Research Article

Personal Factors and Clinical Learning Environment as Predictors of Nursing Students' Readiness for Practice: A Structural Equation Modeling Analysis

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A R T I C L E I N F O

S U M M A R Y

Purpose: It is essential to ensure the readiness for practice among undergraduate nursing students since the purpose of such education is to cultivate competent nurses who deliver high-quality and safe nursing. Astin's theory of student involvement suggests that this is affected by their personal factors and learning environment.
Methods: We conducted a cross-sectional study between November 16, 2020 and December 21, 2020 which examined personal factors and aspects of the clinical learning environment among senior nursing students (*n* = 838) enrolled across 54 nursing schools in Korea. The participants were asked to fill out a self-administered online survey, which assessed demographic characteristics, self-esteem, depression, work-life balance, clinical learning environment, anxiety during clinical practicum, and readiness for practice. Readiness for practice was measured using the Casey-Fink Readiness for practice survey. We used structural equational modeling to test our hypothetical model.
Results: The nursing students' readiness for practice was significantly affected by their self-esteem, work-life balance satisfaction, and clinical learning environment. Anxiety during clinical practicum directly influenced their readiness for practice.
Conclusion: Increasing self-esteem and work-life balance satisfaction, and improving their clinical learning environment by providing sufficient educational and clinical support, could help facilitate the transition from nursing schools to real-world practice for nursing students.

Introduction

Nursing students constitute a future healthcare workforce that will be tasked with safeguarding the health and well-being of all people. The cultivation of competent nurses is critical, particularly owing to the high prevalence of global health crises such as the COVID-19 pandemic. Preparing nursing students for clinical practice is a goal shared by nursing educators and administrators in clinical practice and academia [1]. Enabling nursing students to adapt to clinical practice remains a significant challenge, given the global shortage of nurses exacerbated by the high turnover rate of new graduate nurses. The RN Work Project—a 10-year panel study

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of new nurses in the United States—reported that ~17.5% of new nurses leave their first job within one year [2]. In Korea, the turnover rate of new nurses was 33.6% in 2011 and increased to 44.5% in 2019 [3].

In addition, most of the current nursing students and new graduate nurses belong to Generation Z and, thus, have significantly different generational characteristics and values compared to more experienced nurses [4]. A new generation of students—Generation Z, born between the mid-1990s and ending around 2012 [5]—is entering nursing programs and the workplace [6]. Surrounded by technology, Generation Z is known to be pragmatic; immature in social and interpersonal skills; individualistic; displays a desire for convenience and immediacy; cares about emotional, physical, and financial safety [7]. These characteristics result in lower self-esteem [8], higher depression [9], and greater importance of work-life balance (WLB) [10] than in older generations.

For new graduates, being ready for practice involves possessing the attributes that enable them to succeed in their workplace [11]. Readiness for practice is an essential element of undergraduate nursing programs as its primary objective is to cultivate competent nurses who deliver high-quality and safe nursing care [12]. However, students whose hands-on education is limited to clinical experience are often unprepared for clinical work [13]. The prevalence of perceived unpreparedness among nursing students leads to their maladaptation to practice and high turnover rates for new nurses [14]. To respond to this concern, the American Association of Colleges of Nursing suggested that educational programs should prioritize the adaptation of nursing students to the actual clinical field [15].

Previous research has shown that the readiness for practice of nursing students is associated with diverse factors, including their individual characteristics, psychosocial status, and clinical learning environment. A recent scoping review of 17 studies on nursing education conducted from 2000 to 2017 showed that the readiness for practice of nursing students was primarily influenced by personal and educational factors [16]. Personal factors included their backgrounds and feelings, whereas educational factors involved their professional competencies. Individual characteristics, including age [17,18], sex [17], and previous health care experience [19], were associated with their practice readiness. Self-esteem [20], depression [21], and anxiety during clinical practicum [22] were also related to their readiness for clinical practice. Nursing students who had negative emotions such as fear and anxiety toward clinical practicum experienced insecurity about working as a nurse and lacked professional confidence [7]. The clinical learning environment is integral since it supports the development of the professional competence of students, which in turn influences their readiness for practice. The quality of the practice sites and clinical supervision [17,23], feedback and support from faculty and clinical preceptors [15,23], and clinically centered hands-on training [24] were associated with an improvement in the professional competence of students.

Most previous studies regarding readiness for practice in nursing students were conducted in the Western culture, as described above, to develop an instrument [15] exploring the current status and associated factors [18,24]. On the other hand, research on practice readiness in Korea is scarce, focusing only on nursing competence of graduating nursing students and the role transition of senior nursing students [25]. Although lower readiness for practice is an important predictor of negative outcomes, such as maladaptation [26], turnover [27], and transition shock [28] among new nurses, few studies have comprehensively examined the factors affecting readiness for practice among nursing students [22,29].

The factors that reflect the unique characteristics and values of the new generation of students have also not been explored. Most of the current nursing students and new graduate nurses belong to Generation Z. These individuals are known to be pragmatic, individualistic, and lacking in social and relationship skills, which increases their risk of experiencing isolation, anxiety, insecurity, and depression [7]. The persistently high turnover rates of new nurses warrant innovative actions to improve their readiness for practice [6]. The aim of this study was, therefore, to examine the associations of personal factors with readiness for practice among senior nursing students in Korea. The specific factors of interest included self-esteem, depression, and satisfaction with WLB, clinical learning environment, and anxiety during clinical practicum.

Hypothesized model

A hypothesized model was derived from Astin's theory [30] of student involvement.

Astin's [30] student involvement theory research discusses students' college experiences and how these experiences play a role in changing and developing students over time. With numerous factors influencing academic achievement and social involvement through these experiences, Astin used the critical elements of student inputs (I), the educational environment (E), and student outcomes (O) to create a model for identifying such variables. In this model, "input" variables refer to the characteristics of students on school entry. The "environment" refers to the college context, including institutional aspects or student experiences while attending college. Finally, "outcome" refers to students' academic performances or degree attainment. One notable example is the work of Thomas et al. [31] who utilized Astin's I-E-O model to examine the relationship between personal behavioral and emotional health (e.g., depression, anxiety, and antisocial behavior) as input factors and the school environment factors (e.g., social support, student organization participation) to student retention from a large urban university. Their quantitative study revealed that increased depressive symptoms, antisocial behaviors, lower social support, and school participation were consistently related to decreased college retention. Consequently, Thomas et al. [31] have provided vital insight into how factors such as personal characteristics can benefit college students while challenging individuals to consider which environments may affect their retention.

We identified factors related to individual psychological and emotional health in line with the supposition that the effect of school environment factors on persistence is influenced by individual-level factors in the I-E-O model [30]. Consistent with the model, some entering characteristics are demographic and academic backgrounds, same as most previous studies [32,33], while others represent student values, beliefs, and attitudes [31,34]. Assessing nursing student's personal characteristics, including psychological health, can help nursing programs understand how the educational environment affects students' readiness for practice in a more integrated manner. Therefore, in this study, input referred to personal factors, including their self-esteem, depression, and satisfaction with WLB. Environment referred to their clinical learning environment and anxiety regarding clinical practice. Outcomes include their readiness for practice. We hypothesized that these personal factors affect readiness for practice through their clinical learning environment and anxiety during clinical practicum (Figure 1).

Methods

Design and participants

In this cross-sectional study, a total of 842 senior nursing students from 54 nursing schools with 4-year baccalaureate programs
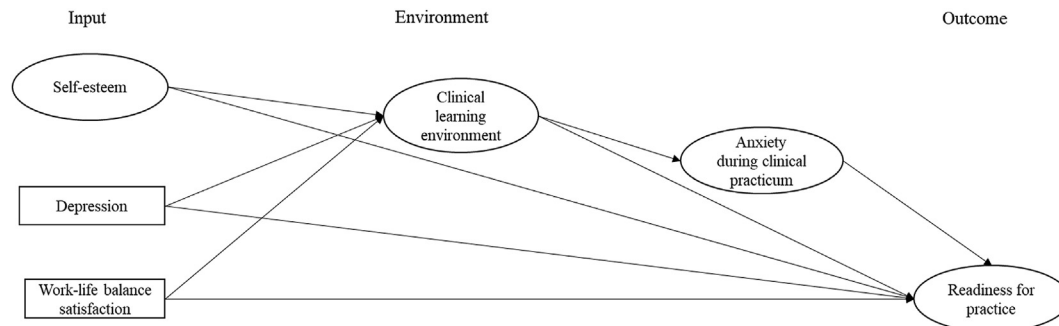
Figure 1. Hypothesized Model.

participated. Inclusion criteria were (1) senior nursing students aged 20−29 years to include Generation Z students (generally referring to those born between 1997 and 2012) [5], (2) expected to graduate in February 2021, and (3) expected to take the national nurse licensure examination in 2021. Data of four participants were excluded due to incomplete responses or the inclusion criteria not being met, and our final sample thus comprised 838 participants. The sample size used for the structural equation modeling (SEM) in the study was calculated based on the condition that the ratio of the sample size to the parameters should be no less than 10:1 [35]. Therefore, the total sample size was suitable for testing a model with 49 free parameters, which would necessitate the inclusion of at least 490 participants.

Measurements

A self-administered questionnaire with 81 items was used. After getting authors' approval for all measures of the study, a committee translation [36] was performed for the measures being used for the first time in Korea—the Casey-Fink Readiness for Practice Survey (CFRPS). The committee translation recommended by the Guidelines for Best Practice in Cross-Cultural Surveys was performed [37]. After the committee translation, cognitive interviews were conducted with 12 nursing students with clinical experience to evaluate the cultural relevance and semantic homogeneity of the translated questionnaire and the response-related complexity of its questions [38]. The survey instrument was finalized after the complicated/ambiguous sentences and questions that were difficult to answer were revised. The Korean version of the readiness for practice survey comprised 20 items (Supplementary Figure 1).

Demographic characteristics

The general characteristics queried included participants' age, gender, type of nursing school, other degrees, school locations, the reason for joining nursing school, and employment expectations.

Personal factors

Self-esteem was measured using the Korean version [39] of Rosenberg's Self-Esteem Scale [40], which consists of 10 items. The Cronbach's α was .85 at the time of the instrument's development [39] and .80 in this study. Each item was rated on a 4-point Likert scale that ranged from 1 (strongly disagree) to 4 (strongly agree). The overall mean is considered the scale score, and higher scores indicated higher levels of self-esteem. The overall mean score of self-esteem was used for the correlation analysis with other variables. In the SEM, item parceling was performed using the "item-to-construct balance" technique to obtain more stable parameter estimates and better model fit. Item parceling was used by averaging item scores in each parcel and generating parcel scores as indicators of latent variables [41]. There were three-item parcels of self-esteem, all of which were confirmed to be valid through confirmatory factor analysis (CFA).

Depression was measured using the Short Form of the Normal Depression Scale for Individual Screening (SFNDS), which consists of five items [42]. The Cronbach's α was .81 at the time of the instrument's development [42] and .80 in our study. Each item was rated on a 5-point Likert scale that ranged from 1 (strongly disagree) to 5 (strongly agree), and the total score (range, 5−25) was calculated by adding the scores of each item. A score of 5−17 is considered normal, whereas ≥18 indicates dysfunctional depression. The total score of the five items was used in the correlation analysis. We used the total score as an observed variable in the SEM.

WLB was assessed using two items—one for WLB proportion and the other for WLB satisfaction. WLB proportion was measured using the WLB Charter by the Japanese Cabinet [43]. In this study, the WLB proportion was determined by calculating the ratio of the percentage of time spent on work to the percentage of time spent on private life. WLB satisfaction was measured using a 4-point Likert scale that ranged from 1 (not at all satisfied) to 4 (very satisfied) developed [44]. Higher scores indicated greater WLB satisfaction. The participants were asked, "How satisfied are you with your current WLB?" The WLB satisfaction score was used in the correlation analysis and SEM as an observed variable.

Environment factor

The clinical learning environment was evaluated using a modification of the Korean version of the Clinical Learning Environment, Supervision and Nurse Teacher Scale (CLES + T) [45]. The Korean version was developed with 33 items and seven subdomains that were adapted from the original CLES + T [46], an instrument that is used internationally to evaluate clinical learning environments in undergraduate nursing education. Given the purpose of this study, we used 13 items from three subdomains: pedagogical atmosphere in the ward, supervisory relationship, and role of nurse teacher. Each item was rated on a 5-point Likert scale that ranged from 1 ("entirely disagree") to 5 ("entirely agree"), and higher scores indicated that the students perceived their clinical learning environment to be more positive. The Cronbach's alpha of the Korean version of the CLES + T for the overall scale was .94, and the subscales ranged from .78 to .94. [45]. The Cronbach's α was .96 for the total scale and .83 to .88 for the subscales in the present study. The overall mean score was used for the correlation analysis with other variables. As a latent variable in the SEM, clinical learning environment had three indicators, corresponding to the overall mean scores of the three subscales.

Anxiety during clinical practicum was assessed using the Korean version [22] of the clinical experience assessment form [47]. The Korean version was developed with 16 items and three subdomains. Given the purpose of this study, we used 12 items from two subscales (communication and procedural aspects, and interactions with faculty) to measure the perceptions of anxiety-provoking situations during clinical practicum in nursing students. The Cronbach's alpha of the Korean version of the clinical experience assessment form for the overall scale was .82, and the subscales were not reported. [47]. The Cronbach's α was .89 for the total scale and .76 to .86 for the subscales in the present study. Each item was rated on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"), and higher scores indicated greater anxiety levels about clinical practicum. The mean score for this factor was calculated and used in the correlation analysis. As a latent variable in the SEM, anxiety during clinical practicum had two indicators, corresponding to the average scores of the two subscales.

Outcomes

Readiness for practice was assessed using the comfort/confidence section of the CFRPS [15]. This 20-item self-report questionnaire was used to measure the confidence and comfort to providing nursing care among the participants. The questionnaire contained four subscales: clinical problem solving, learning techniques, professional identity, and trials and tribulations. The instrument underwent committee translation and was validated through a CFA. Based on the validation result, we used the four original subscales, and the items were rated on a 4-point Likert scale that ranged from 1 ("strongly disagree") to 4 ("strongly agree"). The mean of all items was considered scale score, and a higher score indicated better readiness for practice. The Cronbach's α for the overall scale was .69 and the subscales ranged from .50 to .80 at the time the instrument was developed [15]. The Cronbach's α was .89 for the total scale and .50 to .76 for the subscales in the present study. The overall mean scores of the readiness for practice were used for the correlation analysis with the other variables. As a latent variable in the SEM, readiness for practice had four indicators: the mean scores of the four subscales.

Data collection

For data collection, we selected nursing schools using convenience sampling and asked them to distribute the study flyer online and offline to their students. Students interested in the study participated by accessing the New Nurse e-cohort study website (http://newnurse.or.kr). All participants were asked to complete the survey after carefully reading the explanation on the first page of the online survey link, stating the purpose and content of the study, non-collection of personally identifiable information, confidentiality, and anonymity, and right to withdraw from research participation. Each participant was provided with a small incentive of approximately $16. Data were collected using the online survey, which took 10–20 minutes to complete. The item non-response rate was minimized because the online survey did not proceed to the next question until the current one was answered. The data collection was conducted from November 16, 2020 to December 21, 2020.

Data analysis

SPSS Version 26.0 (SPSS Inc., Chicago, IL, USA, 2019) was used to conduct statistical testing, including a description of the data, correlation analysis, and the calculation of reliability estimates. To explore the impact of personal factors, and clinical learning environment on the readiness for practice among senior nursing students, SEM as implemented in AMOS Version 26.0 was used to test the model hypothesized in this study.

In this study, univariate normality was satisfied, and even if multivariate normality was not satisfied, parameter estimation was performed with the maximum likelihood method according to the report that the estimated parameters are reliable if the maximum likelihood method is used [48]. Maximum likelihood estimation was used to estimate the model, and the bootstrap resampling technique was used in the SEM to obtain more stable and valid standard errors of the estimates. Multivariate normality reported a multivariate kurtosis value of 32.712 in AMOS, and multivariate normality was not satisfied because it exceeded the critical value. Path analysis was used to identify both the direct and indirect effects in the model. The direct, indirect, and total effects of the variables in the model are presented in Supplementary Table 1. The model fit was assessed using the following indices, i.e., relative chi-square (x^2/df) test <5.00 [49], comparative fit index (CFI) $\geq$ 0.90 [50], root mean square error of approximation $\leq$ 0.08 [49], and standardized root mean square residual $\leq$ 0.08 [51]. A p-value <.05 was considered statistically significant.

Ethical consideration

This study was approved by the Institutional Review Board of Yonsei University Medical Center (Approval No: Y-2020-0138). All participants received information about the study, which guaranteed their confidentiality and underlined that their participation was voluntary and could be terminated at any time.

Results

Students' general characteristics

Of the total of 842 participants, 838 were used for the final analysis, excluding two born before 1997 and two with careless responses. The average age of the participants was 22.9 ± 1.4, and women students accounted for 90.6% of the sample (Table 1). In total, 82.6% of the participants were enrolled in university, and only 4.4% of them were pursuing a second degree. The high employment rate after graduation (39.5%), as well as academic interest and aptitude (33.9%), were the major reasons for the participants joining nursing schools. Most (88.4%) of the students are expected to be employed. A majority (54.2%) of the participants spent >50.0% of their time on work (Table 1).

Descriptions and factor loadings of study variables

The participants' perceived readiness for practice was at a moderate level (2.86 ± 0.31) (Supplementary Table 2). In total, 86.8% of the participants responded to questions on the CFRPS with "agree" or "strongly agree," which indicated that they were ready for practice. Learning technique and professional identity were the subdomains with the highest scores (2.94 ± 0.54 and 2.94 ± 0.43, respectively), whereas trials and tribulations received the lowest (2.73 ± 0.35). Self-esteem was at a moderately high level (3.23 ± 0.45). The mean score of depression among students was 10.85 ± 4.12, and only 7.0% of the students were assessed to be experiencing dysfunctional depression (scores >18). The participants displayed a moderate level of WLB satisfaction (2.82 ± 0.63).

The students perceived their clinical learning environment as moderate (3.14 ± 0.67). Role of nurse teacher (3.79 ± 0.82) was the subdomain that received the highest score, whereas pedagogical atmosphere in the ward (2.82 ± 0.81) received the lowest score.

Table 1 *Students' Demographic Characteristics (N = 838).*

Characteristics	Mean ± SD or n (%)
Age (year)	22.9 ± 1.4
21−23	648 (77.3)
≥24	190 (22.7)
Gender	
Women	759 (90.6)
Men	79 (9.4)
Type of school	
University	692 (82.6)
College	146 (17.4)
Second-degree students	
Yes	37 (4.4)
No	801 (95.6)
Location of school	
Capital area	425 (50.7)
Urban	204 (24.3)
Rural	209 (25.0)
Reason for joining nursing school	
High employment rate after graduation	331 (39.5)
Academic interest and aptitude	284 (33.9)
Suggestions of family and friends + Social perception and reputation	123 (14.7)
Depending on SAT score + Aiming to get into medical or dental schools	100 (11.9)
Expected employment	
Yes	741 (88.4)
No	97 (11.6)
WLB proportion	
Balance (50:50)	156 (18.6)
Life-oriented imbalance (spent above 50% of time on private life)	228 (27.2)
Work-oriented imbalance (spent above 50% of time on work)	454 (54.2)

Note. SAT = Scholastic aptitude test; WLB = Wok-life balance.

Their anxiety during clinical practicum was at a moderate level (2.84 ± 0.70).

Students felt more anxious about communication and the procedural aspects related to patients (2.90 ± 0.89) compared to interactions with faculty (2.81 ± 0.71). The CFA results are reported in Supplementary Table 2. The values of the factor loadings ranged from .440 to .874 (>.40), showing that the latent variables were measured comprehensively by their observed indicator variables [46].

Correlations of study variables

A correlation matrix was prepared before testing the hypothesized model (Supplementary Table 3). Self-esteem (r = .42, $p < .001$), WLB satisfaction (r = .34, $p < .001$), and clinical learning environment (r = .40, $p < .001$) were positively correlated with readiness for practice. In contrast, depression (r = −.23, $p < .001$) and anxiety during clinical practicum (r = −.50, $p < .001$) were negatively associated with readiness for practice. Their correlation coefficients were less than .70, which is the criterion for questioning multicollinearity [52]. The Variance inflation factor (VIF) value of 1.7 or less confirmed no multicollinearity between all variables.

Test of the hypothetical model and parameter estimates

The modified model's goodness of fit with the research variables was $x^2/df = 4.888$ (<.001), GFI = 0.950, CFI = 0.941, and root mean square error of approximation= 0.068. Thus, the modified model fit the data. Through the modifications, the difference between the Chi-square of the hypothesized model and the third modified model [$x^2 = 98.281$ (411.118 − 312.837), $df = 3$ (67 − 64)] is larger

than 18.55 and in the range of $p = 0.005$, the modified model may be considered significant and be adopted in place of the hypothesized model [53], and also, CFI improved from .918 to .941 (Supplementary Table 1). A fully adjusted model that controlled for all the participant characteristics (age, gender, type of school, second degree students, location of school, reason for joining nursing school, expected employment) was also tested, and the effects among the study variables were consistent with the unadjusted hypothetical model. For simplicity, we have reported the unadjusted results in this paper. The final model is presented in Figure 2. After checking the modification indices, within-factor correlated measurement was allowed, and the model fit indices improves compared to the previous model.

Tables 2 and 3 summarize the final model's standardized direct, indirect effect, and total path estimates. There were significant direct and indirect effects associated with the personal factors, environment factors, and readiness for practice. Higher self-esteem (β = .29, $p < .001$), higher WLB satisfaction (β = .12, $p < .001$), and better clinical learning environment (β = .30, $p < .001$) were directly associated with better readiness for practice. Conversely, lower anxiety during clinical practicum was directly related to better readiness for practice among nursing students (β = −.36, $p < .001$). In addition, higher self-esteem (β = .19, $p < .001$) and higher satisfaction with WLB (β = .25, $p < .001$) were associated with a better clinical learning environment. The clinical learning environment significantly influenced the nursing students' readiness for practice through anxiety during clinical practicum. A better clinical learning environment was associated with lower anxiety during clinical practicum (β = −.37, $p < .001$), which resulted in better readiness for practice. Self-esteem indirectly influenced readiness for practice through clinical learning environment, anxiety during clinical practicum sequentially (β = .02, $p = .001$). Self-esteem also indirectly influenced readiness for practice through clinical learning environment (β = .06, $p = .001$). WLB indirectly influenced readiness for practice through clinical learning environment, anxiety during clinical practicum sequentially (β = .03, $p < .001$). WLB also indirectly influenced readiness for practice through clinical learning environment (β = .08, $p = .001$). Depression had no direct or indirect effect on readiness for practice. The model estimated a 49.7% variance in the readiness for practice of nursing students.

Discussion

The findings of this study generally supported our hypothesized model, even though some paths were not significant. We observed that readiness for practice was directly and indirectly affected by self-esteem, WLB satisfaction, and clinical learning environment.

Anxiety during clinical practicum also directly influenced readiness for practice. These findings provided a more comprehensive picture of how personal factors and clinical learning environment are related to the readiness of nurses for practice, driven by anxiety during clinical practicum. However, given the weak-to-moderate effects of the examined variables, further research is needed to explore more factors related to readiness for practice among nursing students.

We used the comfort and confidence section of the CFRPS after the validation process to measure readiness for practice, new graduate nurses have reported that a lack of clinical confidence impedes their transition to clinical practice [1]. While other researchers changed the subscales or number of items [18,29] of the CFRPS to suit the context of their study, we used the four original subscales with 20 items each to facilitate global comparisons. The Korean senior nursing students displayed a moderate level of readiness, which was similar to, or slightly lower than, those
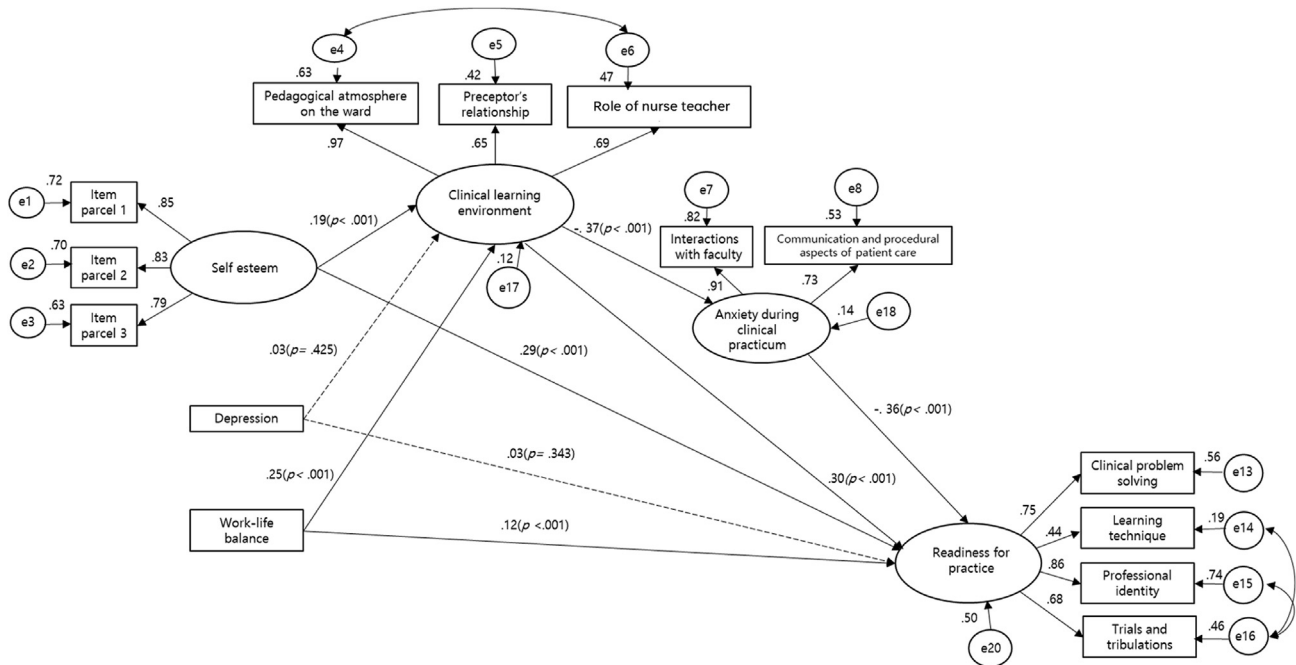
Figure 2. Final Model with Standardized Coefficients. Note: The dashed lines with arrows represent non-significant relationships (*p* > .05).

observed in previous studies that used the same instrument [18,23,29]. In terms of the subscales, nursing students were more confident in their professional identity and learning technique and less confident about addressing their trials and tribulations. The results of this study were similar to those of previous studies, which indicated that nursing students reported higher scores in professional attributes but lowest in time management, prioritization, and management of multiple patients [1,15,23]. These results can inform teaching strategies, including simulation education to complement clinical practicum, strengthen academic-clinical partnerships, and promote readiness for entry-level practice [1].

Our findings further revealed that as personal factors, both self-esteem and WLB satisfaction had a specific indirect effect on readiness for practice through the clinical learning environment and the anxiety during the clinical practicum. This finding is supported by the previous study, which reported that lower self-esteem has significant adverse effects on perceiving both themselves and the clinical learning environment, provoking defensive behavior and poor communication, resulting in negative clinical practicum achievements among nursing students [20,54]. These results suggest that the self-esteem level of nursing students needs to be identified before delivering clinical practicum. In addition,

improving WLB satisfaction is a potential strategy to improve readiness for practice. Dissatisfaction with WLB causes problems such as anxiety, stress, and depression, which negatively affect the academic performance of students [55]. Given that Generation Z prioritizes WLB, which seems to be commensurate to their academic achievement [56]. WLB satisfaction is an important factor that reflects the characteristics of Generation Z and influences their academic achievement. Educational institutions should thus strive to increase WLB satisfaction in order to improve readiness for practice among students.

On the contrary, depression had no significant effect on readiness for practice, which is a different result from the study by Ruz et al. [57], where the lower the depression of nursing students, the higher their academic achievement. This might be related to self-selection bias. Due to the nature of voluntary participation of the subjects, it is believed that students with depression are not likely to respond to the survey. According to a systematic review by Tung et al. [58], the prevalence of depression among nursing students is 34.0%. However, only 7% of the participants in the study had dysfunctional depression, which meant that most students do not experience depressive symptoms. A possible reason for this result is that there is a possibility of assessing depression inaccurately in

Table 2 *Direct, Indirect, and Total Effects of Variables in the Final Model (N = 838).*

Endogenous variables	Predicting variables	Standardized direct effect		Standardized indirect effect		Standardized total effect		SMC
		β	p	β	p	β	p	
Clinical learning environment	← Self-esteem	.19	<.001			.19	<.001	.122
	← Depression	.03	.425			.03	.425	
	← Work-life balance satisfaction	.25	<.001			.25	<.001	
Anxiety during clinical practicum	←Clinical learning environment	−.37	<.001			−.37	<.001	.135
Readiness for practice	←Self-esteem	.29	<.001	.08	.001	.37	.001	.497
	←Depression	.03	.343	.01	.416	.04	.214	
	←Work-life balance satisfaction	.12	<.001	.11	.001	.23	.001	
	← Clinical learning environment	.30	<.001	.13	.001	.43	.001	
	←Anxiety during clinical practicum	−.36	<.001			−.36	<.001	

Abbreviations. SMC = Squared Multiple Correlation.

Table 3 *Specific Indirect Effects of Readiness for Practice (N = 838).*

Path	B	β	p	95% CI
Self-esteem → Clinical learning environment → Anxiety during clinical practicum → Readiness for practice	0.02	0.02	0.001	[.006, .029]
Self-esteem → Clinical learning environment → Readiness for practice	0.03	0.06	0.001	[.016, .060]
Work-life balance → Clinical learning environment → Anxiety during clinical practicum → Readiness for practice	0.02	0.03	<.001	[.009, .025]
Work-life balance → Clinical learning environment → Readiness for practice	0.03	0.08	0.001	[.020, .050]

practice although SFNDS has been a relatively reliable and proven tool. Whether the dysfunctional depression identified using the SFNDS is consistent with the actual clinical diagnosis has not fully established [42]. Hence, further studies are needed to confirm the practical usefulness of the SFNDS.

A notable finding of this study was that, among all variables, the clinical learning environment had the most significant effect on the readiness for practice. Specifically, the clinical learning environment had a direct effect on the readiness for practice for nursing students; moreover, it indirectly affected the readiness for practice through the anxiety during clinical practicum. The more positively the students perceived their clinical learning environment, the lower their anxiety during clinical practicum, which in turn indicated better readiness. Similar to our findings, another study reported high rates of attributable to unfamiliar new clinical conditions during clinical practicum [59]. A poor clinical learning environment causes nursing students to worry and diminishes their confidence, reducing the efficiency of their clinical practice education [2]. Thus, the educational environment in the clinical setting is critical, as students should be nurtured as professional nurses and be given the opportunity to integrate their knowledge into practice [60]. In addition, among the sub-domain of CLES + T, " role of nurse teacher" had the highest scores, which means the better the nursing faculty's relationship with the practice setting and ability to integrate theory and practice, the more positive the students' perception of the clinical learning environment. This result is consistent with Saarikoski's study [46], suggesting that the nurse teacher should take effort to ensure the continuity of theory and practice with open communication and commitment between students, teachers, and staff nurses in clinical teaching. Further, a partnership between the nursing school and the hospital is needed to provide better clinical education to the students in a consistent and exemplary manner. In Korea, due to the rapid increase in the number of nursing schools over the last 10 years [61], numerous nursing schools find it difficult to secure clinical practicum sites and qualified preceptors for training students [62]. In addition, the provision of a good learning experience is hindered within the current hospital environment due to high turnover rate of patients, limited access to medical records, and increased awareness regarding the rights and safety of humans [63]. This situation provokes anxiety, depression, and burn-out among students and deteriorates the quality of their clinical education [62,63].

The last notable finding was that anxiety during clinical practicum had directly affected readiness for practice among students. This is in consistent with the results of previous studies, which reported that high levels of anxiety during clinical practicum negatively affect the clinical performance and successful adaptation and retention to practice of students [22]. Incorporating pre-clinical knowledge and skill development sessions through simulation education [64] is effective in decreasing anxiety among students. Most nursing students in Korea are provided simulated education because simulation hours are accepted as 10.0% of the compulsory 1,000 clinical hours by the Korean Accreditation Board of Nursing Education [65]. Given that anxiety during clinical practicum can be mediated through various methods, the persistent attention and efforts of educators are needed to ameliorate this anxiety and improve readiness for practice among students.

This study has several limitations. First, our findings must be viewed with caution as most participants were female and from universities located in urban areas due to the convenient sampling method employed. Second, we measured readiness for practice using a self-administered survey based entirely on the students' perspectives. Readiness for practice should be evaluated by the student, nursing faculty, and nurse educators in practice as they have different lenses through which they view practice readiness. Additionally, this study was cross-sectional, limiting our understanding of the influence of personal and environmental factors on readiness for practice based on the I-E-O model [30]. A longitudinal study may be conducted to better explore relationship between factors and understand the association between analyzed variables. Lastly, we modified the standardized instruments with multiple subdomains into shorter versions to suit the purpose of our study. This may have hindered us from attaining an in-depth understanding of the concepts and limited the comparisons that could be made with other studies that explored readiness for practice. While the readiness for practice instrument maintained the same construct as the original instrument, Cronbach's alpha value was .5 in learning techniques, one of the sub-domains, which was not ideal but was acceptable [66]. Although this is the same result as the original instrument when developed, a psychometric test for the Korean student nursing population is proposed in follow-up studies to secure validity and reliability.

Conclusions

Our findings suggest that taking personal factors into account, improving their clinical learning environment, and providing sufficient educational and clinical support could enable nurses to establish better professional values and readiness for practice. In addition, considering the characteristics of Generation Z, where individual values and characteristics are becoming increasingly important, the cooperation among nursing schools, teaching hospitals, and clinical learning institutions toward providing clinical learning curricula reflecting generational characteristics can effectively improve readiness for practice among nursing students. This would effectively help ensure readiness for practice so that graduates can transition to professional nurses.

Author contribution

Taewha Lee, guided the research plan from the beginning to the completion, participated in the entire process until the completion of the research, and revised and developed the manuscript.

Yoonjung Ji, all processes including research plan preparation, data collection, result analysis, discussion writing, manuscript writing, and submission.

Yea Seul Yoon participated in research plan preparation and data collection.

Hyunju Ji participated in research plan preparation and data collection.

SangA Lee participated in discussion writing and manuscript writing.

Sookhee Yoon participated in statistical analysis, result analysis and writing the result of the manuscript.

Su Jeong Lee participated in research plan preparation.

Conflict of interest

There are no conflicts of interest to declare.

Acknowledgments

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.anr.2023.01.003.

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