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Stress**

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The Reflection of Online Education during the Covid-19 Pandemic on Nursing Students' Care Behaviors and Stress

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Abstract

The pandemic period creates a feeling of inadequacy in applying the education that students receive. During this period, students who receive online education seem to feel inadequate and experience stress in a practical lesson. It aims to evaluate the level of changing the care behaviors of undergraduate nursing students and the stress they experience during the Covid-19 process. This research was completed with a nursing student in 2192 in Turkey. The research is descriptive and relationship-seeking. Data were collected at the end of the semester with the caring behaviors competency and the stress scale. t-tests, Kolmogorov-Smirnov tests, and correlation tests were used in the analysis of the data. Bachelor of Science in Nursing (BSN) students are predominantly in the first year of study. A significant difference was found in the perceived stress level according to the variables of gender, education level, perceived care sufficiency, and the type of university attended. It was determined that the caring behaviors of male students were higher than females, and those in private schools were higher than those in public universities. Nursing students' age, class, and perceived stress scores significantly affect their care behavior. Nursing education in Turkey focuses on care-based education which emphasizes skill development across the BSN program, establishing measurable care behavior, and ensuring that managing student stress is part of the curriculum content.

Introduction

Nursing education is a planned program with theoretical and clinical infrastructure that aims to provide a Professional (Sheu et al., 2002). Nursing educators play a critical role in training nurses ready to work in the current pandemic conditions (Taylor et al., 2020). Student education in this period; is carried out through online platforms and innovative methods are developed to explain the processes (Aggarwal et al., 2020). Strategies determined in the continuation of nursing education aim to provide practice related to clinical infrastructure rather than continuing education. For this reason, trainers make significant efforts for the active use of different application tools and methods.

Care, which is the basic component of nursing practices, is considered a competency that should be taught to students (Begum & Slavin, 2012). It constitutes the necessity of creating, developing, and adopting the concept of care in the nursing curriculum as an important field of study (Begum & Slavin, 2012; Schoenhofer, 2001). To evaluate the effects of nursing care on the patient and the quality of their care, it is necessary to determine the care behaviors of nursing students, especially during the pandemic period.

In nursing programs where the individual's knowledge, attitudes, and skills are applied, students are faced with stress factors that affect their academic performance (Pulido-Martos et al., 2012; Sheu et al., 2002). Learning stress can create different results, especially in an environment where different stressor factors such as pandemics exist. It is stated that the thinking and decision-making competencies of the students change, their health is adversely affected, and even the negative effects of their professional motivation reduce their professional competence (Altıok & Üstün, 2013; Edwards et al., 2010).

Continuing nursing education during the pandemic is important both to ensure the continuity of professional development and to meet the need for personnel who can work in the field. Research; is a descriptive study that seeks relationships, aiming to evaluate the effects of the online training that Undergraduate BSN students receive during the Covid-19 process on their care behaviors and stress.

Method

This study determines and evaluates the care behavior competence of students after the care training given within the scope of Covid-19. Quantitative data was collected from students receiving online education.

Participants and Data Collection

The research was completed without sampling with 2192 BSN students who met the research acceptance criteria, which can be accessed from online platforms between January and June 2021. BSN students aged 18 and over, training in Turkey, reading and understanding Turkish, and taking at least one semester of online nursing care training were accepted for the study. In the power analysis performed using the GPOWER package program, the mean scores of the care behaviors scale, which is the dependent variable of the research, were used. As a result of the analysis, the sample power was found to be 99.9% at the 0.05 significance level.

Data Collection Tools

The Caring Behaviors Scale-24, which is a quantitative assessment criterion, was used to evaluate care outcomes. Nursing students' perceived stress scale was used to determine the stress in students. In addition, demographic information was collected and included the participant's age, gender, race/ethnicity, and year of employment. The study was reviewed and approved by the central university ethics committee. Completing the questionnaires submitted on the online platform was accepted as informed consent.

The questionnaire prepared on the online platform (Google Forms) was sent to the students who met the sampling criteria via WhatsApp, Instagram, LinkedIn, Facebook, and e-mail. In the questionnaire, there are students' introductory characteristics, caring behavior development scale, and nursing students' perceived stress scale.

1. Introductory Features Questionnaire

It consists of nine questions that will determine the socio-demographic characteristics of the students (age, gender, educational status, etc.).

2. Caring Behaviors Scale-24 (CBS-24)

The validity and reliability study of the scale developed by Wolf et al. (Wolf et al., 1994), made with patients and nurses, and consisting of 42 items in its original version, was conducted by Kurşun and Kanan (2012) with patients and nurses (Kurşun & Kanan, 2012). The internal consistency of the scale ranged from 0.96 for both patients and nurses and between 0.82 and 0.92 for subgroups. The scale consists of 24 items and 4 sub-dimensions (assurance, knowledge-skill, respect, commitment). After the scores of all items are summed, the total scale score between 1-6 is obtained by dividing the collected score by 24. The high mean score obtained from the scale indicates that the perception of nursing care is high, and the low mean perception of nursing care is low (Kurşun & Kanan, 2012). The Cronbach alpha value of the scale in our study was determined as 0.98.

3. Nursing Students' Perceived Stress Scale (PSS):

The original scale is in Chinese and consists of 29 items (Sheu et al., 2002). The six-factor structure of the scale, whose English version was used in the original study, explains 50.7% of the total variance. In the original study, Cronbach's alpha found 0.89, sub-dimensions 0.87–0.89 (Chan et al., 2009). The scale was adapted to Spanish as 30 items and the total variance was 56.1% and the Cronbach's alpha coefficient was 0.85–0.70 (Jimenez et al., 2010). The Cronbach alpha value of the scale, which was validated in Turkish by Karaca et al., was found in the range of 0.67–0.93 (Karaca et al., 2015).

In the evaluation of the items; A five-point Likert-type assessment was used, with '4– Very stressful for me, 3, 2, 1, 0– Not stressful for me. Sub-dimensions: stress caused by lack of professional knowledge and skills, stress experienced while caring for the patient, stress caused by homework and workload, stress caused by lecturers

and nurses, stress caused by the environment, stress caused by peers and daily life. Total score; It ranges from 0 to 116. A high score indicates a high degree of stress (Sheu et al., 2002). The Cronbach alpha value of the scale in our study was found to be 0.97.

Data Analysis

The data obtained from the research were analyzed using the SPSS (Statistical Package for Social Sciences) 25.0 program. Percentage, the significance of the difference between two means in dependent-independent groups, one-way analysis of variance, and correlation test were used in the evaluation of the data. The compatibility of the data with the normal distribution was determined by the Kolmogorov-Smirnov test. Obtained data were evaluated at a 5% significance level with a 95% confidence interval.

Results and Discussion

The research sample (N=2192) includes students who continue their nursing education. The mean age of the participants was 20.5±1.6 and most of them were women (87.5%). 42.5% of the participants represented the Mediterranean, 17.3% Southeastern, 13% Black Sea, 8.1% Central Anatolia, 7.3% Aegean, 7.1% Marmara, and 4.7% Eastern Anatolia Region. It was seen that 55% of all participants were first graders, 10.2% were second graders, 17% were third graders and 17.8% were fourth graders. The students felt sufficient in caregiving at 3.06±0.9 (min:1, max:5). While 91.9% of all participants stated that they liked their profession, they expressed their concern with 3.31±1.1 (min:1, max:5).

Table 1. Distribution of nursing students' average scores obtained from the CBS-24

| Characteristic | N (%) | Assurance | Knowledge- skills | Respect | Commitment | Total |
|----------------------------------------|-------------|---------------------|----------------------|---------------------|---------------------|----------------------|
| | | Mean±SD | Mean±SD | Mean±SD | Mean±SD | Mean±SD |
| Gender | | | | | | |
| Female | 1197 (87.5) | 5.59±0.77 | 5.39±0.92 | 5.60±0.77 | 5.51±0.85 | 5.52±0.78 |
| Male | 275 (12.5) | 5.78±0.39 | 5.65±0.48 | 5.76±0.30 | 5.66±0.46 | 5.71±0.57 |
| | 2192 (100) | t=4.03 p<0.0001 | t=4.51 p<0.0001 | t=3.44 p<0.0001 | t=2.80 p<0.0001 | t=3.95 p<0.0001 |
| Education level | | | | | | |
| First | 1206 (55.0) | 5.74±0.53 | 5.57±0.68 | 5.72±0.49 | 5.66±0.58 | 5.67±0.52 |
| Second | 223 (10.2) | 5.58±0.52 | 5.35±0.66 | 5.65±0.56 | 5.58±0.52 | 5.54±0.50 |
| Third | 372 (17.0) | 5.52±0.64 | 5.26±0.67 | 5.57±0.67 | 5.41±0.91 | 5.44±0.68 |
| Fourth | 391 (17.8) | 5.35±1.23 | 5.16±1.44 | 5.35±1.24 | 5.23±1.25 | 5.27±1.24 |
| | 2192 (100) | F=31.64 p<0.0001 | F=28.18 p<0.0001 | F=27.05 p<0.0001 | F=32.12 p<0.0001 | F=33.05 p<0.0001 |
| Perceived caregiving competence | | | | | | |
| Good | 172 (7.8) | 5.31±1.70 | 5.22±1.67 | 5.28±1.69 | 5.28±1.69 | 5.27±1.68 |
| Acceptable | 1905 (86.9) | 5.66±0.56 | 5.49±0.69 | 5.67±0.55 | 5.57±0.68 | 5.60±0.57 |
| Weak | 115 (5.2) | 5.37±0.73 | 4.64±0.69 | 5.26±0.69 | 5.24±0.74 | 5.13±0.76 |
| | 2192 (100) | F=24.55 p<0.0001 | F=58.55 p<0.0001 | F=38.11 p<0.0001 | F=18.46 p<0.0001 | F=35.47 p<0.0001 |
| Perceived anxiety | | | | | | |
| Very | 436 (19.9) | 5.30±0.82 | 4.91±0.98 | 5.34±0.80 | 5.14±0.95 | 5.17±0.81 |
| Acceptable | 1578 (72.0) | 5.73±0.45 | 5.58±0.63 | 5.74±0.45 | 5.67±0.54 | 5.68±0.46 |
| Little | 178 (8.1) | 5.33±1.67 | 5.27±1.65 | 5.26±1.65 | 5.25±1.65 | 5.28±1.65 |
| | 2192 (100) | F=78.16 p<0.0001 | F=111.36 p<0.0001 | F=79.51 p<0.0001 | F=92.60 p<0.0001 | F=101.11 p<0.0001 |
| University | | | | | | |
| State University | 1226 (55.9) | 5.45±0.89 | 5.25±0.99 | 5.48±0.89 | 5.33±0.98 | 5.38±0.89 |
| Private University | 966 (44.1) | 5.82±0.40 | 5.64±0.65 | 5.79±0.37 | 5.79±0.42 | 5.76±0.40 |
| | 2192 (100) | t=11.85 p<0.0001 | t=10.39 p<0.0001 | t=10.87 p<0.0001 | t=13.34 p<0.0001 | t=12.16 p<0.0001 |

N: number of students, SD: standard deviation, F: ANOVA, t: Independent samples-test, p: statistical significance

It was determined that the mean scores of the participants' CBS-24 items were quite close to each other. More than 60% of the participants always described the care behaviors of "Listen to the patient carefully", "Treat the patient as an individual", "Keep the patient's information confidential", "Encourage the patient to call when

he/she has a problem" and "Administer the patient's treatments and medications on time" stated. Less than 60% stated that they can always perform care behaviors such as "using tools and equipment skillfully", "Exhibiting professional/professional knowledge and skills", "responding promptly to the patient's call", and "knowing how to administer injections, IV interventions". It was determined that the caring behaviors of male students were higher than females, and those in private schools were higher than those in public universities (Table 1).

Table 2. Distribution of nursing students' average scores obtained from the PSS

| Characteristic | N (%) | Stress from lack of professional knowledge and skills | Stress from taking care of patients | Stress from assignments and workload | Stress from teachers and nursing staff | Stress from clinical environment | Stress from peers and daily life | Total |
|----------------------------------------|-------------|-------------------------------------------------------|-------------------------------------|--------------------------------------|----------------------------------------|----------------------------------|----------------------------------|---------------------|
| | | Mean±SD | Mean±SD | Mean±SD | Mean±SD | Mean±SD | Mean±SD | Mean±SD |
| Gender | | | | | | | | |
| Female | 1197 (87.5) | 7.01±3.29 | 19.40±8.10 | 12.46±5.20 | 14.09±6.42 | 6.38±3.45 | 9.40±4.33 | 68.78±28.76 |
| Male | 275 (12.5) | 7.08±3.40 | 19.61±7.85 | 12.58±4.39 | 15.05±5.56 | 7.09±3.51 | 9.70±3.58 | 71.13±26.19 |
| | 2192 (100) | t=0.32 p=0.74 | t=0.37 p=0.22 | t=0.36 p=0.003 | t=2.34 p=0.01 | t=3.16 p=0.002 | t=1.11 p<0.0001 | t=1.28 p=0.02 |
| Education level | | | | | | | | |
| First | 1206 (55.0) | 6.37±3.26 | 16.88±7.89 | 11.67±5.46 | 12.71±6.37 | 5.65±3.50 | 8.71±4.36 | 62.02±28.80 |
| Second | 223 (10.2) | 9.26±1.85 | 26.13±3.05 | 15.43±2.71 | 19.41±2.81 | 8.51±2.30 | 13.30±1.87 | 92.06±11.55 |
| Third | 372 (17.0) | 6.95±3.16 | 22.26±5.63 | 12.89±3.93 | 15.32±5.19 | 6.83±2.94 | 9.60±3.40 | 73.88±21.18 |
| Fourth | 391 (17.8) | 7.82±3.50 | 20.82±9.08 | 12.88±5.29 | 14.82±6.73 | 7.47±3.60 | 9.35±4.39 | 73.17±31.45 |
| | 2192 (100) | F=61.63 p<0.0001 | F=130.20 p<0.0001 | F=38.41 p<0.0001 | F=86.77 p<0.0001 | F=64.97 p<0.0001 | F=81.97 p<0.0001 | F=89.01 p<0.0001 |
| Perceived caregiving competence | | | | | | | | |
| Good | 172 (7.8) | 5.40±4.98 | 15.66±11.06 | 9.86±6.77 | 10.73±9.46 | 5.53±4.98 | 6.16±5.69 | 53.37±42.24 |
| Acceptable | 1905 (86.9) | 6.98±3.07 | 19.32±7.64 | 12.43±4.86 | 14.20±5.89 | 6.38±3.30 | 9.56±3.98 | 68.88±26.41 |
| Weak | 115 (5.2) | 10.20±1.17 | 27.00±3.64 | 17.20±2.04 | 19.60±2.88 | 9.40±1.50 | 12.40±2.88 | 95.80±11.92 |
| | 2192 (100) | F=78.99 p<0.0001 | F=74.07 p<0.0001 | F=76.66 p<0.0001 | F=72.06 p<0.0001 | F=49.89 p<0.0001 | F=85.74 p<0.0001 | F=82.65 p<0.0001 |
| Perceived anxiety | | | | | | | | |
| Very | 436 (19.9) | 8.38±2.95 | 24.04±5.36 | 13.78±3.46 | 17.14±4.28 | 7.88±2.24 | 11.65±3.04 | 82.91±18.32 |
| Acceptable | 1578 (72.0) | 6.78±3.07 | 18.62±7.48 | 12.47±5.04 | 13.63±6.00 | 6.11±3.38 | 9.06±4.14 | 66.70±26.95 |
| Little | 178 (8.1) | 5.81±4.85 | 15.40±12.68 | 9.33±7.25 | 12.14±10.03 | 6.20±5.39 | 7.36±5.50 | 56.26±45.17 |
| | 2192 (100) | F=55.19 p<0.0001 | F=111.64 p<0.0001 | F=50.30 p<0.0001 | F=66.64 p<0.0001 | F=46.80 p<0.0001 | F=93.87 p<0.0001 | F=80.45 p<0.0001 |
| University | | | | | | | | |
| State University | 1226 (55.9) | 6.99±3.28 | 20.10±8.39 | 12.21±4.99 | 14.40±6.42 | 6.50±3.51 | 9.17±4.37 | 69.41±29.22 |
| Private University | 966 (44.1) | 7.07±3.34 | 18.59±7.56 | 12.80±5.23 | 13.97±6.19 | 6.42±3.42 | 9.78±4.07 | 68.66±27.46 |
| | 2192 (100) | t=0.55 p=0.57 | t=4.37 p<0.0001 | t=2.68 p=0.007 | t=1.57 p=0.11 | t=0.52 p=0.60 | t=3.33 p=0.001 | t=0.60 p=0.54 |

N: number of students, SD: standard deviation, F: ANOVA, t: Independent samples-test, p: statistical significance

Table 2 shows the perceived stress scale total scores of the nursing students and their sub-dimension mean scores. It was determined that perceived stress caused a significant change according to gender, education level, perceived care sufficiency, perceived stress, and the type of university he/she attended.

A significant correlation was found between the nursing students' age, class, perceived stress score, and caring behavior scores. It was observed that this significance was positively correlated with perceived stress and negatively correlated with caring behaviors, both for age and class. It was determined that as the perceived stress increased, caring behaviors decreased (Table 3).

Table 3. Age, class, CBS-24, and PSS correlations of nursing students

| Features | Age | Education level | CBS-24 |
|-----------------|----------------------|----------------------|----------------------|
| Education level | R=0.769 p<0.0001 | | |
| CBS-24 | R=-0.203 p<0.0001 | R=-0.208 p<0.0001 | |
| PSS | R=0.103 p<0.0001 | R=0.181 p<0.0001 | R=-0.238 p<0.0001 |

The reflectios of the distance education that nursing students received during the pandemic period on their stress and care behaviors were examined comparatively. It is seen that there is a parallelism between the stress perceived by nursing students and their scale scores during the pandemic process and that there is an inverse relationship between stress and care behaviors. It was thought that the research had a homogeneous distribution in that it included samples from every region of Turkey, from every class, and both public and private schools.

According to the CBS-24 scale mean scores, significant differences were determined according to gender, education level, perceived care behavior, perceived anxiety, and university ($p < 0.05$). It was observed that more than four-fifths of the participants adopted the care behaviors of "Listen to the patient carefully", "Treat the patient as an individual", "Keep the patient's information confidential", "Encourage the patient to call when he has a problem" and "Administer the patient's treatments and medications on time". Less than three-fifths said that they did not feel good enough in care behaviors such as "using equipment skillfully", "Exhibiting professional/professional knowledge and skills", "Responding immediately to the patient's call", and "knowing how to administer injections, IV interventions". In a study conducted with nurses with a similar measurement tool, it was seen that nurses scored high in their care behaviors in items requiring skill (Uzelli Yılmaz et al., 2017). It was thought that the high scores of the students mostly in the care behavior items on communication might be due to the clinical practice deficiencies arising from online education.

It was determined that male students were higher in all CBS-24 sub-dimension mean scores. In a study using a similar measurement tool, it was seen that women had high scores in all sub-dimensions (Uzelli Yılmaz et al., 2017), in another study, it is noted that women are significantly higher (Türk et al., 2018). It was thought that this difference in the study may be due to the fact that women are more concerned about their professional competencies than men.

When the distribution of CBS-24 scores of the students according to the classes was evaluated, it was determined that the average scores of caring behaviors decreased as the class increased, but there was a negative significant correlation between them. In studies conducted with a similar measurement tool, it is seen that scale scores increase as the class increases, and this situation is associated with theoretical knowledge (Gül & Arslan, 2021; Labrague et al., 2017). It was evaluated that this adverse result in the research could be caused by stress caused by the pandemic and that the students could see their problems related to their self-efficacy more clearly as they approached graduation. In addition, it was thought that the first and second-year students thought that they had time to complete their self-efficacy and that other students were at the graduation stage.

Significant differences were found in terms of gender, education level, perceived care behavior, and perceived anxiety according to PPS scale score averages ($p < 0.05$). It was seen that men had a higher stress level than women, and this level was mostly related to peers and daily life sub-dimensions. In a study conducted with a similar measurement tool, it was stated that women experienced higher levels of stress than male students in terms of all sub-dimensions and total average scores, except for the stress sub-dimension caused by a lack of professional knowledge and skills (Karaca et al., 2017). In another study, although there is no significant difference between them, it is noted that women experience more stress (Suarez-Garcia et al., 2018). In our study, it was thought that the fact that men experienced significantly more stress than women might be related to their self-efficacy. It can be considered normal for all students who have not yet completed their professional qualifications to have high professional concerns.

It is seen that as the education level of the students increases, their stress decreases. Similarly, in another study, it is observed that the stress level decreases according to the grade level (Suarez-Garcia et al., 2018). In a systematic study, it was pointed out that the professional experience of students is an important source of stress (Turner & McCarthy, 2017). It is thought that the stress levels of second-year students are significantly higher than the others, which may be associated with the pandemic. It can explain that the first-year students have not yet been aware of the university and professional equipment, but the second-year students experience higher stress than the others because they have received vocational training online for the last 1.5 years. In addition, it is thought that the group who received online education during the pandemic experienced the anxiety of not being able to perform clinical practice until graduation, which can be explained by the high-stress levels caused by the patients.

The perceived care behaviors of students with high-stress levels are also high, suggesting that stressed students attempt to provide better care services. In another study, it was determined that as students' perceived stress levels increase, their avoidance needs to increase (Karaca et al., 2017). In a study conducted with first-year students during the pandemic period, it is pointed out that management strategies where students' stress levels are high should be improved (Bhurtun et al., 2021). When the results of the research are evaluated, it is seen that the stress levels of nursing students are high and they are insufficient to cope with the advantageous and disadvantageous situations of stress in providing care services.

As age and education level increase, it is seen that the stress level creates a positive and a negative change in care behavior. It is determined that as the stress level increases, the level of developing care behaviors

decreases, and this relationship is significant. In one study, it was pointed out that there was a significant negative relationship between stress and care behaviors among nursing students (Li et al., 2020). This shows that high-stress level negatively affects caring behavior. It suggests that in cases where it is aimed to increase caring behaviors, attempts should be made to evaluate and reduce stress.

With this research, it is possible for nursing educators to evaluate the relationship between care and stress and to evaluate the online education given during the pandemic. It is seen that there are serious differences between the stress levels of the group who received active education before and the students who have never experienced active learning. It is seen that the education provided by the nursing programs, which are trained based on clinical practice, on online platforms is not sufficient to develop care behavior. In addition, it should not be forgotten that this situation is perceived as a stressor by students and is reflected in their care. Students state that they are negatively affected by the care behaviors they will offer to both their peers and patients, and they have problems in care due to stress. It is thought that the nursing education planned during the pandemic should be reviewed with these results and the stressors of the students should be considered in the curriculum plan.

Conclusion

The competency of the nursing profession is a compulsory education to be carried out practically. This situation requires careful management of the application areas from the training content. It should be foreseen that different application methods are needed in cases such as pandemics where the online education process is mandatory. Conducting nursing education remotely both causes stress and results in inadequacy in care behaviors. In this case, it is important to prepare student-centered technological environments and to maintain the application areas as soon as possible.

Limitation

This study contains some limitations. The survey included a small number of male participants relative to the number of women, but it should be noted that this widely reflected the gender distribution among all nursing schools across the country. However, the small number of male participants limited gender comparisons in this study. Another limitation is that research data is based on student self-reported data; however, a similar approach was often adopted in previous studies.

Recommendations

Patient data was required to access the findings of this study. To effectively provide online nursing education, a robust digital infrastructure, and interactive content should be utilized. Students ought to benefit from diverse digital tools to enhance their theoretical knowledge and practical skills. Regular evaluations of students' education should be conducted, accompanied by the development of improvement strategies. No input from patients or the public was necessary for the design, analysis, or interpretation of the study, or the preparation of the article. Nonetheless, the research data holds significance for the public.

Scientific Ethics Declaration

*Before the implementation of the study, the ethics committee approval and written permission from the hospital were obtained from Gumushane University on (No. 2021/11). In collecting the data, the researcher informed the nursing students about the purpose, method, and scope of the scientific research, and their consent was obtained.

* The author declares that the scientific ethical and legal responsibility of this article published in JESEH journal belongs to the author.

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