Psychosomatic symptoms and stressful working conditions among Palestinian nurses: a cross-sectional study

Yousef Jaradatab*, Khaldoun Nijemc, Lars Lien d, Hein Stigum b, Espen Bjertness b and Rita Bast-Pettersena

aDepartment of Occupational Medicine and Epidemiology, National Institute of Occupational Health, Oslo, Norway; bSection for Preventive Medicine and Epidemiology, Institute of Health and Society, University of Oslo, Oslo, Norway; cOccupational Epidemiology and Biological Research Lab, Department of Biology, Hebron University, Hebron, Occupied Palestinian Territory; dNational Competence Centre for Dual Diagnosis, Innlandet Hospital Trust, Hamar, Norway

(Received 16 December 2014; accepted 3 May 2016)

Background: High levels of perceived stressful working conditions have been found to have an adverse effect on physical and mental health. Objectives: To examine the associations between self-reported stressful working conditions and Psychosomatic Symptoms (PSS), and to investigate possible gender differences. Methods: The present cross-sectional study comprises 430 nurses employed in Hebron district, Palestine. Self-reported stressful working conditions were recorded, and a Psychosomatic Symptoms Check list was used to assess prevalence of PSS. Findings: Median score on the psychosomatic symptom checklist for the group was 11, (range 1–21). Women reported more symptoms than men, with medians 11.6 and 10.0, respectively (p = .0001). PSS were associated with more self-reported stressful working conditions for both men (p < .0001) and women (p < .0001). The association was strongest among men. Conclusions: PSS were associated with high self-reported stressful working conditions, and this association was strongest among the men.

Keywords: nurses; psychosomatic symptoms; stressful working conditions; gender differences

High levels of perceived stressful working conditions have been found to have an adverse effect on the physical and mental health of nurses (Mc Vicar, 2003; Mojoyinola, 2008). Nurses in clinical work may experience adversity and moral distress that inhibit their capacity to provide morally sensitive patient care (Vanderheide, Moss, & Lee, 2013). Occupational stressors among nurses include a lack of perceived social support from supervisors and peers (Bartram, Joiner, & Stanton, 2004; Sveinsdottir, Biering, & Ramel, 2006), low levels of work conditions and caring for dying patients (Hamaideh, Mrayyan, Mudallal, Faouri, & Khasawneh, 2008), working overtime and non-organizational factors (Mc Vicar, 2003) and shift work, with round the clock care for patients (Hamaideh & Ammouri, 2011; Jaradat et al., 2012).

In the literature, the terms “stressors”, “stressful events” and “stress” are used in several ways (Folkman & Lazarus, 1991). Potter and Fiedler (1981) define the term “stress” as the result of two
divergent forces that act on the individual. As the demands begin to outstrip the individual’s resources, the individual will experience a corresponding increase in stress. In the present study, we will use the terms “stressor”, “stressful event” and “self-reported or perceived stressful working conditions or work situation” to mean an environmental condition or a stimulus to which the individual is exposed. “Stress” will be used as a perceived bodily response to a stressful event/stressor (Beck & Srivastava, 1991; Cohen & Wills, 1985; Martins, Moraes Ferreira, & Guilhem, 2013).

Nurses are exposed to stressors with potential adverse effects on physical and psychological health (Dickinson & Wright, 2008; Jaradat et al., 2012). High levels of work stress among nurses may result in increasing job-related accidents, late arrivals and absence of work, and may thus result in decreased productivity and responsibility (Lee & Wang, 2002) and may affect the nurses’ professional efficiency, which might reduce the quality of patient care (Kane, 2009; Kawano, 2008; Lindegård, Larsman, Hadzibajrovic, & Ahlborg, 2014; Sherman, 2004). Health care staff are being faced with increasing pressure, and emotional exhaustion scores were high among Hungarian health care staff included nurses (Pikó, 2006). Several studies have reported an association between stressful working conditions on the one hand and psychosomatic symptoms (PSS) and/or musculoskeletal complaints on the other hand.

The incidence of psychosomatic disorders was increased in Indian hospital nurses who reported higher self-reported stress scores; stomachache, back pain, and stiffness of shoulders and neck were related to exposure to stressors at home and the workplace (Kane, 2009). A study on the prevalence of musculoskeletal complaints among nurses reported that nurses had back complaints (36%), arm and neck complaints (30%), and leg complaints (16%); in addition, most of the nurses (89%) considered nursing work as physically strenuous (Engels, Van der Gulden, Senden, & van’t Hof, 1996). A 44% prevalence of back disorders among female nurses was reported (Violante et al., 2004).

Fewer years of experience and negative family support are predictors of psychological symptoms among nurses (Arafa, Nazel, Ibrahim, & Atta, 2003). Several studies have reported that women face different stressors than men (Artazcoz et al., 2004; Gyllensten & Palmer, 2005) and that they may react in different ways to perceived stressors. A study among workers in Spain found that men’s health status and PSS were not associated with family demands but were associated with occupational social class; however, in women, PSS were associated with family and job demands (Artazcoz et al., 2004). The most frequent PSS among both women and men were sleeping problems, chronic fatigue and back pain, whereas tension headaches and chronic fatigue were the most frequent PSS among women (Pikó, Barabás, & Boda, 1997).

In a study conducted in one hospital in Palestine, nurses reported that they faced harsh treatment from the public because they are in direct daily contact with patients and their families; in addition, they reported that supervision focuses on mistakes rather than on providing a real evaluation of the quality of their work and that punishment is the most common way in which their errors are addressed (Hasan-Bitar & Narrainen, 2011). Palestinians are at a high risk of exposure to traumatic events, which have the capacity to produce traumatic stress reactions (Khamis, 2005). A previous study reported a major prevalence of depressive episodes of 18.7% and a prevalence of post-traumatic stress disorders of 26.5% among adult Palestinians (Madianos, Sarhan, & Koukia, 2011).

Health care and services in Palestine are provided by the Ministry of Health (MOH), Non-Governmental Organizations, United Nations Relief and Works Agency (UNRWA), and private medical service. Most of health care services in Hebron city are primary health care centers and hospitals. The primary health care centers provide the general health examination, community care, maternity-health child care, and school health care. The hospitals include an assortment of operations and procedures in medicine. There are 51 hospitals in West Bank (WB) and 25 in Gaza Strip (GS) with total number of 5108 beds, this comprises both government
and non-government hospitals, and this means that there are 12.6 beds per 10,000 of population. After the second intifada (2000) and its political consequences including poverty (53%) and unemployment (30%) (Palestinian Central Bureau of Statistics [PCBS], 2008), Palestinian patients tend to consult the governmental hospitals and clinics through the free health insurance offered by the MOH. A total of 11,300 nurses (6618 in WB and 4682 in GS) are supervised and regulated by the Palestinian Nursing Association. It is estimated that there is one nurse for one thousand inhabitants (1/1000) in Hebron district which reflects the shortage in nurses’ labor force and the huge work load. In the primary health care centers, nurses work morning shift, while in hospitals the nurses are working day, evening, and night shifts. To our knowledge, this study is the first to report on PSS among nurses in Palestine. This study is part of a larger study on the health of Palestinian nurses.

The aim of this study was to examine the associations between self-reported stressful working conditions and PSS among nurses in Palestine. Because there are a much larger proportion of male nurses in Palestine than in Western countries, we also aimed to investigate possible gender differences in the association between perceived stressful working conditions and PSS.

Methods

Study population

The present cross-sectional study involved nurses working in the Hebron district of Palestine. A total of 542 nurses were working at hospitals and primary health care centers in the autumn of 2008. They were employed in various health care settings including the governmental sector and others (non-governmental, UNRWA and private sectors). The data were collected from August to October, 2008. The inclusion criterion was at least one year of service prior to the start of the study. Of the 542 employed nurses, 70 did not meet this criterion; 18 nurses were not available because they were on leave, resulting in 454 available nurses. Ten refused to participate, and two nurses with incomplete background data were excluded. We also excluded 12 nurses who did not answer the questionnaires on self-reported stressful working conditions and PSS. After all the exclusions, 430 nurses were included in the analysis, resulting in a participation rate of 94.7%. As shown in Table 1, the dataset comprised 259 (60%) women and 171 (40%) men, ranging in age from 20 to 59 years (mean age 33.6, SD 8.6 years). Most participants (74.4%) were married, (42.3%) had 15−16 years of education, and (71.8%) had 7 or more years of experience.

Data collection

Background data were collected using a predesigned self-administered questionnaire. The questionnaire included questions about socio-demographic and organizational characteristics variables. To measure the exposure variable, the self-reported perceived stressful working condition/situation was assessed by using the question, “How stressful do you perceive your present job?” (Pikó, 1999; Potter & Fiedler, 1981). The responses were ranked on a nine-point scale from the lowest stress level (1) to the highest stress level (9), due to small numbers in some of the nine levels, we performed the analyses based on three exposure categories; low stressful working conditions level (a score of 1−3), a medium stressful working conditions level (scores of 4−6) and a high stressful working conditions level (scores of 7−9). To measure the outcome variable, a psychosomatic symptom questionnaire was used to record the prevalence of self-reported PSS. The questionnaire comprised a scale that has been applied in several studies (Pikó, 1999, 2006; Pikó et al., 1997), and with a reported Cronbach’s α of 0.80 (Pikó, 2006). Seven symptom items were queried: back pain, tension headache, sleeping problems, chronic
fatigue, stomach acidity, tension diarrhea, and heart palpitation. This measure was used in order to obtain information on the frequency of these symptoms during the last 12 months. For example,
respondents were asked: “During the last 12 months, how often did you have back pain?” Responses were coded as follows: never (0), seldom (1), occasionally (2), and often (3). A Likert-type scoring procedure of 0, 1, 2, and 3 was applied to investigate the association of PSS with self-reported stressful working conditions, allowing for a total score range between 0 and 21 and was reliable with a Cronbach’s $\alpha$ of 0.78; where a higher score represents increased symptom occurrences.

The questionnaires were translated from English into Arabic by the research team and were revised with assistance from a professional translator in the field to overcome language problems. The questionnaires were piloted prior to the formal data collection by randomly selecting 24 nurses. After piloting, the questions were amended and rephrased in order to be clearer. Back translation was not performed.

**Ethical considerations**

The study was approved by the Regional Committee for Medical and Health Research Ethics, REC South East, Norway. Permission to conduct the study was obtained from the Palestinian Ministry of Health and other health care providers (non-governmental, UNRWA and private sectors), and the research protocol was approved by the research board at Hebron University. The participants were provided with information about the purposes of the study and were informed that the collected data were strictly confidential and would be used for scientific purposes only. Additionally, they were informed that their participation was voluntary, that they could refuse to answer any item, and that there would be no adverse consequences for refusing to participate. Informed written consent was obtained from each participant prior to beginning the study.

**Statistical analysis**

The statistical analysis package STATA (Version 10.0) was used for the analyses. The exposure variable was self-reported perceived stressful working conditions. PSS were used as the outcome variable. In the first part, the PSS were used as a continuous variable on the 0–21 scale. We inspected the distribution in density plots, tabulated the median levels with non-parametric tests (Kruskal–Wallis) in the bivariate analysis, and used an ordinary linear regression in the multivariable analysis. The regression model was built with a three-level stressful working condition scale as the main independent variable, and the overall scores of PSS were used as the dependent variables. The following items regarding the socio-demographics and organizational characteristics were considered as possible confounders and were included in the primary analysis: gender, age, marital status, number of children, family size, education, providing financial support to extended family members (other than children and spouse), work setting, work schedule, type of task, years of experience, work hours per week, and work overtime. Factors that changed the association less than 10% between stressful working conditions level and PSS were removed. The variables age, years of education, working overtime, and providing financial support to extended family members were included as confounding variables in the final model. Because PSS vary with gender, most analyses were performed separately for females and males. To examine whether the effects of self-reported levels of stressful working conditions were different for men than for women, we included an interaction term.

The psychosomatic symptom scale is constructed from seven underlying items on a four-unit scale. In the second part of the analysis, we focused on these individual items as outcomes. We showed the prevalence of the psychosomatic items based on levels of stressful working conditions in the bivariate analysis. We then dichotomized each item using the levels “often” as 1 and “occasionally”, “seldom” or “never” as 0. Linear binomial regression models were used to
estimate the associations between the occurrence of PSS (level “often”) and the self-reported level of stressful working conditions. These models show prevalence differences (PDs) as association measures. Age, education, worked overtime, and providing financial support to extended family members were included as confounders. Separate models were used for each gender (14 models in all). In some cases, the models did not converge, so we used a linear regression model with robust variance estimation as an alternative. The level of statistical significance was defined as $p \leq .05$ with a 95% confidence interval (CI).

The assumptions of the linear model (linearity and constant error variance) were checked by plotting residuals against the predicted values (i.e. by adding a smoothing curve with a CI). We checked the robustness of the model by plotting delta-beta values for the exposure variables. The regression model showed no deviation from the assumptions of linearity and the constant variance of the residuals. The results are therefore considered robust against outliers.

Results
The median score of PSS for the nurses as a group was 11.0, ranging from 1 to 21. Figure 1 shows the distribution of PSS for the female and male nurses, with lines indicating the medians. The women reported more symptoms than the men: 11.6 versus 10.0 ($p = .0001$). The entire distribution was shifted to the right compared with the males. However, the variance among the males was higher, so there were slightly more males with very high symptom scores (>18).

Table 1 shows the self-reported level of stressful working conditions among nurses by socio-demographics and working characteristics. 12.3% of the nurses reported low stressful working conditions, 47.4% reported medium stressful working conditions, and 40.2% reported high stressful working conditions. A significant association was found between high self-reported stressful working conditions and education, providing financial support to extended family members, working in settings other than governmental organizations, working alternating shifts, and long working hours per week.

Figures 2 and 3 illustrate the distribution of PSS related to the self-reported level of stressful working conditions for all nurses and separately for each gender, respectively. PSS were more prevalent among nurses with high self-reported stressful working conditions. The distribution

![Figure 1. Distribution of PSS among nurses by gender (vertical lines indicate medians).](image)
of PSS for women and men suggests a stronger association with perceived stressful working conditions for men than for women (Figure 3). This pattern is shown in Table 2. The median scores were 12 units among both women and men in association with high self-reported stressful working conditions. In contrast, the median symptom scores in association with low self-reported stressful working conditions were 10 units among women and only 5.6 units among men. There were also gender differences with regard to the influence of socio-demographics or organizational characteristics on PSS. For women, the median symptom score was higher for those with smaller families, and for those who worked overtime. For men, the median score of symptoms was higher for married men, for men with 1–3 children and men who had more years of education. Men who worked with both direct and indirect patient care, and had seven or more years of work experience also reported more symptoms (Table 2).

The gender differences adjusted for age, education, working overtime, and providing financial support to extended family members are illustrated in Table 3, showing a significant association between perceived stressful working conditions and symptoms, and this association was much stronger for men than for women. Men with high self-reported stressful working conditions scored 5.40 units higher than men with low self-reported stressful working conditions (95% CI 3.60–7.20), while women with high self-reported stressful working conditions scored 3.00 units higher than women with low self-reported stressful working conditions (95% CI 1.50–4.50). Furthermore, while working overtime was associated with more symptoms for women, the male nurses with more education reported more symptoms. On the other hand, the men who financially supported extended family members showed a 1.70 unit lower score (95% CI −3.10 to −0.26). To examine whether the effects of stressful levels of working conditions were different for men than for women, we included an interaction term. The psychosomatic symptom score in association with high self-reported stressful level rose with 3.2 units (95% CI 1.6–4.8) for women and with 5.5 units (95% CI 3.8–7.1) for men (p = .05) (not tabulated).

Table 4 shows the frequency of the different psychosomatic items across categories of self-reported stressful working conditions. There was a gender difference with respect to the type of reported symptoms. Among the women who reported high stressful working conditions,
45.3% reported back pain, while this symptom was reported by 31.3% of the men. Tension headache was reported by 36.8% of the women with high perceived stressful working conditions, compared with 26.9% of the men with high perceived stressful working conditions. On the other hand, among the nurses with high perceived stressful working conditions, 37.9% of the men and 19.8% of the women reported sleeping problems, and 23.9% of the men and 17.5% of the women reported stomach acidity.

Table 5 shows the association between a high score on the separate psychosomatic items and self-reported stressful working conditions in a multivariable analysis. The first model shows the association between “often back pain” and self-reported stressful working conditions. Women with high self-reported stressful working conditions had a 6-percentage-point (pp) higher prevalence of “often back pain” than women with low stressful working conditions, although this finding was not significant. Men with high stressful working conditions had a 19-pp higher prevalence of frequent back pain than men with low stressful working conditions, a difference that was statistically significant (95% confidence level from 3% to 36%). Among both women and men, a significant association was found between high self-reported stressful working conditions and frequent occurrence of tension headache, chronic fatigue, stomach acidity, tension diarrhea, and palpitation. Among men, associations were also found between high self-reported stressful working conditions and sleeping problems.
Table 2. Medians of PSS by self-reported level of stressful working conditions, socio-demographics and work characteristics among nurses by gender.

| Variables | Female | | | Male | | |
|-----------|--------|---|---|--------|---|---|
|           | N 259 | % 60 | Median score | p-Value | N 171 | % 40 | Median score | p-Value |
| Socio-demographic factors | | | | | | | | |
| Self-reported level of stressful working conditions | | | | | | | | |
| Low | 26 | 10.1 | 10.0 | <0.001 | 27 | 15.9 | 05.6 | <0.001 |
| Medium | 127 | 49.0 | 11.0 | | 77 | 44.7 | 09.0 | |
| High | 106 | 40.9 | 12.0 | | 67 | 39.4 | 12.0 | |
| Age group (years) | | | | | | | | |
| <30 | 92 | 35.5 | 11.2 | 0.62 | 76 | 44.7 | 08.5 | 0.25 |
| 30–45 | 135 | 52.1 | 11.8 | | 74 | 43.5 | 11.0 | |
| >45 | 32 | 12.4 | 11.5 | | 20 | 11.8 | 10.0 | |
| Marital status | | | | | | | | |
| Married | 195 | 75.3 | 12.0 | 0.43 | 124 | 72.9 | 10.0 | 0.03 |
| Un married | 64 | 24.7 | 11.0 | | 46 | 27.1 | 08.0 | |
| Number of children | | | | | | | | |
| No child | 88 | 34.4 | 12.0 | 0.65 | 62 | 36.7 | 08.0 | 0.04 |
| 1–3 child | 79 | 30.9 | 11.0 | | 51 | 30.2 | 11.0 | |
| >3 child | 89 | 34.8 | 11.4 | | 56 | 33.1 | 10.0 | |
| Family size | | | | | | | | |
| 1–4 | 87 | 34.1 | 12.0 | 0.02 | 34 | 20.7 | 10.5 | 0.26 |
| 5–8 | 110 | 43.1 | 11.0 | | 100 | 61.1 | 11.0 | |
| >8 | 58 | 22.7 | 11.0 | | 30 | 18.3 | 08.0 | |
| Years of education | | | | | | | | |
| 10–14 | 129 | 49.8 | 11.8 | 0.16 | 67 | 39.4 | 09.0 | 0.04 |
| 15–16 | 104 | 40.2 | 11.0 | | 78 | 45.9 | 10.0 | |
| >16 | 26 | 10.0 | 13.0 | | 25 | 14.7 | 12.0 | |
| Providing financial support to extended family members | | | | | | | | |
| No | 103 | 39.8 | 11.0 | 0.15 | 38 | 22.4 | 11.0 | 0.08 |
| Yes | 156 | 60.2 | 12.0 | | 132 | 77.6 | 09.0 | |
| Organizational characteristics | | | | | | | | |
| Work setting | | | | | | | | |
| Government | 141 | 54.4 | 11.8 | 0.57 | 90 | 52.9 | 10.0 | 0.76 |
| Others | 118 | 45.6 | 11.0 | | 80 | 47.1 | 10.0 | |
| Work schedule | | | | | | | | |
| Morning only | 141 | 54.7 | 11.0 | 0.34 | 48 | 28.2 | 09.0 | 0.63 |
| Evening or night only | 5 | 01.9 | 11.0 | | 16 | 09.4 | 10.0 | |
| Alternating | 112 | 43.4 | 12.0 | | 106 | 62.4 | 10.0 | |
| Type of task | | | | | | | | |
| Direct patient care | 211 | 81.5 | 11.0 | 0.37 | 139 | 81.8 | 10.0 | 0.05 |
| Indirect patient care | 15 | 05.8 | 11.0 | | 19 | 11.2 | 07.0 | |
| Both types of care | 33 | 12.7 | 12.0 | | 12 | 07.1 | 12.0 | |
| Experience (years) | | | | | | | | |
| 1–6 | 65 | 25.9 | 11.0 | 0.47 | 53 | 31.9 | 08.0 | 0.01 |
| 7–12 | 119 | 47.4 | 12.0 | | 79 | 47.6 | 11.0 | |
| >12 | 67 | 26.7 | 11.0 | | 34 | 20.5 | 10.0 | |
| Work hours (week) | | | | | | | | |
| <36 | 114 | 44.0 | 12.0 | 0.99 | 63 | 37.1 | 10.0 | 0.43 |
| 36–44 | 73 | 28.2 | 11.0 | | 39 | 22.9 | 08.5 | |
| >44 | 72 | 27.8 | 11.0 | | 68 | 40.0 | 11.0 | |
| Work overtime | | | | | | | | |
| No | 222 | 85.7 | 11.0 | 0.02 | 116 | 68.6 | 09.5 | 0.20 |

(Continued)
The main finding in this study was an association between self-reported stressful working conditions and an increased number of PSS. To our knowledge this is the first available study of PSS among nurses where 40% of the nurses were males, allowing to study gender differences with respect to such symptoms. The results indicate gender differences; the female nurses reported more symptoms, but the association between self-reported stressful working conditions and symptoms was stronger for the men (interaction term $p$-value = .05).

The finding that PSS were more prevalent among nurses with high self-reported stressful working conditions than among nurses with low self-reported stressful working conditions is consistent with previous studies that reported that a high level of exposure to stressors contributes to some forms of PSS (Kane, 2009; Kawano, 2008; Mojoyinola, 2008; Pikó, 1999). Higher levels of stressful working conditions among nurses were associated with more health complaints such as back pain, chronic fatigue, tension headache, and sleeping problems (Pikó, 1999). Most nurses are involved in direct patient care that includes lifting and transporting patients and standing for long hours, and this may produce psychosomatic disorders. A study by Kawano (2008) stated that hospital nurses with excessive amounts of work under pressure and difficulties with caring for
patients with various complaints may be more likely to feel physical and mental exhaustion, and this might affect patient satisfaction. Several studies have shown a connection between stressful working conditions and the physical and mental health of nurses (Hamaideh et al., 2008; Mojoyinola, 2008; Pikó, 1999).

**Gender differences**

The finding of more PSS reported by women than men is consistent with other studies. From a study with the same psychosomatic questionnaire as the one used in the present study, the mean score of PSS was higher among female compared to male students (Pikó et al., 1997). Female patients displayed more head-related PSS than males (Tsai, 2010). The higher frequency of PSS among women might be explained because women have extra responsibilities with

| Table 4. Prevalence/frequency of the different PSS among nurses by gender and by level of self-reported stressful working conditions (N = 430). |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                | Females         | Males           |                | Females         | Males           |                |
|                | Low             | Medium          | High           | Low             | Medium          | High           |
| Back pain      |                 |                 |                 |                 |                 |                 |
| Often          | 38.5            | 38.6            | 45.3            | 11.1            | 17.1            | 31.3            |
| Occasionally   | 42.3            | 52.0            | 48.1            | 33.3            | 55.3            | 52.2            |
| Seldom         | 07.7            | 07.9            | 05.7            | 33.3            | 18.4            | 14.9            |
| Never          | 11.5            | 01.6            | 00.9            | 22.2            | 09.2            | 01.5            |
| Tension headache |               |                 |                 |                 |                 |                 |
| Often          | 11.5            | 18.1            | 36.8            | 00.0            | 09.2            | 26.9            |
| Occasionally   | 61.5            | 61.4            | 51.9            | 44.4            | 55.3            | 59.7            |
| Seldom         | 26.9            | 17.3            | 11.3            | 37.0            | 25.0            | 10.4            |
| Never          | 00.0            | 03.1            | 00.0            | 18.5            | 10.5            | 03.0            |
| Chronic fatigue |               |                 |                 |                 |                 |                 |
| Often          | 03.8            | 19.4            | 29.2            | 00.0            | 06.7            | 20.9            |
| Occasionally   | 46.2            | 42.7            | 42.5            | 11.1            | 44.0            | 49.3            |
| Seldom         | 26.9            | 25.8            | 23.6            | 40.7            | 25.3            | 20.9            |
| Never          | 23.1            | 12.1            | 04.7            | 48.1            | 24.0            | 09.0            |
| Sleeping problems |          |                 |                 |                 |                 |                 |
| Often          | 07.7            | 18.9            | 19.8            | 03.8            | 09.5            | 37.9            |
| Occasionally   | 38.5            | 40.9            | 55.7            | 11.5            | 41.9            | 31.8            |
| Seldom         | 46.2            | 29.1            | 20.8            | 53.8            | 31.1            | 27.3            |
| Never          | 07.7            | 11.0            | 03.8            | 30.8            | 17.6            | 03.0            |
| Stomach acidity |               |                 |                 |                 |                 |                 |
| Often          | 00.0            | 12.7            | 17.5            | 07.4            | 17.3            | 23.9            |
| Occasionally   | 30.8            | 36.5            | 35.0            | 29.6            | 44.0            | 29.9            |
| Seldom         | 42.3            | 26.2            | 29.1            | 25.9            | 22.7            | 31.3            |
| Never          | 26.9            | 24.6            | 18.4            | 37.0            | 16.0            | 14.9            |
| Tension diarrhea |             |                 |                 |                 |                 |                 |
| Often          | 00.0            | 02.4            | 07.5            | 00.0            | 04.0            | 04.6            |
| Occasionally   | 19.2            | 12.7            | 17.9            | 03.7            | 13.3            | 15.4            |
| Seldom         | 30.8            | 29.4            | 34.9            | 29.6            | 22.7            | 35.4            |
| Never          | 50.0            | 55.6            | 39.6            | 66.7            | 60.0            | 44.6            |
| Palpitation    |                 |                 |                 |                 |                 |                 |
| Often          | 00.0            | 06.3            | 10.4            | 00.0            | 02.7            | 09.2            |
| Occasionally   | 26.9            | 31.0            | 38.7            | 18.5            | 32.4            | 35.4            |
| Seldom         | 26.9            | 35.7            | 34.0            | 25.9            | 35.1            | 27.7            |
| Never          | 46.2            | 27.0            | 17.0            | 55.6            | 29.7            | 27.7            |
Housekeeping duties and caring for children in addition to the tasks in the workplace. Housework adds to the physical workload and increases the incidence of musculoskeletal disorders among working women (Kishi, Kitahara, Masuchi, & Kasai, 2002; Scott, Hwang, & Rogers, 2006). An interaction between work and family roles resulting in chronic fatigue among female nurses may serve as a risk factor especially when combined with the acute fatigue associated with night work (Clissold, Smith, Accutt, & Di Milia, 2002). The conflict between career and family life roles may have a stronger negative impact on the physical and mental well-being of women (Artazcoz et al., 2004; Bourbonnais, Comeau, & Vézina, 1999).

The finding that male workers seemed to be more vulnerable to self-reported perceived stressful working conditions is an unexpected finding. Other studies do not support this finding (Artazcoz et al., 2004; Gyllensten & Palmer, 2005; Pikó et al., 1997; Pikó, 2006). One explanation could be related to the work situation, a larger percent of the men reported that they had a work schedule with alternating shifts (Table 2). Shift work has been reported to be associated with a variety of

|                      | Female                  |          | Male                  |          |
|----------------------|-------------------------|----------|-----------------------|----------|
|                      | Crude PD\(^a\) (95% CI) | Adjusted PD\(^b\) (95% CI) | Crude PD\(^a\) (95% CI) | Adjusted PD\(^b\) (95% CI) |
| Often back pain      |                         |          |                       |          |
| Low stressful        | Reference               | Reference| Reference             | Reference|
| Medium stressful     | 0.00 (−0.20–0.20)       | 0.00 (−0.21–0.20) | 0.06 (−0.09–0.21)     | 0.05 (−0.10–0.20) |
| High stressful       | 0.07 (−0.14–0.28)       | 0.06 (−0.20–0.21) | 0.20 (0.04–0.36)      | 0.19 (0.03–0.36)* |
| Often tension headache|                         |          |                       |          |
| Low stressful        | Reference               | Reference| Reference             | Reference|
| Medium stressful     | 0.07 (−0.08–0.21)       | 0.06 (−0.08–0.20) | 0.09 (0.03–0.16)      | 0.08 (0.01–0.15)* |
| High stressful       | 0.25 (0.10–0.41)        | 0.23 (0.08–0.39)* | 0.27 (0.16–0.38)      | 0.25 (0.14–0.36)* |
| Often chronic fatigue|                         |          |                       |          |
| Low stressful        | Reference               | Reference| Reference             | Reference|
| Medium stressful     | 0.15 (0.05–0.25)        | 0.15 (0.04–0.26)* | 0.07 (0.01–0.12)      | 0.05 (−0.01–0.12) |
| High stressful       | 0.25 (0.14–0.37)        | 0.23 (0.10–0.35)* | 0.21 (0.11–0.31)      | 0.20 (0.11–0.30)* |
| Often sleeping problems|                       |          |                       |          |
| Low stressful        | Reference               | Reference| Reference             | Reference|
| Medium stressful     | 0.11 (−0.01–0.24)       | 0.09 (−0.04–0.22) | 0.06 (−0.04–0.15)     | 0.05 (−0.05–0.15) |
| High stressful       | 0.12 (−0.01–0.25)       | 0.07 (−0.07–0.21) | 0.34 (0.20–0.47)      | 0.32 (0.19–0.46)* |
| Often stomach acidity|                         |          |                       |          |
| Low stressful        | Reference               | Reference| Reference             | Reference|
| Medium stressful     | 0.13 (0.07–0.18)        | 0.14 (0.07–0.21)* | 0.10 (−0.03–0.23)     | 0.09 (−0.04–0.22) |
| High stressful       | 0.17 (0.10–0.24)        | 0.15 (0.06–0.24)* | 0.16 (0.02–0.31)      | 0.16 (0.01–0.31)* |
| Often tension diarrhea|                       |          |                       |          |
| Low stressful        | Reference               | Reference| Reference             | Reference|
| Medium stressful     | 0.02 (−0.00–0.05)       | 0.03 (−0.00–0.05) | 0.04 (−0.01–0.08)     | 0.04 (−0.01–0.09) |
| High stressful       | 0.08 (0.03–0.13)        | 0.08 (0.02–0.14)* | 0.04 (−0.01–0.10)     | 0.05 (0.00–0.10)* |
| Often palpitation    |                         |          |                       |          |
| Low stressful        | Reference               | Reference| Reference             | Reference|
| Medium stressful     | 0.06 (0.02–0.11)        | 0.07 (0.02–0.12)* | 0.03 (−0.01–0.06)     | 0.02 (−0.02–0.06) |
| High stressful       | 0.10 (0.05–0.16)        | 0.12 (0.05–0.18)* | 0.09 (0.02–0.16)      | 0.09 (0.02–0.16)* |

Note: CI, confidence interval.
\(^a\)Crude PD for age, education, working overtime and providing financial support to extended family members.
\(^b\)Adjusted PD for age, education, working overtime and providing financial support to extended family members.
*Statistical significant.
health complaints by nurses (Conway, Companini, Sartori, Dotti, & Costa, 2008; Jaradat et al., 2012; Mc Vicar, 2003). Further, in the Palestinian society, male nurses have an obligation to work on-call and in emergency situations, which may account for the effect of stressful working conditions.

Another explanation for the difference might be related to the role expectations in the Palestinian society where men do have a larger economic responsibility for their family. Palestinian data indicates that 87.3% of the women over age 18 do not have to contribute to the family budget, compared to 18% of the men over 18 (PCBS, 1999). Married men with more children reported more symptoms. Palestinian women’s participation in the formal labor force is 16% compared to 66.3% for men (PCBS, 2008). These conditions may increase the expectation for the male nurses to support their family financially, which might aggravate their health conditions and affect the occurrence of psychosomatic disorders.

The finding of fewer PSS among female nurses with a larger family size might indicate that a large family with children represents an emotional support for the women. Palestinians favor marriage and children, and the family forms the center of an individual’s life and affects decisions such as whether or not to marry (Haj-Yahia, 1994).

The different/individual PSS

In our study, back pain was the most frequently reported symptom in nurses, which is consistent with the findings of other studies (Engels et al., 1996; Kane, 2009; Pikó et al., 1997). Perceived stressful working conditions were found to be strongly associated with low-back pain among Danish female nurses (Gonge, Jensen, & Bonde, 2001). Lifting and transporting patients may lead to back pain among nurses. Headache was the second most frequently reported symptom by nurses in this study. Nurses who worked more than 49 hours a week had a higher incidence of headaches (Callaghan, Tak-Ying, & Wyatt, 2000). A stressful environment is associated with primary headaches in nurses in Taiwan; approximately 50% of the nurses had experienced primary headaches, and 48.1% had episodic – type headache; in addition, a neurological interview revealed that 13.4% had tension headaches (Lin, Huang, & Wu, 2007). Sleeping problems and fatigue were also frequently reported by the nurses. It is possible that shift and night work may have an impact on the sleep and physical health of the nurses; this supports the findings from earlier studies (Bara & Arber, 2009; Lin et al., 2007). Working longer hours may lead to fatigue (Wirtz, Lombardi, Willetts, Folkard, & Christiani, 2012). Having control over work hours can protect against high fatigue (Nijp, Beckers, Geurts, Tucker, & Kompier, 2012).

Strengths and limitations

Strengths

One of the fundamental strengths of the present study is the high response rate (94.7%). We were unable to access information from 18 nurses who were on leave, but with respect to the large response rate, the missing population should not create a selection bias of any significance. The study covered nurses working in different units in hospitals and primary health care centers. Secondly, this study of Palestinian nurses had a larger proportion (40%) of male nurses in contrast to most studies on nurses from other parts of the world, where females represent a much higher ratio of the nurse population. We used a questionnaire (Pikó, 1999) for assessing the work stress level. The questionnaire was developed in a country (Hungary) that is different
from Palestine in several ways; but the subjects belonged to the same profession in both countries, which is a considerable strength.

The question of whether this questionnaire is a valid instrument for assessing PSS may be raised. Responses such as "often back pain" might reflect musculoskeletal disorders rather than psychosomatic problems. However, the association between back pain and self-reported stressful working conditions indicates that this question covers symptoms related to stressful events, whether they are psychosomatic or somatic symptoms.

**Limitations**
Among the limitations are that a cross-sectional design has several potential biases and limitations. Therefore, causality should be interpreted cautiously when drawing conclusions about associations in cross-sectional studies. It is possible that the use of self-report data for exposure (stressful working conditions) and effect (PSS) may have inflated the associations between the exposure and outcome variables (Schnurr & Green, 2004), reducing the reliability of the associations between the exposures and outcomes. Another possible limitation might be that almost all of the nurses in our study were younger than 45 years which may have influenced their reporting of psychological symptoms. A study by Clendon and Walker (2013) reported that nurses aged over 50 consider themselves to have a high health related quality of life.

**Conclusion**
The main findings of this study are that women reported more PSS than men, that PSS were associated with perceived self-reported stressful working conditions or work situations and that this association was stronger for men than for women. The study indicates that perceived stressful working conditions can interfere with nurses' physiological and psychological well-being.

**Practical implications**
In Palestine, no psychosomatic questionnaires are available to date. This questionnaire could be a useful instrument for the study of PSS among Arab nurses in the future. Future research using longitudinal designs may validate the findings of this study and provide more information to inform clinical practice and research.

Knowing workplace stressors in clinical areas among nurses help nurse managers and health care administrators to adopt strategies that manage job stressors effectively in work settings such as work scheduling, reduce workload, and improve work environment. Efforts to alleviate stressful working conditions among nurses can lead to an increased quality of care delivery. We recommend to Palestinian nursing policy-makers to choose strategies to help nurses’ cope effectively with workplace stressors. Nursing managers should develop strategies to address and improve the quality of working conditions for nurses. Providing educational and career prospects can contribute to decrease nurses’ occupational stress level, the maintaining their work ability.

**Acknowledgements**
We would like to thank Professor Petter Kristensen (National Institute of Occupational Health, Oslo, Norway, and University of Oslo, Norway) for his valuable contribution to a previous version of this manuscript. We thank all the participating nurses for their time and cooperation. We would also like to thank the research assistant at Hebron University, Ms Naseem Talhami, for data collection and technical help in data entering and cleaning.
Disclosure statement
No potential conflict of interest was reported by the authors.

Funding
This study was supported by The Norwegian Programme for Development, Research and Education (NUFU): [NUFU pro x1 50/2002] and [NUFUSM-2008/10232]. The authors would like to thank the National Norwegian State Education Loan Funds for the financial support.

References
Arafa, M. A., Nazel, M. W. A., Ibrahim, N. K., & Attia, A. (2003). Predictors of psychological well-being of nurses in Alexandria, Egypt. International Journal of Nursing Practice, 9(5), 313–320.

Artazcoz, L., Artieda, L., Borrell, C., Cortés, I., Benach, J., & García, V. (2004). Combining job and family demands and being healthy: What are the differences between men and women? European Journal of Public Health, 14(1), 43–48.

Bara, A. C., & Arber, S. (2009). Working shifts and mental health – findings from the British Household Panel Survey 1995–2005. Scandinavian Journal of Work, Environment & Health, 35(5), 361–367.

Bartram, T., Joiner, T. A., & Stanton, P. (2004). Factors affecting the job stress and job satisfaction of Australian nurses: Implications for recruitment and retention. Contemporary Nurse, 17(3), 293–304.

Beck, D. L., & Srivastava, R. (1991). Perceived level and sources of stress in baccalaureate nursing students. The Journal of Nursing Education, 30(3), 127–133.

Bourbonnais, R., Comeau, M., & Vézina, M. (1999). Job strain and evolution of mental health among nurses. Journal of Occupational Health Psychology, 4(2), 95–107.

Callaghan, P., Tak-Ying, S. A., & Wyatt, P. A. (2000). Factors related to stress and coping among Chinese nurses in Hong Kong. Journal of Advanced Nursing, 31(6), 1518–1527.

Clendon, J., & Walker, L. (2013). The health of nurses aged over 50 in New Zealand. Contemporary Nurse, 45(1), 85–94. doi:10.5172/conu.2013.45.1.85

Clissold, G., Smith, P., Accutt, B., & Di Milia, L. (2002). A study of female nurses combining partner and parent roles with working a continuous three-shift roster: The impact on sleep, fatigue and stress. Contemporary Nurse, 12(3), 294–302.

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. Psychological Bulletin, 98(2), 310–357.

Conway, P. M., Companini, P., Sartori, S., Dotti, R., & Costa, G. (2008). Main and interactive effects of shiftwork, age and work stress on health in an Italian sample of healthcare workers. Applied Ergonomics, 39 (5), 630–639. doi:10.1016/j.apergo.2008.01.007

Dickinson, T., & Wright, K. M. (2008). Stress and burnout in forensic mental health nursing: A literature review. British Journal of Nursing, 17(2), 82–87.

Engels, J. A., Van der Gulden, J. W., Senden, T. F., & van’t Hof, B. (1996). Work related risk factors for musculoskeletal complaints in the nursing profession: Results of a questionnaire survey. Occupational and Environmental Medicine, 53(9), 636–641.

Folkman, S., & Lazarus, R. S. (1991). Coping and emotion. In A. E. Monat & R. S. Lazarus (Eds.), Stress and coping: An anthology (3rd ed.) (pp. 207–227). New York, NY: Columbia University Press.

Gunge, H., Jensen, L. D., & Bonde, J. P. (2001). Do psychosocial strain and physical exertion predict onset of low-back pain among nursing aides? Scandinavian Journal of Work, Environment & Health, 27(6), 388–394.

Gyllensten, K., & Palmer, S. (2005). The role of gender in workplace stress: A critical literature review. Health Education Journal, 64(3), 271–288.

Haj-Yahia, M. (1994). The Arab family in Israel: A review of cultural values and their relationship to the practice of social work. Society and Welfare, 14(3–4), 249–264.

Hamaideh, S. H., & Ammouri, A. (2011). Comparing Jordanian nurses’ job stressors in stressful and non-stressful clinical areas. Contemporary Nurse, 37(2), 173–87. doi:10.5172/conu.2011.37.2.173

Hamaideh, S. H., Mrayyan, M. T., Mudallal, R., Faouri, I. G., & Khasawneh, N. A. (2008). Jordanian nurses’ job stressors and social support. International Nursing Review, 55(1), 40–7. doi:10.1111/j.1466-7657.2007.00605
Hasan-Bitar, S., & Narrainen, S. (2011). ‘Shedding light’ on the challenges faced by Palestinian maternal health-care providers. Midwifery, 27(2), 154–9. doi:10.1016/j.midw.2009.05.007

Jaradat, Y., Bast-Pettersen, R., Nijem, K., Bjertness, E., Lien, L., Kristensen, P., & Stigum, H. (2012). The impact of shift work on mental health measured by GHQ-30: A comparative study. Middle East Journal of Psychiatric and Alzheimer, 3(1), 8–16.

Kane, P. P. (2009). Stress causing psychosomatic illness among nurses. Indian Journal of Occupational and Environmental Medicine, 13(1), 28–32. doi:10.4103/0019-5278.50721

Kawano, Y. (2008). Association of job-related stress factors with psychological and somatic symptoms among Japanese hospital nurses: Effect of departmental environment in acute care hospitals. Journal of Occupational Health, 50(1), 79–85.

Khamis, V. (2005). Post-traumatic stress disorder among school age Palestinian children. Child Abuse & Neglect, 29(1), 81–95.

Kishi, R., Kitahara, T., Masuchi, A., & Kasai, S. (2002). Work-related reproductive, musculoskeletal and mental disorders among working women – history, current issues and future research directions. Industrial Health, 40(2), 101–112.

Lee, I., & Wang, H. H. (2002). Perceived occupational stress and related factors in public health nurses. Journal of Nursing Research, 10(4), 253–260.

Lin, K. C., Huang, C. C., & Wu, C. C. (2007). Association between stress at work and primary headache among nursing staff in Taiwan. Headache: The Journal of Head and Face Pain, 47(4), 576–584.

Lindegård, A., Larsman, P., Hadzibarjramovic, E., & Ahlborg, G., Jr. (2014). The influence of perceived stress and musculoskeletal pain on work performance and work ability in Swedish health care workers. International Archives of Occupational and Environmental Health, 87(4), 373–9. doi:10.1007/s00420-013-0875-8

Madianos, M. G., Sarhan, A. L., & Koukia, E. (2011). Posttraumatic stress disorders comorbid with major depression in West Bank, Palestine: A general population cross-sectional study. The European Journal of Psychiatry, 25, 19–31.

Martins, V. F., Moraes Ferreira, V., & Guilhem, D. (2013). Psychophysiological consequences arising from the stress of everyday life and work activities. Salud Mental, 36, 141–147.

Mc Vicar, A. (2003). Workplace stress in nursing: A literature review. Journal of Advanced Nursing, 44(6), 633–642.

Mojoyinola, J. K. (2008). Effects of job stress on health, personal and work behavior of nurses in public hospitals in Ibadan Metropolis, Nigeria. Ethno-Medicine, 2(2), 143–148.

Nijp, H. H., Beckers, D. G., Geurts, S. A., Tucker, P., & Kompier, M. A. (2012). Systematic review on the association between employee worktime control and work-non-work balance, health and well-being, and job-related outcomes. Scandinavian Journal of Work, Environment & Health, 38(4), 299–313. doi:10.5271/sjweh.3307

Palestinian Central Bureau of Statistics. (1999). Man and women: Trends and statistics (Executive summary). Ramallah: Author.

Palestinian Central Bureau of Statistics. (2008). Population, housing and establishment census (2007). Census final results in the West Bank – Summary (Population and housing). Ramallah: Author.

Palestinian Central Bureau of Statistics. (2008, April–June). Press release on labour force survey results. Ramallah: Author.

Pikó, B. (1999). Work-related stress among nurses: A challenge for health care institutions. The Journal of the Royal Society for the Promotion of Health, 119(3), 156–162.

Pikó, B., Barabás, K., & Boda, K. (1997). Frequency of common psychosomatic symptoms and its influence on self – perceived health in a Hungarian student population. The European Journal of Public Health, 7 (3), 243–247.

Pikó, B. F. (2006). Burnout, role conflict, job satisfaction and psychosocial health among Hungarian health care staff: A questionnaire survey. International Journal of Nursing Studies, 43(3), 311–318.

Poter, E. H., & Fiedler, F. E. (1981). The utilization of staff member intelligence and experience under high and low stress. Academy of Management Journal, 24(2), 361–376.

Schnurr, P. P., & Green, B. L. (2004). Understanding relationships among trauma, post-traumatic stress disorder, and health outcomes. Advances in Mind-Body Medicine, 20(1), 18–29.

Scott, L. D., Hwang, W. T., & Rogers, A. E. (2006). The impact of multiple care giving roles on fatigue, stress, and work performance among hospital staff nurses. Journal of Nursing Administration, 36(2), 86–95.

Sherman, D. W. (2004). Nurses’ stress & burnout. How to care for yourself when caring for patients and their families experiencing life-threatening illness. The American Journal of Nursing, 104(5), 48–56.
Sveinsdóttir, H., Biering, P., & Ramel, A. (2006). Occupational stress, job satisfaction, and working environment among Icelandic nurses: A cross-sectional questionnaire survey. *International Journal of Nursing Studies, 43*(7), 875–889.

Tsai, C. H. (2010). Factor analysis of the clustering of common somatic symptoms: A preliminary study. *BMC Health Services Research, 10*, 160. doi:10.1186/1472-6963-10-160

Vanderheide, R., Moss, C., & Lee, S. (2013). Understanding moral habitability: A framework to enhance the quality of the clinical environment as a workplace. *Contemporary Nurse, 45*(1), 101–13. doi:10.5172/conu.2013.45.1.101

Violante, F. S., Fiori, M., Fiorentini, C., Risi, A., Garagnani, G., Bonfiglioli, R., & Mattioli, S. (2004). Associations of psychosocial and individual factors with three different categories of back disorder among nursing staff. *Journal of Occupational Health, 46*(2), 100–108.

Wirtz, A., Lombardi, D. A., Willetts, J. L., Folkard, S., & Christiani, D. C. (2012). Gender differences in the effect of weekly working hours on occupational injury risk in the United States working population. *Scandinavian Journal of Work, Environment & Health, 38*(4), 349–357.