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Factors affecting the turnover intention of newly graduated Generation Z nurses in Korea: multilevel analysis

Mee Sun Lee[1] and Sujin Shin[1*]

Abstract

Background The turnover rate of newly graduated nurses is very high, and their turnover intention is affected not only by individual-level factors, but also by organizational-level factors. However, the multilevel factors reflecting the characteristics of newly graduated nurses in Generation Z and their turnover intention have not been identified previously.

Objective To identify the individual- and organizational-level factors that affect the turnover intention of newly graduated nurses in Generation Z.

Methods This study was a cross-sectional questionnaire survey. Online survey was performed from August to November 2022. Participants were a total of 283 newly graduated nurses and 45 nurse managers to respond to each individual and organization-level questionnaire. The collected data were analyzed for frequency, descriptive statistics, and multilevel analysis.

Results The multilevel analysis indicated that the individual-level factors that affected the lower turnover intention of newly graduated nurses in Generation Z were higher work–life balance ($\beta = -0.320$, $p < 0.001$), higher organizational commitment ($\beta = -0.384$, $p < -0.001$), and desired nursing unit placement ($\beta = -0.209$, $p < 0.001$). The organization-level factors associated with lower turnover intention were lower average number of night shifts per month ($\beta = 0.303$, $p < 0.05$), higher salary ($\beta = -0.263$, $p < 0.05$), longer orientation period ($\beta = -0.612$, $p < .01$), preceptor–preceptee ratio of 1:1 ($\beta = -0.409$, $p < 0.05$), and existence of a mentoring program ($\beta = -0.318$, $p < 0.05$). Furthermore, the nursing work environment was the most influential factor, and a supportive environment for nursing work ($\beta = -0.630$, $p < 0.01$), efficient computer-related environment ($\beta = -0.251$, $p < 0.05$), and recognition and respect ($\beta = -0.564$, $p < 0.05$) were associated with lower turnover intention.

Conclusions The findings indicate that improvements to the nursing work environment and human resources of the organization should be prioritized to prevent the turnover of newly graduated nurses in Generation Z.

Keywords Personnel turnover, Intention, Nurse, Multilevel analysis, Hospitals

Introduction

The global demand for nurses continues to rise due to demographic changes such as population aging and increasing chronic illness [1]. Nurse retention has become critical determinants of healthcare quality [2]. In Korea, the nurse-to-population ratio was only 4.16 per 1000 in 2019, well below the OECD average of 7.51 [3].

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Compounding this issue is a high turnover rate among newly graduated nurses, which reached 47.7% in 2020, indicating that nearly half leave within their first year [4]. This high turnover rate contributes to substantial financial losses for institutions, estimated at approximately USD 33,733 per departing nurse [5], and compromises the stability and quality of care delivery [6]. Therefore, identifying and mitigating factors contributing to early career nurse turnover is a critical priority in healthcare human resource management.

Turnover intention, defined as an individual's conscious and voluntary desire to leave their organization [7], is regarded as the most immediate antecedent of turnover behavior and, importantly, is a modifiable construction that allows for early intervention [6]. Research has shown that turnover intention is affected by a variety of individual, organizational, and generational factors [8]. Differences across generation in terms of values, employment attitudes, and career progression expectations have been found to be significantly associated with turnover intention [8].

Generation Z, born between 1995 and 2005, represents the newest group entering the nursing profession [9]. As digital natives, Generation Z generally values meaningful work that aligns with personal purpose [10–12], and places strong emphasis on maintaining work life balance and protecting personal [13, 14], and emphasize fair compensation [15]. They seek opportunities for continuous professional development [16, 17], although they may demonstrate relatively limited social interaction skills due to their preference for online interaction [18]. These traits may influence how newly graduated Generation Z nurses engage with and adapt to the workplace and subsequently affect their turnover intention.

Individual-level factors

Work value reflects individuals' priorities and expectations in the workplace, play a critical role in job choice, satisfaction, and retention [19]. In prior generation nurses, misalignment between individual and organizational work values influenced turnover intention [20]. Although Generation Z nurses prioritize social and instrumental values [11], the association between work values and turnover intention remains unexplored.

Generation Z nurses reported that many left their positions to achieve better work–life balance, avoid working on holidays [13]. A perceived lack of work–life balance was associated with lower job satisfaction [21], while being able to take days off on preferred dates increased job satisfaction [21]. Additionally, unrestricted use of days off has been shown to influence turnover intention [22]. Although Generation Z places high importance on work–life balance [23], the extent to which these factors affect turnover intention remains underexplored.

Perceived unfair compensation has also been shown to increase turnover intention [24]. Generation Z places particular emphasis on fairness in rewards [15], and while intrinsic motivation remains important, financial stability and rewards are crucial extrinsic motivators [12]. Therefore, it is necessary to evaluate how perceived salary satisfaction and the actual salary provided by the organization each influence turnover intention.

Organization commitment is one of the most significant predictors of turnover intention [25, 26]. Generation Z nurses exhibit significantly lower levels of organization commitment compared to previous generations [27], possibly due to growing individualism [28]. Offering jobs in the desired department has been found to increase organizational commitment and reduce turnover intention [22, 25]. Therefore, Generation Z nurses may struggle more with organization commitment, and the effect of placement in the desired department on turnover intention warrants investigation.

The final clinical practicum prior to graduation is also known to play a formative role in shaping professional identity and work readiness [29]. All Generation Z newly graduated nurses in Korea have completed four years bachelor's program [30]. However, they have limited face-to-face clinical experience due to the COVID-19 pandemic [31]. The impact of this constrained training on organizational adaptation and turnover remains unclear.

Generation Z engages in online interactions [17, 18]. Digital communication has expanded their social networks and increased opportunities for support [32]. Online social support, like its offline counterpart, has been found to buffer against negative emotions [33]. Although it is well known that social support influences turnover intention [34], little is known about the impact of perceived online social support on turnover intention.

Organizational-level factors

A higher average number of monthly night shifts is associated with turnover intention among newly graduated nurses [35] and contributes to work–life imbalance [36]. Therefore, examining the impact of night shift frequency on turnover intention in Generation Z nurses is needed.

Generation Z prioritizes professional development and educational opportunities [16–18, 37]. Korea hospitals offer human resource practices for newly graduated nurses, including orientation, preceptorship, mentoring [38], and a government support project for clinical nurse educator [39]. Since 2019, it has contributed to reducing turnover by managing training programs, offering emotional support, and conducting preceptor training [39]. However, the implementation of these practices varies

across hospitals [38, 40] and limited comparative studies on the effectiveness of specific programs present research gaps.

The nursing work environment, defined as the physical setting, collegial relationships, and institutional policies that support professional nursing practice [41], influences turnover intention. A positive perception of the work environment has been associated with lower turnover intention among newly graduated nurses [22]. While previous studies have assessed individual perceptions of the work environment, this study aims to evaluate the shared organizational-level work environment and its impact on individual turnover intention.

Given that nurses are nested within organizations [42], it is essential to use multilevel analysis to examine individual and organizational determinants of turnover [43]. Although prior studies have addressed aspects of Generation Z work values, characteristics, and turnover patterns [11, 13, 23], few have applied multilevel analysis to explore these issues.

This study aims to identify multilevel factors influencing turnover intention among newly graduated Generation Z nurses in Korea and to inform human resource strategies tailored to generational characteristics.

Methods

Design

This study is a cross-sectional descriptive correlational study using a multilevel model.

Sampling and participants

Organizational-level data were obtained from general and tertiary hospitals nationwide that had hired nurses within the past year, with responses from nurse managers in education or management. Individual level participants were newly graduated Generation Z nurses born between 1995 and 2005, with less than 12 months of experience at the selected hospitals and capable of independently performing nursing duties after completing clinical orientation. Those with prior hospital experience were excluded due to its potential impact on turnover intention [24].

Following Maas and Hox's (2005) guideline of at least 30 groups and 10 individuals per group, priority was given to securing group-level sample size, as it plays a more critical role in ensuring research validity [44]. Therefore, even when some groups had fewer than 10 individuals, 45 institutions and 283 newly graduated nurses were included to meet the group-level requirement.

Conceptual model

This study was guided by the JOINT model (Job, Organization, Individual, National, and inTerpersonal) developed by Daouk-Öyry et al. [45], which categorizes turnover-related factors into micro-level (individual and interpersonal) and macro-level (job, organizational, national) domains. At the micro-level, individual factors encompass demographic characteristics, competencies, work-related behaviors and attitudes, health status, while interpersonal factors pertain to workplace interactions, such as support from colleagues and supervisors. Macro level factors include job demands (night shifts), organizational factors (human resource practices, work environment), and national factors (healthcare policy, legal and economic conditions). This model provides a theoretical basis for multilevel analysis by integrating variables across hierarchical levels [45].

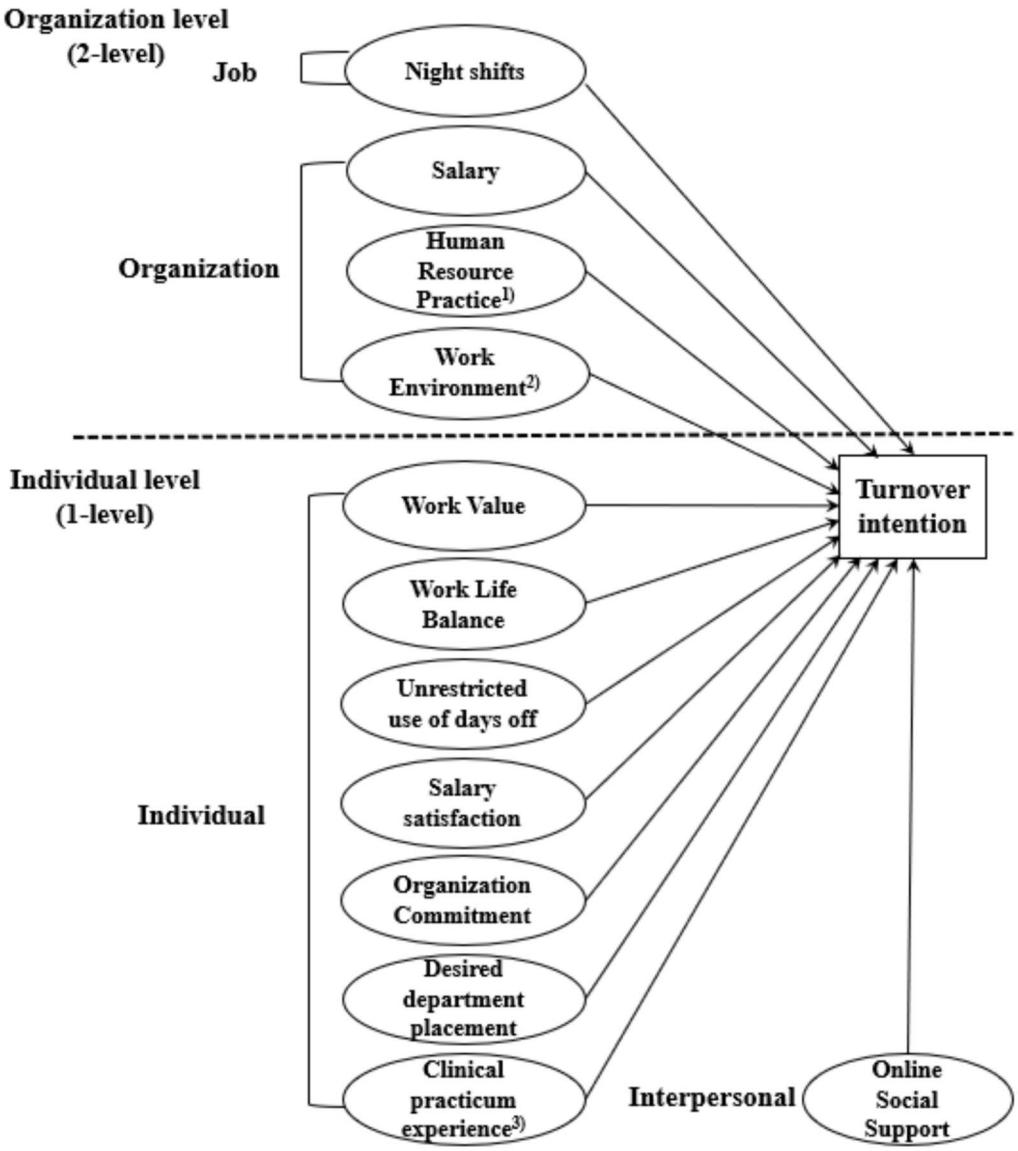
In this study, individual-level (level 1) variables comprised work values, work life balance, unrestricted use of days off, salary satisfaction, organization commitment, desired department placement, clinical practicum experience, and online social support. Organizational-level (level 2) variables included monthly night shifts, salary, human resource practices, and the work environment. National-level factors were excluded, as the study was conducted within Korea context (Fig. 1).

Measurements

The study employed the Turnover Intention Scale (TIS), specifically the abbreviated TIS-6 [7]. The Korean-translated and back-translated version demonstrated content validity, with an Item Content Validity Index (I-CVI) ranging from 0.83 to 1.00 and a Scale Content Validity Index Average (S-CVI/Ave) of 0.89. The scale used a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), with scores of 18 or higher indicating a high level of turnover intention. Cronbach's α in this study was 0.75.

Individual level measurements are presented in Supplement 1. The Work Value [19] was translated and back-translated, with the I-CVI ranging from 0.83 to 1.00 and an S-CVI/Ave of 0.92. The Work Life Balance [46] used a 5-point Likert scale, with reverse coding so that higher scores reflected better balance. Organization Commitment [47] was measured on a 5-point Likert scale, with a Cronbach's α of 0.87 in this study. Unrestricted use of days off, placement in the desired department were assessed with binary responses. Salary and clinical practicum satisfaction were rated on a 5-point Likert scale, with higher scores indicating greater satisfaction. Type of clinical practicum during the final semester was categorized as face-to-face, online, or mixed. Online social support [48] was measured on a 5-point Likert scale, with a Cronbach's α of 0.91 in this study.

Organizational-level measurements are shown in Supplement 2. Human resource practices included pre-employment education and information, timing of



1) Human resource practices: Providing pre-employment education and information, Orientation, Ratio of preceptor to preceptee, Mentoring, Participation in a government support project for clinical nurse educator, Training period by support program
2) Work environment: Supporting environment for nursing work, Hospital's support for working environment, Patient care environment and professional activities, Computer problems, Sufficient inventory and supply, Manager leadership, Recognition and respect, Satisfaction with work schedule, Violence within ward
3) Clinical practicum experience: Type and Satisfaction of undergraduate clinical practice

Fig. 1 Conceptual model

provision, orientation after unit placement, preceptor-to-preceptee ratio, mentoring implementation, participation in a government support project for clinical nurse educators, and training period for newly graduated nurses through the project. To assess the shared perception of the nursing work environment within each organization [42], the Korean Work Environment Scales of Clinical Nurses (KWES-CN) [49] were administered to newly graduated nurses, and responses were aggregated at the organizational level. Items violence within the ward and computer problems were reverse-coded, so higher scores reflected a better nursing work environment.

Analysis

Data were analyzed using SPSS/WIN Statistics 25.0 and Mplus 8.5. Four models were constructed:

- A baseline model focusing on between-organization differences, without independent variables.
- A model using only individual-level independent variables to explain the dependent variable.
- A model using only organizational-level independent variables.
- A final model combining both individual and organizational-level variables.

The multilevel model was estimated using full information maximum likelihood, which is robust to violations of statistical assumptions, and applied grand mean centering. Data were collected through an online survey from August to November 2022, following approval from the Institutional Review Board (****-202,208–0006-02).

Results

Individual and organizational-level descriptive statistics

A total of 283 nurses participated, 91.9% of whom were female. Participants reported an average daily smartphone use of 4.36 ± 2.06 h, including 2.82 ± 1.98 h on social networking services (SNS). The mean duration of employment at their current institution was 26.28 ± 9.13 weeks. The sample comprised 45 hospitals, 68.9% of which were general hospitals (Table 1).

Turnover intention

The average turnover intention score of newly graduated nurses was 20.59 ± 4.57 out of a score range of 6–30.

Characteristics of factors related to individual and organizational level

Details of individual and organizational-level variables are presented in Table 2. The average score for work life balance was 2.81 ± 0.74, and organization commitment averaged 38.40 ± 7.37. Overall, 63.3% of participants were assigned to their preferred department.

At the organizational level, 88.9% of hospitals provided orientation prior to unit placement, with a mean duration of 4.80 ± 3.66 weeks. Preceptorship was implemented in 38 hospitals, 78.9% of which maintained a one-to-one preceptor-to-preceptee ratio. Mentoring was offered in 64.4% of institutions, and 44.4% participated in a government support project for clinical nurse educators. The average nursing work environment score was 2.61 ± 0.28.

Table 1 Individual and organizational-level descriptive statistics

Variables	Category	*n* (%)	Mean ± SD[1]	Min–max (range)
Individual level (*N* = 283)				
Gender	Female	260(91.9)		
	Male	23(8.1)		
Age (years)			24.22 ± 1.56	21–27
Smartphone usage time per day (hours)[2]			4.36 ± 2.06	1–10
SNS usage time per day (hours)			2.82 ± 1.98	1–10
Career experience as RN (weeks)			26.28 ± 9.13	3–48
Department	Ward	210(74.2)		
	ICU	44(15.5)		
	ER	12(4.2)		
	OR	10(3.5)		
	Other	7(2.5)		
Organizational level (*N* = 45)				
Hospital type	Tertiary hospital	14(31.1)		
	General hospital	31(68.9)		
Number of beds	< 300	14(31.1)	645.60 ± 437.32	148–2453
	300–599	9(20.0)		
	600–899	12(26.7)		
	≥ 900	10(22.2)		

[1] Standard deviation

[2] Missing data = 1, *N* = 282 individuals

Table 2 Individual and organizational-level study variable statistics

Variables	Category	*n* (%)	Mean ± SD[1]
Individual level (*N* = 283)			
Work value	Cognitive		3.46 ± 0.62
	Instrumental		3.83 ± 0.53
	Social		3.77 ± 0.64
	Prestige		2.85 ± 0.86
Work–life balance			2.81 ± 0.74
Unrestricted use of days off	Yes	135(47.7)	
	No	148(52.3)	
Salary satisfaction			2.79 ± 0.95
Organization commitment			38.40 ± 7.37
Desired department placement	Yes	179(63.3)	
	No	104(36.7)	
Type of undergraduate clinical practicum	Face-to-face	136(48.1)	
	Non-face-to-face	27(9.9)	
	Mixed	118(41.7)	
Satisfaction with undergraduate clinical practice			3.14 ± 0.89
Online social support			2.77 ± 0.87
Organizational level (*N* = 45)			
Number of night shifts per month			6.33 ± 1.38
Monthly salary (US dollars)			2228.88 ± 61.54
Providing pre-employment education and information	Yes	27(60.0)	
	No	18(40.0)	
Timing for providing pre-employment education and information[2]			2.52 ± 1.65
Orientation	Yes	40(88.9)	
	No	5(11.1)	
Period of orientation[3]			4.80 ± 3.66
Ratio of preceptor to preceptee[4]	1 on 1	30(78.9)	
	1 on many	6(15.8)	
	Many on 1	2(5.3)	
Mentoring	Yes	29(64.4)	
	No	16(35.6)	
Participation in a government support project for clinical nurse educator	Yes	20(44.4)	
	No	25(55.6)	
Training period by support program (month)[5]			6.80 ± 4.90
Work environment	Total		2.61 ± 0.28
	Supportive environment for nursing work		2.36 ± 0.42
	Hospital's support for working environment		2.66 ± 0.34
	Patient care environment and professional activities		2.72 ± 0.31
	Computer environment		2.23 ± 0.46
	Sufficient inventory and supply		2.77 ± 0.32
	Manager leadership		2.75 ± 0.30
	Recognition and respect		2.79 ± 0.73
	Satisfaction with work schedule		2.39 ± 0.70
	Violence within ward		2.64 ± 0.54

[1] Standard deviation

[2] *N* = 27 hospitals

[3] *N* = 40 hospitals

[4] *N* = 38 hospitals

[5] *N* = 20 hospitals

Factors affecting turnover intention using a multilevel analysis

A multilevel model was employed to identify factors influencing turnover intention (Table 3). Both individual ($p < 0.001$) and organizational ($p < 0.05$) residual variances were significant, with an intra-class correlation coefficient of 0.279, indicating that 27.9% of the variance was explained by organizational differences, supporting the use of multilevel modeling.

In the second model, lower turnover intention was significantly associated with higher work life balance, organizational commitment, and placement in a desired department (all $p < 0.001$). The squared multiple correlation (R_1^2) was 0.363, indicating that 36.3% of the variance was explained by the nine predictors. However, residual variance remained significant ($p < 0.001$), suggesting the influence of unexplained individual-level factors.

In the third model, hospital type was used as a control variable. Lower turnover intention was significantly associated with longer orientation period ($p < 0.01$), one-on-one ratio between preceptor and preceptee ($p < 0.05$), and implementation of a mentoring ($p < 0.01$). Among the subcategories of the work environment, a more supportive environment ($p < 0.001$), recognition and respect ($p < 0.01$), and violence within ward ($p < 0.05$). Organizational-level factors explained 99.5% of the variance across institutions ($R_2^2 = 0.995$).

In the final model, lower turnover intention was significantly associated with higher work life balance ($\beta = -0.320$, $p < 0.001$), higher organization commitment ($\beta = -0.384$, $p < 0.001$), and placement to desired department ($\beta = -0.209$, $p < 0.001$) at the individual level. At the organizational level, higher monthly average night shifts ($\beta = 0.303$, $p < 0.05$), lower salary ($\beta = -0.263$, $p < 0.05$), longer orientation periods ($\beta = -0.612$, $p < 0.001$), a one-on-one preceptor–preceptee ratio ($\beta = -0.409$, $p < 0.05$), and mentoring programs ($\beta = -0.318$, $p < 0.05$) were significantly associated with lower turnover intention. Additionally, a more supportive environment for nursing work ($\beta = -0.630$, $p < 0.01$), better computer environment ($\beta = -0.251$, $p < 0.05$), and higher recognition and respect ($\beta = -0.564$, $p < 0.05$) were also significant. The model explained 41.6% of the variance at the individual level and 99.8% at the organizational level, with total explanatory power of 57.9%.

Discussion

In this study, the turnover intention score of Generation Z newly graduated nurses was 20.59 out of 36, which is notably higher than the average score of 13.74 reported among newly graduated nurses in China [50]. This suggests a heightened risk of turnover in this group and underscores the need for targeted retention strategies. To inform such efforts, this study further examines the most influential factors associated with turnover intention.

Individual-level factors affecting turnover intention

Organization commitment was the strongest factor of turnover intention, followed by work life balance and preferred department placement. These findings align with previous meta-analyses identifying organizational commitment as a key individual-level factor influencing turnover [51]. Generation Z nurses demonstrated significantly lower levels of organization commitment compared to previous generations ($F = 7.73$, $p < 0.001$), and unlike their predecessors, this commitment was not significantly influenced by social support from supervisors or colleagues [27]. These findings highlight the need for strategies to strengthen organization commitment among newly graduated Generation Z nurses, given their distinct values and reduced motivation in the absence of purposeful work [14]. As this cohort is particularly sensitive to perceived discrimination and injustice, higher levels of commitment are observed in organizations that emphasize fairness, respect for individual values, and horizontal communication [17]. Promoting organizational fairness and cultivating a communicative and supportive work environment are therefore essential for enhancing retention in this population.

Improved work life balance was significantly associated with lower turnover intention. Work–life balance is an established factor influencing nurse retention [21], and organizational efforts to empower nurses in adjusting their work schedules are essential to support this balance [50]. Generation Z nurses are more likely than previous generations to turnover in pursuit of better work life balance [13], indicating a need for revised support and motivational strategies. Given their emphasis on self-development, personal growth, and leisure [52], organizations should implement targeted interventions that reflect these generational priorities.

Newly graduated Generation Z nurses assigned to their desired departments demonstrated significantly lower turnover intention. This supports prior findings that department placement is a key determinant of turnover among newly graduated nurses [22]. Preferred department is associated with higher job satisfaction, as it reduces transition shock and facilitates organizational adjustment [21, 53]. Generation Z has distinct personal value [14] and desires career development in the nursing profession [13]. Therefore, organizations should proactively identify the departments that align with Generation Z nurses' interests and assign them accordingly to better meet their needs.

On the other hand, work values were not found to be significant. Research suggests that as the perceived gap

Table 3 Multilevel model for Generation Z nurses' turnover intention

Variables	Model 1 *β* (*p*)	Model 2 *β* (*p*)	Model 3 *β* (*p*)	Model 4 *β* (*p*)
Fixed effect Intercept (γ_{00})	20.693 (< 0.001)	20.531 (< 0.001)	20.727 (< 0.001)	20.467 (< 0.001)
Individual level (*N* = 283)				
Work values				
Cognitive		0.025 (0.752)		0.031 (0.707)
Instrumental		0.047 (0.495)		0.042 (0.542)
Social		− 0.038 (0.561)		− 0.059 (0.391)
Prestige		0.019 (0.747)		0.019 (0.756)
Work–life balance		− 0.316 (< 0.001)		− 0.320 (< 0.001)
Unrestricted use of days off		− 0.040 (0.427)		− 0.014 (0.785)
Salary satisfaction		− 0.115 (0.072)		− 0.072 (0.198)
Organization commitment		− 0.371 (< 0.001)		− 0.384 (< 0.001)
Desired department		− 0.207 (< 0.001)		− 0.209 (< 0.001)
Type of undergraduate clinical practice (ref = Face-to-face)				
Non-face-to-face		0.019 (0.729)		− 0.019 (0.749)
Mixed		0.027 (0.568)		0.050 (0.281)
Satisfaction with undergraduate clinical practice		0.039 (0.347)		0.036 (0.439)
Online social support		− 0.004 (0.945)		0.045 (0.468)
Organizational level (*N* = 45)				
Tertiary hospital			0.073 (0.353)	− 0.059 (0.648)
Number of night shifts per month (days)			0.101 (0.117)	0.303 (0.012)
Salary			− 0.200 (0.050)	− 0.263 (0.042)
Providing pre-employment education and information			− 0.098 (0.472)	− 0.288 (0.087)
Timing for providing pre-employment education and information			0.179 (0.050)	0.264 (0.063)
Orientation			0.093 (0.214)	0.249 (0.091)
Period of orientation			− 0.329 (0.004)	− 0.612 (< 0.001)
Ratio of preceptor to preceptee (ref = Not implemented)				
1 on 1			− 0.218 (0.044)	− 0.409 (0.034)
1 on many			− 0.049 (0.586)	− 0.164 (0.269)
Many on 1			− 0.091 (0.285)	− 0.087 (0.570)
Mentoring			− 0.203 (0.006)	− 0.318 (0.019)
Participation in a government support project for clinical nurse educator			− 0.001 (0.994)	0.314 (0.186)
Training period by support program (month)			0.187 (0.123)	0.078 (0.580)
Work environment				
Supportive environment for nursing work			− 0.522 (< 0.001)	− 0.630 (0.002)
Hospital's support for working environment			− 0.235 (0.305)	− 0.390 (0.161)
Patient care environment and professional activities			0.043 (0.772)	0.191 (0.426)
Computer environment			− 0.126 (0.212)	− 0.251 (0.049)
Sufficient inventory and supply			− 0.035 (0.763)	0.128 (0.425)
Manager leadership			0.297 (0.155)	0.275 (0.270)
Recognition and respect			− 0.563 (0.001)	− 0.564 (0.012)
Satisfaction with work schedule			− 0.379 (0.064)	− 0.184 (0.451)
Violence within ward			− 0.275 (0.025)	− 0.271 (0.093)
Random effects				
Individual-level residual variance (σ^2)	14.768 (< 0.001)	9.404 (< 0.001)	13.548 (< 0.001)	8.621 (< 0.001)
Organizational-level residual variance (τ^2)	5.740 (0.026)	1.178(0.079)	0.023 (0.889)	0.014 (0.928)
R_1^2		0.363		0.416
R_2^2			0.995	0.998
R^2				0.579

Table 3 (continued)

Variables	Model 1 *β* (*p*)	Model 2 *β* (*p*)	Model 3 *β* (*p*)	Model 4 *β* (*p*)
ICC	0.279			

between an individual's pursued work values and the organization's values widen, turnover intention tends to increase [20]. This phenomenon may be attributed to individuals evaluating the alignment between their expectations of organizational support and rewards and their own work values. When organizational rewards and support are perceived as insufficient relative to personal value expectations, turnover intention increases [54].

Online social support, types of clinical practicum experiences, and satisfaction during undergraduate studies were not significantly associated with turnover intention. Although Generation Z is considered digitally native, prior studies indicate a preference for real-time, face-to-face interactions and direct workplace feedback [14, 55]. Therefore, further research is needed to identify the relationship between social support and turnover intention, including specific factors related to social support providers and delivery methods.

Although positive final year clinical practicum experiences may facilitate organizational commitment and ease the transition into professional roles, they were not directly associated with turnover intention [56]. Prior studies suggest that clinical practicum experiences may influence turnover intention indirectly, through mediating factors such as emotional distress and role conflict [57]. These findings imply that the type and satisfaction level of undergraduate clinical practicums are not direct predictors of turnover intention among newly graduated nurses.

Organizational-level factors affecting turnover intention

The nursing work environment emerged as the most influential factor associated with turnover intention, followed by orientation duration, preceptor-to-preceptee ratio, mentoring implementation, average number of monthly night shifts, and salary. Among the subdomains of the nursing work environment, significant predictors included support for nursing tasks, recognition and respect, and computer-related conditions.

A supportive environment encompasses elements such as efficient workflow, adequate staffing, guaranteed breaks, appropriate compensation, and transparent task evaluation criteria [49]. For newly graduated nurses, who often face heavier workloads than experienced staff, structured task allocation is essential to support their adaptation [58]. Given Generation Z's strong emphasis on fairness, perceived equity in task distribution and performance evaluation is closely linked to job satisfaction [15]. Establishing clear and transparent communication channels that reinforce perceptions of fair evaluation may serve as an effective strategy to reduce turnover intention. The computer-related work environment also showed a significant association. In this study, it received the lowest mean score among environmental subdomains. For Generation Z nurses, who are highly accustomed to digital technologies, inefficiencies or obstacles related to electronic systems may be perceived as substantial barriers to effective nursing practice.

Recognition and respect were also significant components of the work environment, encompassing collegial respect and a positive ward atmosphere [49]. Lower scores in these domains were associated with increased turnover intention. Previous studies have evaluated nurses in their 30s-50s as being indifferent and passive in their relationships with nurses in their 20 s [59], but Generation Z is known to prioritize face-to-face social interactions [55, 60]. This difference in perception between generations can be attributed to the lack of communication and social relations skills for the formation of relationships with colleagues [17, 60]. Therefore, a clear understanding of Generation Z characteristics within nursing organizations is essential to promoting mutual respect among colleagues and fostering a supportive ward environment.

Within human resource practices, longer orientation periods were significantly associated with lower turnover intention. However, previous studies have shown that even with a longer orientation period, if it is unsatisfactory, it has been shown that the turnover intention is higher [61]. Therefore, it is necessary to consider both the duration and quality of orientation. Generation Z nurses require development in communication skills and clinical reasoning, including the ability to evaluate information critically. As they prefer individualized learning and real-time feedback aligned with their competency levels [37], it is essential to assess their clinical competencies in advance and provide tailored educational support accordingly.

This study found that turnover intention was significantly lower when a one-on-one preceptor-to-preceptee ratio was implemented, compared to cases with no preceptorship. However, there was no significant difference when the ratio was not one-on-one and preceptorship was not implemented. Previous studies have also shown

that the greater the number of preceptors responsible for newly graduated nurses, the higher the turnover intention [62]. Effective preceptorship depends on the quality of the preceptor–preceptee relationship [63], which is best supported through active one-on-one interaction, and has been shown to positively influence organizational adaptation and retention among newly graduated nurses [40, 63]. If the preceptorship ratio is inappropriate, these effects may be diminished. Thus, assigning preceptors through one-to-one matching and fostering interpersonal relationships should be prioritized to improve the effectiveness of preceptorship.

This study found that the implementation of mentoring was associated with lower turnover intention. Mentoring has been shown to reduce job stress and anxiety among newly graduated nurses, while enhancing self-efficacy and job satisfaction [40]. Generation Z, characterized by limited internal coping resources, seeks mentoring that offers both emotional support and professional development [55]. Thus, assigning preceptors on a one-to-one basis and promoting relationship-building should be prioritized to enhance preceptorship effectiveness.

This study found that a higher average number of monthly night shifts (ranging from 3 to 10 days) was related with increased turnover intention. Consistent with previous research, night shift frequency was identified as a significant predictor of turnover among newly graduated nurses [35]. Night shifts are characterized by reduced staffing, limited break time, and greater workload intensity [64], and are a primary contributor to work–life imbalance [36]. Given that work life balance was a significant factor influencing turnover intention among Generation Z nurses in this study, these findings suggest that night shift burden plays a critical role in early career retention. Accordingly, organizations should consider strategies such as workload adjustment and limiting night shift assignments during the transition period to support work–life balance and reduce turnover.

The organizational-level average monthly salary, ranging from 1,696.58 to 2,827.64 USD, was significantly associated with turnover intention, whereas individual-level salary satisfaction was not. Additional analysis of the correlation coefficient between salary and salary satisfaction in this study revealed a low correlation of 0.289 ($p < 0.01$), suggesting some degree of association but indicating that higher salary does not necessarily equate to higher salary satisfaction. Previous studies suggest that newly graduated nurses who experience increased workload and responsibility often perceive compensation as inadequate, contributing to higher turnover intention due to perceived unfairness [24]. Therefore, it can be concluded that the salary measured at the organizational level reflects nurses' evaluation of their compensation and work environment, which influences their perception of appropriate rewards and significantly impacts turnover intention. In contrast, individual-level salary satisfaction solely evaluates satisfaction with the current salary without providing criteria such as workload or effort to assess fairness [65], which may explain the lack of significant results. Therefore, further research is needed to explore the average monthly salary and salary satisfaction by section and consider specific differences in the characteristics of each institution.

This study employed multilevel analysis to account for the hierarchical structure of nurses nested within organizations. In the model, it included only organizational factors, night shifts, salary, and the computer environment were not significantly associated with turnover intention. However, in the final model incorporating both individual and organizational factors, the significant predictors differed. These results enhance understanding of how individual and organizational contexts jointly shape turnover intention.

Limitations

This study was conducted as a cross-sectional survey to assess final-year clinical practicum experiences following on-site education and to explore their relationship with turnover intention. However, because these experiences were assessed retrospectively, potential threats to validity may have been introduced. Therefore, a longitudinal research design is recommended to more accurately establish causal relationships.

Conclusions

This study highlights the significant influence of individual and organizational-level factors on the turnover intention of newly graduated Generation Z nurses. Enhancing organizational commitment and work life balance should be prioritized, as they were the strongest individual predictors. At the organizational level, tailored human resource practices such as extended orientation, appropriate preceptorship, and mentoring are essential.

Additionally, adjusting night shifts, improving reward fairness, and considering departmental preferences may further reduce turnover intention. Establishing a shared governance model that fosters a supportive work environment, promotes work life balance, and strengthens educational management systems may be critical in reducing turnover intention.

Supplementary Information

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Additional file 1.

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Author contributions
S.S. and M.K. wrote the main manuscript text and M.K. prepared tables and Fig. 1. All authors reviewed the manuscript.

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Data availability
No datasets were generated or analyzed during the current study.

Declarations

Ethics approval and consent to participate
The study was approved by the relevant Research Ethics Committee, EWHA Womans University, Korea (EWHA-202208–0006-02).

Competing interests
The authors declare no competing interests.

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