Work profile and associated health hazards among nursing students at Mansoura University, Egypt

Hala S. Abou-Elwafa [1], Eman O. Khashaba [1], Abdel-Hady El-Gilany [2] and Samar Abd El-Raouf [3]

مرتَسَم العمل والمخاطر الصحية لدى طلاب التمريض، جامعة المنصورة، مصر

هالة سمير أبو الوفا، إيمان عمر خشبة، عبد الهادى الجيلاني، سمر عبد الرؤوف السيد

الخلاصة: يتولى طلاب التمريض على نحوٍ متزايد العمل بدوام كامل من أجل دفع نفقات معيشتهم ودراساتهم. ولقد هدفت هذه الدراسة إلى تقدير معدّل انتشار العمل، والعوامل المرتبطة بها، والمخاطر الصحية المحتملة. ولقد أجرى هذه الدراسة المقطعية طلاب التمريض باستخدام الاستبيان الذي تضمّن البيانات الاجتماعية والسكانية وبيانات العمل، وأسباب العمل، والمخاطر الصحية المحتملة في مكان العمل، والآثار المتصورة على الأداء الأكاديمي. واتضح أن معدّل انتشار عمل الطلاب المدفوع الأجر23.3٪. ويرتبط كون طلبة التمريض من الذكور والانتماء إلى طبقة اجتماعية متدنية ارتباطاً مستقلاً باحتمال العمل أثناء الدراسة. وكان الدعم المالي هو السبب الرئيسي لعمل الطلاب. وتشمل المخاطر في مكان العمل الضوضاء، ودرجات الحرارة القصوى، والضغوطات النفسية والاجتماعية. وكانت اضطرابات النوم هي الآثار الصحية الأكثر شيوعاً تليها الشكاوى في العضلات والعظام. ويتعرَّض طلاب التمريض لخطر العديد من الآثار الصحية الضارة التي لا تشملها برامج الصحة والسلامة المهنية.

ABSTRACT Nursing students are increasingly undertaking paid term-time employment to finance their living expenses and studies. The objectives of this study are to estimate its prevalence, factors associated, and possible health hazards. A cross-sectional study was conducted of nursing students using a questionnaire that included sociodemographic and employment data, reasons for working, possible health hazards in the workplace, and perceived effects on academic performance. The prevalence of student paid employment was found to be 23.3%. Being male and belonging to a low social class were independently associated with the likelihood of working while studying. Financial support was the main reason for student employment. Workplace hazards included noise, temperature extremes and psychosocial stressors. Sleep disorders were the most frequent health effects followed by musculoskeletal complaints. Nursing students are at risk from many deleterious health effects which are not covered by occupational health and safety programmes.

Profil professionnel et risques sanitaires associés parmi les étudiants en soins infirmiers de l'Université de Mansoura, Égypte

RÉSUMÉ Les étudiants en soins infirmiers sont de plus en plus nombreux à avoir un activité rémunérée durant l'année universitaire dans le but de subvenir à leurs besoins et de financer leurs études. La présente étude a pour objectif d'estimer la prévalence de ce type d'activité, les facteurs et les risques sanitaires qui y sont associés. Une étude transversale a été conduite auprès d'étudiants en soins infirmiers à l'aide d'un questionnaire incluant des données socio-démographiques et sur l'emploi, les raisons de travailler, les risques sanitaires possibles sur le lieu de travail, et les conséquences perçues sur les performances universitaires. La prévalence des emplois étudiants rémunérés a été estimée à 23,3 %. Le fait d'être de sexe masculin et l'appartenance à une classe sociale basse avaient une association indépendante avec la probabilité de travailler pendant les études. Un besoin de soutien financier était la raison principale de l'emploi étudiant. Les risques sur le lieu de travail incluaient le bruit, des températures extrêmes et des facteurs de stress psychologiques. Les conséquences sur la santé les plus fréquentes étaient des troubles du sommeil, suivis par des douleurs musculosquelettiques. Les étudiants en soins infirmiers sont exposés à des risques nocifs pour la santé qui ne sont pas pris en compte par les programmes de santé et de sécurité au travail.

[1]Department of Occupational Health and Industrial Medicine, Faculty of Medicine, Mansoura University, Mansoura, Egypt (Correspondence to: E.O. Khashaba: eman_khashaba2000@yahoo.com). [2]Department of Public Health, Faculty of Medicine, Mansoura University, Egypt. [3]Department of Community Health Nursing, Faculty of Nursing, Mansoura University, Mansoura, Egypt.

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Introduction

Student employment is increasingly found in many countries. Not only do more students work but they also work for longer hours compared to earlier decades (*1*). Most countries in Western Europe and North America have experienced an increase in student employment. A recent Europe-wide student survey showed that in some countries more than two-thirds of students are employed and their income from employment covers up to 80% of their living and study costs (*2*). The average student employment rate is around 47% in Europe (*1*).

Several reasons explain why students get employed such as increasing costs of higher education and changes in the funding system (*3*), changes in the expected lifestyle and consumption preferences of students (*4*). Also, the profile of university students has changed as higher education is now more open to students who are more inclined to work during their studies (*5*) and, finally, universities may now provide opportunities that make combining work and study more feasible (*1*).

An excessive work load on students may compromise their academic progress. Less study time is associated with lower learning outcomes and a higher probability of dropping out of school (*5,6*). At the same time, students may work also for positive benefits. Employment may provide necessary work experience and contribute to building a social network that will help find a job in the future (*7*).

Nursing students are increasingly undertaking paid term-time employment to finance their living expenses and studies (*8*). Apart from the possible adverse impact on academic progress, nursing workers in hospitals are exposed to different occupational risk factors, including exposure to chemical substances, which can be inhaled or come in contact with the skin, causing deleterious health effects (*9*).

To the best our knowledge, there has been little research on undergraduate employment among nursing students in developing countries including Egypt. Therefore, the objectives of this study were to estimate the prevalence of employment among undergraduate nursing students in Mansoura University, and to assess the factors associated with taking up work and the possible occupational health and safety hazards of working.

Methods

Study design and setting

A descriptive cross-sectional study was carried out on undergraduate nursing students in Mansoura University during the academic year 2013-2014.

Sample size and selection

Pre-university education for the studied students included a 2-year programme (Technical Nursing Institute or Health Technical Institute-Nursing Section). All students in all academic years were targeted except first-year students who were excluded as they had no experience of work. The total target population was 1 846 students (including first-year students). The male to female ratio was 1:3, after exclusion of first-year students. A pilot study was conducted on 100 students (not included in the final study) which found that about 23% had worked at some point in their past academic years.

Sample size was calculated according to the following equation (*10*): $n = Z^2\ P\ (1\text{-}P)/d^2$, where n = sample size, Z = Z statistic for 95%confidence level (1.96), P = expected prevalence (proportion) (23%), and d = precision (0.05). The required sample size was found to be 272. To compensate for non-responders, the sample size was increased by 20% and rounded to 330 students.

A stratified random sampling was used proportional to size according to the total number of students in each academic year (1087 after exclusion of all first year students): second year (560 students, 51.5%), third year (306 students, 28.2%) and fourth year (221 students, 20.3%) of the total. Accordingly, the sample was distributed proportionately as follows: second year (170), third year (93), and fourth year (67) students. Students were recruited by systematic random sampling within each year group according to available student records with a random start then selection of every third student. This led to a total of 352 questionnaires being distributed and 330 questionnaires were returned with a response rate of 93.8%.

Data collection tool

A self-administered semi-structured questionnaire in Arabic was used for data collection. It included the following information: demographic data, e.g. age, sex, residence, socioeconomic status of the family (*11*); paid employment information, e.g. working status, age of starting ever work, nature and place of work, the number of work hours per day; reasons for working; possible hazards at the workplace, e.g. physical (noise/vibration/temperature extremes, ionizing radiation, lifting heavy weights), biological, chemical products, which may include disinfectants, antiseptics, hazardous drugs and latex exposure, e.g. chlorine, glutaraldehyde, ethylene oxide and cytotoxic drugs, and psychosocial; perceived adverse health effects, e.g. musculoskeletal disorders, sleep disorders, occupational accidents or injuries; pre-employment health and safety training; and perceived effects on academic performance.

The content validity of the questionnaire was evaluated by a jury of 5 occupational medicine staff and the necessary changes were made before pilot testing.

The questionnaires were distributed to the target students during a suitable break between the rounds (clinical training rounds related to nursing courses at different departments of Mansoura University Hospital) and before lectures under the supervision of one of the investigators to encourage participation and answer their enquiries. Each questionnaire required 10–15 minutes to complete.

Ethical considerations

The study was approved by the Research Ethics Committee of the Faculty of Nursing and Faculty of Medicine of Mansoura University, code number [R/15.12.85].

Informed verbal consent of the individuals to participate in the study was obtained before distribution of the questionnaire. All participants were assured of the confidentiality and anonymity of the data. Subjects participated voluntarily with a full right to withdraw from the study at any time.

Data analysis

Data were analysed using the *SPSS*, version 16 and *Epi Info*, version 7. Categorical variables are presented as numbers and percentages; the chi-squared test was used for comparison between groups. Quantitative variables are presented as means and standard deviations (SD). Binary stepwise logistic regression analysis was used to determine the independent predictors of student employment as the dichotomous outcome variable. Variable found statistically significant in a bivariate analysis were entered into the logistic regression analysis using a forward Wald method. Odds ratios (ORs) and their 95% confidence intervals (CIs) were calculated. A P-value ≤ 0.05 was considered to be statistically significant.

Results

The age of the sample of nursing students ranged from 19 to 22 years with a mean age 20.3 (SD 0.8) years. The overall prevalence of student employment was 23.3% (Table 1). Table 1 shows the sociodemographic characteristics of the students and their association with student employment. Student employment was significantly higher among male students, those whose fathers had received less than secondary education or worked in non-professional jobs and those and of very low socioeconomic status. Student employment was also significantly lower among second-year students compared to fourth-year students.

Logistic regression analysis showed that being male (OR = 2.6; 95% CI: 1.44–5.05) and belonging to a family of a very low socioeconomic status (OR = 2.8; 95% CI: 1.34–5.82) were independently associated with employment while studying. On the other hand, second-year students were significantly less likely to be working (OR = 0.3; 95% CI: 0.16–0.62) (Table 2). Father's occupation and education were not significant in the logistic regression and were excluded from the final regression analysis of independent variables associated with employment while studying.

Table 3 shows that more than half of the working students started work when they were older than 18 years and the majority worked in the field of nursing. Working students reported that the hospital was the most common place of work (57.1%) and 38.9% worked shifts. The main reason for working while studying was for financial (68.8%) but 54.5% also said they worked to gain experience. More than half of the working students (61.1%) worked 8 hours or more daily and 63.6% had worked for less than 6 months in the past year.

Noise and temperature extremes were the most frequently reported physical hazards (84.4% and 80.5% respectively). Only 33.7% of the working students reported exposure to chemical hazards at work while a large per cent (80.5%) mentioned exposure to workplace psychosocial stressors. Lack of safety training programmes and protective equipment at work were each reported by 68.8% of the working students. There was higher frequency of occupational health hazards among the students who started work after 18 years of age compared to those who started at a younger age; however, the difference was not statistically significant (P> 0.05) (Table 4).

Working students reported that sleep disorders were the most frequent work-related health effects (85.7%) followed by musculoskeletal complaints (74.0%) with the most frequent sites being the legs/feet and back. Occupational injuries represented 68.8% of the reported work-related health effects, mostly needle-stick injuries (45.5%) and 32.5% reported having occupational infections, mainly of the respiratory tract (Table 5).

Work-related health effects among students who started work after the age of 18 years were more frequently reported than that in younger age groups, but these were not statistically significant (P> 0.05). However, both musculoskeletal complaints and occupational injuries were more frequently reported among female students (75.4%, 71.7% respectively) compared to male students (24.6%, 28.3% respectively) with statistically significant difference (P = 0.0006, P = 0.01 respectively) (Table 6).

It was found that 15.6% of the working students reported non-attendance of lectures and clinical training due to work load. Also, 17% reported rare attendance or non-attendance. More than half (54.5%) of the working students considered work had a positive effect on their academic performance (Table 7).

Discussion

The prevalence of student employment was 23.3% among nursing students in our study with the percentage of employed students increasing across the academic years (17.1%, 25.8%, 35.8%

Table 1 Prevalence of student employment and its association with sociodemographic characteristics

Sociodemographic characteristic	Total No.	Working student No. (%)	Significance test	OR (95%CI)
Overall	330	77 (23.3)		(19.00–28.22)
Sex				
Man	69	29 (42.0)	$\chi2 = 15.7$, P≤ 0.001	3.2 (1.75–5.96)
Women (R)	261	48 (18.4)		1
Academic year				
Second	170	29 (17.1)	$\chi2 = 9.7$, P = 0.001	0.44 (0.23–0.86)
Third	93	24 (25.8)	$\chi2 = 1.9$, P = 0.17	0.73 (0.37–1.45)
Fourth (R)	67	24 (35.8)		1
Pre-university education				
General secondary school	167	39 (23.4)	$\chi2 = 0.3$, P = 0.5	1.19 (0.65–2.19)
Nursing school	40	13 (32.5)	$\chi2 = 2.5$, P = 0.1	1.89 (0.79–4.48)
Health/nursing institute (R)	123	25 (20.3)		1
Residence				
Urban	89	21 (23.6)	$\chi2 = 0.01$, P = 0.9	1.02 (0.55–1.88)
Rural (R)	241	56 (23.2)		1
Father's education				
< Secondary school	79	24 (30.4)	$\chi2 = 4.3$, P = 0.03	1.98 (1.01–4.00)
Secondary school	118	29 (24.6)	$\chi2 = 1.6$, P = 0.2	1.48 (0.77–2.84)
> Secondary school (R)	133	24 (18.0)		1
Father's occupation				
Non-professional[1]	110	33 (30.0)	$\chi2 = 4.1$, P = 0.04	1.7 (1.01–3.00≥)
Professional/semiprofessional (R)	220	44 (20.0)		1
Mother's education				
< Secondary school	84	20 (23.8)	$\chi2 = 0.4$, P = 0.4	1.28 (0.65–2.73)
Secondary school	144	37 (25.7)	$\chi2 = 1.2$, P = 0.2	1.42 (0.73–2.75)
> Secondary school (R)	102	20 (19.6)		1
Mother's occupation				
Working	125	24 (19.2)	$\chi2 = 1.9$, P = 0.16	0.68 (0.38–1.21)
Not working (R)	205	53 (25.9)		1
Family size				
≥ 5 members	259	56 (21.6)	$\chi2 = 1.9$, P = 0.16	0.66 (0.33–1.24)
< 5 members (R)	71	21 (29.6)		1
Family income				
Just met routine expenses	104	26 (25.0)	$\chi2 = 0.01$, P = 0.9	1.04 (0.54–2.16)
Met routine & emergency expenses	148	32 (21.6)	$\chi2 = 0.2$, P = 0.63	0.86 (0.43–1.72)
Able to save money (R)	78	19 (24.4)		1
Socioeconomic status				
Very low	90	32 (35.6)	$\chi2 = 3.8$, P = 0.04	1.96 (1.01–4.12)
Low	75	16 (21.3)	$\chi2 = 0.01$, P = 0.9	0.96 (0.42–2.22)
Middle	83	11 (13.3)	$\chi2 = 2.1$, P = 0.14	0.54 (0.22–1.32)
High (R)	82	18 (22.0)		1

[1]Non-professional includes trade and business (n = 14) and non-working (n = 6) and manual workers (n = 90).
R = reference group; OR = odds ratio; CI = confidence interval.

Table 2 Logistic regression analysis for independent predictors of student employment

Predictor	*β*	*P*-value	Adjusted OR (95%CI)[1]
Academic year			
Second year	-1.15	0.001	0.3 (0.16- 0.62)
Third year	-0.6	0.07	0.5 (0.24-1.07)
Fourth year (R)	–	–	–
Socioeconomic status			
Very low	1.03	0.006	2.8 (1.34-5.82)
Low	0.43	0.3	1.5 (0.68-3.51)
Middle	-0.15	0.7	0.86 (0.36-2.00)
Higher (R)	–	–	–
Sex			
Male	0.9	0.002	2.6 (1.44-5.05)
Female (R)	–	–	–
Constant	–	-1.09	–
Per cent correctly predicted	–	75.5	–
Model χ^2	–	31.5; P≤ 0.001	–

[1]*Adjusted for all variables found to be significant in the bivariate analysis.*
R = reference group; OR = odds ratio; CI = confidence interval.

for second, third, and fourth years respectively). About 91% of working students were engaged in paid and nursing-related work.

Our findings concur with other studies that employment among students increases with years of study although the proportion of working students is less among our sample. For example, survey data from 2 496 students in Estonian public and private universities showed that term-time employment was extremely wide-spread among Estonian students and 61% of full-time students worked (*1*). The survey results also showed that the most important predictor for working was age. Older students (over 23 years) were more than three times more likely to have paid jobs than younger students. It is thus clear that when students are older they are more likely to have jobs and they work more on full-time jobs. Students do not wait until they finish their studies before they enter the labour market.

Similarly, in a study of nursing students in metropolitan Sydney, Australia there was a statistically significant increase in the percentage of students engaging in paid work during term time, increasing from 70% in Year 1 to 84% in Year 3 and a statistically significant difference was seen in the type of work undertaken, from non-nursing to nursing-related work (*12*).

In a survey of a second-year cohort of nursing students from a regional university in Australia, more than three-quarters (78%) of students were participating in paid employment. This high number was anticipated because clinical facilities specifically recruit students at the end of the first year of their Bachelor of Nursing programme to work as assistants in nursing or enrolled nurses (*13*).

The lower proportion of students working in our study may be due to the Egyptian culture where among moderate or high socioeconomic levels, students depend on their families during study years, which may be similar to some western countries.

In our study, student employment was significantly higher among males while there was no statistically significant difference regarding urban/rural residence. The survey of Estonian students revealed that personal characteristics did not seem to be influential in whether students worked (*1*). Our findings are different from those reported in a study of full-time undergraduate students at the University of Glasgow, Scotland where there was no significant difference between the proportion of male and female students who worked, however, significantly more students who lived at home worked compared to those who lived away (*14*). This could be explained by the cultural and social norms of Egypt in which males can move about more easily and are free to work while females are more conservative and tend to stay at home after study time.

Despite the fact that undergraduate education is free of charge in Egypt, the main reason for work while studying was for financial support (68.8%); more additional money for personal needs and more than one reason were mentioned by the participants. This is supported by the fact that student employment in our study was more common among students from families of low socioeconomic status. This is similar to the results of the study in Estonia which found that the less the means of a family the more likely it was that a student worked

Table 3 Occupational profile of working students

Occupational profile	Ever working students (*n* = 77) No. (%)
Age of starting ever work (years)	
< 15[1]	9 (11.7)
15–18	26 (33.8)
> 18	42 (54.5)
Mean (SD)	18.3 (2.2)
Range	12–20
Number of working years before university education: median (range)	1 (0.5–6)
Field of work (*n* = 71)[2]	
Nursing related	65 (91.5)
Non-nursing related	4 (5.6)
Both	2 (2.8)
Type of work	
Paid	70 (90.9)
Voluntary/unpaid	7 (9.1)
Place of work	
Private clinic	12 (15.6)
Hospital	44 (57.1)
Other (pharmacy, store)	21 (27.3)
Work time	
Morning	19 (24.7)
Evening	28 (36.4)
Shift	30 (38.9)
Work seasonality	
During summer	35 (45.5)
Throughout the year	42 (54.5)
Reason for working[3]	
Financial support for own needs[4]	53 (68.8)
Gain practical experience	42 (54.5)
Cooperation with different medical teams	9 (11.7)
Guarantee employment opportunity	17 (22.1)
Work hours per day	
< 8	30 (38.9)
≥ 8	47 (61.1)
Mean (SD)	10.3 (3.1)
Duration of work (months)	
< 6	49 (63.6)
≥ 6	28 (36.4)

[1]Below the legal age of working.
[2]Some respondents did not answer this question.
[3]Categories are not mutually exclusive.
[4]Own needs include smoking, accessories and entertainment.
SD = standard deviation.

in order to be able to support himself or herself (*1*). They found that while 77% of students from the low-income group worked for subsistence, only 62% of the middle-income group and 42% of the upper-income group reported this as a reason. Students from more affluent families were more likely to work for extra income and for general and professional work experience (*1*). Also, the study of full-time undergraduate students at the University of Glasgow reported that students noted financial necessity, extra cash for fun and work experience as the most important reasons for working (*14*). A study in Australia in 2011 found that students work to support their lifestyle (*15*).

Apart from the financial benefits, students have reported greater self-confidence, an understanding of the business world and skills development as benefits of paid work (*16,17*). Students also perceive paid work will enhance their opportunities for full-time employment on leaving university (*18*), thus making them more 'employable' (*19*). In addition to providing a source of financial support while completing their nursing education (*8*), engaging in nursing-related work during the term time has been suggested to improve the "work-readiness" of these students in preparation for graduate practice through the development of personal and professional skills in clinical practice (*16*).

In our study, the mean number of work hours per day was 10.3. Much longer working hours were reported in other countries. In the study of full-time undergraduate University of Glasgow students, the mean number of hours worked was 14.2 (*14*). Similarly, the survey of 267 nursing students from a regional university in Australia reported that the average hours spent in paid employment were 14.43 (SD = 10.50) hours per week (*13*).

In our study, the majority of working students were engaged in nursing-related fields with only 5.6% working in non-nursing related field. This agrees with the survey of a second year cohort of nursing students from a regional university in Australia, where the majority of students were engaging in nursing-related work (*13*).

Table 4 Occupational health hazards and protective measures among working students by age at starting work

Occupational health hazards	Working students (*n* = 77)	Age at starting work (years)			*P*-value
		< 15 (*n* = 9)	15–18 (*n* = 26)	> 18 (*n* = 42)	
	No. (%)	No. (%)	No. (%)	No. (%)	
Physical hazards[1]					
Noise	65 (84.4)	7 (10.8)	22 (33.8)	36 (55.4)	0.8
Temperature extremes	62 (80.5)	8 (12.9)	20 (32.3)	34 (54.8)	0.7
Vibration	32 (41.5)	3 (9.4)	11 (34.4)	18 (56.3)	0.8
Radiation	24 (31.2)	3 (12.5)	8 (33.3)	13 (54.2)	0.9
Carrying heavy loads	41 (53.2)	4 (9.8)	15 (36.6)	22 (53.6)	0.8
Chemical hazards	26 (33.7)	3 (11.5)	9 (34.6)	14 (53.7)	0.9
Psychosocial stressors	62 (80.5)	6 (9.7)	20 (32.3)	36 (58.1)	0.3
Lack of safety training programme	53 (68.8)	7 (13.2)	18 (34)	28 (52.8)	0.8
Lack of PPE at work	53 (68.8)	5 (9.4)	20 (37.7)	28 (52.8)	0.4

[1]*Categories are not mutually exclusive.*
PPE = personal protective equipment.

Our study showed that subjective noise and temperature extremes were the most frequently reported physical hazards by working students (84.4% and 80.5%; respectively). In a study of daytime decibel levels in 4 medical/surgical nursing units in hospital, it was found that noise levels in patient rooms were significantly higher than in the nurses' station and patient care areas were as noisy as a busy office. However, nurses' judgment of noise levels was not enough to make informed decisions for controlling the acoustic hospital environment (*20*).

In our study, 33.7% of working students reported exposure to chemical hazards at work. In a study of nurses at the emergency care unit of a university hospital in Brazil, participants confirmed they came in contact with different chemical compounds in their work environment and they indicated that occupational exposure to these substances can cause health problems (*21*).

In addition, our study showed that a large proportion of working students reported exposure to workplace psychosocial stressors (80.5%). This is similar to the findings of a study of Canadian nurses where nurses were significantly more likely to say that most days at work were "quite a bit" or "extremely" stressful compared to other employed postsecondary-educated women (*22*).

Our results report subjective sleep quality complaints among 85.7% of the working student nurses, which may be attributed to the fact that about 40% worked shifts and also to the combination of work and studies. Young healthy nurses tolerated the first night shift exposure well, as judged by parameters related to quality of sleep. An increased sleep need during work days led to longer total sleep time, but did not lead to longer supplementary sleep episodes (*23*).

In our study, 74% of the working students had musculoskeletal complaints mostly in the legs/feet (55.8%) and back (46.7%), with a significantly higher frequency among female students. This

Table 5 Frequency of reported work-related health effects among working students

Work-related health effects[1]	Working students (*n* = 77)
	No. (%)
Musculoskeletal complaints	57 (74.0)
Neck	15 (19.5)
Arm/hand	14 (18.2)
Back	36 (46.8)
Leg/feet	43 (55.8)
Sleep disorders	66 (85.7)
Occupational injuries	53 (68.8)
Needle sticks	35 (45.5)
Fractures	3 (3.9)
Sprains	11 (14.3)
Occupational infection	25 (32.5)
Eye and skin	9 (11.7)
Respiratory tract	16 (20.8)
Bloodborne	5 (6.5)

[1]*Categories are not mutually exclusive.*

Table 6 Work-related health effects by age at starting work and sex

Work-related health effects[1]	Age (years)				Sex		
	< 15 (*n* = 9)	15–18 (*n* = 26)	> 18 (*n* = 42)	*P*-value	Male (*n* = 29)	Female (*n* = 48)	*P*-value
	No. (%)	No. (%)	No. (%)		No. (%)	No. (%)	
Musculoskeletal complaints (*n* = 57)	6 (10.5)	20 (35.1)	31 (54.4)	0.8	14 (24.6)	43 (75.4)	0.0006
Sleep disorders (*n* = 66)	8 (12.1)	22 (33.3)	36 (54.5)	0.9	22 (33.3)	44 (66.7)	0.056
Occupational injuries (*n* = 53)	5 (9.4)	18 (34.0)	30 (56.6)	0.6	15 (28.3)	38 (71.7)	0.01
Occupational infection (*n* = 25)	3 (12.0)	7 (28.0)	15 (60.0)	0.7	8 (32.0)	17 (68.0)	0.4

[1]*Categories are not mutually exclusive.*

concurs with a study among Korean nursing students where musculoskeletal symptoms at any body site were reported by 73.3% of the participants. The most commonly reported sites were the shoulder (46.0%), lower back (39.1%), neck (35.6%), feet (25.2%) and lower legs (23.8%) (*24*). It has been reported that women have a higher musculoskeletal morbidity than men (*25*). Greater prevalence or severity of symptoms may be due to the higher demands and constraints that women face or because women are more affected by, or vulnerable to, the health impact of particular demands and constraints (*26*).

A study at a public hospital in Brazil of occupational health hazards for intensive care unit nurses and nursing technicians reported that leg pain and sleep disturbance symptoms were at critical levels among nurses; among nursing technicians, critical levels were detected for leg and back pains (*27*).

It is widely accepted that the most common occupational hazard for all health care professionals involved in clinical care is needle-stick and sharps injuries mainly caused by inadequate disposal and recapping of needles (*28*). This concurs with our study where the most frequently reported occupational injuries among the working students were needle-sticks injuries (45.5%). In addition, a study of the frequency and causes of occupational injuries among nursing students in Turkey reported that needle sticks (47.3%) and broken ampoules during medication preparation (37.8%) were the 2 most common reasons for injuries (*29*). Also, in a study of 124 nurses working in the emergency departments of 6 general hospitals in Greece, 77.2% reported exposure to blood or body liquids through the skin due to needle-stick injury (*28*).

In our study, lack of safety training programmes and protective equipment at work were reported by 68.8% of working students. These findings suggest the need for the integration of occupational health and safety and practical training in the first year curricula with a focus on the prevention of needle-stick injuries and the effective use of personal protective equipment.

The results of our study showed that about 60% of the working students regularly attended university and more than half believed that working has a positive effect on their academic performance. Several studies have reported negative consequences of full-time students participating in paid work during term-time in higher education, which include higher stress levels (*18*), a reduction in leisure and social activities (*30,31*), missing classes (*32*), and handing in assignments late (*17*).

As more nursing students are employed, it is essential that schools of nursing examine the relationship between student employment and academic performance. A statistically significant negative relationship was found between students working >16 hours a week and academic performance, especially in high-attrition courses (*33*).

There were some limitations to our study. The use of self-reports can be prone to error because nurses' reporting

Table 7 Academic achievements of working nursing students

Academic performance (*n* = 77)	No.	%
Previous year's score		
Unsatisfactory[1]	14	18.2
Good	12	15.6
Very good	51	66.2
University attendance		
Never	8	10.4
Rarely (once per week)	5	6.5
Average (twice per week)	18	23.4
Regular (daily)	46	59.7
Non-attendance due to work load	12	15.6
Effect of work on academic performance		
Positive	42	54.5
Negative	35	45.5

[1]*Unsatisfactory includes students who had repeated failure, postponed exams and a pass (< 60–65%) score.*

patterns could be influenced by their own knowledge of health conditions and risks. Also the possibility of recall bias cannot be excluded. Furthermore we could not directly assess the occupational health hazards (i.e. noise or vibration) in the multiple private sectors where the students work and evaluation depended only on the students' reports which could be subjective.

Further research is recommended for assessment of sleep disorders and needle stick injuries among working nursing students.

Conclusion

In conclusion, employment is common among nursing students in our university. As reported by the students, working has positive effects on both their education and experience despite having negative health consequences. It is necessary to put in place regulations to minimize the adverse health effects of student employment and to enforce child labour laws as 11.7% of the students started work below 15 years i.e. below the legal age of working in Egypt.

It is recommended to provide advice to all incoming and current students on working, perhaps producing a leaflet with information on how to minimize any adverse impact of part-time work on health and academic performance and how to maximize the benefits of working on student potential. It would be useful to implement occupational health and safety training during nursing education as many work-related health effects seem to be modifiable.

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