

**ORIGINAL PAPER****Effects of the Sports Activities of Female Nursing Students on their Problem-Solving Skills and Academic Achievement****Tulay Basak, RN, PhD**

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**Abstract**

**Background:** Participation in sports are known to have many benefits for the students. It has been correlated with positive developmental indicators, including improved self-esteem, self confidence, cognitive development, social development, goal attainment, problem-solving and academic performance.

**Objective:** The study aims to identify the effects of sports on the student female nurses' problem-solving skills and academic achievement.

**Methodology** The study was designed and carried out as a descriptive and cross-sectional investigation. A total of 363 nursing students who volunteered to take part in the study at a Nursing School in Turkey participated. The data were collected through the use of a data collection form and the problem solving inventory. Independent samples t-test were used to describe and compare the mean scores of the students who do and students who don't do sports.

**Results:** The mean age of the participants was  $20.5 \pm 1.23$  years. Regarding participation in sports, 14.3% of the participants formerly dealt with sports, while 32.0% currently participate in sports. The general academic mean scores of the students who are doing and not doing sports were  $81.17 \pm 5.10$  and  $80.66 \pm 5.77$ , respectively. However, this difference was not statistically significant ( $p > 0.05$ ). The mean scores of the students who do and do not do sports had significantly differences at four dimensions of the problem solving inventory: "evaluative" ( $p < 0.05$ ), "planned" ( $p < 0.05$ ), "considering" ( $p < 0.01$ ), and "self-confident" ( $p < 0.05$ ).

**Conclusion:** This study found that students practice the following approaches toward the problem-solving process: considering, evaluation, self-confidence and planning. Well-developed problem-solving skills are significant for school nurses for efficient and high-quality health care services.

**Key Words:** sports, nursing students, problem-solving, self-esteem, academic performance

**Introduction**

A problem is defined as a difficulty that should be solved in order for individuals or societies to be successful. During the early years, individuals came across simple problems in their daily activities that were mostly related to their basic needs. However, later they came across much

more complex professional or social problems. Regardless of the nature of the problem, all problems can be efficiently solved if the problem-solving skills of individuals are sufficient (Tasci, 2005).

The individual's attitudes toward the problems they faced is more important than the fact that

there are problems (Hamarta, 2009). The process of problem-solving is complex, including cognitive, affective and behavioral activities to overcome barriers in order to achieve something (Brand-Gruwela, Wopereisa, & Vermetten 2005; Funke, 2010; Jonassen, 2000; Kara, 2012). Education may contribute to the individuals' ability to solve a problem. Including the process of problem-solving improves an individual's higher thinking skills such as critical, scientific and creative thinking (Can, Oner, & Celebi, 2009).

Furthermore, the ability to solve problems supports the individual's coping behavior (Heppner et al., 2002). One of the aims of nursing education is to improve the nurses' knowledge-base, attitude and behavior in relation to their coping strategies (Altun, 2003). Student nurses should develop the skills of solving problems, creatively thinking about solutions and making connections between events and concepts (Eser, Khorshid, Ozkutuk, & Orgun, 2009; Olgun et al., 2010). Research suggests that education based on problem-solving helps to improve the student nurses' problem solving skills (Taylor, 1997; Taylor, 2000; Wang, Kaolo, & Ku, 2004). In nursing education, it is essential for providing the quality nursing care (Kim, 2012). In addition, the development of problem solving skills in nursing is encouraged through systematic utilization of the nursing process and a problem solving approach to planning care (Müller-Staub, Lavin, Needham, & Achterberg, 2006).

In nursing education, one of the other main aim for most students and their nurse educators is to succeed academically. For this reason, it is important for the nurse educators to know which factors are likely to have an influence on students' academic achievement. Positive behaviours of the student contribute to positive academic outcomes. Because the students promote academically oriented behavior, such as intellectual curiosity, belief control, social motivation and an interest in schoolwork (Waxman & Huang, 1997; Wentzel & Wigfield, 1998).

### **Background**

The Healthy People 2010 objectives address the need for an increased number of hours required in physical education or physical activities (Knight et al., 2006). Participation in sports are known to have many benefits. It has been correlated with numerous positive developmental

indicators, including improved self-esteem, self confidence, cognitive development, social development, goal attainment, problem-solving and academic performance (Bailey, 2006; Barber, Eccles, & Stone, 2001; Chomitz et al., 2009; Marsh & Kleitman, 2003).

Sports participation positively affects academic performance by making a connection with the other academically oriented students and role models, increasing the attachments of all students to school and also enhancing self-confidence and self-esteem, and social and cognitive development (Eitle, 2005; Neal, 2010; Bailey et al., 2009). Chomitz et al. (2009) explained this relationship in terms of four reasons. First, a relationship between fitness and academic achievement may reflect the achievement orientation of motivated students. That is, motivated students may strive for achievement in both academics and physical fitness or athletics.

Second, a student's physical fitness may reflect better overall health-better nutrition, physical activity, and/or weight status and good health may contribute positively to academic achievement. Links between components of a students' health status such as weight status and food sufficiency and academic performance have been documented.

Third, physical activity and fitness may enhance students' concentration and classroom behavior in school, which may contribute positively to academic achievement.

Fourth, physical activity may improve mental health and self-esteem (Chomitz, 2009). School nurses should receive education during the school year so that they can be prepared for their roles in supporting the students' academic achievement, sports activities, physical and mental health status (Neal, 2010; Wainwright, Thomas, & Jones, 2000).

As stated in the related studies, participating in sports has positive effects on individuals' problem-solving skills (Caglayan et al., 2008; Goral, 2010; Karabulut 2009; Karabulut & Ulucan, 2011). It is also accepted that people who do sports are more independent, more objective and less apprehensive than who are not engage in any sports, and directing cognitive characteristics and affective processes like displaying behavioral reactions respectively in order to comply with the internal or external desires or appeals. They try to find alternative

ways to solve the problem, and they analyse the process at the end in order to find what serves their purpose (Goral, 2010).

There is a need for more evidence about the developmental benefits of sport participation, especially for the college students (Kane 2004). In addition, the purpose of this study related to student nurses has not been frequently studied by any nurse educators. Therefore, this study examined to identify the effects of sports on the student nurses' problem-solving skills and academic achievement. This study was guided by the following questions;

1. What is the rate of nursing students participating in sports?
2. What are the reasons of nursing students participating in sports?
3. Is there a difference between problem-solving skills of the nursing students participating in sports or not?
4. Is there a difference between general academic mean scores of the nursing students participating in sports or not?

## METHODS

### Design and Participants

The study was designed and carried out as a descriptive and cross-sectional investigation in the military nursing school. Only female students studied in this school. In Turkey, many school of nursing has female students. The study was conducted during the 2011-2012 academic year.

There were totally 378 nursing students in this school. Study sample were 363 student nurses who volunteered to take part in this study. Of these participants, those who were a member of a sports and dance clubs took part in at least one official competition and did systematic training are called "students doing sports" (n=116).

In this study, general academic mean score was accepted as academic achievement. It was calculated by the sum of total success scores of the each course during the period of education and the multiplication of all courses' credits which was divided by the sum of all courses' credits.

### Data Collection Procedures

The data were collected through the use of a data collection form that consisted of two sections. The items in the first section were developed by

the authors based on the literature review. This section is made up of 18 questions related to the socio-demographic characteristics and sports activities of the participants. The second section is an inventory of problem-solving with 35 items.

### Problem Solving Inventory

The problem solving inventory was developed by P. P. Heppner and C. H. Petersen in 1982. (Heppner & Petersen 1982) It includes 35 items and is a Likert-type scale. The items are scored using numbers ranging from one to six. Items numbered 9, 22 and 29 were excluded while scoring. Therefore, only 32 items are considered: 1, 2, 3, 4, 11, 13, 14, 15, 17, 21, 25, 26, 30 and 34 were those scored in a reverse order.

The inventory's score ranges between 32 and 192 the higher the scores, the higher the perception of insufficiency regarding problem-solving skills. The inventory was adapted to Turkish by Sahin, Sahin and Heppner (1993).

The scale's Cronbach's alpha reliability coefficient was found to be .88 with a sample of 244 undergraduate students. The factor analysis revealed that the inventory consisted of six factors as follows: "hasty approach" (related items: 13, 14, 15, 17, 21, 25, 26, 30, and 32,  $\alpha = 0.78$ ), "considering approach" (18, 20, 31, 33, and 35,  $\alpha = 0.76$ ), "avoidant approach" (1, 2, 3 and 4,  $\alpha = 0.74$ ), "evaluative approach" (6, 7 and 8,  $\alpha = 0.69$ ), "self-confident approach" (5, 23, 24, 27, 28 and 34,  $\alpha = 0.64$ ), and "planned approach" (10, 12, 16, and 19,  $\alpha = 0.59$ ).

Of these six factors, four (considering, self-confident, evaluative and planned approaches) are related to positive-desired problem-solving skills, while the remaining two factors (hasty approach and avoidant approach) are related to negative-ineffective problem-solving skills. In the evaluation of the former approaches, lower scores indicate higher levels of the related skills. In relation to the factors concerning the negative-ineffective problem-solving skills, lower scores indicate less use of the related skills (Heppner & Petersen 1982; Sahin et al. 1993).

The Cronbach's Alpha coefficient is found to be 0.80 in this study.

### Data analysis

SPSS for Windows Ver. 15.00 (SPSS Inc., Chicago, IL, U.S.) was used for the statistical analyses of the data. The appropriateness of the scale as a normal distribution was investigated by

a single sampling Kolmogorov-Smirnov test. The distribution of the data was expressed as counts and percentages, while the descriptive statistics were presented using the arithmetic mean and standard deviation frequency and percentage. The mean scores of the students who do and do not do sports were compared using an independent samples t-test. The level of statistical significance was set at  $p < 0.05$ .

### Ethical Considerations

This study was carried out after written ethical approval was obtained from the ethical committee of the military education and research hospital and application permission was granted

by the nursing school. Individual informed consent was obtained from each participant. Participants were free to refuse to participate or withdraw from the study at any time. Subjects agreed to the purpose of this study, voluntarily signed a form, and participated in the study. The survey was distributed to each participant by the authors during class time.

### Results

This section provides the study's findings concerning the effects of sporting on student nurses' problem-solving skills and academic achievement.

	n	%
Grade level (n=363)		
First-grade	103	28.4
Second-grade	100	27.5
Third-grade	105	28.9
Fourth-grade	55	15.2
Doing sports before coming to school (n=363)		
Yes	52	14.3
No	311	85.7
Doing sports (n=363)		
Yes	116	32.0
No	247	68.0
Distribution of students based on grade levels		
First-grade	21	18.1
Second-grade	36	31.0
Third-grade	42	36.2
Fourth-grade	17	14.7
How did you begin to sport (n=116)		
Family's support	41	35.3
The availability of the sport facilities	62	53.5
As a result of friends' influence	7	6.0
Other	6	5.2
Frequency (n=116)		
Everyday	27	23.3
Two or three times per a week	89	76.7
Type of the interested sports (n=116)		
Orienteering	35	30.2
Volleyball	16	13.8
Shooting	16	13.8
Dance	15	12.9
Basketball	15	12.9
Tennis	8	6.9
Mountaineering/Camping	7	6.0
Martial arts	3	2.6
Swimming	1	0.9

Table 1 indicates the participants' socio-demographical characteristics. As seen in the table, 28.9 % of participants were third graders, 28.4 % were first graders, 27.5 % were second-graders and 15.2 % are fourth graders. The mean age of the participants was 20.5±1.23 years. Regarding participation in sports, 14.3 % of the participants formerly dealt with sports, while

32.0 % currently participate in sports. As seen in Table 1, the most frequently stated reason for doing sports was the availability of the sports facilities in the school (53.5 %). It was also found that students did sports two or three days per week (76.7 %) and that they are mostly interested in "orienteeing" sports (30.2 %).

**Table 2.**Reasons for making sports (n=116)

	Totally agree		Agree		No idea		Disagree		Totally disagree	
	n	%	n	%	n	%	n	%	n	%
To improve health	63	54.3	45	38.8	5	4.3	2	1.7	1	0.9
As an activity during sparetimes	31	26.7	58	50.0	15	12.9	10	8.6	2	1.7
As a habit	26	22.4	50	43.1	17	14.7	18	15.5	5	4.3
Personal pleasure	60	51.7	43	37.1	9	7.8	2	1.7	2	1.7
To improve academic achievement	25	21.6	54	46.6	13	11.2	12	10.3	12	10.3
To make friends	14	12.1	26	22.4	25	21.6	38	32.8	12	10.3

Table 2 provides the findings about the reasons why students to do sports. The frequently stated reasons for participating in sports were "to improve health," "liking the sports," "as a spare

time activity" and "to improve their academic achievement" (93.1 %, 88.8 %, 76.7 %, and 68.2 %, respectively).

**Table 3.** Problem Solving skills and academic achievement scores of the nursing students according to making sports (n=363)

	Students Who Do Sports (n=116)	Students Who Do Not Sports (n=247)	t*	p
	Mean±SD	Mean±SD		
Hasty approach	36.06±6.25	33.80±6.78	3.042	0.01
<b>Considering approach</b>	<b>11.39±3.75</b>	<b>12.65±4.31</b>	<b>-2.707</b>	<b>0.01</b>
<b>Evlutive approach</b>	<b>6.64±2.40</b>	<b>7.45±2.87</b>	<b>-2.36</b>	<b>0.01</b>
Avoidant approach	18.50±3.62	17.06±3.82	3.401	0.01
<b>Self confident approach</b>	<b>15.48±3.88</b>	<b>16.70±4.05</b>	<b>-2.711</b>	<b>0.01</b>
<b>Planned approach</b>	<b>8.68±2.98</b>	<b>9.81±3.27</b>	<b>-3.144</b>	<b>0.01</b>
Total Scores	100.54±10.70	101.01±13.00	<b>-0.341</b>	0.73
General academic achievement scores	81.17±5.10	80.66±5.77	0.810	0.41

\*: t test

Table 3 shows the relationships between the nursing students according to making sports or do not and problem solving skills, general academic mean scores. The general academic mean scores

of the students who are doing and not doing sports were 81.17±5.10 and 80.66±5.77, respectively. However, this difference wasn't statistically significant (p>0.05; t=0.810).

The scores of the students doing sports on the dimensions of the problem solving inventory were as follows: “evaluative” ( $6.64 \pm 2.40$ ), “planned” ( $8.68 \pm 2.98$ ), “considering” ( $11.39 \pm 3.75$ ), “self-confident” ( $15.48 \pm 3.88$ ), “hasty” ( $36.06 \pm 6.25$ ) and “avoidant” ( $18.50 \pm 3.62$ ) (Table 3). The mean scores of the students who do and do not do sports were statistically different at four dimensions of the scale: “evaluative” ( $p < 0.05$ ;  $t = -2.360$ ), “planned” ( $p < 0.05$ ;  $t = -2.707$ ), “considering” ( $p < 0.01$ ,  $t = -3.144$ ), and “self-confident” ( $p < 0.05$ ;  $t = -2.711$ ).

### Discussion

In this study, we focused on identifying the effects of sports on the student nurses’ problem-solving skills and academic achievement. The results from this study indicated that 32% of the nursing students participated in sports. It was found that fewer students (14%) participated in sports before attending the nursing school. It was also found that after attending the nursing school, the rate of those who participated in sports increases by 18%. This is fairly important result that students participate in sports during nursing education. It may be a result of the supportive approach of faculty members and the availability of the sport facilities at the military nursing school. In this study, 53.5% of nursing students stated that availability of the sport facilities effects the status of beginning to sports. The military schools provide the students with sporting opportunities to improve the students’ health. Educational institutions are responsible for producing both mentally and physically healthy generations. Educational institutions in Turkey attach much more importance to sport activities with the aim of improving the students’ academic achievement (Turkcapar, 2009). In this study, most of the students reported that they participated in sports in order to improve their health status (93.1%). It may be result of nursing education curriculum. Related research suggests that health-care related courses should be included in the curriculum to make students aware of health-friendly behavior, maintenance and improvement of a healthy life (Shin et al. 2007). Such courses are known to have positive effects on the awareness of health care (Ayaz et al., 2005). The student nurses are expected to be role models for others as a result of their training (Pawloski & Davidson, 2003). Therefore, they should be encouraged to take part

in health improvement activities (Ayaz, Tezcan, & Akinci, 2005).

Based on the extant literature, we determined that it has not been found enough studies how participate in sports effects the problem-solving skills and academic achievement of nursing students. Nevertheless, there are many studies suggesting that playing sports has positive effects on physical health (Pawloski & Davidson, 2003; Monteiro & Mancussi eFaro, 2006). The findings of the study clearly show that the student nurses who participate in sports used the following approaches in terms of problem-solving skills: considering, evaluative, self-confident and planned approaches. The major approaches of the student nurses who do not participate in sports were found to be hasty approach and avoidant approach toward the problem-solving process. In the study of youth staying at orphanages, Karabulut & Ulucan (2011) found a statistically significant difference between those dealing with sports and those not dealing with sports in terms of the dimension of the avoidant approach toward problem solving. In other words, those students who do not participate in sports have a more avoidant approach to problem-solving in contrast to those that participate in sports. Therefore, sporting has positive effects on problem-solving approaches. Caglayan, Tasgin, and Yıldız (2008) examined the problem-solving skills of high school students doing sports, and Karabulut (2009) investigated the correlation between problem-solving skills of the graduate students attending the physical training department and their personal characteristics in Turkey. However, these studies did not compare the variables examined between those who participate in sports and those who do not.

A review study of “evidence based physical activity for school-age youth” shows a positive association between academic performance and physical activity (Pawloski & Davidson, 2003). We found that there was not any statistically difference between the academic achievement of the student nurses participated in sports or not. This study also provides that 68.2 % of the nursing students stated the reasons for participating in sports were “to improve their academic achievement”. This awareness may help students increase to participate in sports activities. Researchs suggest that sporting, when done systematically, has positive effects on academic achievement and individual

development (Castelli, Charles, Buck, Erwin, 2007; Oh et al., 2003).

The results from this study indicated that 30.2 % of students were most interested in orienteering sport. Orienteering is a kind of sport for finding the target indicated on a map by running during the given time. This type of sports can be useful to improve the ability of the strategic and critical thinking of individuals. Critical thinking skills are related to problem-solving (Shin 1998). School nurses should provide advice in managing the students' problems and improving their problem-solving and critical thinking skills by supporting the sports activities such as orienteering.

### Limitations

The sample of this study was derived from nursing students who participated in a nursing school. This may limit the generalizability of findings to other nursing schools and to other settings.

### Conclusion

This study found that student nurses practice the following approaches toward the problem-solving process: considering, evaluation, self-confidence and planning. Well-developed problem-solving skills are significant for school nurses for efficient and high-quality health care services regarding protection from health risks, and maintaining and promoting a high-level of life quality.

Physical activity is one of the "school health programs" components in the 21st century. This program are employed by teachers, administrators, support staff, nurses, counselors, psychologists, social workers. Nursing students may be one of the school health coordinator in future. School nurses occupy a key position to counsel about health risks of the school aged students, assist for the management of physical, mental, and psychosocial problems by organising the health education programs for the parents, teacher and students. Therefore, this study also emphasizes that college educators should increase their awareness in the importance of physical activity for youth to improve the students' problem solving skills and strategies during the process of their university career. Physical activity may also increase the problem solving skills and positive gains in academic performance for the students.

The findings of this study will guide future studies with a larger population. Such studies may be planned by comparing young people who attend university and those who do not in terms of their problem-solving approach and perspective based on their involvement in sports.

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