

Analysis of the Nursing Competence of Senior Nursing Students

Kuei-Yun Lu, RN, MSN¹, Yueh-Chih Chen, RN, Ph.D.², Mei-Chie Wang, RN, MSN¹

The purpose of the study is to analyze senior nursing students' clinical competence pre- and post-clinical practice and its relationship with clinical settings. Yu's questionnaire, the Scale of Nursing Competence, was adopted for data collection and was self-administered by 898 senior students (4th to 5th year). A total of 798 pre test and 689 post test questionnaires were returned. The results showed: (1) The students' overall competence ranked between "competent" and "somewhat competent" both pre- and post-clinical practice. (2) Among the six sub-scales, interpersonal relationship (IPR)/communication was the highest and critical care the lowest on both pre and post tests. (3) After practice, all students had higher clinical competence score with statistical significance in overall competence, planning/evaluation, teaching/collaboration, IPR/communication, leadership and professional development. (4) The students' practice in medical centers showed improvement in teaching/collaboration and IPR/communication. In regional hospitals there was improvement in overall nursing professional competence, planning/evaluation, teaching/collaboration, IPR/communication and leadership. Students who rotated between hospitals showed improvement in overall competence and in all sub-scales except critical care. (5) Except for leadership competence, there were no significant relationship between the competence improvement and the clinical setting.

Key words: nursing competence, clinical practice, senior nursing students
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INTRODUCTION

The cultivation of qualified, competent professional nurses is the main focus of nursing education and, as a result, it has also been one of the primary concerns of nursing professionals. However, there are many definitions of what constitutes competence. In general, the liberal education of nursing places its primary

emphasis on professional knowledge, professional skills, and the implementation of the nursing process. It should also include the cultivation of the contextual practice, analytical practice, aesthetic practice, leadership and professional development^[1]. Traditionally, nursing education has placed more emphasis on the cognitive, affective and psychomotor domains, which implies a stronger emphasis on the cognitive domain than on the cultivation of the

Foo Yin Institute of Technology¹ Nursing Department, National Taiwan University.²

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Address correspondence to: Kuei-Yun Lu, 151 Chin-Hsueh Road, Yung-Fang, Ta-Liao, Kaohsiung Hsien, Taiwan.

affective one^[2]. Because of the difficulty of drawing a clear distinction, different definitions and classifications of these domains of nursing competence have developed^[3]. With respect to the goals of nursing education, nursing students in different programs should not all have the same competence requirements^[4,5]. In Taiwan, according to a National Taipei College of Nursing study, nursing competencies have been classified into six sub-scales: nursing care, management, communication, personal and professional growth, nursing teaching, and research^[6,7]. By comparing various research reports, it has been shown that nursing professionals with different educational backgrounds demonstrate different nursing competence levels^[8-10]. Some researchers who have based their findings on the different roles which are performed by nursing professionals in clinical practice have defined nursing competence according to the following five sub-scales: administration, clinical, teaching, management, and interpersonal relationships^[11]. Most research used the Schwirian Six Dimension Scale^[12] as a tool of measurement^[9-10,13-14]. This scale divides nursing competencies into six sub-scales: planning/evaluation, critical patient care, teaching/collaboration, interpersonal relationships/communication, professional development, and leadership.

Clinical practice is a very important component of nursing education^[2,15]. In clinical practice, nursing students learn to apply theories in actual practice situations^[16] and accomplish professional socialization^[17]. Therefore, knowing how to best evaluate nursing students' professional development and competence after clinical practice has been an important focus in the field of nursing education. There has been some research which has compared pre and post clinical practice changes in college-nursing students' nursing competence

^[14,17-19]. At the present time, Taiwan lacks such research. This research hopes to study college-nursing students' nursing competence and influencing factors. The objectives of this research are to explore college nursing students': 1) overall competence and competence in each sub-scale, both pre- and post-clinical practice; 2) changes in competence pre- and post-clinical practice both overall and for each sub-scale; and 3) the relationship between the competence changes and the clinical settings. The results of this research will be used as a reference for arranging nursing students' clinical practice.

MATERIALS AND METHODS

The subjects of this research were 898 senior nursing students at Foo-Yin Institute of Technology five-year program who were doing their clinical practice rotation from March 1996 to February 1997. These students had already finished their nursing core courses and three weeks of fundamental nursing clinical practice. Each of the students used the same clinical practice plans. This research used the "Scale of Nursing Competence" which was developed by Yu in 1993^[10] and which was adapted from Schwirian's "Six Dimensions" scale (1978)^[12]. It includes 51 items which are divided into the following six sub-scales: planning/evaluation, critical patient care, teaching/collaboration, interpersonal relationship/communication, leadership, and professional development. It is scored on a four point scale: "very competent" was scored a 4; "competent" 3; "somewhat competent" 2; and "incompetent" was worth 1 point. The higher the score of the student, the higher the nursing competence. The questionnaire's reliability and validity were examined by professional experts and Cronbach's alpha coefficient was 0.961 for the overall questionnaire. For the

six sub-scales, the Cronbach's alpha coefficient was between 0.814 and 0.915.

There were ten student teams and each team had approximately 90 students. Each team had 10 units with approximately 9 students in each unit. Students were assigned to do their clinical practice in medical centers (group A), in regional hospitals (group B), or they rotated in between more than four regional hospitals and medical centers (group C). Each nursing student was required to do clinical practice in ten different units (such as medical, surgical, general, operating room, obstetrics, postpartum, nursery, pediatrics, psychiatric, and public health).

The data were collected in January of 1996 (participants were 4th year students) and in March 1997 (when participants were in their 5th year of college). The questionnaire was voluntary on both occasions. A total of 798 pre test and 689 post test questionnaires were returned. The return rate was 72.6%. Statistical analysis by an SPSS/PC 6.1 computer software program was then done. The mean and T values were achieved by comparing the nursing competence pre- and post-clinical practice scores. The relationships between the nursing competence changes pre- and post-clinical practice and in the clinical setting were analyzed by repeated measures ANOVA.

RESULTS

Demographic Data

The 898 students were divided into three groups: Group A had 225 students who practiced at 3 medical centers; Group B had 270 students who practiced at 3 regional hospitals; and Group C had 403 students who rotated among many different hospitals in different

parts of Taiwan.

Nursing Competency

The overall nursing competence mean was 141.4 ± 21.5 before the clinical practice. Each item's mean score was 2.77 which equaled to 70%. The post-clinical practice nursing competence mean was 146.6 ± 8.4 . Each question's mean score was 2.88 which equaled the 72% range. Interpersonal relationship/communication had the highest scores both pre- and post-clinical practice. The mean score was 2.90 (72%) pre-clinical and 3.03 (76%) post-clinical. Critical patient care had the lowest scores among the six sub-scales both pre-clinically (2.69 or 67%) and post-clinically (2.67 or 67%). Professional development was second in pre-clinical practice and fifth in post-clinical practice. Teaching/collaboration ranked fifth in pre-clinical practice and second in post-clinical practice. Finally, planning/evaluating and leadership both had the same score pre- and post-practice, and both also ranked third and fourth in the six sub-scales (Table 1).

Changes in Nursing Competence

Students' overall nursing competence increased 5.2 points after clinical practice which was a significant change. Among the six sub-scales, only the critical patient care did not $P = .001$, and the other four sub-scales all showed highly significant increases ($P = .000$) (Table 1).

The three groups of students' nursing competence changes are shown in Table 2. The overall nursing competence of Group A, the medical center group, did not show significant change. Group B, the regional hospital group, and Group C both showed significant increases ($P = .000$). The details of each sub-scale's changes are as follows: (1) Planning/evaluating

Table 1. The Mean, SD of the pre- and- post test of students nursing competencies

Variable	Item	Number of pairs	Mean (pre) n=798	SD	Mean (post) n=689	SD	paired t- test	P value
Planning/evaluation	11	686	30.22	5.32	31.31	4.30	4.97	.000
Critical care	7	687	18.82	4.12	18.71	3.03	-.63	.529
Teaching/collaboration	10	681	27.32	4.74	29.17	4.38	8.38	.000
IPR/communication	11	683	31.88	5.35	33.36	4.82	6.17	.000
Leadership	5	684	13.73	2.44	14.24	2.20	3.63	.000
Professional development	7	678	19.35	3.66	19.70	3.16	3.50	.001
Overall nursing competencies	51	652	141.43	21.55	146.63	18.44	5.67	.000

showed no significant change in Group A students and showed significant increases ($P = .002$) in Group B and Group C. (2) Critical patient care showed slight significant decreases ($P = .036$) in Group A students and no significant change in Group B and in Group C students. (3) Teaching/collaboration showed significant increases in post-clinical practice in all three groups. (4) Interpersonal relationship/communication showed significant increases in post-clinical practice in all three groups. (5) Leadership showed no significant changes in

Group A post-clinical practice but showed highly significant increases in Group B and Group C students. (6) Professional development showed no significant change in Group A and Group B, while Group C showed modestly significant increases.

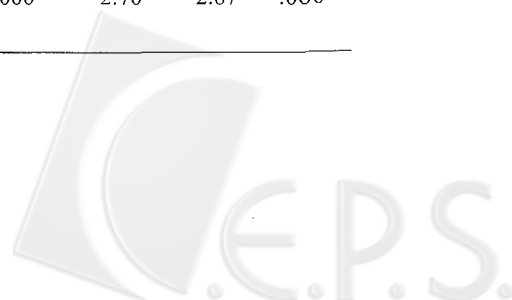
Relationship between Nursing Competence Changes and Clinical Settings

In post-clinical practice, all six sub-scales except for critical patient care showed significant increases (see pre-and-post P value).

Table 2. The Mean of each item of students' nursing competencies at pre- and- post clinical practice among three groups

Variable test	Medical centers (A) (n=201)			Regional hospitals (B) (n=234)			Rotational (C) (n=326)		
	Pre	Post	P*	Pre	Post	P*	Pre	Post	P*
Planning/evaluation	2.77	2.84	.065	2.78	2.90	.002	2.70	2.81	.002
Critical care	2.67	2.57	.036	2.73	2.72	.783	2.67	2.71	.338
Teaching/collaboration	2.76	2.89	.003	2.74	2.97	.000	2.72	2.97	.000
IPR/communication	2.90	3.00	.031	2.94	3.09	.000	2.87	3.03	.000
Leadership	2.78	2.78	.934	2.79	2.92	.000	2.71	2.85	.000
Professional development	2.80	2.82	.612	2.81	2.89	.062	2.70	2.82	.001
Overall nursing competencies	2.80	2.83	.208	2.81	2.93	.000	2.70	2.87	.000

*By paired- t test.



Only leadership competence showed a slight change with different clinical settings (see pre-and-post clinical, the interaction of pre-and-post test and clinical setting, $P=$

.023); the changes in the other five sub-scales and the overall nursing competence did not show any significant relationships with different clinical settings (Table 3).

Table 3. Repeated measures ANOVA of students nursing competencies and the clinical settings

Variable	Source of variation	SS	DF	MS	F	P value
Planning/evaluation	Within + Residual	19801.11	639	30.99		
	Clinical	201.14	2	100.57	3.25	.040
	Within + Residual	10915.84	639	17.08		
	Pre-and-Post	369.94	1	369.94	21.66	.000
	Clinical*Pre-and-post	15.51	2	7.76	.45	.635
Critical care	Within + Residual	10472.17	640	16.36		
	Clinical	99.36	2	17.69	3.04	.049
	Within + Residual	6519.80	640	10.19		
	Pre-and-Post	11.21	1	11.21	1.10	.295
	Clinical*Pre-and-Post	44.09	2	22.05	2.16	.116
Teaching/collaboration	Within + Residual	15762.85	634	24.86		
	Clinical	48.36	2	25.18	.97	.379
	Within + Residual	10575.97	634	26.68		
	Pre-and-Post	1043.85	1	1043.85	62.58	.000
	Clinical*Pre-and-Post	48.88	2	24.44	1.46	.431
IPR/communication	Within + Residual	20237.99	637	31.99		
	Clinical	135.13	2	67.56	2.11	.122
	Within + Residual	12716.69	637	19.96		
	Pre-and-Post	637.96	1	637.96	33.76	.000
	Clinical*Pre-and-Post	23.00	2	1.50	.58	.696
Leadership	Within + Residual	4280.89	638	6.71		
	Clinical	46.27	2	23.13	3.45	.032
	Within + Residual	2553.89	638	4.00		
	Pre-and-Post	61.13	1	61.13	15.27	.003
	Clinical*Pre-and-Post	33.23	2	15.11	3.78	.023
Professional/development	Within + Residual	9556.31	632	15.12		
	Clinical	101.79	2	50.89	3.37	.035
	Within + Residual	5389.92	632	8.53		
	Pre-and-Post	83.27	1	83.27	9.76	.002
	Clinical*Pre-and-Post	22.60	2	11.30	1.32	.267
Overall Nursing Competencies	Within + Residual	327410.23	606	535.38		
	Clinical	2682.92	2	1341.46	2.51	.083
	Within + Residual	168328.55	606	277.77		
	Pre-and-Post	7320.55	1	7320.55	24.36	.000
	Clinical*Pre-and-Post	891.55	2	445.78	1.60	.202

Note: clinical=clinical settings.



DISCUSSION

Among the six sub-scales, interpersonal relationship/communication ranked the highest. This is similar to other research findings that indicate nursing professionals feel the least stress at work in interpersonal relationships^[20]. Critical patient care ranked the lowest, because it is not the major focus of the nursing college education which places more emphasis on general nursing skills and general practice. The National Taipei College of Nursing has developed standard nursing competence criteria for nursing instructors and directors of nursing departments in hospitals which also does not include critical patient care. Therefore, its low rank in our research seems to be a reasonable outcome of it not having an important place in the current education curricula. Teaching/collaboration improved to the second highest level in post-clinical practice. This may be related to the increased opportunity for actual practice during the practice period. On the other hand, professional development competence such as self-confidence, assisting in research, and accounting for new responsibilities were higher level aspects of competence. Moreover, the maturity of the students and the actual experience enhance students' ability to learn. The subjects of the research were seventeen-years-old pre-clinically and eighteen years old post clinically during this important stage professional development. After eight months of clinical practice rotation, the students were older and more able to judge their own professional development competence. This may have been why the professional development score improved from fourth to second in ranking. Planning/evaluation and leadership both had the same mean score which may have been due to the similar content of the two sub-scales.

Planning/evaluation competence included the implementation of nursing process and leadership. It was mostly related to patient care, such as prioritizing patient care according to factors such as patients' critical condition, offering nursing advice, and giving instructions. This item did not show any change. We concluded that this result may have been due to improvement in the students' self-evaluation toward patient care competence.

Yu's research showed the overall nursing competency mean was 135.5 for five-year program students and 147.75 for bachelor degree students^[10]. This research's pre- and post-clinical means were between 135.5 and 147.75 which may be due to the differences in research subjects and testing times. Yu's rank of interpersonal relationship and critical patient care were the same as this study. However, the rank of the other sub-scales, was different. According to Ms. Yu's research, the five-year program student group showed means 2-3% pre-clinically and 5.6% post-clinically lower than our results. However, Yu's bachelor degree students showed a higher mean score than our research.

In Swanson's research results, each sub-scale's results were slightly higher than those in this study^[9]. In their research, the interpersonal relationship mean score was the highest, and the critical patient care ranked the lowest. These results matched our findings. In Witt's^[14] research, the nursing students' professional development ranked the highest, and the teaching/collaboration had the lowest ranking; the nursing students' competence in planning/evaluation, teaching/collaboration, interpersonal relationships and professional development before graduation were significantly higher than in the freshmen year. These results were different from our findings. Critical care did not show any significant difference which was the

same as the findings in our study and Witt's. In comparison with McCloskey's^[13] findings, this research showed a similar result in the self-evaluating of nurses' IPR/communication competence, which ranked the highest. However, in professional development competence which ranked second; and in teaching/collaboration which had the lowest ranking, the results were different from McCloskey's. The differences may have arisen from the differences in the subjects' background or characteristics. The subjects in McCloskey's study were senior nurses who had much more experience than did the subjects in this research.

Clinical practice is an essential part of nursing education. Through actual work experience nursing students learn the general skills that all nurses are expected to have. The results from this study show that the students' overall nursing competence improved remarkably after clinical practice with the exception of critical patient care. This research found nursing students' competence in general skills and operating equipment to have had significant increases. Such research findings were similar to Hughes'^[18] whose report indicated that nursing students' post-clinical competence improved, especially in the area of nursing skills. In the five sub-scales, which showed increased competence there were from one to three items within each sub-scale which did not show improvement after clinical practice. This leads to the conclusion that there are areas of higher level of nursing care, such as in areas of patient psychosocial problems, the ability to cope in the working environment, the ability to utilize community resources, time management and in self-evaluation. Researchers believe that junior nursing colleges have focused mainly on general nursing knowledge and skills, and since these students were younger than the average university student, it was difficult to see a marked

improvement in those abilities during an eight-month period of clinical practice. In Windser's^[17] research, there were also indications that students felt time management and effective utilization of resources were more difficult tasks to master. The questionnaires which were completed by students voluntarily showed that the standard deviation was higher pre-clinically, despite the fact that most competence sub-scales increased in mean value post-clinically. The nursing students' self-evaluation competence category seemed to be more consistent and had less variation.

The clinical practice settings in this school are arranged according to the students' preferences. There has been research that has found that a clinical setting with a good clinical environment, good equipment, sufficient information resources, and qualified nursing professionals helped students to have a successful clinical practice experience. Theoretically, medical centers are the better choice in Taiwan, because they are more likely to have these advantages. However, repeated measurement showed that students' overall competence scores and each sub-scale's scores did not change in different clinical settings. There was only a slightly significant change in the leadership competence. According to Table 2, only two sub-scales of nursing competence showed some increases in the group of students who did their clinical practice at medical centers. Among the regional hospitals and in the rotating groups, there were more sub-scales with significant increases. The clinical setting's environment and the nursing professionals' attitudes toward nursing students had a great impact on their competence changes^[17,21]. Perhaps rotating from different clinical settings enabled students to gain confidence, especially in leadership ability. Also, the high stress atmosphere of the medical centers could have produced a situation where nursing

staff were less patient or had less time to interact with students, leading to student frustration^[22]. It is also possible that students who had chosen the medical centers as their clinical practice setting were more aggressive, had higher expectations, and had more self-critical personalities. Mozingo's^[22] research indicated that nursing students with good grades had lower means in nursing competence. McCloskey^[13] also suggested that students with idealistic personalities seem to be lacking in self-confidence. Yu's research also suggested that certain personality traits seemed to be related to certain nursing competence mean scores^[10]. All of the above findings lead to questions that need further research and exploration. Since the subjects of this research were students from a nursing college, the research findings should only be used as a reference for nursing education and healthcare industries. Further research needs to include other types of nursing schools.

CONCLUSION

This research used the "Six Dimensions" scale as the tool to explore the students' nursing competence changes pre and post clinical practice and the relationships between the changes and clinical settings. The results were as follows: (1) The nursing students' overall competence mean in pre-practice was 141.4 which was about 70%, and the post-practice mean was 146.6 which was about 72%. The highest mean sub-scale was interpersonal relationship/communication. Critical patient care had the lowest mean score. (2) Overall nursing competence, planning/evaluation, IPR/communication, teaching/collaboration, leadership, and professional development all showed significant increases, post-clinically. Teaching/collaboration had the largest overall change post-clinically. Critical patient care showed the

least change. (3) The medical center group showed an increase in teaching/collaboration and IPR/communication. The regional hospital group showed an increase in planning/evaluation, teaching/collaboration, leadership, and IPR/communication competence. The group that rotated their clinical practice showed increases similar to the regional hospital group, plus an increase in professional development competence. (4) Only leadership showed a slight change due to differences in clinical settings.

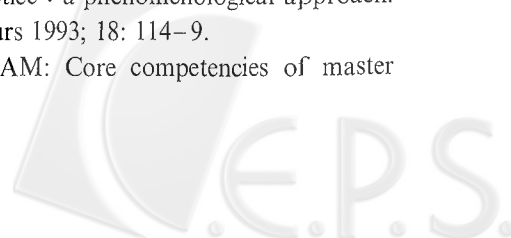
This research can serve hospital nursing departments as a reference. It can be used to understand the ability of new graduates from junior colleges. Further research is needed to further explore the relationship between the clinical setting, clinical instructors' teaching styles, nursing students' personality traits, coping strategies and changes in nursing competence after clinical practice.

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護生綜合實習前後護理能力分析

呂桂雲¹ 陳月枝² 王美綺¹

護生的護理能力是護理教育界及業界所關心的課題。本研究目的為探討護生綜合實習前後的護理能力和改變，及與實習場所的關係。以輔英技術學院專科部898名護理科五年級學生為樣本，採結構式自答問卷，在實習前一個月及實習後二個月，由學生自行填寫，實習期間共36週。所得資料以平均值、t檢定、重復量數ANOVA等統計方法分析之。結果顯示：(1)護生實習前後的整體護理能力均介於「大部份做到」與「部份做到」間；(2)六分項能力中，前後均以「人際關係/溝通」能力最高，「臨危照顧」能力最低。(3)就全體學生來看，

整體護理能力及計劃/評值、教學/協調、人際/溝通、領導、專業發展等五分項能力實習後有顯著增加，臨危照顧能力沒有改變。(4)就實習醫院而言，實習後有顯著增加：醫學中心組在教學/協調和人際/溝通方面；區域醫院組在整體性能力及計劃/評值、教學/協調、人際/溝通、領導等能力；巡迴組除了與區域醫院組相同之各項外，專業發展能力亦顯著增加。醫學中心組的臨危照顧能力。於實習後顯著降低。(5)實習前後能力的改變中，領導一項因實習場所不同而有差異。

關鍵詞：護理能力，綜合實習，護生
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輔英技術學院護理科¹ 台大護理學系所教授²

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通信作者地址：呂桂雲 高雄縣大寮鄉永芳村進學路151號 輔英技術學院護理科