







## Research Article

## The Effects of Training About Prevention of Factors Associated with Musculoskeletal Symptoms on Nursing Students Affectivity

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### Abstract

**AIM:** This study aimed to evaluate the effectiveness of pedagogical training program for the prevention of musculoskeletal symptoms in affectivity of nursing students.

**METHOD:** A quantitative, longitudinal, and quasi-experimental study, which included a pre-test, intervention, and a later test was conducted in a convenience sample of 21 students from the 4<sup>th</sup> year nursing degree at a private university in the region of Lisboa e Vale do Tejo. A total of 11 students were included in the experimental group and 10 were included in the control group. A multidisciplinary team conducted the musculoskeletal symptoms prevention program to the experimental group. Participants completed the Positive and Negative Affect Schedule Scale before and after attending each of the 6 program sessions that took place between February and April 2019. Each session lasted for about 120 minutes.

**RESULTS:** Before implementing the program, the groups did not reveal any statistically significant differences in positive and negative affectivities. However, after the program, there were statistically significant differences observed in positive affectivity, showing gains in the experimental group, and a decrease in negative affectivity was observed in the experimental group. A significant increase in positive affectivity was observed in psychotherapeutic techniques.

**CONCLUSION:** Is essential the nursing schools provide learning experiences with an impact on students' affectivity to allow a better and more effective integration of knowledge and skills in their training path.

**Keywords:** Health education, higher education, nursing students, subjective well-being

### Introduction

Nursing students' training has been a subject of constant changes. It has been influenced by the transformations that took place in teaching until it reached a student-centered training methodology. This methodology should include pedagogical programs that enable the training of qualified professionals and should contribute to the realization of changes that strengthen it (Draganov et al., 2013; Tonhom et al., 2016). Bearing in mind that students in their 4<sup>th</sup> year of nursing have all reached adulthood and experienced contact with the

reality of the profession, they now play an active role in their training and the teacher becomes a facilitator of their overall learning process. The experience gained by each person, as well as the individual cognitive structure, both influence the learning process and the retention of new knowledge (Carneiro et al., 2018; Fonseca, 2016). Learning experience comes from positive affective experiences that reflect pleasure and subjective well-being and other negatives that may include discontent, fear, nervousness, and worry (Chaves et al., 2016). Subjective well-being is defined based on the assessment that each person makes of his own life or

relapses into the peculiar aspects of it as a whole (Porta-Nova, 2009). Studying the subjective well-being of nursing students is considered to be a research contribution in the fields of education and nursing. It seeks to understand the perception that students have of the relevance of what is taught and how this knowledge can contribute to their academic performance, autonomy, and accountability for their future (Bublitz et al., 2012; Chaves et al., 2016).

As professionals and professors of nursing and health who are directly involved in this training process, the authors have identified the need to enhance the role of students in their training. The theme of musculoskeletal symptomatology (MS) was chosen to carry out a pedagogical training program for nursing degree students (NDS), which has been predisposed to this type of symptomatology in both the basic course and professional life. Overload, repetitive movements, inadequate postures related to positioning and transfers, excessive computer use, academic and professional stress, and depression and anxiety can be predictors of decreased quality of life and well-being for NDS and future nurses (Abledu & Offei, 2015; Bublitz et al., 2012; Firmino et al., 2018; Firmino et al., 2019), which impact their life experience and learning ability. Motivated by the interest in investigating, which is the most appropriate intervention to help students in the process of acquiring skills for the prevention of MS, no research was found on this topic. Authors believe that the prevention and/or reduction of MS in nursing students will have an impact on their well-being and their learning effectiveness. For this reason, a multidisciplinary team promoted a pedagogical training program, with the aim to prevent and intervene in the reduction of MS. This research/action program is supported by theoretical models aimed at avoiding and/or modifying unhealthy behaviors through postural exercises, positioning and transfer of patients, manual handling of loads, relaxation techniques, and mindfulness. It also includes occupational health through the promotion of health, well-being, and productivity. These themes are in line with several authors who report improvements in the symptoms described above. (Capelo, 2011; Mark & Smith, 2011; Martins et al., 2013; Orly et al., 2012). This study aimed to describe the affectivity of nursing students before and after the training program.

Considering the above, the following research question has been formulated: what is the effectiveness of a pedagogical training program for the prevention of MS, in the affectivity of nursing students?

Therefore the following research hypotheses were formulated:

### **Hypotheses 1: Positive affectivity**

H0- There are no statistically significant differences between the results of the control group and the experimental group observed in positive affectivity before the frequency of the prevention and intervention program in reducing MS.

H1- There are statistically significant differences between the results of the control group and the experimental group observed in positive affectivity before the frequency of the prevention and intervention program in reducing MS.

### **Hypotheses 2: Negative affectivity**

H0- There are no statistically significant differences between the results of the control group and the experimental group observed in negative affectivity before the frequency of the prevention and intervention program in reducing MS.

H1- There are statistically significant differences between the results of the control group and the experimental group observed in negative affectivity before the frequency of the prevention and intervention program in reducing MS.

### **Hypotheses 3: Therapeutic approaches**

H0- There are no statistically significant differences between the results of the control group and the experimental group observed in the different therapeutic approaches of the prevention and intervention program in reducing MS.

H1- There are statistically significant differences between the results of the control group and the experimental group observed in the different therapeutic approaches of the prevention and intervention program in reducing MS.

## **Method**

### **Study Design**

This study is a quantitative, longitudinal, and quasi-experimental study.

### **Sample**

Was conducted in a convenience sample of 21 NDS, which included a pre-test, an intervention, and a later test. Included students from the 4th year of the

nursing degree at a private university in the region of Lisboa e Vale do Tejo.

### Data Collection

**Sociodemographic Questionnaire:** The sample was characterized according to gender and age.

**Positive and Negative Affect Schedule-PANAS:** The Portuguese version of PANAS by Galinha & Pais-Ribeiro (2005) was used, presenting a Cronbach's alpha coefficient of positive affection 0.86 and positive affection of 0.89, considered as adequate values for the reliability and internal consistency of the scale. It consists of 20 emotions composed of 2 subscales (10 positive and 10 negative emotions), which allow to measure positive affection (PA) that reflects pleasure and well-being, including emotions such as enthusiasm, inspiration and determination, and negative affection (NA) that reflects subjective displeasure and malaise, including emotions such as fear, nervousness, and disturbance. The PA is quoted by summing up the scores of the items: 1, 3, 5, 9, 10, 12, 14, 16, 17, and 19. The NA is quoted by summing up the scores of the items: 2, 4, 6, 7, 8, 11, 13, 15, 18, and 20. Both subscales vary in total between 10 to 50 points. Higher values represent greater positive or negative affectivity.

Students were asked to indicate the extent to which they felt each emotion at the time of taking the test, on a "Likert" type scale composed of five items: nothing or slightly (1), a little (2), moderately (3), a lot (4), and extremely (5). It should be noted that this scale, although not presenting a global value, allows to obtain an affective balance, resulting from the positive and negative affections. It arose from the need to obtain a brief, valid, and easy-to-manage measure, to estimate the dimensions of affectivity. This scale is used worldwide, mainly in the age group of adolescents and young adults, which allows us to conclude the validity of this instrument for our group of students, giving greater strength to the intervention program.

In this study, the internal consistency of PANAS at the beginning of the study (pre), is inadmissible < 0.6 (Pestana & Gagueiro, 2005) for both positive affectivity (Cronbach's alpha=0.39) and negative affectivity (Cronbach's alpha=0.46). However, for the measurement after internal consistency, it was excellent for the subscale of positive affectivity (Cronbach's alpha=0.96) and showed a good internal consistency for negative affectivity (Cronbach's alpha=0.87). The study took place between February and April

2019. Before starting the protocol, research objectives were informed to the participants. Group selection was made through a simple random sampling: of the 26 students enrolled and attending the 4<sup>th</sup> year, 13 of them were included in the experimental group and the other 13 were included in the control group. According to the inclusion criteria, a total of 5 students were excluded, leaving the sample size as 21, out of whom 11 were included in the experimental group while 10 were included in the control group. Inclusion criteria were as following: (i) NDS students enrolled in the 4<sup>th</sup> year, (ii) the students of the experimental group be present in all sessions, and (iii) complete the Positive and Negative Affect Schedule Sacle (PANAS) questionnaire before and after each intervention. Exclusion criteria included dropping out of students.

During the intervention, the class was divided, the control group stayed with the teacher of the respective course unit and the other group stayed with the program multidisciplinary team: psychologist, rehabilitation nurse, occupational physician, ergonomist, physiotherapist, and university professor of expressive techniques and health education.

The program for the prevention of factors associated with MS was applied to the experimental group, consisting of 6 sessions of 120 minutes each. Participants were asked to complete PANAS before and after each session.

The MS prevention and intervention program comprised the following sessions:

Session 1: Relaxation techniques: Physical Education perspective and mentoring.

Session 2: Positioning and transfers: The perspective of the Rehabilitation Nurse.

Session 3: Manual Handling of Loads: Perspective of Ergonomics.

Session 4: Physiotherapy exercise program for the prevention of MS.

Session 5: Mindfulness in musculoskeletal symptoms: Perspective of Psychology.

Session 6: Prevention of musculoskeletal symptoms: Perspective of the Occupational Medicine Doctor.

### Statistical Analysis

All statistical procedures were performed using IBM Statistical Package for the Social Sciences v.25 (IBM SPSS Corp., Armonk, NY, USA) for a significance level of 5%. The differences in the scores of

the PANAS positive and negative affectivity scales (difference=post – pre) were computed to evaluate the effectiveness of the intervention program, as well as the contribution of the therapeutic approaches used. Given the small sample size of this study (n=21), non-parametric tests were performed, as they do not depend on the assumption of normal distribution of the dependent variable. The effectiveness of the program was calculated through the difference in affectivity, positive and negative, after and before the program, and examined by Mann-Whitney tests. To assess the effectiveness of each therapeutic approach within the program, two non-parametric Friedman tests were performed. Bonferroni's correction was applied for multiple comparisons of order averages (Marôco, 2011). The effect size of the Mann-Whitney U test was calculated based on the formula  $r = \frac{Z}{\sqrt{n}}$  and for Friedman's test it was calculated through Kendall's W. The magnitude of the effect of multiple comparisons (post-hoc tests with Dunn-Bonferroni correction) was calculated using the same formula for the Mann-Whitney U test. The magnitude of the effect was interpreted according to the criteria of Cohen (1988) (0.1 [weak], 0.3 [moderate], and above 0.5 [strong]).

### Control of "Confusing" Variables

To ensure that the effectiveness of the intervention program was not being explained by other factors, it was verified that gender and age did not differ between the two groups (experimental versus control). The association chi-square did not reveal that the different gender categories of the groups were associated  $\chi^2(1)=0.40$ ;  $p=0.635$ .

Similar results were verified for age, with no difference in mean ages between groups  $Z=-0.21$ ,  $p=0.863$ ,  $r=0.03$ , thus ensuring homogeneity between the groups compared.

### Ethical Considerations

In this study, the ethical standards contained in the Helsinki declaration and Oviedo Convention were respected, having been authorized and approved in 24/06/2017 by the ethics committee of the institution (Approval number 03/2017/CE). Authorization was also required to use the PANAS scale, and the respective authorization was formalized in writing, via email. After clarification about the objectives of the study, data collection process, and confidentiality, written informed consent and voluntary par-

ticipation were requested from each participant, respecting the principle of autonomy. The confidentiality of all collected information was also guaranteed to the participants.

## Results

### Sample Characteristics

A total of 21 students aged between 21 and 28 years (M=24.10; SD=2.00) were considered in the study, out of whom 76.20% were women (n=15) and 23.80% men (n=6) (Table 1).

### Analysis of the Intervention Program Impact (Positive Affectivity and Negative Affectivity)

The results did not reveal statistically significant differences in the positive affectivity  $Z=0.14$ ,  $p=0.887$ ,  $r=0.03$  and in the negative affectivity  $Z=1.50$ ,  $p=0.133$ ,  $r=0.32$  before the program was implemented.

However, when comparing the differences in affectivity before and after the program, the results revealed statistically significant differences in positive affectivity  $Z=-3.90$ ,  $p<0.001$ ,  $r=0.85$ , in the sense that the experimental group (Mordens=16.00) showed a greater gain in positive affectivity compared with the control group (Mordens=5.50). As for the negative affectivity, there was a greater decrease in the experimental group (Mordens=5.50) compared with the control group (Mordens=15.50),  $Z=3.87$ ,  $p<0.001$ ,  $r=0.84$  (Figure 1). Thus, the experimental group showed a greater gain in positive affectivity (Mordens=16.00) compared with the control group (Mordens=5.50) and a greater decrease in negative affectivity (Mordens=5.50) compared with the control group (Mordens=15.50) (Figure 1).

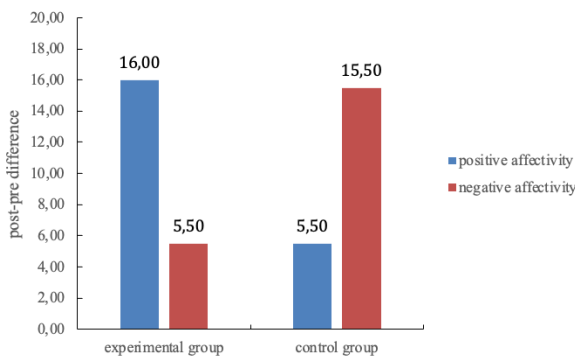
### Impact of Therapeutic Approaches

To assess which therapeutic approaches contribute most to the program's effectiveness, two Friedman tests for positive and negative affectivities were analyzed separately. The results revealed the effect of the multidisciplinary team approach on positive affectivity  $\chi^2(5)=49.55$ ,  $p<0.001$ ,  $W=0.90$ , revealing a strong effect (Figure 2).

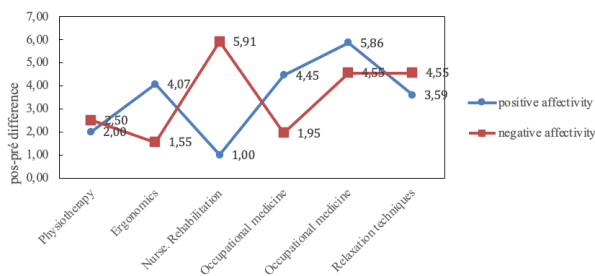
The multiple comparison of order averages indicated that psychology was the therapeutic approach that most increased positive affectivity, with psychology showing a gain significantly higher than physiotherapy ( $Z=4.84$ ,  $p<0.001$ ,  $r=0.88$ ) and rehabilitation

**Table 1**  
Distribution of the Sample According to Gender and Age

Total Sample (n=21)		
	n	%
<b>Gender</b>		
Male	5	23.80
Female	16	76.20
<b>M</b>		<b>DP</b>
Age	24.10	2.00



**Figure 1.**  
Differences in the Assessment of Positive and Negative Affectivity Between the Experimental and Control Groups Note. The values represent the order an average



**Figure 2.**  
Differences in the Assessment of Positive and Negative Affectivity for the 6 Therapeutic Approaches of the Intervention Program Note. The values represent the orders average difference (post-pre) for each approach.

nursing ( $Z=6.10$ ,  $p<0.001$ ,  $r=0.89$ ). A similar effect was found in occupational medicine in relation to physiotherapy ( $Z=3.07$ ,  $p=0.031$ ,  $r=0.88$ ) and rehabilitation nursing ( $Z=4.33$ ,  $p<0.001$ ,  $r=0.89$ ). Relaxing techniques and ergonomics showed a greater impact on positive affectivity compared with rehabilitation nursing ( $Z=3.24$ ,  $p=0.017$ ,  $r=0.89$ ;  $Z=3.87$ ,  $p=0.002$ ,  $r=0.89$ , respectively). No other significant differences were found in positive affectivity between approaches.

About negative affectivity, there were statistically significant differences between the approaches  $\chi_2(5)=49.17$ ,  $p<0.001$ ,  $W=0.89$ , showing a strong effect (Figure 2).

The multiple comparison of the averages of these orders revealed that ergonomics was the therapeutic approach that most reduced the negative affectivity compared with psychology ( $Z=-3.76$ ,  $p=0.003$ ,  $r=0.90$ ), relaxation techniques ( $Z=-3.76$ ,  $p=0.003$ ,  $r=0.90$ ) and rehabilitation nursing ( $Z=-5.47$ ,  $p<0.001$ ,  $r=0.90$ ). An identical effect was found in occupational health, showing a greater and statistically significant decrease in negative affectivity compared with psychology ( $Z=-2.59$ ,  $p=0.017$ ,  $r=0.89$ ),  $v$  ( $Z=-2.59$ ,  $p=0.017$ ,  $r=0.89$ ) and rehabilitation nursing ( $Z=-3.96$ ,  $p<0.001$ ,  $r=0.90$ ). It was also found that physiotherapy showed a greater significant decrease in negative affectivity than rehabilitation nursing ( $Z=-3.04$ ,  $p<0.001$ ,  $r=0.90$ ). No other statistically significant differences were found in negative affectivity.

**Discussion**

The main objective of this work was to analyze the affectivity before and after an intervention program for the prevention of MS in NDS.

It was possible to observe that this program has a statistically significant effect on students' affectivity. Also, the approach taken by the multidisciplinary team had an impact on positive affectivity (increasing it) and in the negative affectivity (decreasing it).

Concerning the contributions of each approach, it is important to mention that psychology and occupational health were the therapeutic approaches that most increased the positive affectivity, although no other significant differences were found in the approaches taken. Psychology has always been anchored in nursing due to the characteristics inherent to both disciplines. Nursing addresses human behavior and development as well as psychology, although each one does it within its own perspective (Melo et al., 2014). In a study conducted by Cunha et al., (2017) students were able to manage stress and had a sense of control and greater psychological comfort, developing a positive affection that allowed them to overcome more complex situations. It also promoted subjective well-being by helping them in adaptive responses and creating learning opportunities with accumulation of resources. The results supported the observations found in the study

conducted by Cunha et al., (2017), since the dynamism carried out by psychology certainly contributed to the increase in positive affectivity by providing strategies that allow students to manage stress and solve problems. In this study, the intervention of occupational health also showed to have an important effect in positive affectivity. With regard to this approach, Oliveira & André (2010) mention that this area increasingly contributes for nursing involvement in the health factors of those who work, improves productivity by preventing diseases, accidents, and injuries and contributes to protection, safety, and confidence in the workplace. This effect can be explained by the approach directed to the prevention of MS and risk control with regard to the tasks performed, thus contributing to the protection and promotion of health, valuing the individual factors that stand out from the psychosocial ones (Marôco et al., 2016).

However, ergonomics and relaxation techniques were the therapeutic approaches that most reduced negative affectivity. No statistically significant differences were found between the other approaches. Freire et al., (2017) highlight ergonomics as an impact factor in performing procedures with greater body awareness, decreasing musculoskeletal problems, and improving quality of life and well-being. On what concerns relaxation techniques, these are increasingly being used by individuals and, particularly in nursing. An example of this is the psych pedagogical program for nurses, with relaxation techniques for stress management developed by Borges & Ferreira (2013). This author shows that nurses satisfactorily adhered to these techniques, getting reduced heart rate, and blood pressure, decreased levels of anxiety and increased mental health. The contributions of ergonomics for their impact in increasing body awareness, and relaxation techniques for their effect in reducing stress, were important in two fundamental ways: on one hand, to increase each one's insight on the predisposing factors of MS; on the other hand, to provide students with strategies that help in stress management.

### Study Limitations

The main limitation of this investigation was the sample size and the possible order effect in the application of the therapeutic approach. For future investigations, authors highlight the need for future studies with the application of randomized approaches with larger samples. The sample re-evaluation would also be desirable to compare the results at different timepoints after the program.

### Conclusion and Recommendations

The results show that therapeutic interventions, such as psychology and occupational health, contribute to increase the positive affectivity for the pleasure and well-being associated with these educational interventions, also having an impact on the subjective well-being. Also, the interventions carried out by ergonomics and relaxation techniques are shown to be important due to their impact in reducing negative affectivity.

Stress management, information on the prevention of risk situations, and the increase in body awareness show to be important in increasing positive affectivity and should, therefore, be integrated into future educational programs in order to improve learning and the retention of new knowledge.

Education and health promotion of the individuals have been intrinsically linked to the nursing profession since its origin. This type of research aims to be a contribution to the promotion and development of personal, cognitive, and academic skills in for the NDS. Knowledge of the well-being of students and future nursing professionals can be a starting point for the implementation of new strategies, rethinking the contents offered in the nursing degree course.

### Implications for Practice

Authors suggest the inclusion in future educational programs, especially in the nursing degree syllabus, that privilege stress management strategies (relaxation techniques, mindfulness), prevention of risk situations, and body awareness. These strategies show to be relevant in increasing positive affectivity and decreasing negative affectivity, improving the integration of knowledge and consolidation of competences.

An investment in mental health nursing areas should be made, as their competencies include psychotherapeutic, socio-therapeutic care, psychosocial, and psychoeducational, in individual and group context.

This study, despite reflecting the situation experienced in a single institution, will certainly be of interest to other actors involved in initial nursing education, since it may reinforce the idea that knowing the affective experiences of the actors in the training process will allow an important base of reflection on the quality of nursing education in order to understand and improve it.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the ethics committee of Universidade Atlantica (Date: June 24, 2017, Approval number 03/2017/CE).

**Informed Consent:** Written informed consent was obtained from all participation who participated in this study.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept – C.F.F., M.F.M., C.S.; Design – C.F.F., M.F.M., C.S.; Supervision – C.F.F., M.F.M., C.S.; Resources – C.F.F., M.F.M., C.S.; Materials – C.F.F., M.F.M., C.S.; Data Collection and/or Processing – C.F.F., M.F.M., C.S.; Analysis and/or Interpretation – C.F.F., M.F.M., C.S., L.M., O.V., A.V.A.; Literature Search – C.F.F., M.F.M., C.S., L.M., O.V., A.V.A.; Writing Manuscript – C.F.F., M.F.M., C.S., L.M., O.V., A.V.A.; Critical Review – C.F.F., M.F.M., C.S., L.M., O.V., A.V.A.

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## References

- Abledu J. K., & Offei E. B. (2015). Musculoskeletal disorders among first-year Ghanaian students in a nursing college. *African Health Sciences*, 15(2), 444-449. [\[Crossref\]](#)
- Borges, E., & Ferreira, T. (2013). Relaxamento: Estratégia de intervenção no stress. *Revista Portuguesa de Enfermagem de Saúde Mental*, 10, 37-42 [\[Crossref\]](#)
- Bublitz, S., Guido, L. A., Freitas, E. O. & Lopes, L. F. D. (2012). Estresse em estudantes de enfermagem: uma revisão integrativa. *Revista de Enfermagem da UFSM*, 2(3), 530-538. [\[Crossref\]](#)
- Capelo, C. A. S. (2011). *Estudo ergonómico do risco ocupacional das tarefas de movimentação manual de doentes e da capacidade de trabalho dos profissionais*. Tese de Mestrado. Universidade Técnica de Lisboa Faculdade de Motricidade Humana.
- Carneiro, D. L., Rocha, D. O., Santos, P. R., Andrade, R. G. S., & Oliveira, J. L. C. (2018). Andragogia nas ações educativas realizadas pelo enfermeiro: revisão integrativa da literatura. *Revista Paranaense de Enfermagem (REPENF)*, 1(1), 84-94.
- Chaves, C., Nelas, P., Cruz, C., Coutinho, E., & Amaral, O. (2016). O perfil sociodemográfico e académico dos estudantes de enfermagem e o bem-estar. *International Journal of Developmental and Educational Psychology*, 2(1), 123-132.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2a Ed.). Hillsdale, NJ, USA: Lawrence Earlbaum Associates.
- Cunha, C. S. M., Macedo, A. P., & Vieira, I. F. (2017). Nursing students' perceptions of training processes in clinical supervision contexts. *Revista de Enfermagem Referência, serIV*(12), 65-74. [\[Crossref\]](#)
- Draganov, B. P., Andrade, A. C., Neves, V. R., & Sanna, M. C. (2013). Andragogia e seu uso na enfermagem: uma revisão da literatura. *Investigación y Educación en Enfermería*, 31(1), 86-94.
- Firmino C. F., Sousa L. M. M., Marques J. M., Antunes A. V., Marques F. M., Simões C. (2019). Musculoskeletal symptoms in nursing students: concept analysis. *Revista Brasileira de Enfermagem (REBEn)*, 72(1), 287-292. [\[Crossref\]](#)
- Firmino, C., Sousa, L., Antunes, A., Valentim, O.; Marques, F. & Simões, C. (2018). Avaliação da qualidade de vida em estudantes do curso de licenciatura em enfermagem. In *Qualidade de Vida e Condições de Saúde de Diversas Populações*, ed. Ramon Missias-Moreira; Luís Manuel Mota Sousa, 13 - 26. Curitiba: Editora CRV. doi: 10.24824/978854442638.8 [\[Crossref\]](#)
- Fonseca, V. (2016). Importância das emoções na aprendizagem: uma abordagem neuropsicopedagógica. *Revista Psicopedagogia*, 33(102), 365-384.
- Freire, L. A., Soares, T. C. N., & Santos Torres, V. P. (2017). Influência da ergonomia na biomecânica de profissionais de enfermagem no ambiente hospitalar. *Biológicas & Saúde*, 7(24). [\[Crossref\]](#)
- Galinha, I., & Ribeiro, J. (2005). Contributions for the study of the Portuguese version of Positive and Negative Affect Schedule (PANAS): II - Psychometric study. *Análise Psicológica*, 23, 219-227. [\[Crossref\]](#)
- Mark, G., & Smith, A. P. (2011). Occupational stress, job characteristics, coping, and mental health of nurses. *British Journal of Health Psychology*, 17(3), 505-521. [\[Crossref\]](#)
- Marôco, J. (2011). *Análise estatística com o SPSS Statistics* (5a ed.). Pêro Pinheiro, Portugal: Report Number
- Marôco, J., Marôco, A. L., Leite, E., Bastos, C., Vazão, M. J., & Campos, J. (2016). Burnout in Portuguese healthcare professionals: an analysis at the national level. *Acta Medica Portuguesa*, 29(1), 24-30. [\[Crossref\]](#)
- Martins, M., Castro, O., & Pereira, P. (2013). Body, stress and nursing: Ethnography of na intensive Care and Surgical Center. *Estudos de Psicologia (Campinas)*, 30(4), 525-537. [\[Crossref\]](#)
- Melo, C. S. B., Miranda, R., Cirino, S. D., & Campos, R. H. F. (2014). A Psicologia na formação de enfermeiros. *Estudos e Pesquisas em Psicologia*, 14(1), 337-354. [\[Crossref\]](#)
- Oliveira, A., & André, S. (2010). Enfermagem em Saúde Ocupacional. *Millenium*, 41, 115-122.
- Orly, S., Rivka, B., Rivka, E., & Dorit, S. (2012). Are cognitive-behavioral interventions effective in reducing occupational stress among nurses? *Applied Nursing Research*, 25(3), 152-157. [\[Crossref\]](#)
- Pestana, M., & Gageiro, J. (2005). *Análise de dados para Ciências Sociais [Data analysis for social sciences]*. Lisboa, Portugal: Edições Sílabo.
- Porta-Nova, R.M.M.M. (2009). *Adaptabilidade, Competências Pessoais e Bem-Estar Psicológico de Jovens do Ensino Superior na Área das Ciências da Saúde*. Dissertação de Doutoramento. Instituto de Ciências Biomédicas de Abel Salazar da Universidade do Porto.
- Tonhom, S. F. R., Moraes, M. A. A., Pinheiro, L. (2016). Formação de enfermeiros centrada na prática profissional: percepção de estudantes e professores. *Revista Gaúcha de Enfermagem*, 37(4): e63782. [\[Crossref\]](#)