

Original Article

Nursing Manpower Planning in a Surgical Unit

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Abstract

Background: In order for the nurses to plan and provide a quality and adequate nursing care in surgical units, there is a need for nursing manpower planning through a unit-specific patient classification system.

Aim: The study was conducted to establish manpower planning system for the nurses working in a general surgery unit.

Method: This descriptive and observational study was carried out with a quantitative approach. The patients were classified through the unit-specific patient classification adapted as specific for the unit and developed for the surgical and internal medicine units. Nursing workload in the unit was measured by 6 independent observers for 4 weeks through the work sampling technique.

Results: One thousand eight hundred and forty eight patients receiving treatment in the unit were classified. According to the result of the work analysis conducted in the unit, it was determined that averagely 18.65 nurses are needed per day.

Conclusions: The nursing manpower in the general surgery unit is inadequate and it needs to be replanned according to the workload of the unit and the patient level. It is important to conduct a manpower planning by performing work analysis in accordance with a patient classification specific for each unit.

Keywords: Surgical nursing, Patient care management, Health manpower

Introduction

The inadequate number of nurses, who constitute the greatest and most important majority of health manpower today, is an important problem all over the world (ILO, 2013). Nursing manpower planning becomes even more important particularly in this process where delivery of health care and survival of patients as well as the presentation and maintenance of effective treatment are based on the effectiveness of health manpower with the rate of 50-80% (Heckemann et al., 2015).

The planning of nursing manpower is a process of planning, implementing and evaluating the number and quality of manpower that will provide an effective and safe care service for a

specific patient group (ANA, 2015; Pickard, & Birmingham, 2010).

The effectiveness of the nursing manpower planning process directly affects the institutional outcomes such as patient care quality, patient safety, labour costs and job satisfaction, leave of employment, nurse turnover rate, etc. (ICN, 2015). While it is stated that complications like infection development decreased, the hospitalization periods are shortened, there is a decrease in patient mortality, and the patient satisfaction increases in hospitals providing adequate nursing manpower (Possari, Gaidzinski, Costa Lima, Fugulin Togeiro, & Herdman, 2015); but when the adequate nursing manpower is not provided, it is expressed that there is a decrease in patient care quality and the job

satisfaction of nurses and an increase in burnout level and in the intention of leave of employment (Aiken et al., 2012).

In the report of International Council of Nurses (ICN) about the nurse employment published in 2013, the importance of evidence-based conduction of the nursing manpower planning by considering the patient and employee outcomes is emphasized (ICN, 2013). In order for health manpower to be effectively planned, unit-specific determination and evaluation of the qualities of the health manpower working in the unit and the patients treated in the unit are important (Possari et al., 2015; Stimpfel Witkoski, Sloane, & Aiken, 2012).

Patient classification system, which enables the classification of patients in the unit according to their qualifications, is one of the methods that measure nursing workload by grouping patients according to their care needs. This system responds to the question "how much nursing care time is required according to the acute degree of the patients". Patient classification system is evaluated as a method of planning the workforce according to patients' dependency levels and nursing workload. This method not only provides the nursing manpower planning according to the number and intensity of patients but also ensures the maintenance of the nursing care standards (Bulechek, Butcher, Dochterman, & Wagner, 2013; Cruz, Bonfim, Gaidzinski, Fugulin, & Laus, 2014).

Hospitals are institutions that provide a 7/24 service and have to work with a shift / watch system in order to continue their services. Heavy working conditions of the nurses, the acute condition of the patients, the intense stress experienced, negative working conditions, and the excessive amount of procedures required to be followed always increase the possibility to make mistakes. In addition, due to insufficient number of nurses in health institutions and especially hospitals, enough time often could not be allocated to the patients and adequate care could not be shown for the patient care. This may also increase the rate of making mistakes for the nurses during the nursing interventions (Aiken, Sloane, Bruyneel, Van den Heede, & Sermeus, 2013; Caruso, 2014), thus the patient safety may be adversely affected (Kirwan, Matthews, & Scott, 2013; Van Bogaert et al., 2014).

The study was conducted in order to establish the manpower planning system for the nurses

working in the general surgery unit of a state hospital in Istanbul. In the study, the following questions were anticipated to be answered;

- What is the number of nursing manpower required according to the workload determined in the unit?
- Is there any difference between manpower planning made by the number of manpower existing in the unit?

Method

The study was conducted in descriptive and observational design, without using any sample selection method, the sample of the study consisted of nurses working in the surgical unit of a state hospital and nursing interventions applied to the patients in the unit. It was determined that the nurses working in the general surgery unit were in the age range of 22-45 (25.81 ± 5.33), had a professional experience of 2-18 years (3.38 ± 3.93), and a working experience of 1-10 years in the surgical unit (2.06 ± 2.17). The unit is a general surgery unit with 66 beds which provides in-patient medical care for 24 hours and where pre-op and post-op surgical patients are treated. There are sixteen nurses working in the unit. The nurses work in two shifts including six nurses working between 8:00-16:00 (day shift) and four nurses working between 16:00 - 08:00 (night shift).

Ethical Consideration: After receiving the institutional permission and ethics committee approval (Date: 27.07.2016, Decision No: 2016/09/05), the manager nurse in the surgical unit of the hospital planned for the data collection was contacted and informed about the study.

Limitations of the Study: The fact that the study was conducted in the general surgery unit of a single institution prevents the generalization of the results of the study.

Data Collection: A total of 3 forms were used as data collection tools in the study:

Questionnaire for determining the characteristics of nurses and the unit: This questionnaire consisted of 13 items to determine the personal and professional characteristics of the nurses and the characteristics of the unit where the study was conducted.

Patient classification system: It is a patient classification tool developed by Yıldırım (2003) for the internal medicine and surgical units including 7 main care criteria and 32 sub-care criteria and classifying patients into 5 categories. Item total score correlation of the patient

classification tool is .93 and its Cronbach's Alpha coefficient is .82.

Work analysis form: by evaluating the performed nursing practices and workload of the unit where the study would be conducted in 3 sessions by the researchers and the nurses working in the unit (1 charge nurse and 15 service nurses), the list of the nursing practices applied in the unit was prepared. The final version of the form is classified in 7 categories as the acceptance of the patient to the unit, preparation of the pre-op patient for the operation, the acceptance of the post-op patient to the unit and his/her nursing care, medical treatment and interventions, nursing care and direct patient care practices, indirect patient care

practices, and preparation for the discharge of the patient.

Data Collection Procedures: Before starting to collect the data of the study, all nurses working in the unit were informed about the study, data collection process, and data collection tools to be used in the study. The patient classification tool developed by Yıldırım (2003) was applied by the nurses in the surgical service for 1 week. It was determined after the application that the patient population in the surgical unit was intense in level I, level III, level IV, and level V; whereas, there was no level II patient. Therefore, patient classifications of I and II levels were combined and the patients were examined in 4 categories (Table 1).

Table 1. Patient Classification of General Surgery Unit

Patient Classification Tool	
Score	Main Care Description
General Health Status	
1	<u>Patients with good general health condition</u> -Pre-op patient, just admitted to the unit -Patient monitored in a certain subject (fever, pulse, blood pressure, sugar) but has no other illness.
2	<u>Patient with moderate symptoms:</u> Patient in need of partial help in meeting the needs for care, eating, urinary and psychological support
3	<u>Patient with acute symptoms:</u> -Patient with more than one acute symptom developing in the course of disease - Patient with medical and surgical problem - Patient who underwent a surgical intervention - Patient who needs high degree of psychological support -Patient who is partially dependent to meet his/her care, nutrition and urinary needs.
4	<u>Critical patient:</u> -Patient who needs very serious psychological support - Completely dependent patient
Treatment Follow-up Practices	
1	<u>In every shift:</u> -Patient who has the vital sign follow-up 1-2 times - Patient with hemogram follow-up once a day
2	<u>In every shift:</u> -Patient who has the vital sign follow-up 2 times -Patient with fluid balance follow-up every 8 hours -Patient with blood sugar follow-up 1-2 times -Patient with one hemogram follow-up - Patient with uncomplicated dressing once a day
3	<u>In every shift:</u> -Patient who have the vital sign follow-up every 4 hours -Patient with fluid balance follow-up every 6 hours

	-Patient with blood glucose follow-up every 4 hours -Patient with hemogram follow-ups 2 times - Patient with complicated dressing
4	<u>In every shift (Patient who needs care of more than one nurse)</u> -Patient with the vital sign follow-up every 2 hours - Patient with blood glucose follow-up every 2 hours - Patient with hemogram follow-up every 2 hours - Patient with CVP follow-up and aspiration -Patient with complicated dressings 1-2 times -Patient with blood and blood product transfusion of 1-2 units -Patient with pain follow-up -Patient treated with cold application
Drug Applications	
1	<u>In every shift:</u> -Patient with oral medication of 1-2 doses
2	<u>In every shift:</u> -Patient with more than 2 oral medications -Patient with 1 parenteral drug -Patient with 1 perfusion treatment
3	<u>In every shift:</u> - Patient with 2 parenteral drugs - Patient receiving more than one perfusion therapy - Patient receiving oxygen therapy
4	<u>In every shift:</u> -Patient with more than 3 parenteral drugs and perfusion (Patient with intensive and emergency treatment) - Patient receiving inhalation treatment
Psychological support	
1	Patient who is well-adjusted or needs moderate psychological support
2	Patients and their families who ask frequent questions, to whom information and education should be given separately
3	- Anxious patient, - Patient and family needing advanced psychological support
4	-Agitation -With Orientation problem - Patient under limitation
Nutrition	
1	Patient who can eat by him/herself
2	Patient in need of food preparation / chewing
3	Patient who cannot eat on his / her own but can chew and swallow food
4	Patient who cannot eat on his / her own and has difficulties in chewing and swallowing food -NGS -Gastrostomy - Patient fed with TPN
Care	
1	Patient who can perform self-care
2	Patient who needs an attendant for basic care (oral care, bathing etc.)

3	Patient performing basic care and bathing needs with the help of more than one person
4	Patient whose basic care and bath need are met with the help on the bed
5	Completely dependent patient
Urinary	
1	Patient who can go to toilet without any help
2	Patient who needs the help of a person while using toilet
3	-Patient with catheter - Patient who needs help from two people while going to the toilet
4	- Patient who needs duck / bedpan in bed and needs help for it - Completely dependent patient (incontinent, patient with underpad)
TOTAL SCORE: Patient Class Score	
	Level I Patient 1-7
	Level II Patient 8-14
	Level III Patient 15-21
	Level IV Patient 22-28

In order to evaluate the reliability of the 4-category patient classification system, the patients staying in the unit were classified by the nurse, who was responsible for that patient care, and the charge nurse for 1 week. As a result of the classification, Kendall's coefficient of concordance and Pearson correlation coefficient for the concordance among the observers were found to be $\geq .80$. It is stated that in order for the inter-observer concordance coefficient to be reliable, it should be between .80-.90 (Polit, & Beck, 2014). In addition, the item total score correlation and Cronbach's Alpha coefficient values of the finalized 4-category classification were examined only based on the data of the surgical nurse who is responsible for the patient care and it was determined that the item total correlation was between .68-.93 according to main care criteria and the Cronbach's Alpha was found to be between .80-.91 and reliable (Buyukozturk, 2012; Polit, & Beck, 2014). After finalizing the patient classification system, 1848 patients who received treatment in the surgical unit for 4 weeks were classified by two researchers at the same time each morning. Kendall's coefficient of concordance and Pearson's correlation coefficient for the concordance among the independent observers was found to be higher than $\geq .80$. In order to determine the nursing workload in the unit, work sampling technique was employed (Bonfim, Bistafa Pereira, Pierantoni, Haddad, & Gaidzinski, 2015; Pickard, & Birmingham, 2010). Nursing interventions applied in each shift (1 shift=8 hours=480 minutes=32 quarter hours)

for a week were recorded using a chronometer via direct observation method by 6 independent observers (2 independent observers in each shift) in random times for 24 hours (96 quarters \times 7 days=672 tour). The level of concordance between the independent observers was determined as 98.1% and an almost perfect level was determined ($p = .001$; $p < .01$) (Intraclass Correlation Coefficient: .981; 95% CI: .979-.982) (Buyukozturk, 2012; Polit, & Beck, 2014). The data of the study were collected between April and June 2017. The average duration of each nursing practice at each patient level was calculated in accordance with the obtained results. Thus, the mean care period required for each patient level was obtained. In accordance with the recommendation decisions of ILO (2013), the daily working period of a full-time nurse was determined as 6-8 hours, each shift was taken as 8 hours and nursing manpower requirement for each patient level was determined. In order to evaluate the current actual situation in terms of nursing manpower, the number of patients, receiving treatment in the unit within one month, at each level was multiplied with the mean care period calculated for each level, one-month nursing workload in the unit was calculated and the mean nursing manpower required for the unit was obtained.

Data Analysis: In the statistical analysis of the study, IBM SPSS 22.0 program was used. While the data were evaluated by using percentage, mean, and standard deviation, Kendall's coefficient of concordance and Pearson correlation coefficient were used to evaluate the

inter-observer concordance of the patient classification tool (in the confidence interval of .80-.90) (Polit, & Beck, 2014). In addition, the item total score correlation and the Cronbach's alpha values of the final version of the patient classification tool were also examined (.80 < α < 1.00). Intraclass Correlation Coefficient was assessed at the confidence interval of 95% for the concordance among the independent observers in the work sampling technique used during the determination of the nursing workload in the unit (Buyukozturk, 2012; Polit, & Beck, 2014).

Results

When the mean application periods of the nursing interventions applied in the unit to 1848 patients for four weeks in the general surgery unit were evaluated, it was determined that an average of 21.60±2.70 minutes in the acceptance of the patient to unit, 44.40±2.88 minutes for preparing the pre-op patient to the surgery, 43.40±4.70 minutes in the acceptance of the post-op patient to the unit and the his/her nursing care, 57.40±20.03 minutes for the application of medical treatment and interventions, 66.00±16.36 minutes for providing nursing care to the patient and in the direct patient care practices,

59.80±21.68 minutes in the indirect patient care practices and 32.80±9.04 minutes in the discharge of the patient were spent. When the patient distribution according to patient classification system and the average duration of nursing interventions were examined; it was found that 12.17% (*n* = 225) of the patients receiving treatment in the unit consisted of level I patients and an average of 34±2.92 minutes were spent; 26.42% (*n* = 488) consisted of level II patients and an average of 90±3.81 minutes were spent; 38.04% (*n* = 372) consisted of level III patients and an average of 150±7.38 minutes were spent; 23.38% (*n* = 372) consisted of level IV patients and an average of 216.8±5.81 minutes were spent (Table 2). The number of patients to be provided care by the nurse who work 8-hour full time (1.0 full-time employee) was determined by considering treatment and nursing interventions applied in the unit and the patient classification system (Table 3); the 4-week nursing manpower need was determined based on days (Table 4); and the general surgery unit, where the study was conducted, was found to need an average of 18.65 full-time nurses for an 8-hour shift.

Table 2. Patient Distribution According to Patient Classification System and the Average Duration of Nursing Interventions

Level	n	%	\bar{x}	$\pm sd$	Min	Max
Level I	225	12.2	34	2.92	30	37
Level II	488	26.4	90	3.81	85	95
Level III	703	38.0	150	7.38	142	160
Level IV	432	23.4	216.8	5.81	210	225

Table 3. Nursing Manpower Requirement for Nurses Working 8 Hours on a Full-Time Basis According to Patient Level

Patient Classification System	Average Time	Number of Patient Encounters									
		1	2	3	4	5	6	7	8	9	10
Level I	34 minutes	.07	.14	.21	.28	.35	.43	.50	.57	.64	.71
Level II	90 minutes	.19	.38	.56	.75	.94	1.13	1.31	1.50	1.69	1.88
Level III	150 minutes	.31	.63	.94	1.25	1.56	1.88	2.19	2.50	2.81	3.13
Level IV	216.8 minutes	.45	.90	1.36	1.81	2.26	2.71	3.16	3.61	4.07	4.52

Table 4. Distribution of Four Weeks' Nursing Manpower Requirement Over Days

Patient Classification System	Date		
	01.05.2017 (Monday)	02.05.2017 (Tuesday)	03.05.2017(Wednesday)
Level I	2 Patients .14 FTE		14 Patients .99 FTE
Level II	28 Patients 5.25 FTE		17 Patients 3.19 FTE
Level III	16 Patients 5.0 FTE	32 Patients 10.0 FTE	20 Patients 6.25 FTE
Level IV	20 Patients 9.03 FTE	34 Patients 15.36 FTE	15 Patients 6.78 FTE
Total	66 Patients 19.42 FTE*	66 Patients 25.36 FTE*	66 Patients 17.21 FTE*
	04.05.2017 (Thursday)	05.05.2017 (Friday)	06.05.2017 (Saturday)
Level I	14 Patients .99 FTE	5 Patients .35 FTE	11 Patients .78 FTE
Level II	5 Patients .94 FTE	22 Patients 4.13 FTE	28 Patients 5.25 FTE
Level III	33 Patients 10.31 FTE	25 Patients 7.81 FTE	18 Patients 5.63 FTE
Level IV	14 Patients 6.32 FTE	14 Patients 6.32 FTE	9 Patients 4.07 FTE
Total	66 Patients 18.56 FTE*	66 Patients 18.61 FTE*	66 Patients 15.73 FTE*
	07.05.2017 (Sunday)	08.05.2017 (Monday)	09.05.2017 (Tuesday)
Level I	13 Patients .92 FTE	13 Patients .92 FTE	9 Patients .64 FTE
Level II	21 Patients 3.94 FTE	27 Patients 5.06 FTE	30 Patients 5.63 FTE
Level III	17 Patients 5.31 FTE	13 Patients 4.06 FTE	17 Patients 5.31 FTE
Level IV	15 Patients 6.78 FTE	13 Patients 5.87 FTE	10 Patients 4.52 FTE
Total	66 Patients 16.95 FTE*	66 Patients 15.91 FTE*	66 Patients 16.10 FTE*
	10.05.2017 (Wednesday)	11.05.2017 (Thursday)	12.05.2017(Friday)
Level I	4 Patients .28 FTE	4 Patients .28 FTE	
Level II	7 Patients 1.31 FTE	8 Patients 1.50 FTE	2 Patients .38 FTE
Level III	41 Patients 12.81 FTE	40 Patients 12.50 FTE	38 Patients 11.88 FTE
Level IV	14 Patients 6.32 FTE	14 Patients 6.32 FTE	26 Patients 11.74 FTE
Total	66 Patients 20.72 FTE*	66 Patients 20.60 FTE*	66 Patients 24 FTE*
	13.05.2017 (Saturday)	14.05.2017 (Sunday)	15.05.2017 (Monday)
Level I	3 Patients .21 FTE	5 Patients .35 FTE	7 Patients .50 FTE
Level II	12 Patients 2.25 FTE	6 Patients 1.13 FTE	38 Patients 7.13 FTE
Level III	36 Patients 11.25 FTE	44 Patients 13.75 FTE	13 Patients 4.06 FTE
Level IV	15 Patients 6.78 FTE	11 Patients 4.97 FTE	8 Patients 3.61 FTE
Total	66 Patients 20.49 FTE*	66 Patients 20.20 FTE*	66 Patients 15.30 FTE*
	16.05.2017 (Tuesday)	17.05.2017 (Wednesday)	18.05.2017 (Thursday)
Level I	6 Patients .43 FTE	10 Patients .71 FTE	5 Patients .35 FTE
Level II	35 Patients 6.56 FTE	18 Patients 3.38 FTE	16 Patients 3.0 FTE

Level III	15 Patients 4.69 FTE	26 Patients 8.13 FTE	28 Patients 8.75 FTE
Level IV	10 Patients 4.52 FTE	12 Patients 5.42 FTE	17 Patients 7.68 FTE
Total	66 Patients 16.20 FTE*	66 Patients 17.64 FTE*	66 Patients 19.78 FTE*
	19.05.2017 (Friday)	20.05.2017 (Saturday)	21.05.2017 (Sunday)
Level I	11 Patients .78 FTE	13 Patients .92 FTE	17 Patients 1.20 FTE
Level II	14 Patients 2.63 FTE	4 Patients .75 FTE	29 Patient 5.44 FTE
Level III	32 Patients 10.0 FTE	28 Patients 8.75 FTE	10 Patients 3.12 FTE
Level IV	9 Patients 4.07 FTE	21 Patients 4.49 FTE	10 Patients 4.52 FTE
Total	66 Patients 17.48 FTE*	66 Patients 19.91 FTE*	66 Patients 14.28 FTE*
	22.05.2017 (Monday)	23.05.2017 (Tuesday)	24.05.2017(Wednesday)
Level I	2 Patients .14 FTE		14 Patients .99 FTE
Level II	28 Patient 5.25 FTE		17 Patient 3.19 FTE
Level III	16 Patients 5.0 FTE	32 Patients 10.0 FTE	20 Patients 6.25 FTE
Level IV	20 Patients 9.03 FTE	34 Patients 15.36 FTE	15 Patients 6.78 FTE
Total	66 Patients 19.42 FTE*	66 Patients 25.36 FTE*	66 Patients 17.21 FTE*
	25.05.2017 (Thursday)	26.05.2017 (Friday)	27.05.2017 (Saturday)
Level I	14 Patients .99 FTE	5 Patients .35 FTE	11 Patients .78 FTE
Level II	5 Patients .94 FTE	22 Patients 4.13 FTE	28 Patients 5.25 FTE
Level III	33 Patients 10.31 FTE	25 Patients 7.81 FTE	18 Patients 5.63 FTE
Level IV	14 Patients 6.32 FTE	14 Patients 6.32 FTE	9 Patients 4.07 FTE
Total	66 Patients 18.56 FTE**	66 Patients 18.61 FTE*	66 Patients 15.73 FTE*
	28.05.2017 (Sunday)		
Level I	13 Patients .92 FTE		
Level II	21 Patients 3.94 FTE		
Level III	17 Patients 5.31 FTE		
Level IV	15 Patients 6.78 FTE		
Total	66 Patients 16.95 FTE*		

*FTE = full-time employee.

Discussion

Increasing the quality and safety of health care is one of the most important subjects of today. For this purpose, the main purpose of hospitals is to ensure the balance between the needs of the patients and the adequate number of the nursing personnel in order to maintain a quality and qualified care (ICN, 2015)

In the world, especially in the developed countries, patient-nurse ratio in the hospitals based on the units has been legally determined

and hospitals are made obligatory to comply with these standards (Aiken et al., 2010; Bray et al., 2010; CICM, 2011). The patient-nurse ratio per nurse in surgical and internal units was determined as 1:5 (Aiken et al., 2010). In Turkey, there are legal regulations published by the Ministry of Health regarding the number of nurses needed to be kept according to the number of beds (Ministry of Health, 2009; Ministry of Health, 2013). Accordingly, the patient-nurse ratio per nurse in the surgical and internal medicine units is determined as 1:7 (Ministry of

Health, 2009). In the study, when the patient levels in the general surgery unit (Table 1) and workload according to the care requirements (Table 2) were taken into account, full-time (8 hours) nursing manpower coefficients were reached (Table 3).

From a global perspective, inadequate number of nurses is not a new phenomenon. This has led to the development of a common standard on policy and working conditions for nursing staff by the International Labour Organisation (ILO) and the World Health Organisation (WHO) regarding inadequate number of nurses since the 1970s. These studies have led to the development of the ILO Nursing Personnel Convention (C. 149) and the accompanying Recommendation (R. 157) international documents in 1977 (ILO, 2005; ILO, 2011).

Services in the health sector are continually carried out 24 hours a day and 7 days a week. This special qualification has led the working hours of health personnel working in the health sector to be regulated as shift work, night shift, working on the weekends and on holidays. When also considering the hard working conditions especially in the health sector, working 24/7 also causes the decreases in the work performances of the health personnel. Therefore, it is recommended for the working hours not to exceed 6 and 8 hours (ILO, 2011; ILO, 2013). According to ILO, the normal working hours of nurses for a day should be regulated in such a way that it does not continuously exceed eight hours and does not exceed 12 hours including the overtime.

In the study, in accordance with the recommendations of ILO (2013), each shift was taken as 8 hours and it was found that minimum 14.28 full-time nurses and at most 25.36 nurses are required for an 8-hour shift in the general surgery unit and when the four-week nursing manpower requirements were examined, it was determined that an average of 18.65 full-time nurses were required (Table 4). On the other hand, in the surgical unit where the study was conducted, the nurses were working in 8-and 16-hour shifts and the service was provided with maximum 6 nurses or minimum 4 nurses in each shift. As a result, even if the service is provided with maximum 6 nurses in an 8-hour shift, it shows that it does not meet the need of 14.28 full-time nursing manpower which is necessary

for an 8-hour shift in which the workload is the least.

Previous studies have reported that there are many negative results on patients as increase in falls and medication errors depending on the increased workload caused by inadequate number of nurses (Aiken et al., 2013; Possari et al., 2015; Van Bogaert et al., 2014). Many studies have also reported a strong correlation between nursing workload and safe and qualified patient care (Cho et al., 2015; Coetzee, Klopper, Ellis, & Aiken, 2013; Dorigan, & Guirardello, 2017; You et al., 2013). As a result, the excessive workload is associated with nurse-patient ratio and mortality rates of patients (Aiken et al., 2014). In addition, the presence of inadequate nursing staff makes patient care standards inadequate and increases treatment costs, patient assessment errors, and documentation errors (Kutney-Lee, Wu, Sloane, & Aiken, 2013; Van Bogaert et al., 2014).

The inadequate number of nurses affects patient care, reduces nurse motivation, and also leads to forgetfulness, frustration, fatigue, excessive workload, excessive responsibility, stress, and burnout. This makes it necessary to regulate nursing manpower according to the workload intensity, interventions applied in the unit, and the care requirement level of the patient (Dorigan, & Guirardello, 2017; Possari et al., 2015).

As a result of the study, patient classification system adapted for the unit in the general surgical unit was started to be used. In addition, studies have been started about re-regulation of the working order of the unit as 8-hour shifts and eliminating the inadequate number of nurses in accordance with the level and number of the patients.

When the results of the study are evaluated as a whole, it can be recommended to;

- Use a patient classification system appropriate for the operation of each unit and patient levels,
- Perform and apply nursing manpower planning by performing work analysis according to the properties of each unit,
- Prevent the medication errors that may arise by eliminating the inadequate number of nurses, protect the occupational health, and maintain the patient safety.

Acknowledgements: We are thankful to the nurses who participated in this study.

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