Sources and predictors of work-related stress among Omani Nurses: A cross sectional study

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Abstract

Background

Nurses experience high levels of stress as they deal with the patients having complex health care problems. Stress in nursing affects the practice of nursing profession worldwide. In response to this, the investigators explored the sources and predictors of work related stress among Omani Nurses.

Methods

Samples were selected through proportionate population sampling (PPS) from five selected tertiary care hospitals. Data were collected through self-administered nursing stress scale. The study included 383 Omani nurses. Descriptive and inferential statistics were used to analyze the data.

Results

The highest level of work-related stress was on the subscale of workload with a mean score of 8.99 followed by the subscale of emotional issues related to death and dying with a mean of 8.72. Omani nurses working in tertiary care hospitals were experiencing high levels of work-related stress due to workload secondary to severe shortage in number of nursing staffs and by performing non-specified work responsibilities. Work- related stress was associated with the nursing position as staff nurses, performing night shift and reduced job satisfaction.

Conclusion

The study's results may help in developing human resource strategies aimed at minimizing nurses' stress and improving quality of health care and task force performance.

Introduction

Nurses encompasses the largest workforce in healthcare organizations. They play an important role in the provision direct patient care[1]. In addition, nurses play a significant intermediary role between the patient and the physician in the healthcare organizations[2]. As nurse's work round the clock and seven days a week, they hold a unique position in the hospital[1]. In addition to providing direct patient care and dealing with the human suffering daily, nurses are expected to meet multiple and conflicting demands imposed by nursing managers, supervisors, medical and other administrative staff in the hospital. These lead the nurses to experience stress, role conflict and workload, which seriously impairs the efficacy of delivery of quality healthcare service[3].

Over the past decade, nurses have regularly been reported to experience highest job stress regardless of their specialty[4]. Several studies indicate that work-related stress (WRS) is particularly prominent among nurses[5]. Work-related stress is the physical and emotional reactions that occur due to encounters between a nurse and their work environment when job demand exceeds the nurse's expertise and resources[6]. It is well known that nurses play a critical and most extensive role in the healthcare facility 24 hours a day and provide holistic patient care. Moreover, they deal with the patients having acute and chronic illness with disability and discomfort from birth to death. Therefore, no surprise that nursing has been unfailingly known globally as stressful work[7].

Considerable (9.20–68.0%) percentage of nurses' worldwide suffer from stress; in particular, 20–40% of nurses suffer from WRS[8]. Irrespective of countries they work, nurses experience WRS across the world. In China, 74.8% of nurses suffer from WRS[9]. Almost three-quarters of the private and public sector nurses in Australia reported their stress levels to be 'extremely high' or 'quite high'[10]. In India, 87.6% of nurses acknowledged that they experience stress, with 2.1% reporting severe stress[11]. In Dubai, a vast majority (95%) of nurses experienced varying degrees of stress due to their work. Besides, 86% of those nurses reported severe stress in their jobs were less than 36 years[12]. While in Oman, no studies have reported about the WRS among nurses.

WRS can be caused due to various reasons. Nurses' stressors in the workplace can be related to physical, social and psychological sources either related to the environment or workplace. Firstly, the physical stressors in nurses' work are associated with complexity of highly interactive medical technology. Moreover, due to understaffing among nurses and escalating healthcare costs, the number of nurses available to cover the unit has decreased which increases their workload. These factors contribute to nurses' feelings of helplessness in providing high-quality care. Secondly, nurses' psychological sources of WRS are related to higher demands for nursing care by patients and families. Additionally, nurses must deal with various complicated human feelings with the patient and multiple family members and friends. It can cause nurses to feel anxiety, fear, depression, and anger[13]. The social sources of nurses' WRS include lack of good relationships with peers, superiors, and colleagues, resulting in low productivity and low risk solving interests[14].

In general, WRS may cause illness, injury, and depression. Similarly, it causes mood and sleep difficulties, stomach problems, headaches, and family conflict. Likewise, anxiety and musculoskeletal pain have all been linked to chronic or long-term WRS[3]. Moreover, WRS in nursing is linked to poor health outcomes, which significantly affects the job satisfaction[15]. Furthermore, nursing stress has been shown to dramatically affect the quality of life of nurses while also decreasing the overall quality of care to their patients. WRS is connected with a decrease in the provision of compassionate care to the patients and an increase in the occurrence of practice errors. Moreover, it has a direct or indirect influence on the delivery of quality care as well as the outcomes of patients[16].

In Sultanate of Oman, nurses account for the highest proportion in the healthcare sector. Throughout Oman, nurses serve in a variety of settings. With a growing population and ongoing healthcare needs, nursing sector suffer from a shortage[17]. While increasing healthcare services and building more hospitals are good for the Sultanate's overall health, they are also the contributing factors to the nursing shortage. Oman is dependent on expatriate nurses. Because of Omanisation, non-Omani nurses started leaving the country, leaving the Omani healthcare system difficult in finding replacement staff. Therefore, Omani nurses encounter increased workload, which may negatively affect healthcare quality[18]. Furthermore, nurses in Oman feel that staffing shortages, heavy workloads, lack of job choice, and difficulty meeting family obligations negatively influence their professional lives. In some hospitals, nurses have no formalized job descriptions and are assigned tasks that have nothing to do with nursing, such as dispensing medication after midnight in the pharmacy and performing online statistical reports. Moreover, nurses working especially in Omani tertiary care hospital face more challenges due to overcrowding[19].

Although a great deal of research has been done on stress among nurses internationally, to the best of our knowledge, little has been done and published about stress among nurses in Oman. Given that the international hospital settings and the provision of health services are different from those in Oman, it would not be appropriate to use the results of previous international studies to explain work related stressors among Omani nurses. Therefore, the authors explored the source and predictors of WRS among Omani nurses.

Materials And Methods

Study design

This study used a descriptive cross-sectional design.

Setting

Data were collected from 15 October 2020 to 30 November 2020 from Sultan Qaboos University hospital (SQUH), Royal hospital (RH), Armed forces hospital (AFH), Khoula hospital (KH) and Al- Nadha hospital, Muscat, Sultanate of Oman. All these hospitals were tertiary care hospitals extending health care services to people from various governorates of Oman. The number of Omani nurses working in SQUH were 490, AFH (484), RH (787), KH (486) and Al- Nadha hospital (258) respectively.

Sample size

The sample size for this study was estimated using the preceding sample size formula as 383. n = (nf * N in a health facility)/N total, where n = number of potential participants in a given public hospital, nf = final sample size obtained using the Cochrane formula. N= the total number of potential participants in the government tertiary hospitals (2,505). Therefore, the calculation of sample size from each hospital was

as follows: SQUH n= (75), AFH n= (75), RH n= (120), KH n= (74) and Al-Nahdha Hospital n= (39). The sample size for this study was therefore 383 nurses. It is shown in Figure-1.

Sampling method

Samples were selected through proportionate population sampling (PPS) from the selected five hospitals. Thereafter, a random number table was used to select the required number of participants for the study from each setting.

Sample characteristics

Nurses were included when they met the following inclusion criteria; Omani registered nurses, working in tertiary governmental hospitals in Muscat City, with at least one year of clinical nursing experience, and who were able to speak, write, and read English language. On the other hand, subjects were excluded if they were suffering from psychological problems like depression, and anxiety-related diseases. In addition, nurses who were working in COVID-19 departments during the time of data collection or had worked in such departments one month before data collection were excluded.

Instruments used for data collection

A self-administered questionnaire was used in data gathering. The questionnaire had two sections, namely, demographic /job related nurses' profile and Nursing Stress scale (NSS).

Demographic /job related nurses' profile

This part consisted of eleven questions that tapped information regarding participants' gender, age, marital status, education level, working institution, working department, working years of experience, nursing position, working in night shift and job satisfaction and thought of changing profession.

Nursing Stress Scale

NSS was designed to measure the frequency and sources of work stress experienced by nurses. Graft-Toft and Anderson developed this instrument in 1981[20]. This tool is publicly available for use by the researchers. It consisted of 34 items that described situations that had been identified causing stress for nurses in their performance of their duties. The type response ranged from "0" indicating 'Never' to "3" showing 'Very frequently' according to their perceived occurrence of stress in the workplace. The NSS identified seven major sources of work stress including death & dying, conflict with doctors, inadequate preparation to deal with the emotional needs of patients and their families, lack of support, conflict with other nurses and supervisors', and workload and uncertainty concerning treatment. The questionnaire was pilot tested and had a Cronbach's alpha of 0.85.

Ethical considerations

Prior to data collection, ethical approval was sought from the Medical Research Ethics Committee (MREC) of Sultan Qaboos University (SQU-EC/263/2020 dated 08/11/2020) , Ministry of Health (MOH/CSR/20/23891 dated 13/10/2020) and Armed Forces Hospital, Sultanate of Oman (AFMS-MREC 024/2020 dated 10/11/2020). The investigator provided sufficient information to the nurses about the purpose of the study before collecting the data. The nurses were given the privilege of clarifying their doubts related to data collection. Thereafter, the data was collected after assuring the confidentiality nature of responses and obtaining implied informed consent from the study participants. All the study participants were encouraged to participate in the study and at the same time, they were told that they have the right not to participate. The collected data was stored in a password-protected computer and only the investigators had the access to the data. The research is performed in accordance with the relevant ethical guidelines.

Data collection

Data were collected from October 2020 to November 2020. Data were collected from the selected nurses using a Google form prepared by the investigators of the study. The responses were received by the Principal investigator of the study. Data were transferred to Statistical Package for the Social Sciences (SPSS) version 25.

Data Analysis

Data analysis was conducted using SPSS software program version 25. Descriptive and inferential statistics were employed in the analysis. Categorical sample characteristics were summarized using number and percentages, whereas continuous sample variables were summarized using descriptive statistics such as mean and corresponding standard deviation. The association between sample demographic characteristics and the WRS were analyzed using the Chi-square for categorical outcome variables. Independent samples t-test and one-way analysis of variance (ANOVA) were also used to determine the mean difference in the WRS variables across categories of the demographic variables. All statistical tests were two-tailed and the significance level was set at 0.05.

Results

In our study, 383 subjects were investigated to assess their sources of WRS. The results showed that most respondents were working at the Royal Hospital (31.3%). In addition, the majority of the samples were from the Medical and Surgical Department (29.8%). Additionally, the majority had 1–5 years of work experience (43.3%). Moreover, the majority had a bachelor's degree in nursing (59.0%). The respondent's age was between 30–40 (49.1%). Most (77.5%) of them were females. About 66.3% were married. While, 61.9% were staff nurses, 73.9% worked in night shifts during the study and 58.0% thought of changing profession. However, 55.6% were satisfied with their job. Table 1 shows the detailed results (Table 1).

Table 1
Demographic variables of nurses

Variable	Frequency (%)
Institution	
Sultan Qaboos University Hospital	75(19.6)
Alnahdha Hospital	39(10.2)
Armed Forces Hospital AL- Khoudh	75(19.6)
Khoula Hospital	74(19.3)
Royal Hospital (RH)	120(31.3)
Department	
Critical care department	84(21.9)
Clinical departments	20(5.2)
Male medical ward	5(1.3)
Maternity and child department	70(18.3)
Medical and surgical department	114(29.8)
Nursing Administration	15(3.9)
Oncology department	39(10.2)
Outpatient Department	24(6.3)
Psychiatry department	12(3.1)
Educational level	
Bachelors	226(59.0)
Diploma	140(36.6)
Masters	17(4.4)
Age range	
< 30 years	185(48.3)
> 40 years	10(2.6)
30−40 years	188(49.1)
Gender	
Male	86(22.5)
Female	297(77.5)

Variable	Frequency (%)
Marital status	
Single	124(32.4)
Divorced	5(1.3)
Married	254(66.3)
Nursing position	
Deputy head nurse	25(6.5)
Head nurse	19(5.0)
Midwife	7(1.8)
Nursing supervisor	10(2.6)
Specialist nurse	32(8.4)
Staff nurse	237(61.9)
Team leader	53(13.8)
Years of experience	
1−5 years	166(43.3)
11−15 years	83(21.7)
16 years and above	35(9.1)
6−10 years	99(25.8)
Work night shift	
No	100(26.1)
Yes	283(73.9)
Job satisfaction	
Dissatisfied	41(10.7)
Neither dissatisfied or satisfied	104(27.2)
Satisfied	213(55.6)
Very dissatisfied	25(6.5)
Thought of changing your profession	
No	161(42.0)
Yes	222(58.0)

Table 2 shows sources of WRS among nurses. The scale contained seven subscales with percentage mean scores ranging from 8.5–21%. The overall mean score for the nursing stress scale was 42.85 ± 17.705. Out of the seven subscales, the highest level of WRS was on the subscale of *workload* with a mean score of 8.99 (21%) followed by the subscale of *emotional issues related to death and dying* 8.72 (20.4%). The lowest mean score was seen on the subscale *lack of support* 3.65 (8.5%) and the subscale of *inadequate preparation to meet the emotional demands of patients and their families* 3.86 (9%) of the total mean.

Table 2
Percentage mean scores of sources of work-related stress among nurses (n = 383)

Subscales of Nursing Stress	Mean (%)	SD±	Min	Max
1. Emotional issues related to death and dying	8.72(20.4)	8.72	0	21
2. Conflict with Physicians	6.03(14.1)	3.092	0	15
3. Lack of support	3.65(8.5)	2.386	0	9
4. Conflict with other Nurses/ supervisors	5.64(13.2)	3.413	0	15
5. Workload	8.99(21.0)	3.96	0	18
6. Uncertainty concerning treatment	5.96(13.5)	3.363	0	15
7. Inadequate preparation to meet the emotional demands of patients and their families	3.86(9.0)	2.286	0	9
Total Nursing stress score	42.85	17.705	0	102
Note: *SD = standard deviation*				

On the individual items per subscale, I related to death and dying, the most stressful condition was *watching a patient suffering* (1.75 ± 0.941) followed by *performing procedures that patients experience as painful* (1.56 ± 0.854) and *feeling helpless in case of a patient who fails to improve* (1.31 ± 0.867). The least stressful source of stress in this sub-scale was *physician not being present when a patient die* (0.89 ± 0.966) (Table 3).

Table 3
Analysis of items related to emotional issues related to death and dying (n = 383)

Items	0	1	2	3	Mean	SD
1. Performing procedures that patients experiencing as painful	38	148	143	54	1.56	0.854
2. Feeling helpless in the case of a patient who fails to improve	71	156	124	32	1.31	0.867
3. Listening/talking to a patient about his /her approaching death	184	93	71	35	0.89	1.011
4. The death of a patient	107	117	106	53	1.27	1.018
5. The death of a patient with whom you developed a close relationship	141	120	81	41	1.06	1.004
6. Physician not present when a patient die	171	115	66	31	0.89	0.966
7. Watching a patient suffer	41	106	144	92	1.75	0.941
Note: 0 = Never, 1 = occasionally, 2 = frequently, 3 = Very frequently						

On conflict with physician's subscale II, the least stressful events were *conflict with a physician* (1.14 ± 0.902) and *disagreement concerning the treatment of a patient* (1.15 ± 0.828). However, *making a decision concerning a patient when a physician is unavailable* was the most stressful event in the subscale-II (1.29 ± 0.904) (Table 4).

Table 4
Items on conflict with physicians, inadequate preparation to meet the emotional demands of patients and their families and lack of support subscales respectively (n = 383)

Items	0	1	2	3	Mean	SD
1. Criticism by a physician	101	149	102	31	1.16	0.91
2. Conflict with a physician	98	166	85	34	1.14	0.902
3. Fear of making a mistake in treating a patient	75	156	117	35	1.29	0.885
4. Disagreement concerning the treatment of a patient	87	173	103	20	1.15	0.828
5. Making a decision concerning a patient when a physician is unavailable	83	141	125	34	1.29	0.904
1. Feeling inadequately prepared to help with emotional needs of a patient's family	77	154	105	47	1.32	0.931
2. Being asked a question by a patient for which I do not have a satisfactory answer	66	161	125	31	1.32	0.851
3. Feeling inadequately prepared to help with the emotional needs of a patient	92	142	118	31	1.23	0.906
1. Lack of opportunity to talk openly with other unit personnel about problems in the unit	84	147	114	38	1.28	0.916
2. Lack of opportunity to share experiences and feelings with other personnel in the unit	101	133	118	31	1.21	0.925
3. Lack of opportunity to express to other personnel in the unit my negative feelings toward patients	92	160	106	25	1.17	0.867
0 = Never, 1 = Occasionally 2 = Frequently 3 = Very frequently						

Feeling inadequately prepared to help with the emotional needs of a patient (1.23 ± 0.906) was the least stressful event in relation to the subscale III; *inadequate preparation to meet the emotional demands of the patients and their families* is the most stressful event in the subscale III (1.32 ± 0.931) (Table 4).

In the sub-scale IV *lack of support*, the least stressful event is *lack of opportunity to express to other personnel in the unit about the negative feelings toward patients* (1.17 ± 0.867). However, *the lack of opportunity to talk openly with other unit personnel about problems in the unit* was the most stressful event in subscale IV (1.28 ± 0.916) (Table 4).

Similarly, on *conflict with other nurses/ supervisors'* subscale V, the most stressful condition was *been asked to relieve other units that are short-staffed* (1.27 ± 0.902) followed by *criticism by a supervisor* (1.13 ± 0.921) (Table 5).

Table 5
Items on conflict with other nurses/ supervisors, workload and uncertainty concerning treatment subscales respectively (n = 383)

Items	1	2	3	4	Mean	SD
1. Conflict with a supervisor	123	143	97	20	1.04	0.885
2. Relieving in other units that are short-staffed	84	147	118	34	1.27	0.902
3. Difficulty in working with a particular nurse outside the unit	123	130	102	28	1.09	0.935
4. Criticism by a supervisor	107	155	87	34	1.13	0.921
5. Difficulty in working with a particular nurse in the unit	98	172	81	32	1.12	0.888
1. Breakdown of computer	129	129	93	32	1.07	0.954
2. Unpredictable staffing and scheduling	65	161	104	53	1.38	0.924
3. Too many non-nursing tasks required, such as clerical work	45	131	124	83	1.64	0.949
4. Not enough time to provide emotional support to a patient	40	140	134	69	1.61	0.9
5. Not enough time to complete all my nursing tasks	37	158	130	58	1.55	0.864
6. Not enough staff to adequately cover unit	30	121	149	83	1.74	0.885
1. Inadequate information from a physician regarding the medical condition of a patient	52	178	122	31	1.34	0.813
2. A physician ordering what appears to be inappropriate treatment for a patient	76	186	95	26	1.19	0.828
3. A physician not being present in a medical emergency	111	161	85	26	1.07	0.884
4. Not knowing what a patient or a patient's family ought to be told about the patient's condition and its treatment	75	179	101	28	1.21	0.841
5. Uncertainty regarding the operation and functioning of specialized equipment	82	185	94	22	1.15	0.818
0 = Never, 1 = Occasionally 2 = Frequently 3 = Very frequently						

Not having enough staff to adequately cover unit (1.74 ± 0.885) is the most stressful event in the *workload subscale* VI followed by the item *too many non-nursing tasks required, such as clerical work* (1.64 ± 0.949). Finally, *inadequate information from a physician regarding the medical condition of a patient* (1.34 ± 0.813) was the most stressful situation in the *uncertainty concerning treatment* subscales VII (Table 5).

Furthermore, Chi square analysis was done to determine the association between demographic variables and WRS. The analysis showed that *nursing position* was significantly associated with work stress ($X2 = 18.297$, $p = 0.004$) using fisher's exact test. In addition, *working in the night shift* was significantly associated with work stress ($X2 = 14.933$, $p < 0.001$). Furthermore, *job satisfaction* was significantly associated with work stress ($X2 = 8.752$, $p = 0.033$). The frequency analysis revealed that those *dissatisfied with their job* are more highly stressed compared to those who are satisfied (Table 6).

Table 6
Association between Socio-demographic variables and work-related stress among nurses

Variable	Category	Low stress (%)	High stress (%)	X^2	p-value
Institution				6.546	0.162
	Sultan Qaboos University Hospital (SQUH)	41(54.7)	34(45.3)		
	Alnahdha Hospital	23(59.0)	16(41.0)		
	Armed Forces Hospital AL- Khoudh	33(44.0)	42(56.0)		
	Khoula Hospital	43(58.1)	31(41.9)		
	Royal Hospital (RH)	53(44.2)	67(55.8)		
Department				8.946	0.346
	Critical care department	42(50.0)	42(50.0)		
	Clinical departments	10(50.0)	10(50.0)		
	Male medical ward	3(60.0)	2(40.0)		
	Maternity and child department	32(45.7)	38(54.3)		
	Medical and surgical department	57(50.0)	57(50.0)		
	Nursing Administration	10(66.7)	5(33.3)		
	Oncology department	15(38.5)	24(61.5)		
	Outpatient Department	17(70.8)	7(29.2)		
	Psychiatry department	7(58.3)	5(41.7)		
Educational level				0.576	0.75
	BSN	117(51.8)	109(48.2)		
	Diploma	67(47.9)	73(52.1)		
	MSN	9(52.9)	8(47.1)		
Age range				4.427	0.105
	< 30 years	84(45.4)	101(54.6)		
	> 40 years	7(70.0)	3(30.0)		
	30−40 years	102(54.3)	86(45.7)		
Gender				1.708	0.191

*Significant at p = 0.05 and ** Fishers Exact test used

Variable	Category	Low stress (%)	High stress (%)	X²	p-value
	Male	38(44.2)	48(55.8)		
	Female	155(52.2)	142(47.8)		
Marital status				1.151	0.611
	Single	58(46.8)	66(53.2)		
	Divorced	3(60.0)	2(40.0)		
	Married	132(52.0)	122(48.0)		
Nursing position				18.297**	0.004
	Deputy head nurse	16(64.0)	9(36.0)		
	Head nurse	13(68.4)	6(31.6)		
	Midwife	5(71.4)	2(28.6)		
	Nursing supervisor	3(30.0)	7(70.0)		
	Specialist nurse	23(71.9)	9(28.1)		
	Staff nurse	103(43.5)	134(56.5)		
	Team leader	30(56.6)	23(43.4)		
Years of experience				2.161	0.54
	1–5 years	80(48.2)	86(51.8)		
	11–15 years	47(56.6)	36(43.4)		
	16 years and above	19(54.3)	16(45.7)		
	6–10 years	47(47.5)	52(52.5)		
Work night shift				14.933	0.001*
	No	67(67.0)	33(33.0)		
	Yes	126(44.5)	157(55.5)		
Job satisfaction				8.752	0.033*
	Dissatisfied	12(29.3)	29(70.7)		
	Neither dissatisfied or satisfied	55(52.9)	49(47.1)		
	Satisfied	111(52.1)	102(47.9)		

*Significant at p = 0.05 and ** Fishers Exact test used

Variable	Category	Low stress (%)	High stress (%)	X^2	p-value
	Very dissatisfied	15(60.0)	10(40.0)		
Thought of changing your profession				0.353	0.552
	No	84(52.2)	77(47.8)		
	Yes	109(49.1)	113(50.9)		
*Significant at p = 0.05 and ** Fishers Exact test used					

Discussion

Stress is a significant occupational health risk. Work-related stress is a very serious problem, both for the individuals experiencing it and for the organizations that incur significant financial losses as a result[21]. WRS is the most important health risks[22]. Owing to the taxing nature of the nursing profession, confronting inappropriate communication in the workplace, stressful work environment, and lack of sufficient competency of the individual or colleagues in performing some tasks, nurses feel stressed out with their work on a daily basis. Moreover, nurses continually face patients who are physically and sometimes mentally in critical conditions and are required to take on the heavy workload and go through the huge pressure of job responsibilities besides personal obligations[23].

Furthermore, WRS in healthcare workers are grouped as the sources of stress under context of work and content of work. Context of work included those factors involved in work organization, career development and interpersonal relationships while content of work stress include risk factors arising from the work environment and equipment, division of tasks and planning, hours of work and workload[24]. In our study, it is obvious that *workload* was the cause for highest level of WRS. This finding is corroborated with a study on WRS among nurses in a tertiary care hospital in Goa. Consistently, the findings from this study showed that major stressors are experienced with excessive workload[25]. Furthermore, another study marked workload as the top source of stress. In this study, workload was significantly higher in the hospitals than in the public health care center[6]. Two studies more have also reported workload[26,27] as the most common source of WRS.

We, in our study found two reasons for the increased workload. Firstly, there was *not enough staff to adequately cover the unit*; secondly, *too many non-nursing tasks required, such as clerical work*. Faremi et al[26] assessed the occupational related stress among nurses and the findings were similar to our study findings. It was identified that too many non-nursing tasks required such as clerical work, inadequate staff to cover ward workload, lack of drugs and equipment required for nursing care, and unpredictable staffing and scheduling, as the frequently reported stressful events as conceived by the nurses. Likewise, administrative issues, such as shortage in the nursing workforce, inadequate support from nursing supervisors, low salary, and high levels of expectations were also reported as stressors in a study[28]. We

can explain why nurses are working more than ever before. It can be due to increased demand for nurses, an insufficient supply of nurses, reduced staffing, increased overtime and patient length of stay[29].

Demand for nurses is growing as the population ages, and Oman is undergoing an age-structural transformation towards a greater proportion of older adults (65+). Secondly, the number of nurses is insufficient to satisfy the existing demand. The shortage is expected to worsen when potential demand rises and nursing schools are unable to keep up with the demand for the adequate number of graduate nurses. Thirdly, because of the global economic crisis, Oman tends to reduce the supply of money and work force to health care services. As a result, hospitals cut nursing personnel and mandated overtime to satisfy unusually high demand, dramatically increasing nursing workloads[30]. Consequently, hospital nurses now provide care for sicker patients than in the past, and would need a more intensive workload. Numerous adverse effects of a high nursing workload includes harm to the patient care; detrimental impact on nursing job satisfaction; and high attrition and nursing shortages[14]. Therefore, strategies should be designed to minimize the workload among nurses to reduce their stress level to improve the quality of patient care.

In our study, "*watching a patient suffering*" in the subscale of *emotional issues, related to death and dying*, was the most stressful condition. Additionally, the nurses reported, "*performing procedures that the patients experience as painful*" and "*feeling helpless in case of a patient who fails to improve*" as stressful events. This can be explained by the fact that the nature of death usually can cause nurses to feel anxious. Multiple aspects of death anxiety contribute to individuals' anxiety and stress. It can affect a person's well-being psychologically, physically, and socially. Death anxiety may be accompanied by an absence of experience, a shortage of knowledge about death, and fear of death[31]. The most common feelings described by nurses in other studies were feelings of inadequacy, incompetence, followed by self-blame as the result of a patient's death[32]. In addition, nurses may not have enough time to support one another's emotions in general, and those related to death and dying in particular, because of their increased workload[33].

In our study, in *Conflict with the physician's subscale*, nurses reported that *making a decision concerning a patient when a physician is unavailable* as the most stressful event. However, no consistent literature is found to support our study findings. Therefore, we recommend further studies to investigate the availability of a physician while making a patient decision as a predictor for stress among nurses. In general, conflict with physicians is a key cause of stress in nursing. The available research demonstrates that the methods of managing conflicts include integrating, dominance, obliging, avoidance and compromise[34]. Therefore, nurses and physicians should be made more aware of the conflicts between them and better educated to handle them constructively.

The most stressful event found in our study is "*Inadequate preparation to meet the emotional demands of the patients and their families*". Likewise, another study stated that one of the most stressful situations were dealing with the demands of patients' and their families'. It was noted that the contact with the patients and their families were more stressful where collectivist beliefs predominate[35]. On the contrary, a

study conducted among nurses in Hungary, Israel, Italy, United Kingdom and the United States of America found that the contact with patients and their families was not a cause of stress among nurses of USA[36]. It may be related to the fact that American nurses are trained to cope with social interactions on the job. Additionally, since the USA is the most individualistic country of the five nations, families probably have less influence over individuals' medical treatment. Therefore, further studies are required to confirm these contradictory study findings. In Oman, the Omani society has an extended family system and families can act as a great support. Therefore, respecting the patient's families and their demands is considered very essential. However, extended family can also be a significant source of pressure, stress and can sometimes be overly protective, which may interfere with the nurses' routine in providing quality patient care.

In the sub-scale *lack of support, the lack of opportunity to talk openly with other unit personnel about problems in the unit* was the most stressful event in our study. We could not find similar literature to support this assertion. Therefore, we recommend further studies to explore this stressful event and its predictors. In general, job satisfaction is related to the environment in which the nurse works. The presence of support from colleagues and supervisors is a significant predictor of job satisfaction and it is a major factor responsible for reducing stress. In addition, organizational support is highly essential for the nurses[37]. Therefore, support from colleagues, supervisors and organization is very much needed to reduce the stress among nurses.

Similarly, in our study on *conflict with other nurses/ supervisors'* subscale, the most stressful condition was *been asked to relieve other units that are short-staffed* followed by *criticism by a supervisor.* Conflict amongst nurses has been noted as a critical problem in health care settings worldwide. In workplaces, the primary drivers of conflict include variations in management styles, employee perceptions, personnel shortages, and goal variations and competition amongst work groups. Typically, superior-inferior factors results in conflict when a nurse reports to the head nurse. When the conflict between the nurse supervisor and the nurse is serious and persistent, it might result in unsatisfactory patient care[38]. Therefore, it is critical that the nurse supervisors resolve and manage conflict effectively.

Finally, *inadequate information from a physician regarding the medical condition of a patient* was the most stressful situation in the *uncertainty concerning treatment* subscale in our study. In line with our study findings, another study showed that 49% of nurses had reported the frequent occurrence of stress, 30% experienced occasional occurrence of stress, and 21% had extreme stress due to uncertainty concerning treatment[39]. These findings alarm us that the communication between nurses and physicians should be improved to enhance the treatment process, thus the quality of patient care.

In our study, *working in the night shift* was significantly associated with work stress. Nursing shift work in general, results in highly pressurized work performance and risk for limited job performance, which might also lead to several health issues in nurses[40]. Nurses in our study had different shift rotation depending on each hospital regulations and policies. For instance, nurses working in SQUH had two shifts ie., twelve hours per shift. The rest of the nurses in other tertiary hospitals works three shifts ie., eight hours per

shift. The frequency of shift changes in these hospitals occurs due to daily movements, weekly rotations, or urgent rotations. This could be the reason for the experience of stress among nurses in our hospitals. In consistent with our study results, several studies showed that the nurses working on rotating shifts and night shifts were more likely to experience occupational stress and burnout than those working on fixed shifts[41,42,43,44, 45]. Therefore, allowing workers the flexibility of work time will help in reducing stress in employees[46].

Furthermore, our study showed that *nursing position* was significantly associated with work stress. Khaleel et al[47] informed that the newly employed nurses undergo WRS than the senior nurses, as the new nurses perform too many responsibilities in their duty while the senior nurses perform official and documentary work which is less stressful. However, Ojekou & Dorothy[48] and Al-Aameri[49] reported inconsistent findings with the previous two study findings. These studies reported that the nurses in the higher positions experienced higher levels of stress as they were accountable for more number of subordinates and supervise administrative responsibilities. Therefore, more studies are to be conducted to confirm these conflicting study findings.

Besides, *job satisfaction* was significantly associated with WRS. Moreover, those *dissatisfied with their job* are highly stressed compared to those who are satisfied. To substantiate our study findings, Dagget et al[6] and others[50,51,52,53] found job satisfaction as a predictor for WRS among nurses. However, Gulavani[39] has reported dissimilar findings whereas job satisfaction was not related to occupational stress. Henceforth, future studies should be done to confirm these different findings.

In summary, the author recommend that the policy makers should consider developing specific programmes to reduce and manage stress among nurses in their work place. Nurses also should be trained to develop appropriate coping strategies to combat the stress.

Limitations

As our study was a cross-sectional study and only provided a snapshot within the study period, hence, different results may be reported. Therefore, longitudinal research can be done to examine whether there is evidence of changes over time. As we utilized self-reported stress questionnaires, the nurses might have provided subjective measures representing individuals' perceptions. This might have affected the validity of our study findings. Therefore, objective assessments shall be applied in future. Moreover, since the study's context was in tertiary care hospitals in Muscat city, it would be useful to investigate the possibility of replicating this study in other different hospitals including secondary or primary, urban or rural, private hospitals of the Sultanate of Oman, which might give different results. In addition, this study was limited to Omani nurses only. Further research is needed to include all nurses from different nationalities.

Conclusion

This study highlighted the sources of work-related stress of nurses and determined the relationship between work-related stressors and demographic profile. Omani nurses working in tertiary care hospitals suffer from high levels of workload, which is related to severe shortage in number of nursing staffs and performing non -specified responsibilities. Nursing position, night shift duties and job satisfaction were statistically significantly associated with work related stressors.

Recommendations

Since workload was identified as the primary source of workplace stress, attempts should be made to reduce the consequences of stressors by organizational strategies. These interventions could involve recruiting additional registered nurses, which is an obvious way to reduce workload; increasing enrolled nurse aids to perform bed linen change, temperature and blood pressure taking; and employing clerical staff to reduce non-nursing activities. Hiring new workers is not a simple choice in the present economic crisis of the country; however, Omani Ministry of Health shall plan different strategies to minimize the WRS among nurses. Additionally, nursing administrators in all five hospitals can view death/dying and workload as significant predictors of stress and devise plans to control nurses' workloads and have a supportive work environment for nurses while coping with patient death/dying. Additionally, counselling should be made available after stressful events faced by the nurses. Nurse managers may help nurses cope with stress by establishing effective two-way communication systems, clarifying role and performance expectations, resolving conflicts practically, developing policies that minimize the stress associated with shift work, establishing support groups for nursing personnel, making psychological counselling accessible and available to affected nurses, and enhancing observational skills to detect increased stress and burnout levels. Finally, more studies are needed relating to stress, burnout, depression and other mental disorders among Omani nurses.

Declarations

Ethics approval and consent to participate

Prior to data collection, ethical approval was sought from the Medical Research Ethics Committee (MREC) of Sultan Qaboos University (SQU-EC/263/2020 dated 08/11/2020) , Ministry of Health (MOH/CSR/20/23891 dated 13/10/2020) and Armed Forces Hospital, Sultanate of Oman (AFMS-MREC 024/2020 dated 10/11/2020). The investigator provided sufficient information to the nurses about the purpose of the study before collecting the data. The nurses were given the privilege of clarifying their doubts related to data collection. Thereafter, the data was collected after assuring the confidentiality nature of responses and obtaining implied informed consent from the study participants. All the study participants were encouraged to participate in the study and at the same time, they were told that they have the right not to participate. The collected data was stored in a password-protected computer and only the investigators had the access to the data. The research is performed in accordance with the relevant ethical guidelines.

Consent for publication

Consent was obtained from the participants for publication without revealing any of their identification data.

Availability of data and materials

The datasets generated/and or analyzed during the current study are not publicly available due to institutional policy, but are available from the corresponding author on reasonable request.

Competing interests

The authors have no conflict of interest to declare.

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Author's contributions

SAY conceptualized and conducted the study, wrote the initial draft of the manuscript. JA critically reviewed and edited the manuscript.

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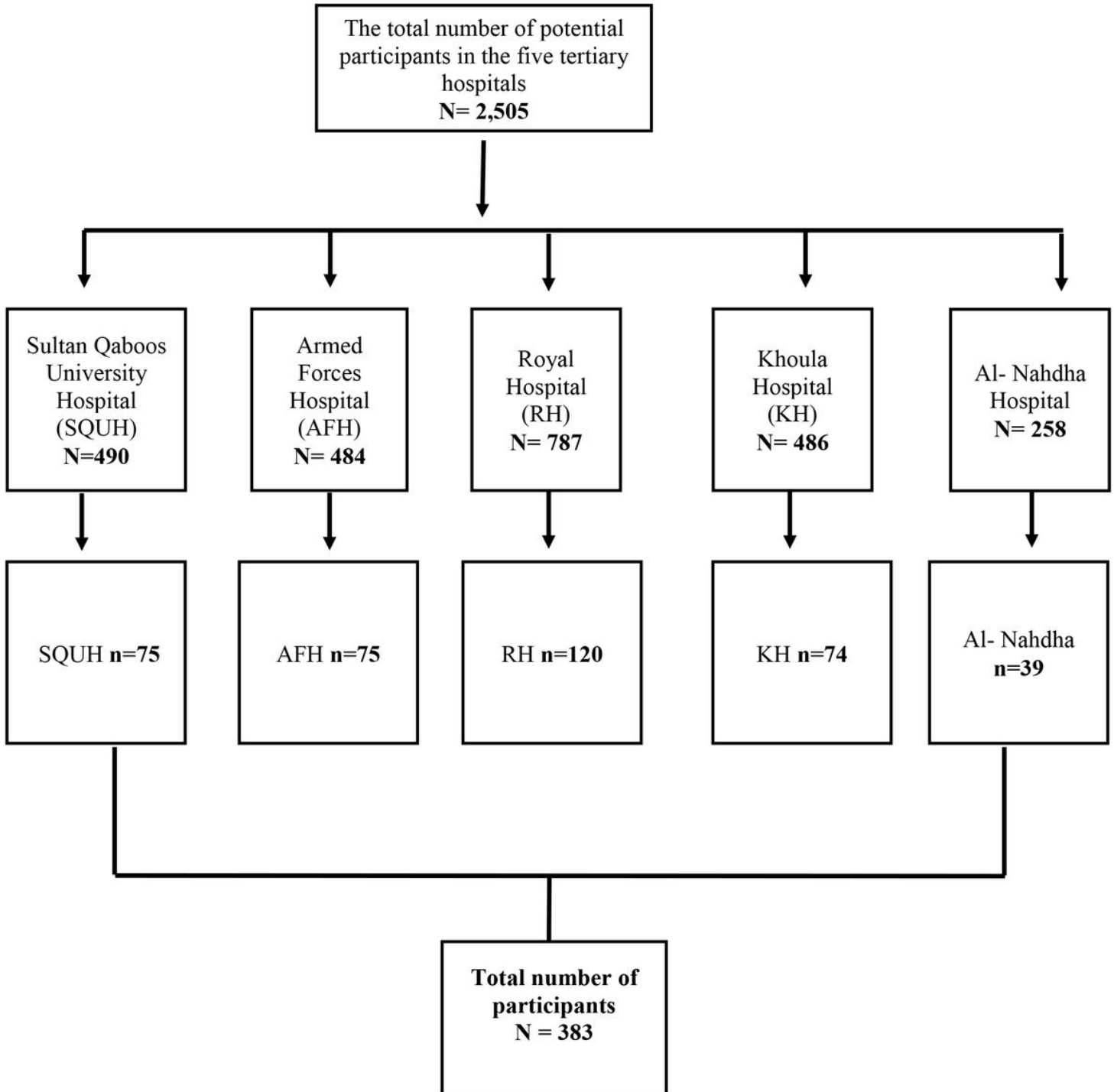
Figures

Figure 1

Sampling frame