

## Problem-solving skills of University nursing students and factors affecting them: A Cross-sectional study

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### Abstract

The aim of this study was to determine problem-solving skills of nursing students and the factors affecting them. This cross-sectional study comprised 233 senior students studying professional nursing at the university level in Turkey in 2018. The research sample comprised 176 students who participated voluntarily and the data was collected from them by using a "Personal Information Form" and "Problem-Solving Inventory." Descriptive statistics and regression analysis were utilised for data assessment. The mean scores of students from the "Problem-Solving Inventory" were  $84.47 \pm 21.21$ . The mean scores of the subscales were as follows:  $24.03 \pm 8.77$  for the "Problem-Solving Reliability";  $45.54 \pm 13.88$  for "way of approaching-avoiding" and  $17.07 \pm 4.04$  for "personal control." The factors found to be affecting the participants in the study were mainly students' gender, income levels and self-evaluation of their own problem-solving skills. These factors linearly increased their total scores and subscale scores. When the relationship of linearity was evaluated, it was highly significant statistically ( $p < 0.001$ ). In conclusion, the problem-solving skills of senior-year students were at a medium-level.

**Keywords:** Nursing Student; Problem solving skills; Turkey.  
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### Introduction

Problem-solving is a cognitive and behavioural process that requires a high-level of thinking process and consists of identifying effective solutions by selecting the most likely or appropriate solution and culminating in effective decision-making.<sup>1</sup> The problem-solving process engenders having social skills, as well as a series of mental capabilities, such as self-confidence, decision-making and endurance.<sup>2</sup> Effective problem-solving skills are expected in professions such as nursing that provide direct care to humans. Therefore, providing nurses with problem-solving

techniques is targeted in nursing education programs.<sup>3,4</sup> Previous studies have demonstrated that nurses with enhanced problem-solving skills have coped better with patients' problems and their health conditions and the mortality and morbidity rates tend to be much lower.<sup>1,2,5</sup> Moreover, educating nursing students in improved problem-solving skills has emerged in importance. It is crucial for nursing students, who are health professionals of the future, to be able to cope with stresses of daily-life and problems at the clinic, because these directly affect the quality of health care.<sup>6,7</sup> Nurses constantly encounter complicated patient problems that are varied and to be able to give quality nursing care, they require the ability to effectively solve problems. Nurses need to be dynamic when juggling many responsibilities, such as attempting to care for individuals with distinct needs, to identify a patient's problems and prioritise them.<sup>3</sup> The quality of the healthcare given by them is improved as well as ensured when better education is provided. Consequently, this study was aimed to identify the problem-solving skills of nursing students and the factors affecting them. Research question: What are the factors affecting nursing students' problem-solving skills?

### Methods and Results

The scope of this single-centre cross-sectional study comprised 4th year nursing students in Katip Celebi University Nursing School in Izmir/Turkey (n:233). A sample selection was not conducted. The attempt was to reach the entire nursing population between May and June in 2018. However, students who wished to participate voluntarily comprised the research sampling (n:176). For data collection, a personal information form was used which consisted of 11 questions based on literature review<sup>2,4-7</sup> and problem-solving inventory (PSI). Sahin et al (1993) were prepared to the Turkish version of the PSI developed by Heppner and Petersen (1982).<sup>4,8</sup> The PSI consists of 32 items that were included in the evaluation. The lowest score was 32 and the highest was 192. Higher scores on the PSI demonstrated that the individual

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**Table-1:** Demographic characteristics of participants (n=176).

| Descriptive characteristics             | n (%)      |
|-----------------------------------------|------------|
| Age (year)                              |            |
| 22-24                                   | 159 (90.3) |
| 25 and over                             | 17 (9.7)   |
| Gender                                  |            |
| Female                                  | 153 (86.9) |
| Male                                    | 23 (13.1)  |
| Mother's education                      |            |
| Literate                                | 43 (24.4)  |
| Primary school graduate                 | 70 (39.8)  |
| High school graduate                    | 45 (25.6)  |
| University graduate                     | 18 (10.2)  |
| Father's education                      |            |
| Literate                                | 15 (8.5)   |
| Primary school graduate                 | 69 (39.2)  |
| High school graduate                    | 75 (42.6)  |
| University graduate                     | 17 (9.7)   |
| Socioeconomic status                    |            |
| Excess income                           | 24 (13.6)  |
| Budget balance                          | 116 (65.9) |
| Expenses exceed income                  | 36 (20.5)  |
| Studied problem-solving previously      |            |
| Yes                                     | 57 (32.4)  |
| No                                      | 119 (67.6) |
| Self-problem-solving skills' evaluation |            |
| High                                    | 85 (48.3)  |
| Middle                                  | 74 (42.0)  |
| Low                                     | 17 (9.7)   |

n=number, %=percentage

perceives himself/herself as inefficient in problem-solving skills. The scale included three sub-dimensions: "Problem-Solving Confidence" (PSC), which refers to a person's confidence in new problem-solving skills (items 5, 10, 11, 12, 19, 23, 24, 27, 33, 34 and 35); "Convergence-Avoidance" (CA) method refers to reviewing the first problem-solving effort for future consultations and making active

investigations for alternate solutions (items 1, 2, 4, 6, 7, 8, 13, 15, 16, 17, 18, 20, 21, 28, 30 and 31) and "Personal Control" (PC) that denotes an individual's ability to maintain control in problematic situations (items 3,14,25,26,27 and 32).

The SPSS 22.0 packet programme (SPSS Inc., Chicago, IU., USA) was used for the assessment of data. Descriptive statistics were used in the evaluation. Linear regression analysis was used to establish the effect of independent variables on dependent variables and sub-dimensions. In order to carry out the work, written permission was taken from the Ethics Committee (IRB no:25.04.2018/173).

The results of this cross sectional-study implemented in 2018 at the university for nursing students are shown in Table 1.

When the distributions of sub-dimension score averages of inventory were scrutinised, the mean scores for PSC was  $24.03 \pm 8.77$  (range, 11-49 point); for CA was  $45.54 \pm 13.88$  (range, 16-86 point) and for PC was  $17.07 \pm 4.04$  (range, 9-30 point). When we examined the PSI, the general average was  $84.47 \pm 21.21$  (range, 38-147 point).

The affecting factors and regression results are shown in Table 2. From the total scores it was established that the students' evaluation of their own income level and their problem-solving skills increased linearly. The regression model is considered a well-established model, since the Durbin-Watson (DW) value was 2.368. The correlation between the score obtained from scale and independent variables was 0.597. The 36% alteration in students' mean scores depends on these variables ( $r^2=0.357$ ). When the linearity of the relationship was assessed, it was linear and

**Table-2:** Regression distribution of inventory's sub-dimension and total score averages (n=176).

| Variables                                 | Total   |         |         | PSC     |         |         | CA      |         |         | PC      |         |         |
|-------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                                           | $\beta$ | t       | p-value | $\beta$ | t       | p-value | $\beta$ | t       | p-value | $\beta$ | t       | p-value |
| Age                                       | 0.062   | 0.901   | 0.369   | 0.002   | 0.027   | 0.979   | 0.850   | 0.776   | 0.439   | 0.505   | 1.770   | 0.079   |
| Gender                                    | 0.128   | 1.856   | 0.065   | 0.064   | 0.933   | 0.352   | 6.215   | 1.960   | 0.045*  | 0.235   | 0.284   | 0.777   |
| Mother's education                        | -0.008  | -0.099  | 0.921   | 0.083   | 1.023   | 0.308   | -1.228  | -0.903  | 0.368   | 0.323   | 0.912   | 0.363   |
| Father's education                        | -0.002  | -0.023  | 0.982   | -0.006  | -0.077  | 0.939   | -0.262  | -0.175  | 0.862   | 0.239   | 0.612   | 0.541   |
| Socio-economic status                     | 0.152   | 2.245   | 0.026*  | 0.139   | 2.066   | 0.040*  | 3.177   | 1.764   | 0.080   | 0.462   | 0.986   | 0.326   |
| Studied problem-solving previously        | -0.020  | -0.302  | 0.763   | -0.072  | -1.111  | 0.268   | 0.698   | 0.323   | 0.747   | -0.306  | -0.543  | 0.588   |
| Evaluation of self-problem solving skills | 0.598   | 8.993   | <.001** | 0.601   | 9.088   | <.001** | 8.501   | 5.429   | <.001** | 3.756   | 9.207   | <.001** |
| R                                         |         | 0.597   |         |         | 0.604   |         |         | 0.447   |         |         | 0.598   |         |
| R <sup>2</sup>                            |         | 0.357   |         |         | 0.365   |         |         | 0.200   |         |         | 0.357   |         |
| DW                                        |         | 2.368   |         |         | 1.975   |         |         | 2.343   |         |         | 1.868   |         |
| F                                         |         | 11.569  |         |         | 12.002  |         |         | 5.216   |         |         | 11.596  |         |
| p-value                                   |         | <.001** |         |         | <.001** |         |         | <.001** |         |         | <.001** |         |

\*\* p&lt;0.001; \* p&lt;0.05, DW: Durbin-Watson.

statistically quite significant ( $F=11.569$ ;  $p<0.001$ ). It was noted that students' evaluation of their own income level and their own problem-solving skills increased linearly in the PSC score. The model was evaluated as a well-established model ( $DW=1.975$ ). The correlation between the PSC score and independent variables was 0.604 and the 37% alteration was associated with PSC score and these variables ( $r^2=0.365$ ). It was statistically quite significant and linear ( $F=12.002$ ;  $p<0.001$ ).

It was found that students' evaluation of their gender and their own problem-solving skills had increased the total CA scores linearly and the regression model was evaluated as a well-established model ( $DW=2.343$ ). The correlation between PSC score and independent variables was 0.447. The 20% alteration in students' mean CA scores was associated with these variables ( $r^2=0.200$ ) and it was statistically quite significant and linear ( $F=5.216$ ;  $p<0.001$ ).

It was identified that students' evaluation of their own problem-solving skills has increased the total PC scores linearly. The model was evaluated as a well-established ( $DW=1.868$ ). The correlation between PC score and independent variables was 0.598. The 36% alteration in PC mean scores was associated with these variables ( $r^2=0.357$ ). When the linearity of the relationship was assessed, it was statistically quite significant and linear ( $F=11.596$ ;  $p<0.001$ ).

## Discussion

In this study, PSI total score obtained from the total scale was from 38-147. The low total score demonstrated that the individual perceives himself/herself efficient in problem-solving skills. Accordingly, it can be stated that students considered themselves as medium-level problem-solvers ( $84.47\pm21.21$ ). One of the studies that supports our research findings are of students' problem-solving skills reported as mid-level.<sup>6</sup> Students having a medium-level problem-solving skills, indicates that the education and experience they received, and the methods utilised, were not of the desired level for developing high-level problem-solving skills. According to the findings of the research, no statistically significant difference could be found between students' age groups and mean scores of the PSI. Consistent with our research findings, the age variable had no effect on problem-solving skills.<sup>9</sup>

In this study for Problem-Solving Inventory and PSC the affecting factors were determined as the participant's socio-economic status; self-evaluation of problem solving

skills for Problem-Solving Inventory and subscales (PSC, CA, and PC) and gender was found affecting factor for CA. In our research, no significant difference could be found between the gender variable and the mean score of the Problem-Solving Inventory and was parallel with the results of other studies.<sup>10</sup> However, in this study, a significant relationship was found between the inventory's CA sub-dimension and the gender variable. In a research carried out to identify personal factors that affect problem-solving perception, males acted more strategically in solving interpersonal problems and were more aware of the problem-solving process.<sup>8</sup> This study is also consistent with the research findings that mother's and father's educational levels did not impact upon students' problem-solving skills.<sup>9,10</sup> In contrast to the findings of this research, certain studies carried out on this topic reported that student's socio-economic status did not have any influence on students' problem-solving skills.<sup>7,10</sup> It was also determined in this study that receiving any previous training for problem-solving would not affect present problem-solving skills. The study also showed that students, who evaluated their own problem-solving skills, had improved problem-solving skills compared to others. It may be due to students encountering various problems during their education-learning process and experience in a clinical setting over a long period of time. Also, possible limitations include a small sample size, and the results can only be generalised to this group of senior-year nursing students.

## Conclusion

Nursing students problem-solving skills which were identified as of a medium-level, were affected by the following variables of gender, socio-economic status and evaluation their own problem-solving skills. It is recommended that the nurses training programmes should be prepared taking into consideration factors affecting the students' problem-solving skills. In many nursing schools arrangements are made related to the curriculum and content are expected to be focused on educating nurses to be care-oriented, have improved problem-solving skills, think critically and have autonomy.

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