



A META ANALYSIS: THE PROBLEM SOLVING SKILLS OF NURSING AND OTHER BACHELOR STUDENTS

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Abstract

This study aims to conduct a comparative analysis on the problem solving skills of nursing students and students from several other departments. The study was designed as a meta analysis. Studies on problem solving skills were accessed through databases such as Turkish Medical Index, Google Academic, YOK (The Council of Higher Education) Dissertation Database, Pubmed, EBSCO Host and Web of Science. The keywords for the review were determined as "problem solving", "student nurse", "nursing", "student", "university" and "Turkey" in both Turkish and English. As a result, it was noted that 31 studies complied with the inclusion criteria. The studies were analyzed with CMA. The study sample included 3019 nursing students and 4754 students from other departments, 7773 students in total. The studies were tested for heterogeneity and it was found that all were heterogenous studies. In accordance with the random model, the mean scores were found to be 92,02 (95%CL 88,47-95,57) for nursing students and 93,54 (95%CL [88,87-98,21]) for other students. The variance between departments wasn't found to be statistically significant ($Q_b=0,257$, $p>0,05$). The study results suggested that problem solving skills of university students in Turkey, regardless of their departments, was found similar.

Keywords: Problem Solving, Nursing, University, Student, Meta Analysis, Education, Turkey.

INTRODUCTION

Problem solving skills basically help to overcome the challenges one has to tackle to attain a desired outcome by integrating personal skills and environmental conditions (Başaran, 2005). These skills essentially require creative and critical thinking skills to accomplish a certain task (Kanbay, Aslan and Işık, 2013, Kelleci, Gölbaşı and Doğan, 2011). They also urge to benefit from solution oriented methods and to initiate efficient and useful tools and attitudes (Schreglmann and Doğruluk, 2012, Durmaz, Kaçar and Can, 2007). Individuals with elevated problem solving skills are commonly assumed to be innovative, critical, creative, and flexible individuals pioneering change and development (Günüşen and Üstün, 2011).

Problem solving skills are indeed an innate ability and they can only be developed through education and experience (Yıldırım, Karakurt and Hacıhasanoğlu, 2014). Therefore, enhancing problem solving skills should be among the major targets of modern educational institutions (Akpınar, 2015). Students often fail to conceive the significance of developing problem solving skills due to the fact that these institutions aren't modeled on



educational policies and strategies to improve problem solving skills, and that teaching staff sometimes don't wholeheartedly embrace these policies and strategies (Koç, Koyuncu and Sağlam, 2015).

Problem solving skills are considered to be most important qualifications for a nurse so as to provide a quality care and improve their professional skills (McEwen and Brown 2002, Çiçek and Albayrak, 2004). Nursing students should be taught at school how to acquire and effectively use these skills to accomplish a quality care in their professional practice (Koç et. al., 2015, Kelleci et. al., 2011). Recent studies have shown that nursing students had problem solving skills at moderate levels, which certainly needed elaboration (Yıldırım, 2014, Yüksel, 2013, Başar 2011, Yılmaz, Karaca and Yılmaz, 2009, Özyazıcıoğlu, Aydınoğlu and Aytekin, 2009 Altun, 2003, Yurttaş and Yetkin, 2003).

The study question in our research was "where does the lack of problem solving skills among nurses stem from, curriculum design and teaching practice in universities in general or only in nursing departments in particular?". In other words, "Are the problem solving skills of nursing students equally developed in comparison with students in other bachelor programs?". This study, therefore, was designed to compare the levels of problem solving skills of nursing students and students from other bachelor programs with a Meta analysis.

METHOD

Search Strategy

The literature review was conducted with a thorough search of published articles, and graduate studies in national and international electronic databases which were Turkish Medical Index, Google Academic, YOK (The Council of Higher Education) Graduate Thesis and Dissertation Database, Pubmed, EBSCO Host, and Web of Science. The analysis basically included such keywords as "problem solving (problem çözme)", "university (üniversite)", "student (öğrenci)", "nurse (hemşire)", and "Turkey (Türkiye)" in both English and Turkish. No time limitation was set for this study and the analysis included all publications up to March 2016 when this particular study was conducted.

Inclusion and Exclusion Criteria

There were a number of inclusion and exclusion criteria to select studies suitable for the Meta analysis according to which all abstracts were reviewed. The inclusion criteria required that (a) the study be conducted in Turkey (b) the study sample include undergraduate nursing students and students from other departments, (c) the study data be eligible for a quantitative analysis, (d) the problem solving skill levels of students be analyzed, and (e) the study data be adequate to enable researchers to conduct further statistical analysis. On the other hand, the studies were excluded from the analysis if (a) they had been published in languages other than Turkish or English, (b) the full text couldn't be accessible, and (c) the study tools weren't suitable for a psychometric analysis.

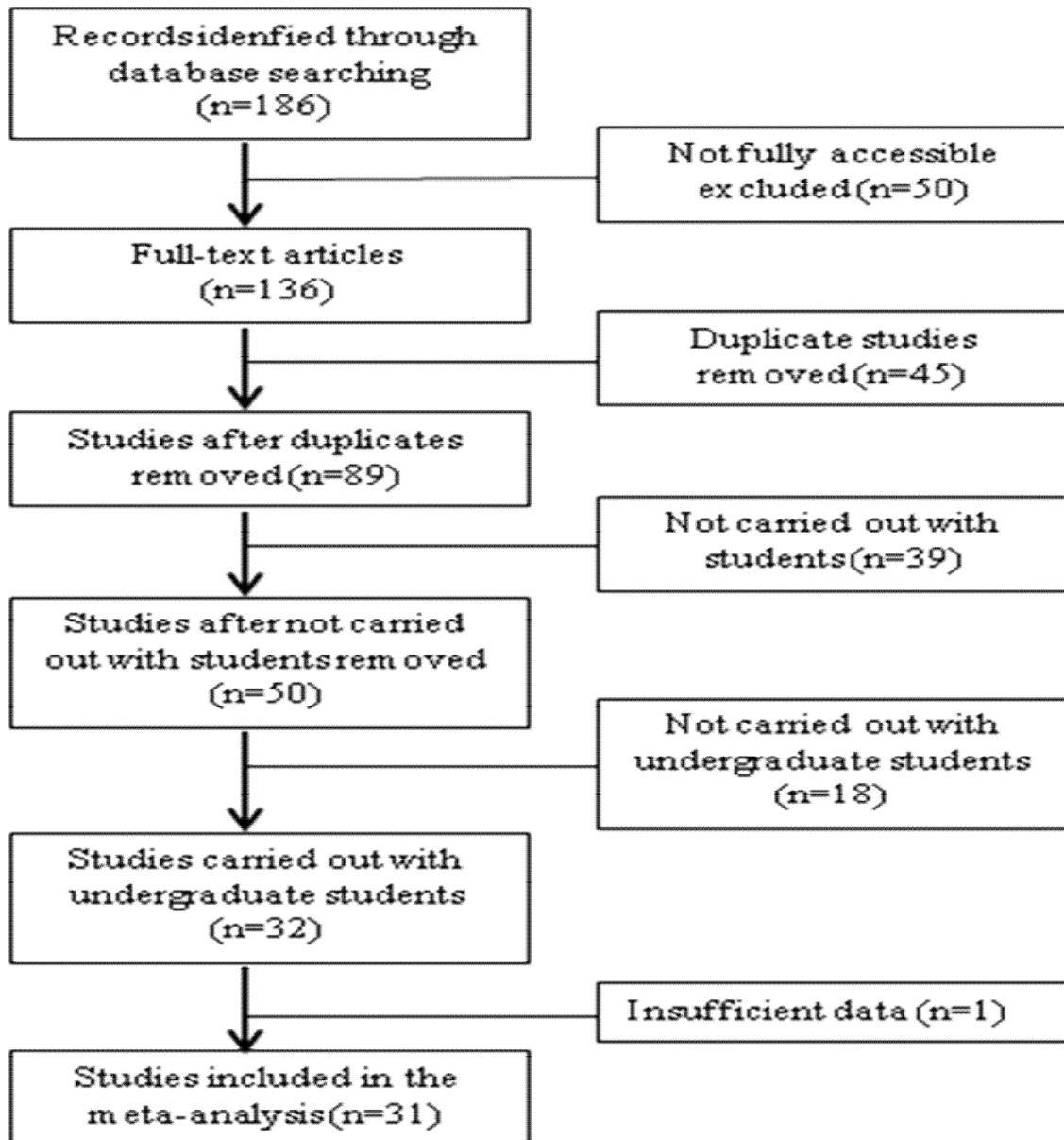


Figure 1. The flow chart of the inclusion process

The flow chart of the inclusion process was given in Figure 1. The results of the preliminary analysis indicated that 186 published articles and graduate studies might be eligible for this study. However, it was eventually found that 50 studies weren't fully accessible and 45 results were duplicates. In addition, 39 studies were excluded because they didn't include a student sample while 18 studies weren't carried out with undergraduate students. It was further noted that 1 study didn't have adequate data. Consequently, 31 studies were found eligible for further meta analysis which was completed by two researchers individually. The interrater agreement on the inclusion criteria was reported to be 100%.

Quality of Primary Studies

The study quality depends on the inclusion criteria, encoding meta analysis data, and reliability requirements of these studies. The reliability of the encoded data was assured with a comparative analysis of the results from two researchers, which indicated a 100% interrater agreement.

Encoding the Data

A data encoding form was used to collect study data, which was developed by the researchers in accordance with the recent studies in literature (Dinçer, 2014, Kış, 2013). The data encoding form included data about study characteristics (method, sample, study tools, publication type, etc.) and the researchers encoded the title, the author, publication date, publication type, sample size, publication language, and problem solving characteristics (sample size, mean score of problem solving skills, and standard deviation) for each study. The reliability of data encoding was tested with a comparative analysis of the results derived from both researchers. The moderator variable was the classification of students as nursing students and other students.

Data Analysis

The study data were analyzed with the Comprehensive Meta-Analysis software (CMA) and the data were encoded with Microsoft Office Excel for meta analysis. The study data were assessed with average scores. The heterogeneity of the effect size was tested with Q and I^2 tests and the publication bias was evaluated with Orwin's Fail-safe N and Tau coefficients. Since the significance level of the studies included in the analysis was 0.05, the significance level of the statistical analyses in this analysis was also determined to be 0.05.

FINDINGS

Table 1: Characteristics of Studies Included in the Meta Analysis

		n	%
Publication Years	2003	1	3.23
	2007	3	9.68
	2008	1	3.23
	2009	5	16.12
	2010	3	9.68
	2011	6	19.35
	2012	2	6.45
	2013	3	9.68
	2014	4	12.90
	2015	3	9.68
Publication Type	Article	21	67.75
	Dissertation	10	32.25
Publication Language	Turkish	28	90.32
	English	3	9.68
Measurement tool	Problem Solving Inventory	30	96.77
	Problem Solving Skills Scale	1	3.23

The total number of participants in all 31 studies in the meta analysis was 7773, 3019 nursing students and 4754 students from other departments. The studies were conducted between 2003-2015, 6 studies were conducted in 2011 (19,35%), 21 studies were published articles (67,75%), and 28 studies were published in Turkish (90,32%). It was further noted that the Problem Solving Inventory, developed by Heppner and Peterson (1982), was used in almost all studies (96.77%) (Table 1).

Table 2: Homogeneity Tests

	Q	df	χ^2	p	I^2
Nursing	790.004	16	26.296	0.000	97.975
Other	1534.979	20	31.410	0.000	98.697
Total	2337.655	37	49.802	0.000	98.417

Table 2 presents the homogeneity test results of studies included in meta analysis. Q value of the studies was found to be 2337,655, which suggested that these studies indicated heterogeneity when compared to chi-

square results with a significance level of 95%. As a result, the effect sizes of these studies were assessed in accordance with the random effects model.

Table 3: Average Scores and Values According to the Fixed Model

	k*	N	Point estimate	SE	V	% 95 CI	Z	P
Nursing	17	3019	92.44	0.08	0.00	92.28-92.60	1118.810	0.000
Other	21	4754	91.46	0.26	0.07	90.99-91.97	346.827	0.000

* Some work has been studied in both groups.

The average scores of students according to the fixed model were given in Table 3. The average scores were reported to be 92,44 (95%CL [92,28-92,60]) for nursing students and 91,46 (95%CL [90,99-91,97]) for other students with a significance level of 95%.

The publication bias was evaluated with Orwin's Fail-Safe N and Tau-kare coefficients. Orwin's Fail-Safe N illustrates the number of studies that might be needed in a meta analysis (Dinçer, 2014, Kış, 2013). The number of publications needed for this meta analysis was reported to be 4188. It was also found that the tau-square coefficient (r^2) was 0,0441 and p value was 0,804 in our analysis. A Tau-square coefficient approximate to 1 and a two tailed p value > 0.05 indicate an unbiased publication (Dinçer 2014). Accordingly, the results of our analysis confirmed that the studies in the meta analysis were unbiased publications.

Table 4: Average Scores and Values According to the Random Model

	k	n	Point estimate	SE	V	% 95 CI	Q_{Between}	p
Nursing	17	3019	92.02	1.81	3.28	88.47-95.57	0.257	0.612
Other	21	4754	93.54	2.38	5.68	88.87-98.21		

* Some work has been studied in both groups.

As shown in Table 4, the average score of nursing students was 92,02 (95%CL 88,47-95,57)) and the average score of students from other departments was found to be 93,54 (95%CL [88,87-98,21]). It was additionally stated that department variable between-study variance wasn't statistically significant ($Q_b=0,257$, $p>0,05$).

DISCUSSION AND RESULTS

This study aimed to investigate the levels of problem solving skills of nursing students and students from other bachelor programs with a meta analysis. The study results suggested that the studies included in the analysis were heterogeneous and unbiased. It was also pointed out that the levels of problem solving skills of nursing students didn't significantly differ from those of other students. In other words, students in both groups had similar problem solving skill levels. The levels of problem solving skills of nursing students and midwifery students have already been compared in several other studies and it has been equally asserted that there wasn't a statistically significant difference between the average scores of problem solving skills (Uçar, 2013, Kantek et. al.,2010, Kazu and Ersözlü 2008, Durmaz, 2007). Altunçekiç, Yaman and Koray (2005) also conducted a study with students from different departments in an education faculty and found no difference in average scores in terms of the department variable. Saracaloğlu, Yenice and Karasakaloğlu (2009) similarly analyzed the problem solving skills of students in education faculties in two different universities and reported no particular difference. In contrast, Bilgin (2010) found that department variable caused a significant difference in the average scores of problem solving skills of university students. Although the results of our study complied with the results of previous studies, it was also noteworthy that the levels of problem solving skills of students in both groups were almost identical. However, it can be reasonably expected that the levels of problem solving skills of nursing students should be different from those of students in other departments as their curriculum, their study fields, their study environments and backgrounds, and even their university entrance qualifications show a stark difference from each other.

In light of study results, it can be recommended to conduct further studies to shed a light on the factors that might influence the development of problem solving skills of undergraduate students.

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