant negative association with work engagement. In the bivariate analysis, its association with mental well-being was not statistically significant; however, work experience emerged as a significant negative predictor of mental well-being in the total effect model, a relationship that was subsequently fully accounted for in the final mediation model. This pattern, where a variable lacking a significant bivariate correlation becomes significant within a multivariate model, is characteristic of a statistical suppressor effect, likely driven by the shared variance between work experience, age, and work engagement. Therefore, these findings should be interpreted with caution. The negative association between work experience and work engagement may reflect differences in work-related motivational experiences across career

stages; however, the cross-sectional design precludes conclusions regarding longitudinal trends or cumulative job exposure effects.

In the context of the Hungarian healthcare system, characterized by documented workforce shortages and high workload demands, this relationship warrants further investigation to better understand how career longevity interacts with working conditions to influence nurses' sustained engagement and psychological well-being. Targeted retention and support strategies may help sustain engagement and mental well-being across different career stages, although their effectiveness would need to be examined in future intervention research.

In contrast, age was not significantly associated with the primary study variables in the present analyses. Given the strong correlation between age and work experience, these findings should be interpreted cautiously and do not allow conclusions about the relative importance of age, professional experience, or workplace conditions. Regarding the gender effect, a significant difference was observed between sexes, indicating that males reported significantly lower mental well-being than females. This direction contrasts with several broader epidemiological studies, in which women have often been found to report slightly lower subjective well-being on average, although findings regarding gender differences in subjective well-being are not fully consistent and vary across context and indicators (Batz-Barbarich et al., 2018). When interpreting this counterintuitive finding, a critical methodological consideration must be raised. Due to the substantial gender imbalance in the study sample, it remains uncertain whether the observed difference reflects a genuine association within this specific cohort or is partly attributable to selection bias resulting from the small number of male participants ($n = 16$), which limits the generalizability of this specific finding.

From a broader contextual perspective, this study contributes to the limited body of evidence from Hungary, where healthcare systems often operate under resource constraints. The findings can be considered alongside previous Hungarian evidence showing that organizational climate is associated with perceived stress, conflictual communication, organizational problem-solving, and intention to remain in nursing (Siket Ujváriné et al., 2020). However, that study did not examine the nursing practice environment, work engagement, or mental well-being as operationalized in the present study. Thus, the present findings provide additional evidence regarding the relationships among practice environment, work engagement, and mental well-being in the Hungarian nursing context, while their cross-sectional nature precludes causal conclusions. From a management perspective, these findings may help identify organizational and motivational factors that warrant further investigation in relation to ongoing workforce challenges. However, the effectiveness of specific management interventions targeting leadership, communication, or professional support remains to be established in future intervention studies.

Strengths and Limitations

This study has several strengths. It uses widely applied instruments supported by a structured translation procedure and demonstrates acceptable to excellent internal consistency. In addition, by examining the mediating role of work engagement within the JD–R framework, the study offers insight into the pattern of association between the practice environment and mental well-being. It also contributes context-specific evidence from the Hungarian healthcare setting.

Despite its contributions, the study should be interpreted in light of its limitations. The cross-sectional design does not allow for causal or temporal conclusions to be drawn, and therefore the directionality of the observed associations cannot be definitively established. The mediation model should be interpreted as a statistically tested pattern of associations rather than a causal process. In addition, the use of convenience sampling and recruitment via social media platforms may have introduced selection bias and limit the generalizability of the findings. Specifically, self-selection bias may be present, as participation was voluntary and attracted individuals who are more motivated to engage with workplace-related psychological topics or who have stronger interest in the study subject. This approach may also limit the representativeness of the sample in relation to the broader population of Hungarian nurses, particularly those who are less active on digital platforms or less likely to participate in online surveys. In addition, nurses working permanent night shifts and other non-standard work schedules were excluded from the analyses because of the small number of cases in these groups. The findings primarily apply to hospital nurses working day or rotating shifts and may not be fully generalizable to all hospital nursing populations. The reliance on self-report measures also raises the possibility of common method bias. The marked gender imbalance in the sample limits the precision and stability of estimates involving gender comparisons due to the small number of male participants. A further limitation of the study is that the Hungarian versions of the applied instruments have not undergone a dedicated psychometric validation in Hungarian nursing populations, includ-

ing confirmatory factor analysis or cognitive testing. Although a rigorous translation and cross-cultural adaptation process was performed, a full validation study was beyond the scope of the present research. In addition, the PES-NWI combines distinct dimensions of the nursing practice environment into a single summary score, which could reduce its structural validity and does not fully reflect its multidimensional nature. Finally, no a priori sample size calculation or power analysis was conducted to determine the required sample size for the mediation model. However, bootstrap resampling was applied to obtain robust estimates of the indirect effects.

Future research should address these limitations by employing longitudinal designs, probability-based sampling methods, and multi-source data collection. Furthermore, exploring additional mediating and moderating variables, such as leadership style or organizational culture, may provide a more comprehensive understanding of the mechanisms underlying nurse well-being.

Conclusion, Implications, and Future Directions

This study provides empirical evidence for the central role of the nursing practice environment in its association with work engagement and mental well-being among Hungarian hospital nurses. The results indicate that organizational resources are associated with mental well-being both directly and indirectly, with work engagement operating as a key statistical mediator within the observed pattern of associations. Practical implications of these findings, aligned with the literature, suggest that healthcare organizations may benefit from prioritizing leadership development programs for nurse managers aimed at fostering a supportive organizational climate. Furthermore, staffing support initiatives and workplace strategies aimed at supporting engagement, such as those promoting professional autonomy and recognition, could contribute to strengthening this motivational process. Finally, institutional mental well-being support systems, including mindfulness-based workshops or peer support groups, may help to strengthen nurses' individual resources within the Hungarian healthcare context.

This evidence highlights the potential value of systemic, resource-oriented management approaches in addition to individual-level strategies. Strengthening leadership, staffing, and professional support structures may represent important factors in promoting sustainable nurse well-being and workforce stability.

To address the limitations of the current cross-sectional design, future research should build on these findings by further examining and evaluating organizational-level interventions aimed at improving the nursing practice environment and fostering work engagement. In particular, implementation-focused studies may help to clarify how such approaches can be integrated into routine healthcare practice. Additionally, incorporating policy-level perspectives and system-wide analyses may further contribute to understanding how nurses' mental well-being can be sustainably supported across healthcare systems.

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Author contribution

Andrea LUKÁCS: conceptualization, design, methodology, investigation, project administration, data management, formal analysis, interpretation, writing original, writing review and editing.

Declaration of interest statement

The author declares that there is no conflict of interest regarding the publication of this article.

Ethical statement

This manuscript is the author's original work.

All participants engaged in the research voluntarily and anonymously. Informed consent was obtained from all participants involved in the study. Their data are stored in coded materials and databases without personal data. The studies involving human participants were reviewed and approved by [B-A-Z County Central Hospital and University Teaching Hospital Regional/Institutional Science and Research Ethics Committee (BORS-11/2025)].

Data availability statement

The data that support the findings of this study are available from the author upon reasonable request.

Declaration on using artificial intelligence in research and manuscript preparation

The author used AI technologies in the preparation of the manuscript, but not in her research. ChatGPT (OpenAI) was used for improving linguistic clarity, stylistic consistency, and grammatical accuracy of the English text. All AI-generated suggestions were manually reviewed, verified, and edited by the author to ensure scientific accuracy and integrity.

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