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Title: THE WARD MANAGER ROLE IN THE CONTEXT OF NURSING AND MID-WIFERY STUDENTS' CLINICAL LEARNING: TESTING A MODEL.

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Abstract

Aim: To test a model of clinical learning that focuses on the role of the ward manager.

Background: The ward manager's role in supporting clinical learning indirectly focuses on the ward climate connected to students' clinical placements. In this way, the ward manager influences both nursing care and the pedagogical atmosphere in the ward.

Design: Cross-sectional, secondary analysis.

Methods: The sample included nursing and midwifery students ($N=5776$, $n=1900$) who had completed their clinical placement. Data were collected with the Clinical Learning Environment, Supervision and Nurse Teacher scale. Structural equation modelling was adopted to test the hypotheses.

Results: Estimates of the model parameters demonstrated that a ward manager's leadership style influences both the premises of nursing at the ward (0.84 , $p<0.001$) and the pedagogical atmosphere (0.93 , $p<0.001$), while the pedagogical atmosphere affects the mentoring relationship (0.87 - 0.86 , $p<0.001$).

Conclusions: Ward managers exert a significant influence on the clinical learning environment via their support for an effective pedagogical atmosphere and, consequently, effective mentoring.

Implications for Nursing Management: Leadership style guides both the premises of nursing at the ward and pedagogical atmosphere. These findings recommend that ward managers should be involved in promoting a supportive learning climate, which supports the mentor-student relationship and, eventually, leads to effective clinical learning.

Keywords: clinical learning, ward manager, mentoring, nursing, student

Introduction

Clinical learning is a core element in developing a professional identity, with this process starting during nursing education when students are first introduced to the clinical setting and organisational environments. Nursing clinical education can be considered as workplace-based learning (Saarikoski & Strandell-Laine, 2018; Tomietto et al., 2016); hence, the ward manager plays an important role in shaping the pedagogical atmosphere of the ward, enhancing the mentoring relationship, and fostering cooperation between academic institutions. Notably, European Directive 2013/55/EU states that up to 50% of nursing education should be delivered in a clinical setting (Directive 2013/55/EU) and highlights the relevance of involving various organisational roles in clinical learning. Previous research has shown that a ward manager's decision to get involved in the development of clinical learning can improve the clinical learning environment, and – in extension – the clinical competence of students (Henderson et al., 2014). The clinical learning environment has been shown to be influenced by interactions between the physical environment, psychosocial and relational factors, the organisational culture, and learning components (Flott & Linden, 2016). Even though this description includes the organisational setting, further empirical evidence of the educational role of the ward manager is needed. Moreover, educational research needs to address how the organisational setting and the ward manager's role contribute to clinical learning.

Nursing students learn far more than just clinical competencies during clinical practice; for example, they also identify with professional role models, compare their ideal vision of nursing with the actual reality, and begin to grasp how organisational culture and inter-professional interactions affect nursing care (Tomietto, 2018). From this perspective, ward managers are pivotal in connecting the workplace clinical setting with educational institutions due to the fact that they are deeply embedded in the organisation and have a comprehensive view of the nursing environment. In other words, a ward manager can support a fruitful clini-

cal learning environment by collaborating with the mentors and nurse teachers embedded within clinical learning (Henderson et al., 2013). This paper aims to test a model that specifically focuses on the role of the ward manager in clinical learning.

Background

Research concerning the clinical learning environment has traditionally adopted a psychosocial theoretical framework. In one of the first academic studies of the clinical learning environment, Moos (1974) addressed three dimensions of human environments: (1) the relationship dimension describes how people participating in a particular environment support each other and openly express themselves; (2) the personal development, or goal orientation, dimension concerns opportunities for personal growth and self-enhancement; and (3) the system maintenance and change dimension describes the extent to which the system responds to change, e.g., through a proactive attitude to innovation. This theory is consistent with the person-organisation fit framework, which states that the coherence between individuals and the environment (organisational, learning or work environment) is essential to enhancing both individual (e.g., job satisfaction, well-being, and motivation) and organisational outcomes (e.g., turnover, patient safety and financial performance) (Gunnarsdottir, 2016; Niskala et al., 2020). This perspective mainly focuses on the interactions between various individuals (each with certain roles) in an environment; as such, it is crucial to identify the core roles involved in supporting and shaping the culture of a specific environment.

A learning environment also includes interactions between individuals' cognitive processes and emotional experiences; in this way, learning can be considered an outcome of the interactions between cognitive and socio-emotional processes (Kolb & Fry, 1975). This is particularly relevant for clinical learning environments, in which students face complex situations that involve taking into account inter-professional teamwork, patients' life histories and con-

ditions, along with personal values and life views (Arieli, 2013). Students have reported experiencing high levels of anxiety and distress during clinical placements (Gibbons, 2010); this provides empirical evidence for prior suggestions that clinical learning is emotionally demanding (Deasy, Coughlan, Pironom, Jourdan, & Mannix-McNamara, 2016; Evans & Allen, 2002). When an environment includes certain demanding variables, positive outcomes can only arise if the environment can provide the resources (e.g., work engagement or an effective learning climate) necessary for overcoming these demands (Tomietto et al., 2016). Certain roles involved in the clinical learning environment, for example, the nurse manager, could be essential to providing the resources required to transform a demanding situation into a meaningful learning opportunity (Henderson et al., 2014; Henderson et al., 2013).

In this way, clinical learning should be considered as a continuous process in which students, mentors, the ward team, ward managers, nurse teachers and the surrounding environment interact through actions, values, emotions, and perceptions to shape clinical learning (Gunnarsdottir, 2016). As the ward managers have a leadership role in the ward, they are in a position to affect the organisational climate of the ward (demands and resources), which also influences clinical learning. On the other hand, the nurse teacher role has gradually become less important to clinical learning, and was phased out from clinical settings when European educational systems were restructured (Pitkänen et al., 2018; Saarikoski & Strandell-Laine, 2016; Warne et al., 2010). Currently, nurse teachers, who are qualified nurses employed by an educational institution, mainly have an indirect role in the clinical learning environment: Their role is based on three main pillars: (1) the integration of theory and practice, which requires competence in connecting students' clinical learning experiences with nursing theory and research; (2) cooperation with various ward staff members, i.e., the extent to which the nurse teacher shares their own expertise with the nursing team; (3) and relationship with men-

tors and students, which covers the extent to which nurse teachers promote clinical learning via interactions with mentors and students (Saarikoski et al., 2008). The reform of European healthcare education has increased the relevance of ward managers and mentors to students' clinical learning as these roles have become embedded into the organisational settings in which clinical learning takes place.

Based on these premises, our study aims to test the hypothetical model presented in Figure 1.

Methods

Aim

This study aimed to develop and test a model describing the role of the ward manager in the context of clinical learning. The model included the main factors of the clinical learning environment according to the Clinical Learning Environment, Supervision and Nurse Teacher scale (CLES+T) framework.

Hypotheses

- H1. The ward manager's leadership style is positively related to the quality of nursing care (H1a) and the pedagogical atmosphere (H1b) of the ward;
- H2. The pedagogical atmosphere of the ward positively influences the mentor-student relationship;
- H3. Three aspects of the nurse teacher role [theory-practice integration (H3a), cooperation between the nurse teachers and ward staff (H3b), and the relationship between the student, mentor and nurse teacher (H3c)] explain how the pedagogical atmosphere of the ward is connected to the mentor-student relationship.

Study sample and setting

Nursing students and midwifery students from nine universities of applied sciences who had completed their clinical placement at one university hospital in Finland during the 2017-2018 academic year were invited to participate in the study. A final sample of 1900 participants was eligible for data analysis (73%) after a total of 2609 responses were screened for multivariate normality. Students were invited to participate in the study following the completion of their clinical practice through an electronic survey link.

Instrument

The Clinical Learning Environment, Supervision and Nurse Teacher scale (CLES+T) (Saarikoski et al., 2008) was adopted to collect data and build an empirical model of clinical learning. According to a systematic review, the CLES+T is currently the most widely used tool for studying the clinical learning environment (Mansutti, Saiani, Grassetti, & Palese, 2017). The CLES+T scale assesses five factors: the mentoring relationship (8 items); pedagogical atmosphere of the ward (9 items); role of the nurse teacher (9 items); leadership style of the ward manager (3 items); and premises of nursing at the ward (4 items) (Saarikoski et al., 2008). In this study, a panel of experts, including nurse managers and educators from the university hospitals involved, reviewed the instrument and agreed that the CLES+T scale should be adapted to the organisational setting following the re-wording of two items and deletion of one item. The adaptation was submitted to, and approved, by Dr. Saarikoski, the scale's developer. In detail, the item "The wards nursing philosophy was clearly defined" was changed to "Nursing care/client foundations of values were clearly defined", whereas the item "The ward can be regarded as a good learning environment" was changed to "Patient/client care situations were utilised in my supervision". The item "The ward manager was a team member" was deleted. The deletion of this item was consistent with the organisational model of the studied university hospital, along with the leadership style promoted by this organisa-

tion. Respondents rated the included items using a ten-point Likert scale ranging from one (fully disagree) to ten (fully agree).

Hypotheses H1 (a, b) and H2 were tested by taking into account the following factors: leadership style of the ward manager; premises of nursing in the ward; pedagogical atmosphere; and mentoring relationship. To test H3 (a, b, c), the role of the nurse teacher (NT) factor was split in three sub-factors (NT 1-3) according to the theoretical structure of the instrument presented by Saarikoski et al. (2008), and empirically tested in further studies (Tomietto et al., 2012). More specifically, the theory-practice integration sub-factor (NT 1) was formulated as "in my opinion, the NT was capable of integrating theoretical knowledge and everyday nursing practices", the cooperation between nurse teachers and ward staff sub-factor (NT 2) was formulated as "the NT was able to give his or her expertise to the clinical team", and the relationship with student, mentor and nurse teacher sub-factor (NT 3) was formulated as "the common meetings between myself, mentor and NT were a comfortable experience". In the current study, two confirmatory factor analyses (CFA) were performed, with one model including the sole NT factor and the other model including the three NT sub-factors, to support the decision to split the NT factor. Further details are reported in the preliminary analyses. Background information was collected to describe the sample.

Data Analyses

Preliminary analyses were conducted to ensure that the prerequisites for Structural Equation Modelling (SEM) were achieved. In detail, Mahalanobis distances were calculated to identify and delete multivariate outliers. The removal of multivariate outliers is an essential step in providing the basic assumptions for a SEM model because outliers compromise the linearity of data distribution and jeopardise the fit indices of the model (Kline, 2010). In addition, Mardia's kurtosis index was calculated and compared to the threshold value for multivariate

normality (Tabachnick & Fidell, 2006). The collected data were checked for missing values through Little's Missing Completely At Random (MCAR) test (Graham, 2009).

The internal consistency of the adapted CLES+T was evaluated based on Cronbach's alpha values. Furthermore, construct validity was tested by performing a Confirmatory Factor Analysis (CFA) with Full Implementation Maximum Likelihood (FIML) estimation and calculating four fit indices: Root Mean Square Error of Approximation (RMSEA); Standardized Root Mean Residual (SRMR); Comparative Fit Index (CFI); and Tucker-Lewis Index (TLI). A model is generally considered acceptable if the fit between model and the dataset demonstrates RMSEA and SRMR values <0.08 , along with CFI and TLI values >0.90 (Kline, 2010).

The hypothesised model was tested using SEM, in which model parameters were estimated using the FIML estimation. The chi-squared statistic was reported for the fit indices (RMSEA, SRMR, CFI, TLI), while the coefficient of determination was reported as a measure of model variance (Kline, 2010). The mediating effect of the nurse teacher role was tested by performing a Sobel z-test, as modified by Iacobucci, Saldanha, and Deng (2007). In detail, given an independent variable X , a mediator M , a dependent variable Y , and a as the parameter $X \rightarrow M$, b as $M \rightarrow Y$ and, c as $X \rightarrow Y$: 1) mediation is complete if c is not significant and the Sobel z-test result is significant; 2) partial mediation exists, with most of the variance explained by the indirect effect, if both c and the Sobel z-test result are significant; 3) partial mediation exists if c is significant while the Sobel z-test result is not significant; and 4) partial mediation exists if neither c nor the Sobel z-test results is significant.

The SEM estimated a total of 63 parameters. To properly test a SEM model, a ratio of participants to estimated parameters ranging from 10:1 to 20:1 is recommended (Kline, 2010; Schreiber et al., 2006). Accordingly, the hypothesised model in this study required a sample size ranging from 630 to 1260 participants.

Mediation analyses were performed in Stata version 12.0 (StataCorp, College Station, TX) using the "medsem" package (Mehmetoglu, 2018). The CFA and SEM models were tested using Stata version 12.0, while the preliminary analyses and descriptive statistics were performed in IBM SPSS version 25.0 (IBM, 2017).

Ethical considerations

Permission to perform the research was obtained from the healthcare organisation in the spring of 2019; thus, the study was in accordance with the standards set forth in Finnish law (Personal Data Act, 523/1999). The use of the CLES+T scale, along with the adaptation of certain items, was agreed upon with the scale's developer, Dr. Saarikoski, and the university hospital involved. Respondent anonymity was ensured during data collection, and all of the respondents were clearly told that their participation was voluntary and that their identities would remain anonymous. The data have been protected and are safely stored in an encrypted file (Personal Data Act, 523/1999). Moreover, the study data will be stored for ten years according to the European Union's General Data Protection Regulation (Official Journal of the European Union, 2016).

Results

Sample description

The participating students represented nine Finnish universities of applied sciences. The students had performed their clinical practice in 19 different clinic placements, most of which were organised in inpatient care. The age distribution of the students was as follows: 44% (n=836) were between 20-24 years of age; 22% (n=418) were between 25-29 years of age; and 34% (n=646) were 30 years of age or older. A majority of the respondents (65%, n=1235) reported previous professional education. The majority of the participants were second- (37%, n=703) or third-year (41%, n=779) degree students. The students were asked about common practices in the clinical learning environment, as well as their experiences of

mentoring during clinical placements. From the total pool of students, 50% (n=950) specified that they had a single mentor during clinical practice, while 21% (n=399) reported that their mentor changed on a continuous basis. Most of the participants reported that the clinical practice lasted between 4-5 weeks. When asked about specific events of their clinical practice, 85% (n=1615) of the students reported discussing learning outcomes with their mentors, while 74% (n=1406) and 88% (n=1672) of the students had received formative and summative evaluations, respectively, at the end of the clinical practice. The data revealed that the mentor and nurse teacher performed the student evaluations together in only 35% (n=665) of cases. The respondents had the following distribution of responses to a question about satisfaction with the support received during clinical practice: excellent, 14% (n=266); quite good, 48% (n=912); average, 28% (n=532); quite bad, 9% (n=171); and very poor, 1% (n=19). The 80% (n=1537) of the participants were nursing students.

Preliminary analyses

Multivariate normality tests were performed to assess whether the models could be properly tested through SEM. More specifically, Mardia's kurtosis index was found to be 713.076, which is in line with the threshold value of 1155 for multivariate normality (Tabachnick and Fidell, 2006). A CFA of the model in which the nurse teacher (NT) factor had been split into three sub-factors demonstrated satisfactory fit index values (e.g., RMSEA=0.078, SRMR=0.055, CFI=0.922, TLI=0.913). The CFA of the model in which the NT factor was not split into sub-factors did not yield satisfactory fit indices (RMSEA=0.106; SRMR=0.056; CFI=0.855; TLI=0.842). As a result, the subsequent analyses presented in this study tested a model in which the NT factor was split into three sub-factors, with the hypotheses tested accordingly. The Cronbach's alpha values varied from 0.81 to 0.97. In detail, the "mentoring relationship" factor (8 items) achieved a Cronbach's alpha value of 0.97, the "pedagogical atmosphere of the ward" (9 items) factor demonstrated a Cronbach's alpha value of 0.94, the

"role of the nurse teacher" factor (9 items) showed a Cronbach's alpha value of 0.94 and, with the sub-factors "theory-practice integration", "cooperation between nurse teachers and ward staff", and "relationship with student, mentor and nurse teacher" showing Cronbach's alpha values of 0.94, 0.90, and 0.95, respectively. In addition, the "leadership style of the ward manager" factor (3 items) and "premises of nursing at the ward" factor (4 items) yielded Cronbach's alpha values of 0.81 and 0.86, respectively.

Hypothesis testing

The following factors were considered when testing the empirical model: mentoring relationship; pedagogical atmosphere of the ward; leadership style of the ward manager; premises of nursing at the ward; theory-practice integration; cooperation with the ward staff and nurse teacher; and relationship between student, mentor and nurse teacher. To test H3, three different SEM models were performed to detect which nurse teacher role sub-factor has the strongest mediating effect on the relationship between pedagogical atmosphere and mentoring relationship.

The ward manager's leadership style was found to significantly foster both the premises of nursing at the ward (0.84) and the pedagogical atmosphere of the ward (0.93), while the pedagogical atmosphere of the ward was found to enhance the mentoring relationship (0.86-0.87). All parameters were statistically significant ($p < 0.001$); hence, H1 and H2 were verified in each of the three tested models. The preliminary analyses also investigated the mediating effects of various aspects of the nurse teacher role on the relationship between pedagogical atmosphere and mentoring relationship, namely, theory-practice integration (H3a), cooperation between the nurse teachers and ward staff (H3b), and relationship between student, mentor and nurse teacher (H3c). The parameter estimates describing the connections between the three nurse teacher role sub-factors and pedagogical atmosphere of the ward were all positive and statistically significant ($p < 0.001$). More specifically, the pedagogical atmosphere was

positively influenced by the relationship between the student, mentor and nurse teacher (H3c; 0.37), followed by theory-practice integration (H3a; 0.32) and cooperation between the nurse teacher and ward staff (H3b; 0.17) (Figs. 2-4, Table 1). The correlations between the mentoring relationship and the three separate nurse teacher role sub-factors were not as clear, since only the relationship between student, mentor and nurse teacher (H3c) was found to significantly improve the mentoring relationship ($p=0.001$), although the effect was low (0.04) (Figure 4). This last model indicates that the nurse teacher role of acting as a facilitator partially mediates the relationship between pedagogical atmosphere and the mentoring relationship (Sobel's test=0.016, $p=0.002$). The fit indices demonstrated satisfactory fit: RMSEA=0.087; SRMR=0.045; CFI=0.921; TLI=0.913. Hence, H3 was verified for the nurse teacher role sub-factor of relationship between student, mentor and nurse teacher (H3c). The model demonstrated a coefficient of determination of 0.958, which means that the included independent variables explained 95.8% of the variance observed in the dependent variables. Tables 1 to 3 provide detailed statistical information regarding parameter estimates (Table 1), fit indices (Table 2) and the mediation effects of each NT sub-factor for all three tested models.

Discussion

The findings of the present study improve the theoretical foundations of clinical learning environment research and provide insight into how organisational interventions can support clinical learning as workplace-based learning. Most notably, we found that a ward manager's leadership style influences the pedagogical atmosphere of the ward, and – in extension – the pedagogical atmosphere promotes the mentor-student relationship. The nurse teacher's role in facilitating interactions between mentors and students partially mediates the association between the pedagogical environment and mentoring relationship. This is an important finding as there is currently only limited empirical evidence of how the NT role contributes to stu-

dents' clinical learning. Overall, these findings confirm the relevance of the relationship dimension, first presented by Moos (1974), in that interactions between the ward manager, mentor and nurse teacher can foster a positive clinical learning environment.

The ward manager has an indirect role in shaping the clinical learning environment, establishing the premises for effective learning, and ensuring the psychological safety of students.

Previous research has already highlighted that ward managers can influence ward team climate and the clinical learning environment (Pitkänen et al., 2018; Henderson et al., 2014).

The presented findings confirmed that a ward manager can indirectly shape the clinical learning environment via their influence on pedagogical atmosphere and the delivery of nursing care. Actions that positively influence these factors of the clinical learning environment could improve the mentor-student relationship, and subsequently, lead to positive clinical learning environment experiences. In this way, the ward manager should promote a learning-oriented organisational climate by enhancing openness and mutual support in the team.

Previous research on the nurse teacher role has been controversial due to the decreased involvement of nurse teachers in clinical settings (Arkan, Ordin, & Yılmaz, 2018; (Mikkonen, Elo, Miettunen, Saarikoski, & Kääriäinen, 2017; Warne et al., 2010). The results of this study confirm that the nurse teacher role does not strongly affect the mentoring relationship, even if it partially mediates the correlation between pedagogical atmosphere and mentoring relationship through the relationship between student, mentor and nurse teacher. By supporting the mentor-student relationship, nurse teachers can improve the mentoring relationship; this mediation effect suggests that various subtle interactions, which are part of the relational dimension of a clinical learning environment, exist in the clinical setting. Furthermore, this finding provides evidence that the nurse teacher is involved in these relationships. In our sample, 85% of the students discussed their learning outcomes with mentors, while only 35% reported having a mutual meeting with a mentor and nurse teacher. This finding indicates that nurse

teachers currently do not have a strong role in managing students' learning outcomes in the clinical learning environment.

According to the presented results, neither the theory-practice integration nor cooperation between the nurse teacher and ward staff sub-factor contributed to improvements in model fit. These findings mirror the evolution of the nurse teacher role during past years, more specifically, nursing students do not feel that nurse teachers play a significant role in overcoming the theory-practice gap, or that they extensively collaborate with the ward team. Currently, both of these tasks are usually performed by the mentors (Mikkonen et al., 2020; Warne et al., 2010), whose work in the pedagogical atmosphere is overseen by ward managers. Nursing degree programmes still have room for improvement, especially in terms of clinical practice and cooperation within organisational settings. For example, the degree programme should ensure that students get enough support in the clinical learning environment to meet their learning objectives, that every student can enjoy a positive mentoring relationship, and that comprehensive normative and/or summative evaluations are provided upon the completion of clinical practice (Immonen et al., 2019; Mikkonen et al., 2019). Moreover, collaboration between various organisational and educational institutions should be strengthened in order to support mentors' education, which will build mentors' – and in extension – students' competencies (Mikkonen et al., 2020; 2019); ward managers are crucial to achieving this goal, and should focus on creating a positive pedagogical atmosphere and balancing the demands and resources of the organisational setting. According to these findings, health care institutions should rethink the current relationship between organisational and educational settings. Potential changes could include rephrasing the nurse teacher's organisational role to cover not only students' clinical learning, but also include the promotion of clinical competence among new staff members as well as the maintenance of every employee's core competencies (Labragie et al., 2020; Cave, 1994).

Limitations

The original five-factor model, in which items related to the nurse teacher role were not separated into sub-factors, was also tested according to the CLES+T psychometric testing described by Saarikoski et al. (2008). The CFA conducted on this model did not yield satisfactory fit indices (e.g., RMSEA=0.106, SRMR=0.056, CFI=0.855, TLI=0.842). Further research should test both the factorial structure of CLES+T scale and the SEM model presented in this study using an international sample. Based on the presented results, it would also be beneficial to identify the ward manager leadership style that is most effective at supporting the pedagogical atmosphere of the ward. More research is also needed to test different roles of the nurse teacher; these studies could apply different interventions, as well as gauge the degree to which nurse teachers are involved in students' clinical learning. Furthermore, subsequent studies should include a wider sample of midwifery students to better detect possible differences in clinical learning environments and model organisational and educational strategies. In this study, the sample size did not enable the reliable testing of the studied model. Furthermore, the SEM was applied to a model that only considered midwifery students, with the results revealing the same pattern that was noted for the overall model; the only difference was that the NT role seems to be less relevant in midwifery education (see supplementary tables 1 and 2). Even if the model's fit indices were acceptable, we recommend to further test this finding with a larger sample of midwifery students.

Implications for nursing management

The presented results can be organised according to the following points: 1) leadership style guides both the premises of nursing at the ward and pedagogical atmosphere, a dynamic that needs to be considered when discussing organisational issues and decision-making concerning either clinical practice or mentoring; 2) the ward manager's leadership style is positively correlated with the pedagogical atmosphere of the clinical learning environment; as such, the

ward manager's actions will guide ward staff in how to integrate student-centred pedagogical practices and establish a collaborative working environment; and 3) the pedagogical atmosphere is linked with both the mentoring relationship and student-mentor-nurse teacher collaboration, which further emphasises the importance of the clinical learning environment of each specific ward and support for mentors in their interactions with students. Further studies, potentially including an international sample, would be important to confirming these results and building the evidence base from which decision-makers can draw insights to improve the clinical learning environment. Furthermore, the presented findings suggest that ward managers are the gatekeepers to the creation of a supportive learning climate which supports the mentor-student relationship and, eventually, leads to effective clinical learning and competencies.

Conclusion

This study represents, to the best of our knowledge, the first instance that a model of the clinical learning environment has been developed and empirically tested with a focus on the ward manager role, along with its impact on the pedagogical atmosphere. We found that the ward manager's leadership style influences the pedagogical atmosphere. Moreover, we identified a partially mediating effect of the nurse teacher role on the mentor-student relationship. Our results regarding how various actors (i.e., ward managers, mentors and nurse teachers) can influence the pedagogical atmosphere and mentor-student relationship provide insight into measures – at both the organisational and educational levels – that could significantly improve students' clinical learning.

Conflict of interest

No conflict of interest has been declared by the authors.

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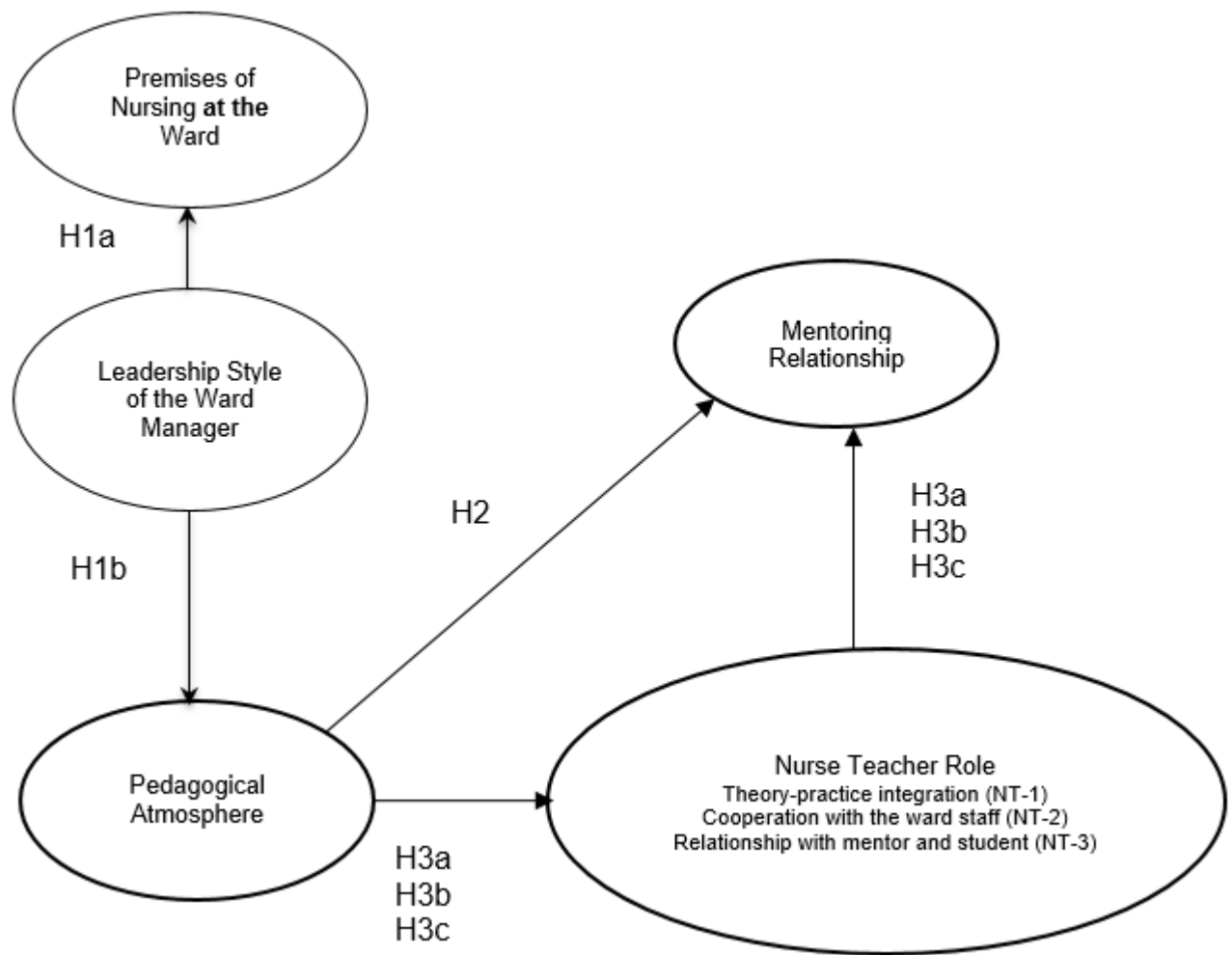


Figure 1. Empirical-based model of the clinical learning environment and mentoring, including the study hypotheses (H1a, H1b, H2, H3a, H3b, H3c).

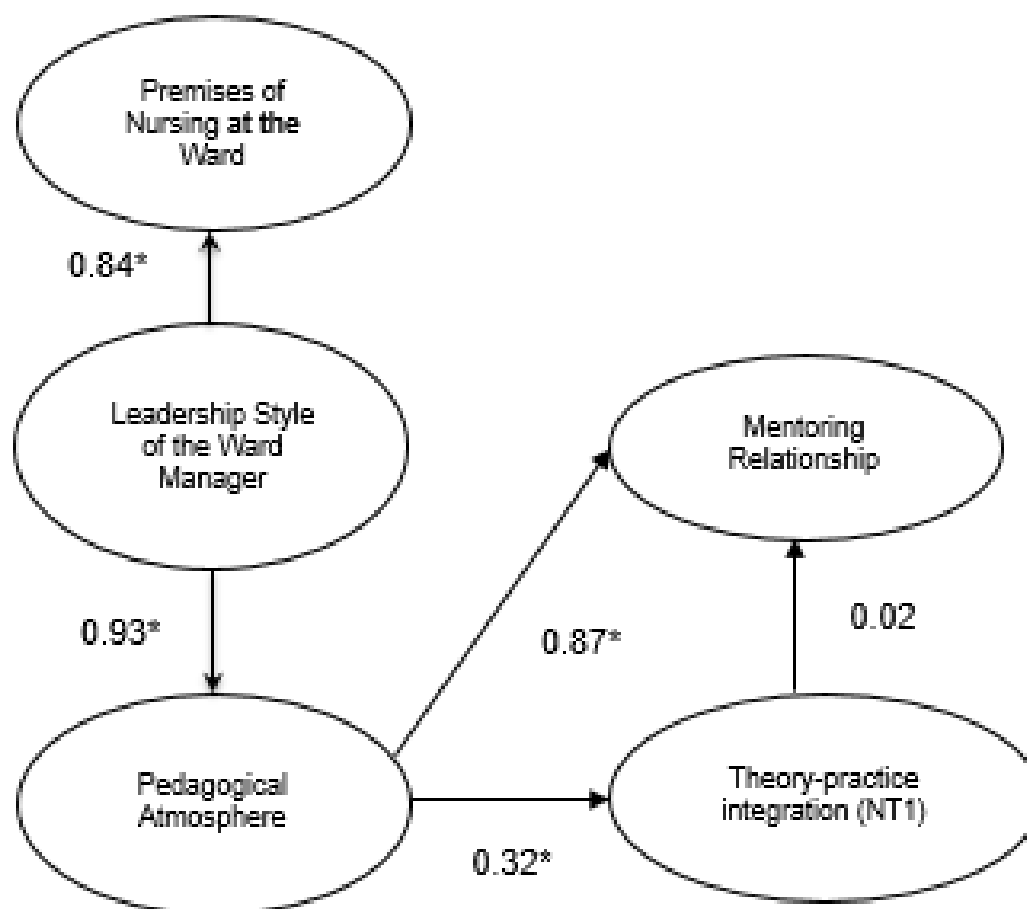


Figure 2. Model 1 (H3a): Structural Equation Model and parameter estimates

* statistical significance ≤ 0.001

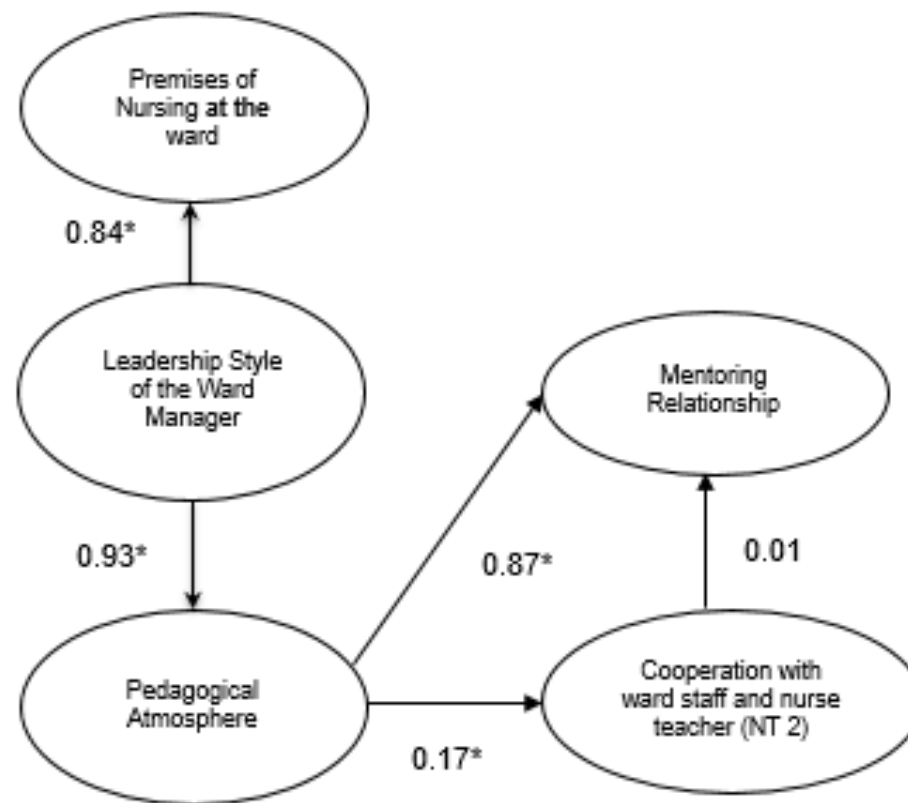


Figure 3. Model 2 (H3b): Structural Equation Model and parameter estimates

* statistical significance ≤ 0.001

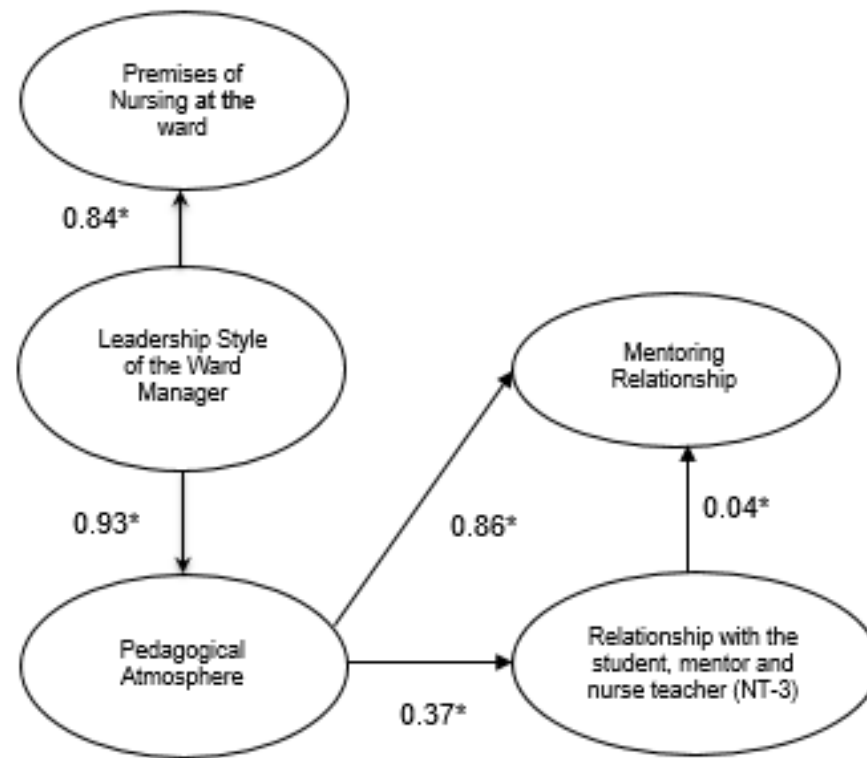


Figure 4. Model 3 (H3c): Structural Equation Model and parameter estimates

* statistical significance ≤ 0.001

Table 1. Structural Equation Modelling parameter estimates, along with the results of selected statistical tests (z-test and p-values) (n=1900)

Model	Hypothesis	Outcome variable	Explanatory variable	Parameter	Standard Error	z-test	p-value
1	H1a	Premises of nursing at the ward	Leadership style of the ward manager	0.84	0.009	87.38	<0.001
	H1b	Pedagogical atmosphere	Leadership style of the ward manager	0.93	0.005	191.84	<0.001
	H2	Mentoring relationship	Pedagogical atmosphere	0.87	0.008	110.43	<0.001
	H3a	Mentoring relationship	Theory-practice integration	0.02	0.013	1.33	0.185
	H3a	Theory-practice integration	Pedagogical atmosphere	0.32	0.022	14.52	<0.001
2	H1a	Premises of nursing at the ward	Leadership style of the ward manager	0.84	0.009	87.28	<0.001
	H1b	Pedagogical atmosphere	Leadership style of the ward manager	0.93	0.005	191.46	<0.001
	H2	Mentoring relationship	Pedagogical atmosphere	0.87	0.007	130.38	<0.001
	H3b	Mentoring relationship	Cooperation with ward staff	0.01	0.013	0.09	0.931
	H3b	Cooperation with ward staff	Pedagogical atmosphere	0.17	0.023	7.07	<0.001
3	H1a	Premises of nursing at the ward	Leadership style of the ward manager	0.84	0.009	87.34	<0.001
	H1b	Pedagogical atmosphere	Leadership style of the ward manager	0.93	0.005	192.17	<0.001
	H2	Mentoring relationship	Pedagogical atmosphere	0.86	0.008	101.78	<0.001
	H3c	Mentoring relationship	Relationship between the student, mentor and nurse teacher	0.04	0.013	3.21	0.001
	H3c	Relationship between the student, mentor and nurse teacher	Pedagogical atmosphere	0.37	0.021	17.61	<0.001

Table 2. Fit index and Coefficient of Determination (CD) results for the three tested models (n=1900)

Model	Chi-square	p	RMSEA	SRMR	CFI	TLI	CD
1	4909.857	<0.001	0.087	0.046	0.920	0.911	0.958
2	5165.582	<0.001	0.089	0.064	0.914	0.906	0.958
3	4935.443	<0.001	0.087	0.045	0.921	0.913	0.958

Table 3. Sobel test results for the mediation effect of nurse teacher sub-factors (n=1900)

Model	Indirect effect	Standard Error	z-test	p-value	mediation
1	0.006	0.004	1.319	0.187	None
2	0.001	0.002	0.087	0.931	None
3	0.016	0.005	3.144	0.002	Partial