



Academic stress and active learning of nursing students: A cross-sectional study[☆]



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ABSTRACT

Background: The active role of nursing students is particularly important in the delivery of health care, since playing an active role at the bedside and the use of active and collaborative engagement of students in the nursing activities has been associated with improved student learning. This is consistent with Karasek's learning hypothesis, but it has never been tested on nursing students. This study aimed at investigating whether nursing students in high control conditions reported lower levels of work impairment than students in the conditions with low control, compared them with a group of healthcare workers (HCWs), and tested the moderating role of social support at work.

Methods: 633 nursing students and 160 HCWs completed the Nursing Work Functioning Questionnaire (NWFQ), and the Demand-Control-Support questionnaire (DCS).

Findings: Results showed that nursing students reported higher levels of work impairment and were less likely to be classified as active (high demand/high control) or low strain (low demand/high control) than HCWs, and that social support at work moderated the association between being in active or low strain condition and work impairment.

Conclusions: Programs to enhance the learning of nursing students must not only fight strain and isolation but must also promote active learning, by increasing the control over the job, team work, and support from teachers.

1. Background

Research across many countries has identified a number of stress factors in nursing education, especially in new students during their clinical training (Alzayyat and Al-Gamal, 2014). While some amount of stress is necessary to stimulate learning, excessive or prolonged stress can interfere with the normal learning process, thereby delaying a student's development of clinical and academic skills.

Academic stress may also be associated with immunological reaction (Guidi et al., 1999) and mental health problems (Turner and McCarthy, 2017). Therefore, we need to understand the relationship between the students' perceived psychological pressure and their ability to cope with it and to grow.

The active role of nursing students is particularly important in the delivery of health care, since playing an active role at the bedside and the use of active and collaborative engagement of students in the nursing schoolroom has been associated with improved student learning (Jeppesen et al., 2017).

The Demand-Control-Support model (DCS, Karasek, 1979), a well-

known model of interpreting job stress, is also useful to evaluate the active/passive learning style. Karasek and Theorell (1990) observed that the acquisition and development of problem-solving capabilities is the consequence of "active" working conditions, characterized by high demand (e.g., workload, time required to perform tasks) and high control (e.g., autonomy in decision-making on the job). Active learning creates a continuous improvement spiral, because individuals acquire the feedback of their learned behaviors, and this leads to more learning and personality positive changes. In the classic Karasek's model, Demand and Control variables are ideally orthogonal and allow to distinguishing people into four categories: high strain (high demand, low control), low strain (low demand, high control), active (high demand, high control), passive (low demand, low control). Demerouti et al. (2001) observed that each of the four combinations of demand and control levels differentially affected the perception of strain or active learning. Job demand was the dimension most clearly related to health impairment, whereas job control was the dimension most clearly associated with active learning.

The learning hypothesis has been supported in a limited number of

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studies (Häusser et al., 2014; Bergman et al., 2012; Vanroelen et al., 2009), but, to the best of our knowledge, no study had tested it on nursing students. As a first working hypothesis, we expected that nursing students in the conditions with high control (active and low strain) should report (relatively) lower levels of work impairment than students in the conditions with low control (passive and high strain). As a (pseudo) control group, we also collected data on health-care workers (HCWs) from the same hospitals. Nursing students experience the same stress factors of other HCWs, such as clinical (excessive workload, fear of making mistakes, compassion fatigue, etc.) and personal/social stressors (economic issues, work/life imbalance, etc.), but also academic stressors (tests, exams, fear of failure in training, etc.) (Pulido-Martos et al., 2012). Thus, we expected that students should experience higher levels of work impairment and job strain (defined as the ratio between demand and control) than HCWs.

Moreover, while social support at work, defined in the Karasek's model as the quality of relationships among coworkers and with supervisors, is a known protective factor against stress-related disorders (e.g., Nieuwenhuijsen et al., 2010), very few studies considered its moderating effect. We thus tested whether the effect of Karasek's categories on work impairment could be moderated by levels of perceived social support at work, i.e., whether support had a different impact in reducing work impairment depending on the combinations of demand and control in nursing students and HCW workers.

2. Methods

2.1. Participants

The research enrolled students of the three-year undergraduate program for nurses of the Università Cattolica del Sacro Cuore (Rome). During the program, they attend university hospitals for a practical training that accounts for one third of the total training time. There are two clinical training terms in the first year, three in the second year, and four in the third year. Six-hundred thirty-three (60.8% females, mean age 25.13 ± 6.88 years) nursing students, at the end of their clinical hospital training, were invited to complete measures of perceived clinical ability and job stress. One-hundred and sixty health care workers (HCWs; 69.4% females; mean age 49.24 ± 7.76 years; 15.6% physicians, 66.3% professional nurses, 7.5% careworkers, 3.1% technicians, 3.1% employees, 4.4% other health-care-related job) from the hospitals where the students were performing their training were invited to complete the same questionnaires before their periodical medical examination at the workplace. The study was approved by the Ethic Committee of the Università Cattolica of Rome.

2.2. Measures

2.2.1. Nurses Work Functioning Questionnaire (NWFQ, Gärtner et al., 2012; Italian Version Magnavita and Chiorri, 2017)

The NWFQ is a measure of nurses' perceived clinical ability, i.e., their individual experiences of their own behavior while at work. While the original Dutch version comprised 50 items, referring to seven subscales, the Italian validation study, after removing statistically redundant items, showed support for a single-factor measurement model with 34 items specific for nursing students. Each item is rated on a 5- or 7-point, Likert-type scale, and operationalises common aspects of the health-related work functioning. The final raw score is standardized in order to obtain a 100-point scale, with higher values indicating higher work impairment. The scale has a very good internal consistency (Cronbach's alpha = 0.91).

2.2.2. Demand-control Support Questionnaire (DCS, Magnavita, 2007)

The DCS is derived from the longer Job Content Questionnaire (Karasek, 1979) and comprises 17 items to be rated on 4-point, Likert-type scales. The questionnaire provides scores on three subscales: The

Demand subscale (5 items, range 5–20) refers to the job's psychological demands, such as work overload, difficulties in tasks, pace of activities, and occurrence of contradictory or controverting orders. The Job Control, or Decision Latitude, subscale (6 items, range 6–24) assesses the use and development skills and autonomy in decision-making on the job. The Social Support at Work subscale (6 items, range 6–24) taps into the quality of relationships among coworkers and with supervisors. The three scales showed acceptable to good internal consistency (Cronbach's alphas 0.60, 0.76 and 0.87 for control, demand and support, respectively).

2.3. Data Analysis

First, we compared the scores of the nursing student and the HCW groups on the NWFQ and the DCS scores using independent samples *t*-tests. We then compared the two groups with respect to the four categories of Karasek's model using a chi-square test for the independence of categorical variables. Finally, we submitted the NWFQ and DCS-Support scores to a factorial analysis of covariance, using the DCS-Support score as a covariate and the NWFQ score as the outcome variable. Eta-squared (η^2) was used as a measure of effect size.

As we aimed at investigating the moderator role of social support at work, we specified the two-way interactions of mean-centered DCS-Support score with the factors and the three-way interaction term.

3. Results

Results of the comparisons of the scores of the nursing student and the HCW groups on the NWFQ and the DCS are reported in Table 1. They show that, after correction for multiple comparisons, nursing students obtained significantly higher scores than HCWs on the NWFQ and on job strain, while their scores were significantly lower on all DCS scales.

Effect sizes were large for NWFQ ($d = 1.69$), DCS-Control ($d = -0.87$), and DCS-Support ($d = -1.01$), and small for DCS-Demand ($d = -0.21$) and Job Strain ($d = 0.45$).

The crosstabulation and within-group (row) proportions that we used to test the independence of group membership (student vs HCW) and Karasek's categories are depicted in Fig. 1.

The chi-square test was significant, with a moderate effect size ($\chi^2 = 72.95, p < .001$). The inspection of ASRs revealed that students were more likely than HCWs for being classified as passive and high strain ($Z = 6.08, p < .001$, and $Z = 3.41, p < .001$, respectively) and less likely to be classified as low strain and active ($Z = -4.16, p < .001$, and $Z = -5.74, p < .001$, respectively).

As for the completely between factorial analysis of covariance, the main effect of group was significant ($F = 136.48, p < .001$), with

Table 1

Descriptive statistics (mean ± standard deviation) and results of the independent sample *t*-tests performed to compare the scores of nursing students and health-care workers (HCW) on the Nurse Work Functioning Questionnaire (NWFQ) and the Demand-Control-Support questionnaire.

Variable	Nursing students (n = 633)	HCW (n = 160)	adj- <i>p</i>	<i>d</i>
NWFQ (range 0–100)	39.13 ± 16.85	14.31 ± 12.23	< 0.001	1.69
Demand (range 5–20)	12.75 ± 2.56	13.31 ± 2.73	0.016	-0.21
Control (range 6–24)	15.60 ± 2.79	18.05 ± 2.82	< 0.001	-0.87
Support (range 6–24)	16.22 ± 3.36	19.73 ± 3.59	< 0.001	-1.01
Job strain	1.01 ± 0.28	0.90 ± 0.21	< 0.001	0.45

Note: adj-*p*: *p*-values adjusted for multiple comparisons using the Benjamini-Hochberg's adaptive step-up correction for false discovery rate; *d*: Cohen's measure of effect size. $|d| < 0.20$: negligible effect size; $0.20 < |d| < 0.50$: small effect size; $0.50 < |d| < 0.80$: moderate effect size; $|d| > 0.80$ large effect size.

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