

## ORIGINAL ARTICLE

# Operating room nurse manager competencies in Greek hospitals

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## Abstract

**Aim:** The purpose of this study was to identify and measure managerial competencies, skills and knowledge necessary for a competent Operating Room (OR) nurse manager so to provide quality care.

**Methods:** The Nurse Manager Questionnaire was used in General and Army Hospitals with at least 5 operating suites. 153 Operating Room nurses and Operating Room nurse managers rated the 53 skills of the Questionnaire depending on how essential those skills are for OR nurse manager (RR=81%). The 53 skills were separated in two columns one for knowledge and understanding and one for ability to implement and/or use. Reliability of the questionnaire was Cronbach ( $\alpha$ ) = 0.987.

**Results:** The decision-making, ethical principles and effective communication were identified as the most necessary competencies for OR nurse manager when in contrast financial competencies were identified as the least necessary. The nurse's educational preparation effected technical, human and leadership competencies in proportional way ( $p \leq 0.05$ ) when nurse's age seemed to affect inversely leadership ( $p \leq 0.027$ ) and financial competencies ( $p \leq 0.034$ ).

**Conclusions:** As the Operating Room is an extremely stressful place, staffed with qualified personnel with multiple and even conflicting interests, OR nurse manager must be equipped with multiple competencies such as technical and human, in order to be able to promote safety and quality of perioperative nursing care to the patient.

## Key words

Operating room nurse manager, Productivity, Efficiency, Nurse manager competencies, Nurse skills

## 1 Introduction

Operating room, from financial and administrative perspective, is one of the most demanding hospital departments. It consumes a big part of hospital budget since it uses modern and accurate technology which additionally requires highly trained personnel<sup>[1]</sup>. It is also staffed with qualified personnel with multiple and even conflicting interests, which sometimes makes it a complex clinical and administrative environment with multiple demands from its leaders, who need to possess some business savvy and be clinically astute<sup>[2]</sup>. Particularly patient-focused clinical responsibilities, combined

with budgetary constraints, equipment procurement issues, staff member training, personnel shortages, and other administrative responsibilities, constitute an enormous challenge for OR nurse managers<sup>[3]</sup>.

The term competency refers to the ability of an individual to be effective in work activities. A historical definition of competence<sup>[4]</sup> includes knowledge and psychomotor abilities, attitudes, and cognitive skills such as problem-solving. Some authors believe that competencies can be learned but also can be diminished when not used, and that some occur on a continuum.

The first detailed study of necessary skills for an administrator was made by Katz<sup>[5]</sup>, who suggests that among others a top manager needs good judgment, the ability to make decisions and the ability to win respect of others.

In his second study in 1974<sup>[6]</sup>, Katz argues that effective administration rests on three basic developable skills, technical, human and conceptual, which obviate the need for identifying specific traits and which may provide a useful way of looking at and understanding the administrative process. According to him technical skills involves specialized knowledge, analytical ability within that specialty and facility in the use of the tools and techniques of the specific discipline. Human skills refers to the ability to work effectively as a group member and to build cooperative effort within the team by encouraging staff to participate in planning and carrying out of those things which directly affect them. In other words technical skills are related to working with “things” (processes and physical objects) while human skills concerns the necessary skills for effectively working with people. As for conceptual skills those involve the ability to see the enterprise as a whole and visualize its entire scope. It includes recognizing how various functions depend on one another, and how changes in any one part affect all the others. This ability also extends to visualizing the relationship of the individual business to the industry, the community, and the political, social and economic forces of the nation as a whole.

Katz stated that the use of each of the skills varies with the level of management responsibility. At lower levels technical skills are indispensable to efficient operation. As the manager moves further from actual operations the need for technical skills decreases. Conceptual skills, however, become critical in effectively and efficiently solving managerial challenges.

An important study undertaken by Chase<sup>[7]</sup>, based on Katz’s second study, using the necessary administrator’s skills, developed an instrument for nurse managers (Nurse Managers Questionnaire) in order to determine the importance of effectiveness competencies for a hospital nurse manager. Chase found that some skills could not be included in any of Katz’s three basic skills, so she added two more categories of competencies, leadership and financial management. Chase repeated her original research in 2010<sup>[8]</sup> in order to compare results and make recommendations for contemporary nurse’s manager role development. Chase’s study was also replicated by Georgette, in 1997<sup>[9]</sup> in order to identify specific behavioral competencies that are considered important for hospital-based nurse manager effectiveness.

Seven years after Chase’s initial study, Kondrat<sup>[3]</sup> used the Nurse Managers Questionnaire exclusively for Operating Room using the title “Operating Room Nurse Managers Questionnaire” in order to determine the OR nurse manager’s essential competencies for proficiency in the field of perioperative nursing.

In addition this instrument (Nurse Managers Questionnaire) has been used in thesis and dissertations by at least three other researchers.

In 1996, Fernsebner determined 17 necessary skills divided into five main competencies that every manager should possess (*administrative, financial, clinical, interpersonal and technological*). Fernsebner, also claimed that a working knowledge of equipment and troubleshooting capabilities is a major requirement in OR arena, when skills in human resources and public relations, knowledge of budgets and finance, and information about legal and ethical issues add to a broad base that leaders today can call upon to manage more efficiently.

In Greek ORs there are no OR managers, so OR nurse managers are fulfilling their responsibilities. Additionally there are no studies in Greece exploring competency skills of first line nurse managers. So in order to clarify the skills of a person who has so many important responsibilities and since there were no documented criteria for assessing competency skills, the authors conducted the research hoping that these competencies could also be used as a framework to formally specify the abilities of OR nurse managers.

## Purpose

The purpose of this study was to identify and measure the competencies, skills and knowledge of an effective Operating Room nurse manager in order to manage successfully the complex and important area of the Operating Room promoting productivity with safety and high-quality care.

## 2 Methods

### 2.1 Research questions/hypotheses

The following questions were addressed in this study:

- 1) What managerial skills contribute to OR Nurse Manager competence?
- 2) Are some managerial competencies more important than others?
- 3) Are perceptions of OR nurse manager competencies impacted by individual demographics (gender, age, education, years of nursing experience, number of OR suites)?

### 2.2 Description of study design, sample, sampling technique

This non-experimental descriptive study on nurses working in ORs relied on the questionnaire (Nurse Managers Questionnaire) created by Chase (1994) who examined important competencies for the overall effectiveness of nurse managers in general.

### 2.3 The instrument

The authors of this research obtained the permission for using the instrument (Nurse Manager Questionnaire) by Linda Chase and it was given via email. All 53 separate skills from Chase's Nurse Managers Questionnaire were used. The competencies were comprised in two columns- subscales one for knowledge and understanding, and one for ability to implement and/or use. The five categories (*Technical, Human, Conceptual, Leadership and Financial management*) in each subscale and the number of items in each category remained unchanged from the original study and so 53 skills were divided to 11 statements for *technical* competencies, 13 for *human*, 8 for *conceptual*, 14 for *leadership* and 7 competency statements for *financial management* category. Specifically the *technical competencies* were between 1 to 11 statements, *human* between 12 to 24, *conceptual* from 25 to 32, *leadership* from 33 to 46 and finally *financial management* were included between 47 to 53 statements. The only difference was the evaluation of the competencies by a 5 point Likert-style scale in contrast to Chase's 4 point Likert-style scale. This was done in order to indicate the possibility of zero contribution of one or more statements to OR nurse manager competence. So in our study the 5th point "0" indicate the non-necessity of the listed competency for the OR nurse manager (see Table 1). This was in accordance to Kondrat's study who added a third subscale in Nurse Managers Competencies tool requiring a yes or no response, in order to determine which of the 53 competencies distinguished an OR nurse manager as superior. According to his statement "using a dichotomous response for subscale three limited the level of data analysis that could be performed".

In Chase's first study (1994) the results of Cronbach ( $\alpha$ ) of the technical, human, conceptual, leadership, and financial management categorical correlations were 0.80, 0.85, 0.84, 0.91, 0.92, respectively and in her second study in 2010 there were similar results.

**Table 1.** Operating room nurse manager questionnaire

Competencies		knowledge and understanding					ability to implement and/or use				
<b>Technical</b>											
1	Nursing practice standards	4	3	2	1	0	4	3	2	1	0
2	Nursing care delivery systems	4	3	2	1	0	4	3	2	1	0
3	Nursing care planning	4	3	2	1	0	4	3	2	1	0
4	Clinical skills	4	3	2	1	0	4	3	2	1	0
5	Patient classification systems	4	3	2	1	0	4	3	2	1	0
6	Infection control practices	4	3	2	1	0	4	3	2	1	0
7	Research-based care practices	4	3	2	1	0	4	3	2	1	0
8	New technology	4	3	2	1	0	4	3	2	1	0
9	Case management	4	3	2	1	0	4	3	2	1	0
10	Information systems and computers	4	3	2	1	0	4	3	2	1	0
11	Regulatory agency standards	4	3	2	1	0	4	3	2	1	0
<b>Human</b>											
12	Effective communication	4	3	2	1	0	4	3	2	1	0
13	Effective staffing strategies	4	3	2	1	0	4	3	2	1	0
14	Recruitment strategies	4	3	2	1	0	4	3	2	1	0
15	Retention strategies	4	3	2	1	0	4	3	2	1	0
16	Effective discipline	4	3	2	1	0	4	3	2	1	0
17	Effective counseling strategies	4	3	2	1	0	4	3	2	1	0
18	Constructive performance evaluation	4	3	2	1	0	4	3	2	1	0
19	Staff development strategies	4	3	2	1	0	4	3	2	1	0
20	Group process	4	3	2	1	0	4	3	2	1	0
21	Interviewing techniques	4	3	2	1	0	4	3	2	1	0
22	Humor	4	3	2	1	0	4	3	2	1	0
23	Team-building strategies	4	3	2	1	0	4	3	2	1	0
24	Optimism	4	3	2	1	0	4	3	2	1	0
<b>Conceptual</b>											
25	Nursing theories	4	3	2	1	0	4	3	2	1	0
26	Administrative/organizational theories	4	3	2	1	0	4	3	2	1	0
27	Strategic planning/goal development	4	3	2	1	0	4	3	2	1	0
28	Ethical principles	4	3	2	1	0	4	3	2	1	0
29	Teaching/learning theories	4	3	2	1	0	4	3	2	1	0
30	Political process	4	3	2	1	0	4	3	2	1	0
31	Total quality management processes	4	3	2	1	0	4	3	2	1	0
32	Legal issues	4	3	2	1	0	4	3	2	1	0

(Table continued on page 20)

**Table 1.** (Continued).

Competencies		knowledge and understanding					ability to implement and/or use				
<b>Leadership</b>											
33	Decision making	4	3	2	1	0	4	3	2	1	0
34	Nursing care delivery systems	4	3	2	1	0	4	3	2	1	0
35	Delegation	4	3	2	1	0	4	3	2	1	0
36	Change process	4	3	2	1	0	4	3	2	1	0
37	Conflict resolution	4	3	2	1	0	4	3	2	1	0
38	Problem solving	4	3	2	1	0	4	3	2	1	0
39	Stress management	4	3	2	1	0	4	3	2	1	0
40	Research process	4	3	2	1	0	4	3	2	1	0
41	Motivational strategies	4	3	2	1	0	4	3	2	1	0
42	Organization of unit work	4	3	2	1	0	4	3	2	1	0
43	Policies and procedures	4	3	2	1	0	4	3	2	1	0
44	Staff education	4	3	2	1	0	4	3	2	1	0
45	Time management	4	3	2	1	0	4	3	2	1	0
46	Interdisciplinary care coordination	4	3	2	1	0	4	3	2	1	0
<b>Financial management</b>											
47	Cost containment and cost avoidance	4	3	2	1	0	4	3	2	1	0
48	Productivity measures	4	3	2	1	0	4	3	2	1	0
49	Unit budget forecasting generation	4	3	2	1	0	4	3	2	1	0
50	Cost/benefit analysis	4	3	2	1	0	4	3	2	1	0
51	Unit budget control measures	4	3	2	1	0	4	3	2	1	0
52	Financial resource procurement	4	3	2	1	0	4	3	2	1	0
53	Financial resource management	4	3	2	1	0	4	3	2	1	0

*Note.* Please rate the importance of each competency statement as it applies to the OR nurse manager role by circling the appropriate number for the first two sections. Use the following rating scale.

4 = Essential for OR nurse manager competence

3 = Contributes significantly to OR nurse manager competence

2 = Contributes moderately to OR nurse manager competence

1 = Contributes minimally to OR nurse manager competence

0 = Do not contribute to OR nurse manager competence

Adapted from the "Nurse Manager Questionnaire" with the permission of L.Chase [7, 8]

Reliability which applies to this current study only, was Cronbach ( $\alpha$ ) =0.987. Cronbach  $\alpha$  for each category skills were: ( $\alpha$ ) =0.940 for technical, ( $\alpha$ ) =0.956 for human, ( $\alpha$ ) =0.920 for conceptual, ( $\alpha$ ) =0.962 for leadership and ( $\alpha$ ) =0.959 for financial management.

Based on this questionnaire, *technical competencies* included handling the operating instruments, implementing intraoperative care planning, general sterilization and disinfection guidelines. *Conceptual competencies* referred to the ability to visualize the scope of a specific procedure. *Human competencies* were defined as the ability to work effectively as a group member and built a cooperative effort within the Operating Room team.

The research instrument was comprised of two parts: the first part was designed to collect demographic data (i.e. gender, age, years of experience, diploma) on participants and the ORs (number of OR suites, number of procedures) in which they

worked, and a second part which include the questionnaire grouped in five categories of competencies (*technical, human, conceptual, leadership, and financial management*).

## 2.4 The sample, sampling technique

A convenience sample of 153 Greek OR Nurses (9 OR nurse managers) working in General and Army Hospitals with at least 5 operating suites participated in the study voluntarily and anonymously. 200 questionnaires were administered (between September to October 2012) to OR nurses and OR nurse managers. The principal investigator (PI) or co-PI gave a brief introduction regarding the aim of the study, gave the necessary explanations and left the instrument packets in a general location for interested participants to pick up. Completed surveys were placed in a labeled box. 162 questionnaires were returned with 153 being usable in the survey (response rate = 81%). Nine of the questionnaires could not be used due to large amounts of incomplete data. The data were distributed to the ORs of the selected hospitals individually by the authors and after three weeks were also collected by the authors. Completion of the instrument took approximately 10-15 minutes, and no compensation was provided to the participants.

## 2.5 Data analysis processes

Responses were examined to determine whether there were any associations among competencies scores and demographic data such as gender, age, marital status, educational level, shift, previous experience working, and number of operating suites. No identifying information was collected from the participants, ensuring the results were anonymous. Upon the collection of the questionnaires they were reviewed by the researchers for completeness and then Statistical Package for the Social Sciences (SPSS version 19.0) has been used for the statistical analysis, to calculate mean score (M), standard deviation (SD) and analysis of variance with  $\chi^2$  test, ANOVA and *t*-test.

*P*-value  $\leq .05$  considered as statistical significant.

Ethical issues: The Ethics Committee of the Hospitals approved the study. All participants gave informed consent and they completed the questionnaire.

Limitations of the study: One limitation has to do with the extent of study sample to which the findings cannot be generalized beyond the cases studied.

## 3 Results/findings

Of the 153 respondents 106 were women and 47 men, while the majority was married (63.3%). The mean age of the respondents was 35.10 (SD  $\pm 6.40$ ) years and the mean age of their work experience was 11.25 years (SD  $\pm 7.68$ ). The majority of OR nurses were Registered Nurses ( $n=88$ , 57.5%) in Operating Rooms with maximum (49.0%) 10-20 OR suites (see Table 2).

### 3.1 Survey findings for Question 1

All skills revealed to contribute to OR Nurse Manager competence because none of them was rated with 0 which represents the non contribution (see Table 5).

### 3.2 Survey findings for Question 2

Most important revealed to be *leadership and human*, on both subscale one (knowledge and understanding) and subscale two (ability to implement and/or use) (see Table 3). Most essential skills were *retention strategies (Human)* with Mean score  $M=3.71$  for knowledge and understanding and  $M=3.42$  for ability to implement and/or use (see Table 4) and *decision making (leadership)* with mean score  $M=3.67$  for knowledge and understanding and  $M=3.47$  for ability to implement and/or use. *Ethical principles (Conceptual)*, *effective communication (Human)* and effective staffing strategies (Human)

were the 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> more essential competency statements with Mean scores 3.64, 3.62 and 3.59 for knowledge and understanding and Mean scores for ability to implement and/or use were 3.39, 3.38 and 3.35 respectively. Of the 5 items with the highest scores, three of them were from the human category. However *technical skills* also seemed to be essential since most of them are placed in the 10 first competencies. For example it is not surprising that clinical skills, nursing practice standards and infection control practices were viewed in this study as essential for OR nurse managers (Mean score  $\geq 3.2$ ).

**Table 2.** Demographic data

<b>Gender</b>					
	<b>female</b>	<b>male</b>	<b>N</b>		
N	106	47	153		
Percent	69.3%	30.7%	100.0%		
<b>Marital status</b>					
	<b>Single</b>	<b>Married</b>	<b>Divorced</b>	<b>N</b>	
N	48	97	8	153	
Percent	31.4%	63.3%	5.3%	100.0%	
<b>Education</b>					
	<b>RN</b>	<b>Diploma</b>	<b>N</b>		
N	88	65	153		
Percent	57.5%	42.5%	100.0%		
<b>Shift</b>					
	<b>Only day shift</b>	<b>Evening and night shift</b>		<b>N</b>	
N	42	110		152	
Percent	27.6%	72.4%		100%	
<b>OR suites</b>					
	0-10	10-20	20-30	>30	<b>N</b>
N	59	75	11	3	148
Percent	38.6%	49.0%	7.2%	2.0%	96.7%
	<b>N</b>	<b>Mean</b>		<b>Std. Deviation</b>	
Age	153	35.10		±6.40	
Years of expertise	143	11.25		±7.68	

In contrast, the five least necessary competencies for OR nurse manager (see Table 5) seemed to be *regulatory agency standards, humor, research process, legal issues* and *interviewing techniques* with Mean score 3.05, 3.05, 3.01, 2.98 and 2.9 for knowledge and understanding when for ability to implement and/or use the Mean scores are only 2.83, 2.8, 2.79, 2.76 and 2.76 respectively.

Over 60% of the respondents indicated 19 of 53 competency statements as essential for OR nurse manager and rated them with 4 in Likert scale. None of them were included in financial management category. In particular only financial resource management was rated as essential by 88 people (57.5%) in subscale one and by 80 people (52.3%) in subscale two (Mean score  $\leq 3.3$  in both subscales). In any case interviewing techniques (Human competency) record the lowest Mean scores

( $M \leq 2.9$ ) in both subscales when 13 of 53 statements for subscale two and only 2 of 53 for subscale one, had Mean scores lower than 3.

**Table 3.** MEAN (M), STANDARD DEVIATION (SD), TOTAL ANSWERS (N) for higher to lower competencies categories in both subscales

Knowledge and understanding	Mean	SD	N	Ability to implement and/or use	Mean	SD	N
Leadership	3.40	±0.637	152	Human	3.17	±0.979	153
Human	3.39	±0.599	153	Leadership	3.16	±0.985	153
Technical	3.39	±0.610	148	Technical	3.08	±0.983	149
Conceptual	3.34	±0.602	153	Conceptual	3.07	±0.959	153
Financial management	3.23	±0.806	153	Financial management	3.01	±1.065	153

**Table 4.** MEAN (M), STANDARD DEVIATION (SD), TOTAL ANSWERS (N) for the 5 highest competency statements

Competency statement	Category	Mean	SD	N* (percentage)
<b>Knowledge and understanding</b>				
1 Retention strategies	Human	3.71	±0.62	120 (78.4%)
2 Decision making	Leadership	3.67	±0.71	118 (77.1%)
3 Ethical principles	Conceptual	3.64	±0.62	110 (71.9%)
4 Effective communication	Human	3.62	±0.59	104 (68%)
5 Effective staffing strategies	Human	3.59	±0.73	107 (69.9%)
<b>Ability to implement and/or use</b>				
1 Decision making	Leadership	3.47	±1.07	110 (71.9%)
2 Retention strategies	Human	3.42	±1.04	102 (66.7%)
3 Ethical principles	Conceptual	3.39	±1.04	98 (64.1%)
4 Effective communication	Human	3.38	±1.02	93 (60.8%)
5 Effective staffing strategies	Human	3.35	±1.08	95 (62.1%)

\*Number of respondents who rated the specific competency statement as essential for OR nurse manager (4 in Likert scale)

### 3.3 Survey findings for Question 3

#### Effect of education

A statistically significant correlation was found between education level of the respondents to technical skills ( $p \leq 0.001$ ), leadership ( $p \leq 0.018$ ) and subscale one of human category competencies ( $p = 0.05$ ) (see Table 6) meaning that RN nurses give attention to leadership competencies in contrast to nurses with diploma.

Likewise the educational preparation of nurses seemed to affect ( $\chi^2$  test) competency statements from other categories such as effective discipline  $p = 0.000$  (human), legal issues  $p = 0.001$  (conceptual) and financial resource procurement (financial)  $p \leq 0.014$  with RN nurses to grade those skills as more essential than their diploma colleagues.

Infection control practices (technical skills) had also significant correlation ( $p \leq 0.05$ ) demonstrating that nurses give importance in nursing practice of OR such as the application of the aseptic technique and perioperative care of the patient.



Although there was not any correlation between educational background and conceptual category of skills, in further analysis we found that diploma nurses consider as less important administrative/organizational strategies ( $p \leq 0.012$ ), strategic planning/goal development ( $p \leq 0.038$ ) and legal issues ( $p = 0.001$ ). And from financial category knowledge and understanding of, the following statements; cost containment and cost avoidance ( $p = 0.038$ ), unit budget forecasting generation ( $p \leq 0.050$ ), cost-benefit analysis ( $p \leq 0.038$ ), and financial resource procurement ( $p \leq 0.014$ ) due to the different responsibilities they have.

**Table 5.** MEAN (M), STANDARD DEVIATION (SD), CONSENSUS (N) for the 5 lowest competency statements

Competency statement	Category	Mean	SD	N* (percentage)
<b>Knowledge and understanding</b>				
1 Retention strategies	Technical	3.05	$\pm 0.99$	57 (37.3%)
2 Decision making	Human	3.05	$\pm 0.99$	64 (41.8%)
3 Ethical principles	Leadership	3.01	$\pm 0.94$	52 (34%)
4 Effective communication	Conceptual	2.98	$\pm 0.95$	51 (33.3%)
5 Effective staffing strategies	Human	2.9	$\pm 0.96$	46 (30.1%)
<b>Ability to implement and/or use</b>				
1 Decision making	Human	2.83	$\pm 1.19$	56 (36.6%)
2 Retention strategies	Conceptual	2.8	$\pm 1.17$	48 (31.4%)
3 Ethical principles	Technical	2.79	$\pm 1.22$	49 (32%)
4 Effective communication	Leadership	2.76	$\pm 1.18$	48 (31.4%)
5 Effective staffing strategies	Human	2.76	$\pm 1.20$	38 (24.8%)

\*Number of respondents who rated the specific competency statement as essential for OR nurse manager (4 in Likert scale)

**Table 6.** Correlation between educational preparation of nurses to category competencies ( $\chi^2$  test)

Educational preparation		Technical		Human	Leadership	
		Knowledge and understanding	Ability to implement and/or use	Knowledge and understanding	Knowledge and understanding	Ability to implement and/or use
RN	N	88	88	88	88	88
	Mean	3.50	3.29	3.47	3.50	3.35
diploma	N	65	65	65	65	65
	Mean	3.10	2.67	3.21	3.17	2.84
<i>p</i>		0.00	0.001	0.05	0.003	0.018

**Effect of Gender- Age- Experience-Number of OR suites**

Gender appeared to have correlation only to 5 competency statements. New technology ( $p = 0.031$ ), staff development strategies ( $p = 0.034$ ), total quality management processes ( $p = 0.000$ ) and interdisciplinary care coordination ( $p = 0.007$ ) believed as more essential by women, when interviewing techniques ( $p = 0.000$ ) rated as more essential by men.

Age seemed to affect only the knowledge (first subscale) of financial category of competencies ( $p = 0.050$ ) (see Table 7). Correlation was also found between delegation  $p \leq 0.027$ , conflict resolution  $p = 0.026$ , problem solving  $p = 0.009$  (leadership) and financial resource procurement  $p \leq 0.015$ , financial resource management  $p \leq 0.034$  (financial) with reduction in the rating by the older respondents (see Table 8).

Working experience seem to affect some technical skills  $p \leq 0.024$  (patient classification systems, infection control practices, nursing practice standards and nursing care planning) and effectively discipline-humam ( $p=0.012$ ). Specifically, respondents with 1-15 years of experience as a nurse, rated those as more important than the respondents with 19-29 years of experience who on the other hand rated as more important teaching/learning theories ( $p=0.016$ ) (see Table 9).

**Table 7.** Correlation between age of nurses to category competencies (one way ANOVA)

Financial management		Age		
		23-30	31-40	41-50
Knowledge and understanding	N	46	76	31
	Mean	3.45	3.18	3.03
$P=0.050$				

**Table 8.** Correlation between age of nurses to competencies statements (one way ANOVA)

Leadership			AGE		
			23-30	31-40	41-50
Delegation	Knowledge and understanding	N	46	76	31
		Mean	1.96	1.95	1.81
		$p$	0.027		
Conflict resolution	Ability to implement and/or use	N	46	76	31
		Mean	1.89	1.82	1.65
		$p$	0.026		
Problem solving	Ability to implement and/or use	N	46	76	31
		Mean	1.91	1.88	1.68
		$p$	0.009		
<b>Financial management</b>					
Financial resource procurement	Knowledge and understanding	N	46	76	31
		Mean	1.91	1.72	1.65
		$p$	0,012		
Financial resource management	Ability to implement and/or use	N	46	76	31
		Mean	1.85	1.68	1.55
		$p$	0.015		
Financial resource management	Knowledge and understanding	N	46	76	31
		Mean	1.91	1.79	1.68
		$p$	0.034		
Financial resource management	Ability to implement and/or use	N	46	76	31
		Mean	1.87	1.75	1.58
		$p$	0,015		

### Number of OR suites

This study also found correlation between number of OR suites and two technical skills such as ability to implement information systems and computers ( $p=0.004$ ) and knowledge and understanding of patient classification systems ( $p=0.047$ ) and were rated as less necessary from nurses who worked in larger hospitals with more OR suites (see Table 10).

**Table 9.** Correlation between working experience of nurses to competencies statements (one way ANOVA)

Technical			Working Experience	
			1-15	16-29
Patient classification systems	Knowledge and understanding	N	108	35
		Mean	1.92	1.77
		<i>p</i>	<b>0.021</b>	
Infection control practices	Knowledge and understanding	N	108	35
		Mean	1.90	1.74
		<i>p</i>	<b>0.021</b>	
Nursing practice standards	Ability to implement and/or use	N	108	35
		Mean	1.82	1.60
		<i>p</i>	<b>0.006</b>	
Nursing care planning	Ability to implement and/or use	N	108	35
		Mean	1.89	1.69
		<i>p</i>	<b>0.004</b>	
Human	Effective discipline	N	108	35
		Mean	1.91	1.74
		<i>p</i>	<b>0.012</b>	
Conceptual	Teaching/learning theories	N	108	35
		Mean	1.78	1.83
		<i>p</i>	<b>0.016</b>	

**Table 10.** Correlation between number of OR suites and technical competencies( $\chi^2$  test)

Technical competencies / number of OR suites			0-20	>20	<i>P</i>
Patient classification systems	Ability to implement and/or use	Moderate to no contribution	30	22.4%	0 0%
		Required substantial contribution	104	77.6%	14 100%
Information systems and computers	Knowledge and understanding	Moderate to no contribution	18	13.4%	6 42.9%
		Required substantial contribution	116	86.6%	8 57.1%

## 4 Discussion

The findings of this study are in accordance with previous studies regarding the order of category competency importance, revealing that human and leadership categories are placed higher than competencies from technical and conceptual category. Some differences appeared to the order of 53 competency statements. For example in this study *retention*

*strategies* was rated first with mean score 3.71 when in Chase's study (2010) was rated as second top competency and in Kondrat's study (2001) had mean score 3.542. *Effective communication* was rated fourth in current study (M=3.62) when in Kondrat's (M=3.908) and in Chase's study (2010) (M=3.96) was rated first as the top essential for OR nurse manager. Even though there was difference in ranking in all three surveys there has been total agreement to the top 5 competencies focusing the importance of communication, decision making, ethical principles and effective staffing strategies an OR Nurse Manager should gain in order to operationalize them on their units.

Other important competencies in all researches were *staff education, time management, effective counseling strategies, organization of unit work, conflict resolution and problem solving*.

Another similarity to Chase's and Kondrat's studies is the low rating of financial management category. This is also consistent with findings from Duffield (1994) [10] study where only two of the 17 competencies were related to financial management. Although financial management is important, Chase explained the low rate because financial management responsibilities are cyclical and become easier after they are learned initially because of repetition.

The significant correlation between education level and technical, leadership and first subscale (knowledge and understanding) of human skills reveals the different perception of nurses on skills importance according to their education level. Only Chase in her first study (1994) found that as nurses move further in the hierarchy and from actual practice, the need for technical skill decreases justifying, that since diploma prepared nurses are less prepared in human, conceptual and leadership skills (and therefore these skills are more challenging to them), they perceived them as more important. Chase, also stated that "*diploma prepared nurses perceive technical competencies as more important because traditionally they have had educational emphasis toward clinical skills*" [7]. Contrary to her first study and according to our own research, she notes in her second study that "*the consistent phenomenon in all the categories was that nurse managers rated competencies higher as their management tenure increased. Those with more management experience rated all competency categories higher demonstrating the greater appreciation of the knowledge and skills due to their experience in the role*" [8]. Our findings also comes to accordance to Kondrat's study who states about the importance of technical skills that "*although skill requirements change as nurses progress from purely technical and clinical positions to managerial positions, many OR nurse managers are responsible for teaching new staff nurses, thus their technical expertise remains important*" [3].

Other researchers [11] also found that at higher management levels human competencies are 70% essential, conceptual 20% and technical only 10% essential.

The correlation between age and financial competencies, probably because nowadays financial competencies are highlighted as important in nursing studies, is in accordance with Chase findings where leadership and financial management were perceived by younger nurses as more important. Chase noted about this phenomenon that younger nurses' managers rated these competencies higher because they see them as a challenge. In her second study she found that nurse managers in the 55+ year category had higher ratings for conceptual and financial management knowledge and she explained it because in older age groups, there is a higher appreciation of competency abilities.

Kondrat's findings on the other hand are similar to Chase's second study; "*as respondents' ages increased, the overall mean for each competency category was also increased*" [3] because as he explained length of time in clinical and managerial practice roles may have provided some respondents with more life and nursing experiences.

Chase also found that in small hospitals, nurses rated higher the financial management probably because these functions were more centralized within the organization and therefore were considered more important. Something similar was not found in Kondrat's research.

Another interesting study on the competencies that contribute to OR nurse manager and their result thereof to employee's satisfaction (from the measurement of specific indicators such as staff turnover) and patients' satisfaction (measured by indicators such as management of pain, medication errors and patient falls) was made by Haaf<sup>[12]</sup>. The results showed that the most important competencies are *leadership* and *humanities* and also showed that these abilities have increased patient satisfaction as related to the management of pain, while a negative correlation was found between patients' falls and human and conceptual skills.

The necessity of human competencies for OR nurse managers is revealed also in the findings of Gillespie and Hamlin<sup>[13]</sup> where emphasis was given to human factors—recognition that teamwork, communication, coordination, and leadership also affect human performance.

The importance of human and leadership competencies along with technical, conceptual and financial management skills leads to the conclusion that this instrument could be used as an assessment to evaluate current status of an OR environment. It can also be used not only as a tool for supervisor ratings but also for self evaluation in order to systematically raise performance.

Additionally since operating rooms are parts of healthcare organizations, OR Nurse Managers must concede the importance of financial competencies and carry them out by attending for example courses in health care finance, in order to maintain operating margin or profit and so provide safety and quality care.

## 5 Conclusion

The role of OR nurse manager has been evolved into a complex and demanding key position since they have to deal at the same time with budgeting, patient safety and quality improvement with little to no training. An effective OR Nurse Manager in order to succeed at operating room management level must gain all professional interaction skills not only leadership and human but also technical, conceptual and financial even though especially for financial competencies were rated lower than the others. For technical and conceptual competencies which also were scored lower, OR Nurse Managers must continue to develop in these areas because this will engender respect and acceptance.

The evaluation of necessary managerial competencies for the OR nurse manager so to be deemed as capable, is an important issue since the absence of some can be disastrous for the safety of patients undergoing surgery and for the overall good functioning of the unit. The Nurse Manager Competency tool can be used as an initial assessment to track progress or to focus on areas identified as opportunities.

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