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Relationships Between Nurse Managers' Work Activities, Nurses' Job Satisfaction, Patient Satisfaction, And Medication Errors At The Hospital Unit Level In Taif

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Abstract

Background: *Nurse Managers (MNs) play a serious role in enhancing nursing and patient outcomes. The work of NMs, who can be described as middle-managers at healthcare organizations, is complex and changes on a daily basis. Only a few studies have clarified how NMs divide their time across various work activities.* ***This study aimed*** *to describe the relationships between NMs' work activities, nurses' job satisfaction, patient satisfaction, and medication errors at the hospital unit level.* ***Methods:*** *A cross-sectional and correlational study design was used. The data were collected from NMs (n = 29), nursing staff (n = 306), and patients (n = 651) from 28 units across three hospitals in Taif at KSA from January to April 2023. Analysis of covariance (ANCOVA) was used to estimate relationships between data from subareas of NMs' Work Content Questionnaire, Kuopio University Hospital Job Satisfaction Scale, and Revised Humane Caring Scale, along with medication error reports. A significance level of 95% was applied when estimating the covariance between variables. Unstandardized regression coefficients (B) were used to explain the relationships between variables.* ***Results:*** *Multiple relationships between NMs' work activities, nurses' job satisfaction, patient satisfaction, and medication errors were identified. NMs' work activities had both positive and negative relationships on the other studied variables. The requiring factors of work (p< .001) subarea of nurses' job satisfaction, total patient satisfaction (p< .001), and medication errors (p< .001) were identified as the variables most significantly [1]affected by other factors.* ***Conclusions:*** *The findings suggest that NMs should focus on improving nursing practices by managing and organizing nurses' work in a way that makes their employees feel supported, motivated and secure. Furthermore, NMs should adopt a leadership style that emphasizes safe and patient-centered care. The results also suggest that the administration of today's health care organizations should actively evaluate NMs' share of work activities to ensure that their daily work is in line with the organizational goals.*

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Keywords: *Job Satisfaction, Medication Errors, Nurse Manager, Patient Satisfaction.*

Introduction

Nurse Managers' (NMs) work has become increasingly demanding in the current health care environment. NMs largely influence nurses' job satisfaction and patient safety, while motivated and engaged staff improves patient satisfaction. Overall, NMs' work and behavior affect nursing outcomes in complex ways [1-7]. Only a limited number of studies have investigated how NMs divide their time across professional work activities [8-13], with a rare studies focusing on how frequently NMs perform certain work activities [14-18]. However, previous literature has shown that NMs have several responsibilities and duties, ranging from staff recruitment and daily management to strategic planning and financial management [13]. In recent years, NMs have become more involved in administrative work while their share of clinical work has diminished [11, 17, and 18].

Recent studies have reported that NMs' daily work often consists of organizing, work scheduling and resource management [13, 19, and 20]. NMs can impact the quality of care [21] by ensuring that their unit has sufficient staff and actively participates in the recruitment of competent staff [22-25]. Today, communication and collaboration represent a considerable part of NMs' work [10, 11, 23, 26-30]. Cadmus and Wisniewska, (2013) [15] discovered that NMs most frequently perform rounds in their unit, guide staff on clinical matters, and have short meetings, or "huddles", with staff on a daily basis. Daily activities of NMs also included "other domains", such as telephone calls, participating in planned meetings, and responding to e-mail. Furthermore, Chen et al. (2020) [16] found that NMs frequently participate in information management on a daily basis. However, increased workloads among NMs have reduced the time they can share with nurses [23, 31-33].

This presents a challenge, as NMs need to be visible and approachable, as well as give regular feedback to their staff [26, 34, and 35]. As NMs are also tasked with promoting work protection [20, 32], work safety activities for staff [33, 36, 37], and a healthy work environment [33, 36, and 37][28]. NMs' daily work also includes patient management and overseeing nursing quality could be considered as completely logical. Although it is recognized that patient safety culture is influenced by hospital-level predictors, e.g., hospital size and staff education levels [38, 39], NMs nevertheless have an important role in patient safety at the unit level [40]. Nevertheless, there is scarce research about how the activities that NMs perform are related to nursing outcomes. Instead, most of the available research covers how a NM's leadership style and work behavior influence nursing outcomes. Multiple studies have identified a positive link between the relational leadership style and nurses' job satisfaction [3, 6, 40], while other research has linked this leadership approach with patient satisfaction [2, 3, 41].

In addition, it is challenging for NMs to lead quality improvement in the complex everyday environment of a health care organization [42]. Recent studies have shown that leadership, managerial support and NM trust reduce medication errors and increase both patient safety culture and the quality of care [5, 6, and 43]. In summary, the current literature on NMs' leadership suggests that there are some relationships between hospital-level predictors and nursing outcomes, but the dynamics underlying these relationships may be highly complex. However, research regarding the relationships between NMs' work activities and nursing outcomes is not available. Due to the limited knowledge base, this study aimed to describe the relationships between NMs' work activities, nurses' job satisfaction, patient satisfaction, and medication errors at the hospital unit level.

Methods

A cross-sectional and correlational design was used. The research applied convenience sampling from three hospitals in Taif at KSA from January to April 2023. The inclusion

criterion for respondents was that they were either a NM or a nurse had to be a registered nurse, midwife, practical nurse or mental health nurse. The exclusion criterion for NMs and nurses was working in an operating room, intensive care unit or pediatric unit. The inclusion criteria for patients were an adult patient who was being discharged from an inpatient ward or outpatient department and the ability to answer the questionnaire by him/herself. The exclusion criteria for patients were children patients and patients in the intensive care unit or operating room.

The inclusion criterion for pooled units was that at least one NM, three or more nurses, and three or more patients from the same unit had answered the survey. Register data describing the medication errors which had occurred before 1 year (2022) were acquired from the hospitals' incident reporting register. Data regarding NMs, nurses, patients and medication errors were pooled by every unit. After all of the inclusion and exclusion criteria had been considered, a total of 29 NMs (one unit was represented by two managers), 306 nurses, and 651 patients across 28 units participated in the study. Furthermore, the study covered 498 incident reports of medication errors.

The researchers visited each hospital and presented the study design plan at a nurse directors' and managers' meeting. Data were collected from NMs and nurses by e-mail and from patients by paper questionnaire. The questionnaires for NMs and nurses were sent to a contact person at each hospital, who then forwarded the email with the questionnaire link to NMs and nurses at the hospital. The questionnaires for patients were distributed to each unit, when they are being discharged. A patient safety coordinator from each hospital delivered anonymous registered data of medication errors by e-mail or mail. All of the hospitals were public hospitals that offer specialized medical care.

Data concerning the demographic characteristics of NMs, nurses and patients were collected. However, only information about a NM's hospital, number of subordinates, and age were reported in this study. Nursing staff were described in terms of type of employment, working hours, type of contract and work experience, while patients were described in terms of hospital, gender, age and reason for hospital admission (Table 1). A total of three different measures (Table 2), along with register data of medication errors, were used in this study. Furthermore, hospital and number of nurses managed by each NM were variables in this study. NMs' Work Content Questionnaire (NMWCQ) was used to collect data related to how often NMs performed various work activities [(18)].

Data collection was performed by electronic questionnaire. The NMWCQ was developed in 2016 to identify the content of NMs' work and which tasks they spend the most amount of time on. The questionnaire includes 87 items across 13 subscales, more specifically: Recruitment (5 items); Organizing (7 items); Work well-being (5 items); Work atmosphere (3 items); Communication (5 items); Clinical nursing (9 items); Development of the unit (12 items); Personnel development (8 items); Development of nursing (4 items); Financial management (7 items); Planning and evaluation of activities (6 items); Collaboration (10 items); and Development with collaborating partners (6 items). The scale employs a six-point ordinal scale (1 = daily; 2 = weekly; 3 = monthly; 4 = 2–4 times a year; 5 = annual; and 6 = never). The development and preliminary results of the questionnaire were reported in an earlier study; as such, the data used in this study represent secondary data. Previous research reported Cronbach's alpha values between 0.554–0.890 for the NMWCQ [(18)], while in this study the Cronbach's alpha values ranged between 0,478–0,916 (Table 2).

Kuopio University Hospital Job Satisfaction Scale (KUHJSS) was used to measure nurses' job satisfaction. The data were collected via an electronic questionnaire [(44)]. The

KUHJSS includes 5 background questions and seven subscales, namely; Leadership (7 items), requiring factors of work (8 items), Motivating factors of the work (6 items), Working welfare (4 items), Participation in decision-making (4 items), Sense of community (4 items), and Working environment (4 items). The subscales include a total of 37 continuous scale questions, which respondents score from 0 to 10, i.e., totally disagree (0) – totally agree [10]. Exploratory factor analysis was used to test the internal consistency of the instrument [44], while instrument validity and reliability were evaluated in several other studies. Cronbach's alpha values between 0.64–0.92 have previously been calculated for the KUHJSS [44, 45], while in the present study Cronbach's alpha values ranged between 0.723–0.95 (Table 2).

The Revised Humane Caring Scale (RHCS) was used to measure patient satisfaction [46, 47]. The data were collected through a paper questionnaire. This instrument includes seven background questions and seven subscales, namely, Professional practice (17 items), Information and participation in own care (11 items), Cognition of physical needs (4 items), Human resources (3 items), Pain and apprehension (4 items), Interdisciplinary collaboration (3 items), and Outcomes variables (4 items). These seven subscales include a total of 46 items, which respondents' grade from 0 to 10, i.e., totally disagree (0) – totally agree [10]. Cronbach's alpha values between 0.775–0.946 have been reported for the RHCS [47, 48]. In this study, the Cronbach's alpha values were between 0.786–0.970. Data concerning medication errors one year before (during the year 2022) were acquired from the hospitals' incident reporting register.

Ethics committee approval was obtained from the University. Approval was also requested, and received, from each of the three hospitals prior to data collection. Furthermore, the General Data Protection Regulation was followed throughout the research [48]. NMs, nurses and patients were informed of the voluntary nature of the study and that data would be anonymously analyzed. In addition, the registered data describing medication errors were anonymous.

Data analysis through frequencies, percentages and means were used to describe the demographic variables. Mean scores were calculated for the NMWCQ, KUHJSS and RHCS subscales while frequencies were used to describe medication errors. In addition, Cronbach's alpha values were calculated for the subscales of the NMWCQ, KUHJSS and RHCS to describe the internal consistency of questionnaires. Missing data were not replaced for any of the scales used. During data analysis, a Spearman's correlation matrix was first used to identify correlations between NMs' performed work activities, nurses' job satisfaction, and patient satisfaction. This analysis assesses the monotonic relationship instead of the linear relationship between two variables and also allows ordinal variables to be included in the analysis [49]. Subscales with correlation coefficients ≥0.3 were included in the covariance analysis.

ANCOVA is a statistical approach that is able to include both categorical and continuous predictors in a single model [49]. This was necessary for our data as the studied predictors contain both types of variables. ANCOVA was used to evaluate the relationships between the NMWCQ, KUHJSS, and RHCS subscales, along with hospital, the number of nurses per NM and medication errors in one unit [49]. The KUHJSS and RHCS subscales, along with medication errors, were applied as dependent variables and ANCOVA was used to test how these variables were affected by the subscales identified during the correlation analysis, as well as hospital and the number of nurses per NM. The NMWCQ, KUHJSS, and RHCS subscales, along with medication errors, were included as predictor variables for each other, i.e., NMWCQ subscales were included as covariates for the KUHJSS and RHCS sub- scales and medication errors.

An individual predictor was included in the ANCOVA model if the significance

level $p < 0.1$. Furthermore, hospital size and the number of nurses per NM were used as fixed factors in the ANCOVA. Unstandardized regression coefficients (B) were used to explain the relationship between predictor and dependent variable. Furthermore, the original scale of the NMWCQ (1 = daily, 2 = weekly, 3 = monthly, 4= 2–4 times a year, 5 = annual, 6 = never) was reversed to improve the interpretation of results, i.e. the reversed scale was: 6 = daily; 5 = weekly; 4 = monthly; 3 = 2–4 times a year; 2 = annual; and 1 = never. The data analyses were performed in SPSS for Windows (version 28.0, IBM Corporation).

Results

Demographic characteristics

Table (1) shows the results represent 28 units, including responses from 29 NMs, 306 nurses, and 651 patients. Each unit was generally represented by one NM, with the exception of one unit which was represented by two NMs. The responding NMs, nurses and patients had average ages of 51, 46, and 57 years, respectively. NMs were on average in charge of 35 nurses (range: 14–60).

Means scores of NMWCQ, KUHJSS and RHCS subscales

Table (2) shows the mean score for NMs' work activities was 3.61 (on a scale of 1–6), with Clinical working being the least frequently performed activity (2.75) and Organizing being the most frequently performed activity (4.62). Nurses' total job satisfaction was 7.36 (on a scale of 0– 10), with the requiring factors of work and motivating factors of the work subscales receiving the lowest (6.34) and highest (8.46) mean scores, respectively. The mean score for total patient satisfaction was 8.74 (on a scale of 0–10), with the human resources and Professional practice subscales showing the lowest (8.51) and highest (9.16) scores, respectively.

Job satisfaction

Table (3) shows the results showed that six subareas of nurses' job satisfaction were related with NMs' work, patient satisfaction and medication errors. The most significant effects were found for the requiring factors of work subscale ($p < .001$). For example, high ratings for both a NM's development of nursing duties and patient assessments of Cognition of physical needs were negatively related with this component of nurses' job satisfaction. The results revealed that nurses' assessments of general factors of their work were rather poor even though NMs were frequently involved in staff orientation and solving patient complaints. Furthermore, patient satisfaction with their physical care was associated with poor ratings of work conditions (e.g. enough staff, satisfaction of working hours) among staff. However, patient views of outcomes were positively associated with nurses' satisfaction with requiring factors of work.

Moreover, There were inter hospital differences in terms of nurses' perceptions of Working environment ($p = .002$) (e.g. appropriate work facilities, work unit is safe and secure). Accordingly, nurses from hospital 1 scored this factor of job satisfaction higher than nurses from hospital 2, while nurses from hospital 3 gave this factor the lowest score. A small number of nurses ($n < 40$) per NM were negatively related to nurses' perceptions of the working environment. In other words, nurses working in small units were less satisfied with their working environment than nurses working in larger units. Furthermore, increased commitment towards Communication among nurse managers was negatively related with nurses' experiences of Working environment at the unit level (Table 3).

However, a small number of nurses per NM ($n < 40$) was positively related with

nurses' perceptions of Leadership (p = .047). Hence, nurses in small units were more satisfied with their managers' leadership behavior than nurses working in larger units. In addition, patient ratings of outcomes variables and the number of medication errors were both found to be positively associated with the Leadership aspect of nurses' job satisfaction. This means that patient satisfaction with treatment and outcomes translated to favorable assessment of leadership among nurses even if the unit had high medication errors rates. In contrast, high scores for NM's Work well-being duties were negatively related with nurses' perceptions of Leadership. Both employee sick leaves and early support conversations are included in well-being duties (Table 3).

An increase in patient perceptions of Cognition of physical needs slightly decreased nurses' Working welfare (p = .025). Accordingly, nurses who worked in a unit where patients needed more physical care evaluated their personal welfare poorly. Furthermore, increased commitment to communication among NMs was negatively associated with nurses' ratings of motivating factors of the work (p = .050), as well as nurses' total job satisfaction (p = .044). The amount of time which nurse managers spent in meetings and counsels was negatively related to nurses' motivation and overall work satisfaction. Patient ratings of outcomes variables were positively correlated with total job satisfaction among nurses (Table 3).

Patient satisfaction

The analysis showed that eight subareas of patient satisfaction were related with NMs' work activities, nurses' job satisfaction and medication errors (**Table 3**).

Table (4) shows the positive nurse assessments of NM's leadership were positively related to the outcomes variables aspect of patient satisfaction (p < .002). This means that patients were more satisfied with their care outcomes when nurses were satisfied with their NMs' leadership behavior. In contrast, a high relative number of Medication errors in a unit were negatively related with the patient outcomes variables subscale. The frequency at which NMs performed work well-being duties and the number of medication errors were both found to decrease patient perceptions of interdisciplinary collaboration (p = .002). NMs' work well-being duties include both promoting health at the workplace and supportive activities for staff.

On the other hand, NMs' nursing development duties involve the orientation and training of staff in addition to handling patient complaints. The frequency at which NMs participated in development of nursing duties and nurses' ratings of requiring factors of work were both negatively related to patient perceptions of cognition of physical needs (p = .003). This could explain the patients' views of physical caring. It should be noted that nurses' assessments of good work conditions, for example, the sufficiency of employees, may not reflect patients' experiences. Three factors decreased patient satisfaction with Professionalism practice (p = .004), namely, a nurse manager's commitment to Organizing and clinical nursing and nurses' perceptions of leadership, i.e., units in which NMs frequently participated in organizing and clinical nursing, and in which nurses were confident with the managers' leadership, showed lower patient satisfaction relative to other units (Table 4).

Increased commitment to communication among NMs was found to improve patient satisfaction with pain and apprehension (p = .005). On the other hand, this component of patient satisfaction decreased with the frequency at which NMs participate in development of nursing duties, nurses' perceptions of working welfare and the number of medication errors. Accordingly, an increase in patient complaints and medication errors increased the time that NMs spend investigating problems (i.e., Development of nursing). Moreover, we identified a seemingly paradoxical inverse relationship between nurses'

work welfare and patient satisfaction with Pain and apprehension (Table 4).

Furthermore, the frequency at which nurse managers participated in Organizing duties and the number of medication errors were negatively related to patient assessments of information and participation in own care ($p = .007$). In addition, an increase in either a NM's commitment to financial management or the number of medication errors diminished patient satisfaction with human resources ($p = .028$) (Table 4). Daily organizing is largely focused on scheduling, which is also related to financial resources. In addition, poorly organized work could increase the amount of medication errors at a unit. Therefore, it is logical that these aspects would influence patients' perceptions of how much time nurses have to guide and inform patients, as well as the extent to which patients are involved in their own care.

An increased focus on work well-being among NMs, higher nurse ratings of working welfare, and a greater number of medication errors were all found to decrease total patient satisfaction ($p = .001$) (Table 4). Thus, although a NM's decision to allot more time to daily supportive duties may improve nurses' assessments of their work welfare; this decision may also increase medication errors, and therefore, decrease patient satisfaction.

Medication errors

Table (5) shows a total of 468 medication errors occurred across the 28 units during the one-year before study period, which translates to an annual average of 17 medication errors per unit (range: 0–75). The results revealed that medication errors at the unit level were related with NMs' work activities, patient satisfaction and the hospital as an organizational factor. However, only two of the tested variables were shown to significantly affect medication errors ($p < .001$). The analysis revealed inter-hospital differences in medication error prevalence, with hospital 2 showing the highest prevalence, as well as significantly more medication errors than hospital 3. Furthermore, the frequency at which NMs participated in planning and evaluation of activities (e.g., process improvements) was found to be linked with an increase in medication errors. In contrast, patients' opinions of Outcomes variables were negatively related with medication errors. Consequently, units in which patients were satisfied with the outcomes of care also showed a lower number of medication errors rates than units in which patients were less satisfied with care.

Models of job satisfaction, patient satisfaction and medication errors

The ANCOVA yielded six different models of nurses' job satisfaction (Table 3), eight different models of patient satisfaction (Table 4), and one model of medication errors (Table 5). These models are presented below, along with descriptions of how the variables included in each are related to nurse managers' work activities.

To summarize, the performed analyses revealed several relationships between NMs' work activities, nurses' job satisfaction, patient satisfaction, and medication errors. NMs' work activities had both positive and negative effects on the studied variables. The requiring factors of work ($p< .001$) aspect of nurses' job satisfaction, total patient satisfaction ($p< .001$), and medication errors ($p< .001$) were found to be the studied variables that were most significantly affected by other factors.

Table (1): Characteristics of nursing staff and patients, described as number (n) and percentage (%)

	Number (n)	**%**
Nursing staff (n = 306)		
Hospital		

	Number (n)	%
1	98	32.0
2	121	39.5
3	87	28.4
Gender		
female	291	95.1
Male	15	4.9
Age (years)		
< 30	37	12.1
30–39	79	25.8
40–49	81	26.5
50–59	88	28.8
60–69	21	6.9
Type of employment		
Permanent	254	83.0
Temporary	52	17.0
Working Hours		
Rotational; three-shift work	187	61.1
Full day	119	38.9
Type of contract		
Full-time employment	258	84.3
Short-term employment	48	15.7
Work experience (years)		
< 10	80	26.1
10–19	106	34.6
≥ 20	120	39.2
Patients (n = 651)		
Hospital		
1	151	23.2
2	364	55.9
3	136	20.9
Gender		
female	388	60.0
male	259	40.0
Age (years)		
< 30	78	12.5
30–39	53	8.5
40–49	50	8.0
50–59	95	15.3
60–69	173	27.8
≥ 70	173	27.8
Hospital admission of patients		

	Number (n)	**%**
Planned	421	58.1
Emergency	224	30.96

Table (2): NMs' work activities (n = 29), nurses' job satisfaction (n = 306) and patient satisfaction (n = 651) presented according to subscale, and described using mean score, standard deviation (SD), and Cronbach's alpha

Scale (number of items)	**n**	**Mean**	**SD**	**α**	**Scale**
Nurse managers' work activities (NMWCQ)					
Recruitment (5)	29	3.2875	.88377	0.842	
Organizing (7)	29	4.6224	.66350	0.767	(1–6):
Work well-being (5)	29	3.4214	.47559	0.738	6 = daily
Work atmosphere (3)	29	3.6429	.77475	0.776	5 = weekly
Communication (5)	29	3.8000	.59129	0.478	4 = monthly
Clinical nursing (9)	29	2.7450	.99992	0.817	3 = 2–4 times a year
Development of the unit (12)	29	4.0418	.78712	0.916	2 = annual
Personnel development (8)	29	3.4281	.68550	0.769	1 = never
Development of nursing (4)	29	3.7232	.80029	0.840	
Financial management (7)	29	3.3010	.78375	0.782	
Planning and evaluation of activities (6)	29	3.4464	.62370	0.779	
Collaboration (10)	29	3.9066	.75205	0.835	
Development with collaborating partners (6)	29	3.8869	.49908	0.656	
Job satisfaction (KUHJSS)					
Leadership (7)	305	7.275	1.998	0.950	0–10:
Requiring factors of work (8)	303	6.340	1.648	0.843	0 = not satisfied at all
Motivating factors of the work (5)	301	8.461	1.154	0.816	10 = completely satisfied
Working welfare (4)	304	7.992	1.296	0.723	
Participation in decision-making (4)	303	6.492	1.889	0.815	
Sense of community (4)	304	7.473	1.639	0.811	
Working environment (4)	304	7.178	1.432	0.766	
Patient satisfaction (RHCS)					
Professional practice (17)	650	9.155	1.098	0.970	0–10:
Information and participation in own care (11)	650	8.813	1.387	0.946	0 = not satisfied at all
Cognition of physical needs (4)	590	8.741	1.803	0.846	10 = completely satisfied
Human resources (3)	642	8.512	1.775	0.881	

Scale (number of items)	n	Mean	SD	α	Scale
Pain and apprehension (4)	621	8.356	1.917	0.786	
Interdisciplinary collaboration (3)	645	9.153	1.162	0.916	
Outcomes variables (4)	644	8.929	1.479	0.894	

Abbreviations: n number of participants, SD standard deviation, α Cronbach's Alpha

Table (3): The relationships of hospital, number of nurses, NMs' work activities (NMWCQ), patient satisfaction (RHCS) and medication errors on nurses' job satisfaction (KUHJSS) subareas at the unit (n = 28) level

The model of job satisfaction (KUHJSS)		B	P
Requiring factors of work	Development of nursing (NMWCQ)	-.623	< .001***
	Cognition of physical needs (RHCS)	-.547	
	Outcomes variables (RHCS)	.779	
Working environment	Hospitals		002
	Hospital 1	.932	
	Hospital 2	.201	
	Hospital 3	0	
	Number of nurses		
	< 40	−.410	
	> 40	0[a]	
	Communication (NMWCQ	−.457	
Leadership	Numbers of nurses		.047*
	< 40 > 40 Work well-being (NMWCQ)	.654 0[a] −.413 .966	
	Outcomes variables (RHCS) Medication errors	.022	
Working welfare	Cognition of physical needs (RHCS)	−.239	.025*
Motivating factors of the work	Communication (NMWCQ)	−.306	.050*
Total job satisfaction	Communication (NMWCQ) Outcomes variables (RHCS)	−.301 .403	.044*

Significance:*=p<0.05; **=p<0.005; ***=p<0.001 Abbreviations: B Unstandardized coefficients, NMWCQ Nurse Managers' Work Content Questionnaire, KUHJSS Kuopio University Hospital Job Satisfaction Scale,
RHCS Revised Humane Caring Scale

Table (4): The relationships between NMs' work activities, nurses' job satisfaction, medication errors and subareas of patient satisfaction at the unit (n = 28) level

The model of patient satisfaction (RHCS)		B	p
Outcomes variables	Leadership (KUHJSS) Medication errors	.132 −.011	**.002****

The model of patient satisfaction (RHCS)		**B**	**p**
Interdisciplinary collaboration	Work well-being (NMWCQ)	-.171	**.002****
	Medication errors	-.005	
Cognition of physical needs	Development of nursing (NMWCQ)	-.782	**.003****
	Requiring factors of work (KUHJSS)	-.543	
Professional practice	Organizing (NMWCQ)	-.124	**.004****
	Clinical nursing (NMWCQ)	-.178	
	Leadership (KUHJSS)	-.114	
Pain and apprehension	Communication (NMWCQ)	.324	**.005****
	Development of nursing (NMWCQ)	-.327	
Information and participation in own care	Working welfare (KUHJSS)	-.420	
	Medication errors	-.011	
	Organizing (NMWCQ)	-.201	**.007****
	Medication errors	-.011	
Human resources	Financial management (NMWCQ)	-.273	**.028****
	Medication errors	-.014	
Total patient satisfaction	Work well-being (NMWCQ)	-.217	**<.001*****
	Working welfare (KUHJSS)	-.356	
	Medication errors	-.006	

Significance: * = p < 0.05; ** = p < 0.005; *** = p < 0.001

Abbreviations: B Unstandardized coefficients, NMWCQ Nurse Managers' Work Content Questionnaire, KUHJSS Kuopio University Hospital Job Satisfaction Scale, RHCS Revised Humane Caring Scale

Table (5): The relationships of hospital, nurse managers' work activities (NMWCQ), and patient satisfaction (RHCS) on medication errors at the unit (n = 28) level

The model of medication errors		**B**	**p**
Medication errors	Hospitals		
Hospital 1		9.643	<
Hospital 2		15.058	**.001*****
Hospital 3		0[a]	
Planning and evaluation of activities (NMWCQ)	Outcomes variables (RHCS)	11.346	
		−15.816	

Significance: * = p < 0.05; ** = p < 0.005; *** = p < 0.001

Abbreviations: B Unstandardized coefficients, NMWCQ Nurse Managers' Work Content Questionnaire, KUHJSS Kuopio University Hospital Job Satisfaction Scale,
RHCS Revised Humane Caring Scale

Discussion

In the present study the participating NMs had an average age of 51 years, the participating nurses had average age of 46 years, nurses were most satisfied with the motivating factors of work, and least satisfied with requiring factors. This is consistent with what has been presented in previous studies of job satisfaction among nurses [45]. The participating patients were generally highly satisfied with the care they received, as has been the case in previous studies [46, 47]. Furthermore, the studied units were found to vary greatly in terms of the number of medication errors. Previous researches has also reported that the number of medication errors can vary within a hospital, i.e., between different units [50-54].

Job satisfaction

Concerning nurses' job satisfaction, requiring factors of work was negatively related to the NMs' focus on development of nursing and to patient satisfaction regarding Cognition of physical needs, while this aspect of job satisfaction was positively linked to patient views of outcomes variables. A potential explanation is that a nurse manager's decision to allocate resources to nursing processes, along with the education and orientation of staff, would reduce the resources for bedside nursing, and therefore, may influence nurse staffing. According to several studies, scheduling and organizing are part of NMs' daily work responsibilities [13, 19, and 20]. Furthermore, patient satisfaction with outcomes variables was found to be positively related to nurses' job satisfaction in terms of both requiring factors of work and total job satisfaction. Recent research by Zaghini et al. (2020) [55] and De Simone et al. (2018) [56] provides support for these findings, i.e., both of these studies reported correlations between patient satisfaction and nurses' job satisfaction. Nurses are motivated to provide high-quality care [47]; as such, it is logical that patient satisfaction with the outcomes of care will improve nurses' job satisfaction.

When rating the working environment aspect of job satisfaction, nurses evaluate whether they work in facilities that are safe and secure. Fang et al. (2018) [57] found that over one-third of nurses thought that they work with unsafe equipment and did not feel adequately supported, while nearly half of nurses felt unsafe in the workplace. However, additional research found that nurses believe that NMs are able to change the work systems and equipment to promote nurse safety [57]. NM's behavior regarding the monitoring (e.g. auditing) and recognizing (e.g. rewarding) of safety issues influences the compliance of staff [57]. Another study reported that the hospital and number of nurses influence both nurses' perceptions of the work environment and/or NMs' leadership abilities. Consequently, nurses from units with less staff were more satisfied with their managers' leadership behavior than nurses from units with more staff [40].

On the other hand, units with fewer nurses were characterized by lower ratings of the work environment in comparison to units with larger pools of nursing staff. The nursing practice environment has been found to impact staff perceptions of staffing and resource adequacy. However, staffing is not the sole reason for dissatisfaction among nurses. For example, dissatisfaction can also be the result of poor leadership and management, lack of lifelong learning opportunities, poor nurse empowerment, an insecure work environment, and strained nurse-physician relationships [58]. In addition, other organizational factors such as environment or culture, organizational support, and staffing adequacy can contribute to nurses' job satisfaction [40, 59]. The frequency at which NMs perform communication tasks was found to be negatively related to nurses' total job satisfaction, along with the following aspects of nurses' job satisfaction: motivating factors of the work; working environment; and leadership. The subarea of communication includes preparing for and participating in meetings, managing unit meetings, and conversations with personnel.

These findings were similar to the results reported by Kirchhoff & Karlsson

(2019) [31], more specifically, NMs who frequently engage in meetings with management, such as networking with other managers and involvement in management- level projects, were less visible in the organizational unit. Several studies have reported that NMs need to be visible, accessible, and provide regular feedback to their staff [26, 34, and 35]. This could be the reason why nurses were less motivated and satisfied when their NMs were highly focused on communication tasks. An alternative explanation is that a large proportion of nurses felt that multiple staff meetings were unnecessary and without meaningful. These results suggest that NMs should focus on their communication skills, e.g. discussing difficult questions, listening to different opinions, delivering constructive feedback, and disseminating up-to-date information, rather than the time they spend on communication tasks [27, 60].

Patient satisfaction

The performed analyses revealed that total patient satisfaction was significantly related to NMs' Work well-being, nurses' Working welfare and medication errors. This means that patients are satisfied when NMs treat staff members equally, are interested in staff well-being, provide staff feedback with the aim of developing work, and are interested in work results and outcomes [19]. Hence, NMs influence patient satisfaction in various ways. Nurses' satisfaction with Leadership demonstrated a positive relationship with patients' outcomes variables, which describes the goals of treatment and satisfaction with outcomes and care, while the number of medication errors had negative influence on this aspect of patient satisfaction. For example, an increase in nurses' perceptions of their NMs' leadership behavior could be expected to improve patient outcomes. Several previous studies have also confirmed that NMs' leadership is related to nurses' job satisfaction [40, 61, and 62]. Furthermore, other studies have linked nurses' job satisfaction with patient outcomes and patient satisfaction [59, 63].

An interesting finding of this study was that the frequency at which NMs performed numerous tasks had a negative impact on different components of patient satisfaction. For example, a NM's decision to dedicate more time to organizing, work well-being, work atmosphere, financial management, clinical nursing or development of nursing care was found to decrease at least one subscale of patient satisfaction. However, it should be noted that most of these observed decreases were rather slight. In contrast, a NM's focus on communication improved patient evaluations of pain and apprehension. It is also important to note that the frequency at which a NM performs a certain task does not necessarily denote an improvement in the quality of work. According to Steege et al. (2017) [64], emphasized that NMs are overwhelmed by their workloads fatigue among NMs decreases the quality of their work, and can impact decision- making.

Medication errors

Several of the tested variables were significantly related to the incidence of medication errors. These included the frequency at which NMs performed certain tasks, patient satisfaction, and the studied hospital, each of which affected the incidence of medication errors at the unit level. There were large inter-hospital differences, as hospitals 1 and 2 had nearly 10 and 15 times more medication errors, respectively, than hospital 3. Another important finding was that the frequency at which NMs participated in planning and evaluating activities significantly increased the amount of medication errors at a unit. NMs are responsible for the fluency of nursing processes and ensuring that all staff members understand the organizational goals.

Consequently, they connect the clinical environment with the organizational

culture. Accordingly, units with strong patient safety culture are characterized by organizational learning, continuous improvement, non-punitive responses to errors, as well as feedback and open communication, and therefore, have a lower incidence of adverse events than units that do not perform as strongly across these safety culture aspects. Furthermore, these environments include an atmosphere in which employees feel safe to report medication errors, discuss them, and learn from previous mistakes [3, 65, 66]. Patient evaluations of their care and treatment were negatively related with medication errors, i.e., units with patients who were satisfied with their care show less medication errors that units in which patients are not as satisfied with their care.

In summary, the increased share of administrative duties allotted to NMs means that they are rarely in the vicinity of patients and nurses. Although NMs are responsible for organizing their units, it is equally important that they find sufficient time to support and motivate their staff. However, it is important to note that NMs can indirectly improve patient care and outcomes by fostering a safe work environment in their unit.

Conclusions

The present study identified several relationships between NMs' work activities, nurses' job satisfaction, patient satisfaction, and medication errors. In addition, organizational factors such as the number of nurses per NM and hospital also influenced nurses' job satisfaction and medication errors. The findings suggest that NMs should focus on improving nursing practices by managing and organizing nurses' work in a way that makes their employees feel supported, motivated and secure. Furthermore, NMs should lead in a way that emphasizes safe and patient-centered care. It would be advisable that the administration at healthcare organizations critically evaluate NMs' work activities to determine whether the current division of tasks will enable them to meet organizational goals. If not, the organization should proactively develop the work of NMs, preferably through collaboration with colleagues, to match what is required in the modern healthcare organization.

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