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## Nurses' occupational satisfaction during Covid-19 pandemic

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### ABSTRACT

**Background:** Covid-19 has brought healthcare workers in general and nurses in particular into the limelight as never before. It is important to study the intensity of the impact of this pandemic on the profession.

**Objective:** This study aims to assess the occupational satisfaction during the pandemic of Covid-19 among the nurses in Israel, to shed light on conditions of work and to identify factors associated with low occupational satisfaction.

**Methods:** Cross-sectional study of 130 Israeli nurses. Minnesota Satisfaction and Measure of Job Satisfaction questionnaire with 28 items was used to assess occupational satisfaction.

**Results:** In the multivariable model, nurses working in the community had higher occupational satisfaction than those working in hospitals ( $\beta = 0.24, p = .032$ ); nurses who took care of patients who tested positive for Covid-19 had significantly lower occupational satisfaction than others ( $\beta = -0.48, p = .009$ ). Most of the sample reported lack of personal protective equipment (PPE). Nurses who experienced lack of PPE reported lower occupational satisfaction than those who did not (3.4 vs. 3.8,  $p = .039$ ). Occupational satisfaction was mainly based on the component, built by the intrinsic characteristics of the occupation related to the personal accomplishment.

Most of nurses had to increase their workload as a result of staff shortages, but the elevation of the workload was not associated with lower occupational satisfaction.

**Conclusion:** Even under the circumstances of the pandemic, the most important nurses' occupational values are worthwhile accomplishments, importance of professional challenge, diversity and interest in the job, personal growth and development and independence in their practice.

### 1. Introduction

The global workforce includes 27.9 million nurses, accounting for 59% of healthcare professionals worldwide (Bean, 2020). Since the end of February, 2020 Covid-19 has become a most serious challenge for the Israeli population and especially for medical staff who found themselves on the front line. Overall at the time of writing (middle of January 2021) 477,357 verified cases have been diagnosed in Israel and 3596 patients have died since the pandemic started (Ministry of Health, 2020). Although Israel started to vaccinate against coronavirus and more than one million people have already been vaccinated (12% of the population ("Coronavirus: Israel leads vaccine race with 12% given jab," 2020)), the epidemiologic situation in the country is threatening and on January 7 Israel entered its third nationwide lockdown.

A sudden onset of a potentially life-threatening illness such as Covid-19 leads to an extraordinary amount of pressure on nursing staff coupled with an increased workload, physical exhaustion, inadequate personal

protective equipment, fear of being infected and infecting family members (Pappa et al., 2020), disturbance of work-life balance, neglect of personal and family needs, and lack of updated information on a new disease (Raudenská et al., 2020). The detrimental effect is most significant among nurses who were directly in contact with infected or suspected Covid-19 patients on the frontline (Nie, Su, Zhang, Guan, & Li, 2020). Fear of infection among the health workers is based on awful statistics: at least 7000 health workers have died around the world after being infected with SARS-Cov-2 (Amnesty, 2020), while more than thousands of the infected were nurses. (Medical Press, 2020) The first medical professional who died of Covid-19 in Israel was a nurse, Suzy Levi, 65 years old (Winer, 2020).

When the first mandatory lockdown was introduced in Israel lasting from the beginning of March till the middle of May 2020, schools and kindergartens were closed and lack of childcare facilities caused additional difficulties for parents who needed to work. This additional burden added to the stressful occupational situation of nurses. The meta-

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analysis of 13 studies conducted worldwide and combined data on 33,062 participants concluded that the prevalence of anxiety among the health workers exceeded 23%; a similar proportion (23%) suffered from depression and 39% suffered from insomnia (Pappa et al., 2020). As a result of the combination of such multiple stressors destabilizing mental well-being, health care workers' experiences during the Covid-19 pandemic result in occupational burnout and post-traumatic stress disorder (Raudenská et al., 2020).

In Israel the manpower in nursing suffered from a serious crisis even before a pandemic. The rate of nurses in Israel is lower than the average in OECD countries (5.0 nurses per 1000 citizens compared to 9.3 nurses per 1000 in OECD countries (OECD, 2016)). Moreover, in Israel there is a considerable gap between the number of nurses in the labor market and the number needed to serve the growing population (Eyal, Samuel, Ben-Shoham, Nirel, & Grinstein-Cohen, 2014; Nirel, Grinstien-Cohen, Eyal, Samuel, & Ben-Shoham, 2015). Thus, the shortage of nursing staff which existed even before the pandemic worsened as a result of the entry of nursing staff into quarantine following exposure to patients and sick staff members during the pandemic (Efrati, 2020).

While discussing the detrimental influence of the pandemic situation on nurses, it is important to take into account that the most outstanding characteristics of the nursing profession, such as nurses' sense of duty, dedication to patient care, personal sacrifice and professional collegiality, is heightened during a pandemic or an 'pandemic (Fernandez et al., 2020). The pandemic influence on occupational satisfaction seems to be negative: in a survey, conducted among the nurses in US before the Covid-19 pandemic and in March 2020, frequency of nurses reported willing to find a new job was double (60%) in March 2020 in comparison with the situation before the pandemic, when 30% of nurses reported interest in finding a new job (Wolters Kluwer, 2020). In an extensive UK study, conducted in April 2020, 60% of nurses reported being professionally dissatisfied and demoralized (Senek et al., 2020).

In Israel little is known about occupational satisfaction during the Covid-19 pandemic. The aim of this study was to assess the occupational satisfaction during the pandemic of Covid-19 among the nurses in Israel, to shed light on conditions of work during the pandemic and to identify factors associated with low occupational satisfaction.

## 2. Methods

### 2.1. Study design

This research was conducted as a cross-sectional study with convenience sample of 130 Israeli nurses recruited to participate through several Facebook groups of nurses during June–September 2020. The study received approval from the Ethical Board of the Department of Nursing. Filling out the questionnaire reflected consent to participate.

### 2.2. Study variables

#### 2.2.1. Demographic variables

Age (used as a continuous variable and as a dummy variable:  $\leq 44$ ; 45+); Gender (female; male);

Family status (married/in relationship; single/divorced); Parental status (does not have children; has children); Country of birth (Israel; other countries); Population group (Jewish; Arab);

Level of religiosity (secular[nonobservant]; traditional [observes some religious commandments] and religious[observes all religious commandments]); Education: RN – registered nurse; RN BA – RN with Bachelor's degree; RN MA – registered nurse with Master's degree. Advanced clinical nursing course (yes; no).

#### 2.2.2. Occupational variables

Form of Employment (full time job; part time job); Occupation seniority (used as a continuous variable and as a dummy variable:  $\leq 11$  (median); 12 years+); Type of exposure to Covid-19 patients (patients who tested

positive for Covid-19; patients who might be positive; patients who definitely did not have Covid-19); Lack of personal protective equipment (PPE) (yes; no); Level of control over work schedule (low; medium; high).

#### 2.2.3. Occupational satisfaction tool (28 items)

Four items from Minnesota Satisfaction Questionnaire (MSQ) (Vocational Psychology Research & Minnesota, 1977) (short version translated to Hebrew (Yakov & Davidovich, 2010)), 17 items from Measure of Job Satisfaction (MJS) (Traynor & Wade, 1993), three items which were identical in MSQ and MJS and four additional items which were included in the final version following the request of three senior nurses working in a general hospital. Items were rated on a 5-point Likert-type scale (1 = to a very small degree to 5 = to a very high degree). Scores range from 28 to 140 with higher scores indicating higher occupational satisfaction.

In Traynor and Wade's (1993) study, Cronbach's alpha for MSQ questionnaire was 0.93 (Traynor & Wade, 1993). Cronbach's alpha in this study was 0.92 pointing to high internal consistency.

### 2.3. Statistical analysis

A mean occupational satisfaction score was calculated for each participant. The Kolmogorov-Smirnov test was used to test the normality of the distribution of the occupational satisfaction score. A *t*-test, Mann Whitney or ANOVA test was used to assess an association between demographic and occupational variables and the mean occupational satisfaction score. Multivariable linear regression model was used to assess the association of each variable found significantly associated with occupational satisfaction in univariable analysis. Before including independent variables in multivariable analysis, correlation between the variables were checked with Kendall's Tau coefficient.

Occupational satisfaction components were constructed using factor analysis with a varimax rotation and an unrestricted number of factors. Variables with factor loadings  $\geq 0.5$  were considered contributing variables to a given factor. A *t*-test was used to assess an association between nurses' characteristics and factors extracted using factor analysis.

Statistical analysis was performed using the IBM SPSS Statistics for Windows, Version 25 (IBM SPSS Statistics for Windows, IBM Corporation, Armonk, NY). For all analyses performed, a value of  $p < .05$  was considered statistically significant.

## 3. Results

### 3.1. Demographic and occupational characteristics of the study population

Most of the study population were married or living with a partner (75%); 58% were parents to children younger than 18 years (Table 1). Among the study sample, 71% reported being secular, 20% reported being traditional and 9% religious. Israeli born nurses comprised 54% of the study population; 46% were immigrants (78% of them from the Former Soviet Union [FSU]).

Mean seniority in the profession was 12.6 years (SD = 10.0). Community nurses had significantly longer length of occupational seniority (15.8 years at average vs. 11.3 years among hospital nurses). Most of the population (54%) worked full time with significant differences between community (40%) and hospital nurses (60%). A significantly higher proportion of the community nurses held managerial positions (50% vs. 12% among hospital nurses). The proportion of males was significantly higher among hospital nurses (21.2% vs. 7.5%).

### 3.2. Occupational Satisfaction (univariate analysis)

The occupational satisfaction score was normally distributed with a mean of 3.6 (SD = 0.6) and a median 3.7 (Interquartile Range [IQR] 3.2–4.1) (Kolmogorov-Smirnov test  $p = .2$ ). No difference in

**Table 1**  
Demographic and occupational characteristics of the study population, among hospital and community nurses.

Demographic characteristics	Hospital n = 85	Community n = 45	Total n = 130
Age (years)			
Mean (SD)	39.1 (10.6)	42.2 (9.1)	39.9 (10.1)
Median [Interquartile Range (IQR)]	37.5 [30.0–46.0]	42.0 [36.0–49.0]	38.0 [32.0–46.0]
Gender (%)**			
Female	78.8	92.5	83.2
Male	21.2	7.5	16.8
Family status “married or living with a partner” (%)	76.5	72.5	75.2
Parental status “has children” (%)	57.6	60.0	58.4
Birth country (%)			
Israel	52.9	57.5	54.4
Other <sup>a</sup>	47.1	42.5	45.6
Population group (%)			
Jewish	90.6	85.0	88.8
Arabs and Bedouins	9.4	15.0	11.2
Level of religiosity (%)			
Secular	70.2	72.5	71.0
Traditional	19.0	22.5	20.2
Religious	10.8	5.0	8.9
Education (%)			
RN	5.9	7.5	6.4
RN,BA	60.0	42.5	54.4
RN,MA	34.1	50.0	39.2
Advanced clinical nursing course (%)	57.6	62.5	59.2
Occupation seniority (years)**			
Mean (SD)	11.3 (10.1)	15.8 (9.6)	12.6 (10.0)
Median [IQR]	8.0 [2.0–20.0]	15.5 [8.5–19.75]	11.0 [4.0–20.0]
Form of Employment (%)**			
Full time job	60.0	40.0	53.6
Part time job	40.0	60.0	46.4
Managerial position (%)**	11.8	50.0	24.0

<sup>a</sup> 78% of immigrants came from Former Soviet Union (FSU).  
\*\* p value for the difference between hospital and community nurses <.05.

occupational satisfaction was found by gender, family status, country of birth, age, population group, form of employment, level of religiosity, education or seniority in profession.

Place of work was found as significantly associated with occupational satisfaction, while community nurses had a higher mean satisfaction score than hospital nurses (3.9 vs. 3.5,  $p = .008$ ). Nurses who held managerial positions had higher occupational satisfaction (3.9 vs. 3.6,  $p = .006$ ).

Although 67% of nurses had to increase their workload as a result of the quarantine of part of the nursing staff, those who experienced this increase or shortage of staff did not report lower occupational satisfaction.

Among the study sample, 10% ( $n = 13$ ) reported that they were planning to leave the profession within the next 5 years. Lower occupational satisfaction was reported by nurses who stated that they had a plan to leave the profession in comparison with those who were planning to stay (3.2 vs. 3.7,  $p = .011$ ).

Among the study sample, 103 nurses (79%) reported lack of personal protective equipment (PPE), while 35% of them reported that they were exposed to the shortage of PPE during the first month (March) of the pandemic; 36% reported the shortage during the two first months (March and April 2020); 9% reported three months of shortage; and 19% reported much longer shortages of PPE. The proportion of nurses reporting lack of PPE was the same in the hospitals and in the community. Masks (N95 and surgical) were the most frequent PPE which was lacking. Nurses who worked with shortages of PPE had lower occupational satisfaction than those who were not exposed to work without PPE (3.4 vs. 3.8,  $p = .039$ ).

Nurses who reported work with patients who tested positive for Covid-19 ( $n = 47$ , 36%) had significantly lower mean occupational satisfaction in comparison with nurses who reported working with patients who could potentially be positive for Covid-19 ( $n = 67$ , 52%) and nurses who did not work with Covid-19 patients ( $n = 15$ , 12%) (mean satisfaction 3.4, 3.7 and 3.9 respectively,  $p = .013$ ).

Level of control over the work schedule was significantly associated with occupational satisfaction: nurses reporting a low level of control were less satisfied in comparison with those reporting medium and high level of satisfaction (3.2, 3.5, 3.8,  $p < .0001$ ).

### 3.3. Occupational satisfaction (multivariable analysis)

As place of work (hospital vs. community) was strongly correlated with managerial positions and with the level of control over work schedule, managerial positions and with the level of control over work schedule were excluded from the multivariable model (Table 2).

Place of work, work in the condition of lacking PPE, and type of exposure to Covid-19 patients were included in the multivariable linear regression model.

After mutual adjustment, nurses working in the community had higher occupational satisfaction than those working in a hospital ( $\beta = 0.24$ ,  $p = .032$ ). Nurses who took care of patients who tested positive for Covid-19 had significantly lower occupational satisfaction than others ( $\beta = -0.48$ ,  $p = .009$ ).

### 3.4. Components of occupational satisfaction

Four factors together explained 60% of variance. The components of each factor are depicted in Table 3.

The first factor, referred to as **Personal accomplishment**, explained a very significant scope (34.4%) of variance. This factor was related to feelings of worthwhile accomplishment, challenge, the extent of diversity and interest in the occupational duties, personal growth and development, the use of skills, and the amount of independence and autonomy at work.

The only nurses’ characteristic found significantly associated with this factor was a managerial position (Table 4): satisfaction related to personal accomplishment was significantly higher among those nurses who had managerial positions.

The second factor, referred to as **Workload** explained 9.2% of the variance. This factor increased with an increase in satisfaction with the workload.

Significantly higher satisfaction with workload was reported by nurses with an MA degree and those who underwent advanced clinical nursing courses (Table 4).

The third factor, referred to as **Professional support** explained 8.4% of the variance. As satisfaction with relationship with the head nurse, nursing staff and multidisciplinary staff increased, this factor increased.

Younger nurses ( $\leq 44$  years) were significantly more satisfied with professional support than those aged 45+. Nurses working in the

**Table 2**  
Linear regression coefficients for occupational satisfaction as dependent variable, by occupational characteristics.

Demographic characteristics	Multivariable model $\beta$ [95% CI]
Place of work	Reference group
Hospital nurses	0.238 [0.021, 0.456]
Community nurses	Reference Group
PPE shortage	0.129 [-0.07, 0.327]
Experienced	
Did not experience	
Type of exposure to Covid-19	-0.475 [-0.831, -0.119]
Patients who tested positive	
Patients who might be positive	-0.255 [-0.604, 0.095]
Patients without Covid-19	Reference group

**Table 3**  
Loading coefficients of factors obtained by factor analysis.

Factor I 34.4%	Factor II 9.2%	Factor III 8.4%	Factor IV 7.4%
Personal accomplishment	Workload	Professional support	Psychological reward
The feeling of accomplishment I get from the job 0.88	The amount of time available to finish everything I have to do 0.78	The amount of support and guidance I receive from my head nurse 0.85	From the treatment I receive from my patients 0.87
The amount of challenge in my job 0.83	From the scope of manpower in shift in relation to the amount of work 0.76	The degree of respect and fair treatment the staff get from the head nurse 0.76	From a sense of gratitude, I receive from the patients 0.84
The extent to which my job is varied and Interesting 0.81	My workload 0.74	The extent that a head nurse takes my needs into account 0.60	The contribution I make to patient care 0.61
The amount of personal growth and development I get from my work 0.81	The amount of time spent on administration 0.73	The degree to which I feel part of a team 0.57	
The extent to which I can use my skills 0.81	The amount of pay I receive 0.7	From the relationship with a multi-professional team 0.52	
The extent to which I can function according to my values 0.59			
The amount of independent thought and action in my work 0.53			

community reported significantly higher satisfaction with this component in comparison to hospital nurses (Table 4).

The fourth factor, referred to as **Psychological reward**, explained 7.4% of the variance. This factor was related to satisfaction from interaction with patients.

Nurses who were parents of children younger than 18 years reported significantly higher satisfaction with this component than those who did not have children (Table 4).

#### 4. Discussion

The current study aimed to study occupational satisfaction during the pandemic among Israeli nurses. Moderate/high mean occupational satisfaction was found in this study under the circumstances of the pandemic. The comparison with other studies is not always possible following different methodology in occupational satisfaction assessment; however, several studies using the same methodology were found. In an Israeli study conducted in 2014, the mean occupational satisfaction was 3.87 (DeKeyser Ganz & Toren, 2014). In a study from Finland (2012), very similar occupational satisfaction was found as in our study (mean = 3.6) in the sample of Finnish nurses (Kvist et al., 2012); mean occupational satisfaction of 3.7 was found in a study from Lisbon, Portugal (Dinis & Fronteira, 2015) and mean occupational satisfaction of 3.3 was found among Chinese nurses in 2006 (Haijuan, Yongpin, & Bibo, 2006). All these studies were conducted under regular (non-pandemic) conditions.

Studying components of occupational satisfaction revealed that the most extraordinary important component of occupational satisfaction in this study is the component related to personal accomplishment. This means that even under the circumstances of the pandemic, the most important nurses' occupational values are worthwhile accomplishments, importance of professional challenge, diversity and interest in the job, personal growth and development and independence in their practice. The same finding of the importance of the perception of the job's merit along with a feeling of having delivered skilled and quality care to patients was reported in the study conducted in England in 1993, using similar methodology of factor analysis for revealing occupational satisfaction components (Traynor & Wade, 1993). Other components of occupational satisfaction such as workload, work conditions, reward (extrinsic factors according to Frederick Herzberg's two-factor theory (Herzberg, Bernard, & Barbara, 1959)) were significantly less important in comparison with much powerful components related to personal accomplishment (intrinsic characteristics, according to "two-factor" theory).

In our study sample, nurses working in the community reported higher occupational satisfaction than those working in a hospital. Previous studies also found that differences in occupational satisfaction exist between hospital and community nurses. Hospital nurses are more satisfied with payment (Cameron, Armstrong-Stassen, Bergeron, & Out, 2004; Campbell, Fowles, & Weber, 2004) than community nurses, but community nurses are more satisfied with the workload and working conditions (Halcomb, Smyth, & McInnes, 2018). Investigation of this finding on differences between community and hospital nurses in our study revealed that the difference is explained by higher frequency of managerial positions among the community nurses in our sample and by higher control over the work schedule among the community nurses. Findings that nurses having high management positions have greater work satisfaction than assistance staff is consistent with other studies (Morton, 2018; Vicario-Merino, Muñoz-Agustin, & Ruiz-López, 2020) and with Frederick Herzberg's two-factor theory. Following this theory, intrinsic factors such as work requiring high skill, recognition for better performance, responsibility, autonomy, meaningfulness, involvement in decision making are the motivators providing the employee positive satisfaction, arising from the intrinsic conditions of the job itself, such as recognition, achievement, and personal growth (Fauziah, Yusoff, Kian, Talha, & Idris, 2013). We believe that managerial positions associated with higher independence/autonomy and responsibility provide higher satisfaction for those who hold them.

In our study nurses who took care of Covid-19 patients had lower occupational satisfaction than other nurses. We believe that this finding is partially explained by difficult work conditions during first months of the pandemic characterized by the lack of PPE. Occupational health principles establish that the employer should minimize health risks for employees. The scope and the transmission of the new disease were not anticipated by health organizations worldwide and this lack of knowledge and supply planning resulted in a lack of PPE for front-line health-care workers, as reported in 63 countries (McCauley & Hayes, 2020). This shortage immediately resulted in increased risk of Covid-19: front-line health-care workers were at increased risk for positive Covid-19 tests compared with the general community (adjusted hazard ratio [HR] 3.4; 95% CI 3.37–3.43) (McCauley & Hayes, 2020). A conflict existed between the duty of care and high perceived risk of infection, along with low agreement with infection control measures, thus creating more ethical problems and dilemmas for nurses (Sperling, 2020b). In a recent Israeli study, it was found that nurses experienced significant personal risk and emotional burdens, but still conveyed strong dedication to providing care, although 41% reported that they were afraid of caring for Covid-19 patients (Sperling, 2020a).

#### 5. Conclusions

High occupational satisfaction is important for nurses' psychological



**Table 4**  
Demographic and occupational characteristics of the study population, and components of occupational satisfaction.

Demographic characteristics		Occupational satisfaction components			
		Personal accomplishment	Workload	Professional support	Psychological reward
Age	≤44 years	0.087	-0.049	<b>0.166</b>	-0.024
	45 years+	-0.209	0.035	<b>-0.373</b>	0.032
Gender	Female	-0.003	-0.036	0.020	-0.037
	Male	0.013	0.168	-0.095	0.147
Family status	Married or living with the partner	-0.060	0.017	0.056	0.011
	Other	0.178	-0.051	-0.165	-0.031
Parental status	Has children	-0.119	-0.007	0.062	<b>0.169</b>
	Does not have children	0.174	0.010	-0.089	<b>-0.247</b>
Birth country	Israel	0.093	-0.077	-0.136	0.016
	Other	-0.111	0.092	0.164	-0.019
	Jewish	-0.015	0.042	0.039	-0.058
Level of religiosity	Arabs and Bedouins	0.033	-0.305	-0.239	0.418
	Secular	-0.015	0.074	-0.013	-0.064
Education	Traditional	0.196	-0.007	-0.180	0.343
	Religious	-0.247	-0.347	0.405	-0.251
	RN	0.323	<b>0.218</b>	0.137	0.293
Advanced clinical nursing course	RN,BA	0.045	<b>-0.260</b>	0.074	0.014
	RN,MA	-0.119	<b>0.319</b>	-0.126	-0.071
	Yes	-0.139	<b>0.122</b>	-0.078	0.013
Occupation seniority	No	0.139	<b>-0.026</b>	0.044	-0.087
	Taking now	0.421	<b>-0.865</b>	0.414	0.348
	≤11 years (median)	0.075	0.072	0.095	-0.079
Place of work	12 years+	-0.094	-0.072	-0.045	0.147
	Hospital nurses	-0.083	0.001	<b>-0.123</b>	-0.073
Form of Employment	Community nurses	0.227	0.072	<b>0.292</b>	0.099
	Full time job	0.023	0.090	0.127	-0.015
Managerial position	Part time job	-0.027	-0.105	-0.149	0.017
	Yes	<b>0.323</b>	0.155	0.082	-0.096
	No	<b>-0.114</b>	-0.055	-0.029	0.034

In bold: p value < .05.

wellbeing and physical health (Allan, Dexter, Kinsey, & Parker, 2018; Faragher, Cass, & Cooper, 2005; Satuf et al., 2018) and also prevents turnover and readiness to leave the profession (Baernholdt & Mark, 2009; Heijden, 2007; Mazurenko, Gupta, & Shan, 2015). In this study nurses reporting readiness to leave the profession had lower mean occupational satisfaction scores. At a time of crises, it is time to take care of those who takes risks on the frontline. Covid-19 is a severe disease, exposing healthcare workers and their families to infection. Healthcare organizations should prevent any shortage of PPE which could compromise the basic values of the nursing profession – taking care of those who need care.

Although difficult work conditions could compromise the basics values of nursing, in reality this did not happen. This study shows that nurses are highly motivated and cling to the values of the profession even in difficult times and even then they are exposed to danger.

## 6. Study limitations

The demographic characteristics of the study population in comparison with the characteristics of the nursing workforce are presented in Table 5. The proportion of males, nurses who underwent advanced clinical nursing courses, nurses working in the Tel-Aviv megapolis region and in Jerusalem region were similar in the study sample and in the workforce. On the other hand, the study sample is younger, more educated, has a lower percent of Arabs and higher proportion of nurses working in the community in comparison with the general Israeli nursing work force. As age, education and population group were not associated with occupational satisfaction, we believe that this underrepresentation would not influence the results. There was overrepresentation of nursing who held managerial position among the community nurses. Higher occupational satisfaction found among community nursing and their higher proportion in the study sample could result in higher occupational satisfaction in this study than is reflected in reality. An additional limitation is that following cross

**Table 5**

Demographic and occupational characteristics of the study sample vs. Israeli nursing workforce.

Demographic characteristics	Study sample n = 130	Israeli nursing force
Age 45+ years, (%)	40	60 <sup>a</sup>
Gender (male), (%)	18	14 <sup>a</sup>
Population group (Arab), (%)	10	19 <sup>b</sup>
Education (RN BA), (%)	54	48 <sup>c</sup>
Education (RN MA+), (%)	39	18 <sup>c</sup>
Advanced clinical nursing course (%)	57	55 <sup>c</sup>
Place of work - community (%)	35	20 <sup>d</sup>
Geographical region (%)		
North	12	32 <sup>d</sup>
Center	43	41 <sup>d</sup>
Jerusalem region	9	8 <sup>d</sup>
South	35	14 <sup>d</sup>
Other	1	5 <sup>d</sup>

<sup>a</sup> Ministry of Health. Workforce in Health Professions in Israel.; 2019.

<sup>b</sup> Popper-Giveon A. Israeli Arabs in Health and Welfare Professions: an Ethnic and Gender Oriented View of Representation and Employment. 2015:1–32. <https://www.jstor.org/stable/24483284?seq=1>.

<sup>c</sup> Samuel, H; Nirel, N; Yair, Y; Riba, S; Reicher, S; Toren O. *Registered Nurses in Israel: Workforce Supply, Patterns and Trends* .; 2010. <https://brookdale.jdc.org.il/publication/registered-nurses-israel-workforce-supply-patterns-trends/>.

<sup>d</sup> Ministry of Health. *Occupational Characteristics of Nurses in Israel*.; 2014. [https://www.health.gov.il/PublicationsFiles/ND\\_occup\\_character.pdf](https://www.health.gov.il/PublicationsFiles/ND_occup_character.pdf).

sectional design of the study, drawing conclusions about the causality of the associations found in the study is problematic.

## Authors' contributions

Dr. Bella Savitsky.

Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Writing - original draft.

Irina Radomislensky.  
Data curation; Formal analysis; Methodology; Writing - review & editing.  
Prof. Tova Hendel.  
Conceptualization; Methodology; Project administration; Resources; Writing - review & editing.

### Declaration of competing interest

None.

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### References

- Allan, B. A., Dexter, C., Kinsey, R., & Parker, S. (2018). Meaningful work and mental health: Job satisfaction as a moderator. *Journal of Mental Health*, 27(1), 38–44. <https://doi.org/10.1080/09638237.2016.1244718>.
- Amnesty. (2020). Nurses' sense of duty, dedication to patient care, personal sacrifice and professional collegiality is heightened during a pandemic or an epidemic. Retrieved from <https://www.amnesty.org/en/latest/news/2020/09/amnesty-analysis-7000-health-workers-have-died-from-covid19/>.
- Baernholdt, M., & Mark, B. A. (2009). The nurse work environment, job satisfaction and turnover rates in rural and urban nursing units. *Journal of Nursing Management*, 17(8), 994–1001. <https://doi.org/10.1111/j.1365-2834.2009.01027.x>.
- Bean, M. (2020). World may be short 5.7M nurses by 2030: 4 report takeaways. *Becker's Hospital Review*. Retrieved from <https://www.beckershospitalreview.com/nursing/world-may-be-short-5-7m-nurses-by-2030-4-report-takeaways.html>.
- Cameron, S., Armstrong-Stassen, M., Bergeron, S., & Out, J. (2004). Recruitment and retention of nurses: Challenges facing hospital and community employers. *Canadian Journal of Nursing Leadership*, 17(3), 79–92. <https://doi.org/10.12927/cjnl.2004.16359>.
- Campbell, S. L., Fowles, E. R., & Weber, B. J. (2004). Organizational structure and job satisfaction in public health nursing. *Public Health Nursing*, 21(6), 564–571. <https://doi.org/10.1111/j.0737-1209.2004.21609.x>.
- Coronavirus: Israel leads vaccine race with 12% given jab. (2020). BBC News. Retrieved from <https://www.bbc.com/news/world-55514243>.
- DeKeyser Ganz, F., & Toren, O. (2014). Israeli nurse practice environment characteristics, retention, and job satisfaction. *Israel Journal of Health Policy Research*, 3. <https://doi.org/10.1186/2045-4015-3-7> (BioMed Central Ltd).
- Dinis, L., & Fronteira, I. (2015). The influence of job rotation in the job satisfaction of nurses in a surgical service. *Revista de Enfermagem Referência*, (No5(IV Série)), 17–26. <https://doi.org/10.12707/riv14008>.
- Efrati, I. (2020). Overburdened by virus. In *Israeli nurses plan strike starting Monday*. Retrieved from <https://www.haaretz.com/israel-news/.premium-overburdened-by-virus-israeli-nurses-plan-strike-starting-monday-1.8997609>.
- Eyal, Y., Samuel, H., Ben-Shoham, A., Nirel, N., & Grinstein-Cohen, O. (2014). The projected supply and demand for nurses. Retrieved from <https://brookdale.jdc.org.il/publication/projected-supply-demand-nurses/>.
- Faragher, E. B., Cass, M., & Cooper, C. L. (2005). The relationship between job satisfaction and health: A meta-analysis. *Occupational and Environmental Medicine*, 62(2), 105–112. <https://doi.org/10.1136/oem.2002.006734>.
- Fauziah, W., Yusoff, W., Kian, T. S., Talha, M., & Idris, M. (2013). Herzberg's two-factor theory on work motivation: Does it works for todays environment? *G.j.c.m.p.*, 2(5), 18–22.
- Fernandez, R., Lord, H., Halcomb, E., Moxham, L., Middleton, R., Alananzeh, I., & Ellwood, L. (2020, November 1). Implications for COVID-19: A systematic review of nurses' experiences of working in acute care hospital settings during a respiratory pandemic. *International Journal of Nursing Studies*. Elsevier Ltd. <https://doi.org/10.1016/j.ijnurstu.2020.103637>.
- Haijuan, W., Yongpin, N., & Bibo, X. (2006). Main factors influencing nurse job satisfaction. Retrieved from <https://www.diva-portal.org/smash/get/diva2:230835/FULLTEXT01.pdf>.
- Halcomb, E., Smyth, E., & McInnes, S. (2018). Job satisfaction and career intentions of registered nurses in primary health care: An integrative review. *BMC Family Practice*, 19(1). <https://doi.org/10.1186/s12875-018-0819-1>.
- Heijden, B. (2007). Occupational turnover: Understanding nurses intent to leave the nursing profession. Retrieved from [https://www.researchgate.net/publication/254765152\\_Occupational\\_turnover\\_Understanding\\_nurses\\_intent\\_to\\_leave\\_the\\_nursing\\_profession](https://www.researchgate.net/publication/254765152_Occupational_turnover_Understanding_nurses_intent_to_leave_the_nursing_profession).
- Herzberg, F., Bernard, S., & Barbara, B. (1959). *Motivation to work* (2nd ed.). New York: John Wiley.
- Kvist, T., Mäntynen, R., Partanen, P., Turunen, H., Miettinen, M., & Vehviläinen-Julkunen, K. (2012). The job satisfaction of Finnish nursing staff: The development of a job satisfaction scale and survey results. *Nursing Research and Practice*, 2012, 1–11. <https://doi.org/10.1155/2012/210509>.
- Mazurenko, O., Gupte, G., & Shan, G. (2015). Analyzing U.S. nurse turnover: Are nurses leaving their jobs or the profession itself? *Journal of Hospital Administration*, 4(4). <https://doi.org/10.5430/jha.v4n4p48>.
- McCauley, L., & Hayes, R. (2020, September 1). Taking responsibility for front-line health-care workers. *The Lancet Public Health*. Elsevier Ltd. [https://doi.org/10.1016/S2468-2667\(20\)30179-1](https://doi.org/10.1016/S2468-2667(20)30179-1).
- Medical Press. (2020). Covid-19 nurse deaths in the thousands: Federation. Retrieved from <https://medicalxpress.com/news/2020-09-covid-nurse-deaths-thousands-federation.html>.
- Ministry of Health. (2020). Ministry of Health Daily Covid-19 update. Retrieved from <https://govextra.gov.il/ministry-of-health/corona/corona-virus/>.
- Morton, I. R. (2018). *Nurse manager job satisfaction and retention*. Gardner-Webb University. Retrieved from [https://digitalcommons.gardner-webb.edu/nursing\\_etd/364/](https://digitalcommons.gardner-webb.edu/nursing_etd/364/).
- Nie, A., Su, X., Zhang, S., Guan, W., & Li, J. (2020). Psychological impact of COVID-19 outbreak on frontline nurses: A cross-sectional survey study. *Journal of Clinical Nursing*. <https://doi.org/10.1111/jocn.15454> (jocn.15454).
- Nirel, N., Grinstein-Cohen, O., Eyal, Y., Samuel, H., & Ben-Shoham, A. (2015). Models for projecting supply and demand for nurses in Israel. *Israel Journal of Health Policy Research*, 4(1). <https://doi.org/10.1186/s13584-015-0043-6>.
- OECD. (2016). Health policy in Israel. *Oecd*. Retrieved from <http://goo.gl/7RQxfN>.
- Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V. G., Papoutsis, E., & Katsaounou, P. (2020, August 1). Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. In *Brain, behavior, and immunity*. Inc.: Academic Press. <https://doi.org/10.1016/j.bbi.2020.05.026>.
- Raudenská, J., Steinerová, V., Javůrková, A., Urits, I., Kaye, A. D., Viswanath, O., & Varrassi, G. (2020). Occupational burnout syndrome and post-traumatic stress among healthcare professionals during the novel coronavirus disease 2019 (COVID-19) pandemic. *Best Practice and Research: Clinical Anaesthesiology*, 34, 553–560. <https://doi.org/10.1016/j.bpa.2020.07.008>.
- Satuf, C., Monteiro, S., Pereira, H., Esgalhado, G., Marina Afonso, R., & Loureiro, M. (2018). The protective effect of job satisfaction in health, happiness, well-being and self-esteem. *International Journal of Occupational Safety and Ergonomics*, 24(2), 181–189. <https://doi.org/10.1080/10803548.2016.1216365>.
- Senek, M., Robertson, S., Ryan, T., King, R., Wood, E., Taylor, B., & Tod, A. (2020). Determinants of nurse job dissatisfaction - findings from a cross-sectional survey analysis in the UK. *BMC Nursing*, 19(1), 88. <https://doi.org/10.1186/s12912-020-00481-3>.
- Sperling, D. (2020a). Ethical dilemmas, perceived risk, and motivation among nurses during the COVID-19 pandemic. *Nursing Ethics*. <https://doi.org/10.1177/0969733020956376>.
- Sperling, D. (2020b). Training nurses to better deal with ethical dilemmas in pandemics. In *Disaster medicine and public health preparedness*. Cambridge University Press. <https://doi.org/10.1017/dmp.2020.144>.
- Traynor, M., & Wade, B. (1993). The development of a measure of job satisfaction for use in monitoring the morale of community nurses in four trusts. *Journal of Advanced Nursing*, 18(1), 127–136. <https://doi.org/10.1046/j.1365-2648.1993.18010127.x>.
- Vicario-Merino, A., Muñoz-Agustín, N., & Ruiz-López, M. (2020). Work satisfaction and nursing management: A quantitative study. *Health Science Journal*, 14(2), 1–7. <https://doi.org/10.36648/1791-809X.14.2.704>.
- Vocational Psychology Reserach, & Minnesota, T. U. of. (1977). *Minnesota Satisfaction Questionnaire (Short Form)* (pp. 1–4). Minnosa UNIVERSITY. Retrieved from [http://vpr.psych.umn.edu/sites/vpr.dl.umn.edu/files/msq\\_booklet\\_short-form\\_1977.pdf](http://vpr.psych.umn.edu/sites/vpr.dl.umn.edu/files/msq_booklet_short-form_1977.pdf).
- Winer, S. (2020). Veteran nurse dies of COVID-19, the first victim among Israel's medical workers. In *The times of Israel*. Retrieved from <https://www.timesofisrael.com/nurse-dies-of-coronavirus-the-first-victim-among-israels-medical-workers/>.
- Wolters Kluwer. (2020). Measuring the impact of COVID-19 on job satisfaction and professional growth in nursing. Retrieved October 5, 2020, from <https://www.wolterskluwer.com/en/expert-insights/measuring-the-impact-of-covid-19-on-job-satisfaction-and-professional-growth-in-nursing>.
- Yakov, T., & Davidovich, N. (2010). Integration into work and satisfaction with work among young physiotherapists, Israel. *Journal of Physiotherapy*, 20–26.