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COMPARATIVE STUDY OF NURSING GROUP PERSONNEL NUMBER TO ACTIVE BED OF HOSPITALS AFFILIATED TO YASUJ MEDICAL SCIENCES UNIVERSITY WITH EXISTING STANDARDS AND FACTORS EFFECTIVE ON IT IN 2015

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ABSTRACT

Introduction: Most problems of institutions providing treatment services in health systems (hospitals) are due to shortage of human force or its unsuitable distribution. Among the most important ways of increasing employing nurses as the major part of hospitals human forces is standardization of quantity and distribution of this valuable source. **Methods:** This study is applied descriptive and of cross sectional type. The research sample and society is nursing group personnel affiliated to Yasuj Medical Sciences University. Data collecting tool is some tables containing number, gender combination and type of employment of nursing personnel (library model) and effective factors like reducing working hours rate due to efficiency law, increasing the number of hospitalization days after health system evolution plan were studied. Information after collecting was analyzed using SPSS software and using descriptive statistical tests. **Results:** The obtained results indicate that the ratio of nurse to active bed number is not similar to standards and there is a difference. The rate of working hours' reduction due to efficiency law and the number of hospitalization days results in need to more personnel after health system evolution. **Conclusion:** The obtained results show that the required nursing force in the hospitals affiliated to Yasuj Medical Sciences University in some wards is not according to the standard of Ministry of Health and systematic attitude standard.

Keywords: Nursing personnel, active bed, standard, Yasouj University of Medical Sciences.

INTRODUCTION

Health is one of the most primary social and individual rights of all society people and the main goal of healthcare section is to promote people health rate. Hospital is an institute whose main duty is to prepare diagnostic and treatment services for various medical status including surgery and non- surgery. In most developing countries, 5-10% of the government costs are allocated to health section. And hospital is considered as one of tools of access to health, while among different parts of health system, hospital services are the major factors of costs growth and human resources are enumerated as the most valuable factor of producing and providing service. Since international standards have estimated human resources cost about 55 to 60% of hospitals total operational costs, increasing efficiency and proficiency of human resources has a great significance[1].

Nurses are the greatest professional group in health care system and since most direct care of patients is

performed by them, they play an important role in care quality and the society health promotion and they influence the whole organization efficiency. Among the most important ways of utilizing this valuable resource is standardizing quantity and combination and distribution of human forces. Standard is a criterion with which the provided services are compared[2].

Human forces shortage in healthcare section is not a new issue, but the country current status regarding population density in urban regions and promotion of life level and people expectations and administering health system evolution plan has made attention to specialized human forces in healthcare affairs inevitable[3]. And it is evident that supplying skillful human resources is much more important and yet it is more difficult than providing other healthcare facilities.

Ministry of Health criterion for determining human resources standard of various hospitals is bed number and type of activity of the hospital.

About bed occupancy percent which is the studied indicator in this study, active bed and approved bed have especial significance. According to the Ministry of Health definition, approved bed is formal and approved beds which are determined and imparted constantly and in the course of getting the hospital exploitation license and active bed is a bed which is ready to accept the patient so that by the patient access to hospital bed, in respect of existence of readiness and specialized facilities, equipment and human resources, the possibility of illness diagnosis, treatment and returning the patient health are realized[4].

The performed studies and available statistical reports show that in hospitals covered by Ministry of Health and medical training, bed occupancy factor about active beds is less than 50%[5]. So, great cost which is designated by human resources in hospitals affairs managing shows necessity of scrutiny and increasing attention to this crucial domain.

A part of reasons of different number of nurses to bed in various hospitals includes: different bed occupancy factor, different number of holidays, using approved or active bed in determining the number of required nurses, considering services of apprentice students, assumption of assigning affairs to non-governmental section or outside the hospital, non-standardization of the number of beds in each department , different type of activity, constructional indicators status, equipment, infrastructure, ratio of bed to area, work circulation and seating of respective units , skills and knowledge of nurses. Regarding these cases, codifying nursing needs with respect to the existing condition is necessary.

Planning of human forces in healthcare organizations is very important and sufficient and qualified nurses should be supplied at suitable time and place so that the organization needs are fulfilled.

According to Gush and Cruz, human forces distribution in each of hospital's departments depends on the specialty type of the department, the society need, hardship of caring the patient, need to coordination in cares and the rate of the organization support and accessibility of equipment required for caring patients which are collectively determining nursing work volume.

Regarding that hospital is an industry extremely dependent to working force, human forces shortage could highly influence on the hospital performance. Lack of accurate planning of human forces results in crisis in hospitals and this crisis has crucial consequences such as reduction of efficiency, performance quality reduction and increasing personnel absence. The studies have shown that by increasing the number of nurses, the possibility of accession of unwanted complications such as pneumonia, hospital infections, shock and so on has decreased in patients to 25% and also it has had a positive impact on the quality of nursing cares and causes increasing of nurses job satisfaction and desirable nursing cares provision as a result of human forces accurate planning will cause increasing of nursing profession significance[6].

Regarding the extension of medical sciences in various contexts, implementation of health system evolution plan and low level of tariffs, the rate of general referral to governmental section has increased, then regarding the mentioned cases, necessity of a comprehensive planning for providing better, faster and with higher precision seems necessary and using skillful medical forces, their training and approaching standards is enumerated among priorities.

Active bed distribution indicator is not similar and uniform in all provinces of the country. The performed studies show that the ratio of nurse human force to each 10000 persons of the population in separation of provinces, from 1381-1383 the least ratio belongs to Kohkilouyeh and Boyer Ahmad province[8].

The present study is conducted for the purpose of comparative study of nursing group personnel number to active bed of hospitals affiliated to Yasuj Medical Sciences University with existing standards, factors effective on it and providing necessary suggestions for more adjustment of nursing force. Standards compared in this research are Ministry of Health standards, Medical Healthcare and systematic attitude standard.

The information obtained from this research could help authorities for decision-making in selecting and coordinating nursing force and required number of nursing group for promoting nursing care quality and to be utilized in preparing and revising the organizations and improvement of the hospital nursing human forces combination and quantity.

Many studies have been performed for determining work rate and calculating the number and combination of nurses. Human force is estimated based on the bed number, care type, department type and so on. Here, the two methods of estimating nursing force are pointed out[9-11]:

1: Human force estimation based on systematic attitude: That according to the following formula and by considering the rate of direct and indirect care is obtained:

= The number of required personnel

The number of beds * (direct + indirect care hours) * year days

Useful working hours * (vacation days – days of year)

Generally, the care rate required by the patient was estimated during 24 hours, regarding direct and indirect care type in independent patient 2 hours, in patients with relative care 3 hours, complete care 4 hours and special 24 hours and finally the selective factor is obtained regarding direct and indirect care and the required human force is acquired according to the following formula:

The required personnel number by systematic attitude method = bed occupancy factor * selective factor* bed number

Surgery, internal, psychic, ENT, factor of 0.74 for each bed in 24 hours

Pediatrics: factor 0.9 for each bed in 24 hours

ICU: factor 4 for each bed in 24 hours

Burn care, CCU, Neurosurgery, NICU: factor of 2.9 for each bed in 24 hours

Surgery room and recovery: factor 3 for each bed in each shift

Neonatal: factor 1.5 for each bed in 24 hours

Emergency, infectious, internal neurology: 1.4 for each bed in 24 hours

2: Estimating human force based on the newest formula suggested by Ministry of Health:

The number of required forces of nursing group= 1.25 * (the number of beds in emergency department + the number of active beds)

Some laws and policies may influence on the need to human force plurality over time like the law of promoting clinical personnel of health system that weekly working hours of practitioners inclusive of this law is reduced regarding work difficulty, service background and work in anomaly shifts proportionately in a week to maximum 8 hours. Or the health system evolution plan which has led to direct payment reduction from people pocket and public tendency has become more in governmental hospitals. In this study, the impact of these factors on the number of nursing group personnel in the province level is addressed.

MATERIAL AND METHODS

The present study is an applied – analytical research which was conducted with the aim of comparative examination of nursing group personnel number required for governmental hospitals affiliated to Yasuj Medical Sciences University in cross-sectional method in 2013.

The research statistical society is training and non-training governmental hospitals under the supervision of Yasuj Medical Sciences University. The research sample content in this study contains nursing group of human force including professional nurse (ward nurse, surgery room and anesthesia personnel who all have related academic educations) and non-professional nurse (nurse's aide who don't have related academic education) in wards and surgery rooms of two Yasuj training remedial hospitals (including Shahid Beheshti hospital with 160 approved beds, Imam Sajad hospital with 132 active and approved beds) and two merely remedial hospitals in Kohkiloyeh cities (Imam Khomeini with 160 approved beds) and Gachsaran (Shahid Rajaie hospital with 136 approved beds).

The study information included the number of active beds (not approved beds) in different departments of each hospital, type of hospital activity, the number of specialized and sub-specialized departments of each hospital and they were collected by examining

documents and by cooperation of human resources and the university treatment affairs. Data collecting tool is human force estimation table including the number of ward active bed, nursing group personnel number available in wards and surgery room, approved selective factor of Ministry of Health, type of hospital activity (training or non-training), bed type (special or normal), gender and employment type (library model) (that this form is approved by experts of medical sciences university and Ministry of Health). Finally, based on the number of active beds, the wards standard nursing personnel was calculated and was analyzed with the number of available cadre combination in the hospital using SPSS software version 21.

RESULTS

Table 1: The personnel gender combination in hospitals subset of Yasuj Medical Sciences University at the end

Hospital name	male		female		frequency of using childbirth leave
	frequency	%	frequency	%	
Yasuj Shahid Beheshti	72	28	184	72	21
Yasuj Imam Sajad	42	15	230	85	17
Dehdasht Imam Khomeini	53	22	187	78	20
Gachsaran Shahid Rajaei	18	9	180	91	19

Table 2: comparing the required personnel number and the number of personnel working in Yasuj Shahid Beheshti hospital (based on systematic attitude)
The number of approved beds: 160

Department name	Number of active beds	bed occupancy factor	Number of total personnel	Required personnel (systematic attitude)
emergency	33	100	42	46
surgery	57	27%	49	31
neurosurgery	10	73%	13	21
sub- internal	14	72%	21	15
burn care	14	48%	11	29
infectious	23	80%	12	13
neurology	11	80%	12	13
ICU	9	85%	32	32
Surgery room	6	0	55	55

Table 3: comparing required personnel number and the number of personnel working in Yasuj Imam Sajad hospital (based on systematic attitude)
The number of approved beds: 132

Department name	No. of active beds	bed occupancy factor	number of total personnel	required personnel (systematic attitude)
internal	24	77%	24	14
emergency	41	95%	55	55
women	32	56%	21	14
Pediatrics	21	100%	17	19
neonatal	27	81%	23	32
ICU	9	100%	24	36
ENT	30	61%	14	14
CCU	10	83%	12	24
Surgery room & recovery	9	0	57	50 day
NICU	18	99%	25	51

Table 4 comparing the required personnel number and the number of personnel working in Dehdasht Imam Khomeini hospital (based on systematic attitude) The number of approved beds: 160

Department name	No. of active beds	Bed occupancy factor	Number of total personnel	required personnel (systematic attitude)
Pediatrics	24	69%	16	13
neonatal	20	38%	13	12
NICU	4	90%	12	11
CCU	6	75%	19	14
internal	31	89%	25	21
surgery	31	95%	24	22
women	16	70%	15	9
ENT	15	62%	13	7
emergency	23	87%	34	29
neurology	10	48%	3	
surgery room	4		40	44
ICU	5	80%	17	16

Table 5: Comparing the number of required personnel and the number of personnel working in Gachsaran Shahid Rajaie hospital (based on systematic attitude) The number of active beds: 136

Department name	No. of active beds	bed occupancy factor	No.of total personnel	required personnel (systematic attitude)
internal	22	78%	16	13
surgery	26	67%	18	13
women	14	59%	7	7
neurology	9	65%	12	5
pediatrics	32	61%	15	18
neonatal	16	90%	17	21
ICU	4	69%	13	16
Neuro surgery	4	71%	13	9
emergency	23	87%	34	29
CCU	5	53%	11	
emergency	17	100	34	51
Surgery room	4	-	40	36

Table 6: Examining the personnel current status and required personnel according to the standard of systematic attitude in hospitals subset of Yasuj Medical Sciences University at the end of 1394

Name of hospital	bed type	No. of active beds	Avg. bed occupancy factor in 94	personnel number	required personnel systematic attitude
Yasuj Shahid Beheshti	normal	129	71%		135
	special	9	85%	32	32
	emergency	33	100%	42	46
	surgery room	6	-	55	55
Yasuj Imam Sajad	normal	134	75%	99	93
	special	37	94%	61	111
	emergency	41	100%	55	55
	surgery	9	-	57	50
Dehdasht Imam Khomeini	normal	147	67%	109	88
	special	15	82%	48	41
	emergency	23	87%	34	29
	surgery	4	-	40	44
Gachsaran Shahid Rajaie	normal	123	68%	98	86
	special	9	61%	24	24
	emergency	17	100%	34	25
	surgery	4	-	40	36

Table 7-4 Examining the working hours' reduction rate, the level of hospitalization before and after evolution plan in hospitals subset of Yasuj Medical Sciences University

name of hospital	working hours reduction level due to efficiency law (hour)	the number of hospitalization days in 92 (before evolution plan)	the number of hospitalization days in 94(after evolution plan)
Yasuj Shahid Beheshti	211546	39963	43155
Yasuj Imam Sajad	230416	50708	64925
Dehdasht Imam Khomeini	206652	42120	47996
Gachsaran Rajaie	189856	29259	37404
total	838470	162050	193480

Table 21-4 Examining the ratio of nursing group human forces of hospitals subset of Yasuj Medical Sciences University with new standard of Ministry of Health – at the end of 1394

name of hospital	emergency bed and active bed	standard factor	required force according to standard	available force	ratio of force to bed
Yasuj Shahid Beheshti	177	1.25	255	256	1.44
Yasuj Imam Sajad	221	1.25	331	272	1.23
Dehdasht Imam Khomeini	189	1.25	299	231	1.22
Gachsaran Rajaie	153	1.25	2.6	196	1.28

There is a direct relation between the number of nurses and the number of active beds in hospitals affiliated to Yasuj Medical Sciences University using linear regression. Determination factor in this study showed that more than 78% of changes in nurses' number are

justifiable with changes in the number of active beds. Also, the working hours' reduction rate due to efficiency law and the need to more personnel and the number of hospitalization days (after health evolution plan) with need to more nurses have a direct relation.

DISCUSSION

Primarily, non -adaption of existing nursing force with studied standards is evident. Secondly, this gap in hospitals with special wards which need complete care like ICU-NICU-CCU is bolder.

By studying tables and analytical – inferential results, it was observed that Imam Sajad hospital which had the most special beds had the highest standard deviation.

In this study, based on new standard of Ministry of Health that all wards (normal, special, emergency and surgery room) are studied in wholesale and generally, the hospitals of Yasuj Imam Sajad and Dehdasht Imam Khomeini have been a little lower than standards and Gachsaran Shahid Rajaie and Yasuj Shahid Beheshti hospitals have been higher than standards. Of course, increase or decrease of nursing force reduction in hospitals in various wards has been different.

In recent years, efficiency law was implemented and nurses enjoyed reduction of working hours, that this shortage was more evident in hospitals who had official and contractual forces with higher antecedent, due to more working hours reduction in such forces and with health evolution plan implementation, tendency for referring the governmental section is increased that this increase leads to increasing of standard deviation.

Regarding that a high percent of working personnel are women and they have some limitations in providing service (such as childbirth leave, night shift limitation, breastfeeding leave …), though these forces are totally considered as available forces, practically, this shows hidden nursing force shortage since there was no different estimations and calculations between men and women while they have less working hours than men. Also, attention to this point that in calculating the required force according to standards, bed occupancy factor has been an effective factor and force designation is obtained by considering this indicator, in hospitals with lower bed occupancy factor, in calculations according to standard less force is accrued to them while observance of minimum force arrangement seems necessary in various shifts. This difference is quite obvious in Gachsaran Shahid Rajaie and Dehdasht Imam Khomeini Hospitals.

The results of other performed studies in the country were indicative of non-adaption of available nursing force with standards. The study of Sadeghifar[12,13] about meeting required nursing force according to the proposed pattern of Ministry of health has shown that force shortage has been observed in Ahavaz Imam Khomeini hospital.

The obtained results indicate serious attention of planners in the issue of organizing the system of supplying nursing force of the hospital various wards. It is suggested that for determining the ratio of personnel to bed for each hospital, other standards are used too. Using findings of this study and other studies[14,15] based on considering effective factors like efficiency laws, Ministry of Health should consider the right of broadcasting encouraging and supportive policies of increasing productivity rate, adaption plan, and existence of minimum nurse in each shift without considering bed occupancy factor in its standards determination.

It is suggested that for more efficiency based on this study findings, wards which have additional force to be modulated and instead in wards which face with shortage of specialized nursing force, some forces to be added.

CONCLUSION

Universities are allowed to use the ministry approved standard based on continental, geographical, cultural, economic and deprivation conditions and determine local standard so the required force to be supplied. Due to shortage of job ranks in hospitals and impossibility of utilizing new nursing force, it is suggested that by logical designation of personnel overtime, the number of human force for responding clients' needs increases and payment to personnel based on performance (salary + reward) is accomplished to raise the personnel motivation. Even, last term students of nursing (interns) and second shift forces could be used for reducing personnel working load in wards which face with force shortage.

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