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The Relationship between Occupational Stressors and Performance amongst Nurses Working in Pediatric and Intensive Care Units

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Abstract **Background:** Nursing has long been considered one of the most stressful professions. Stress at the workplace may have negative consequences on nursing performance. Consequences of stress on nursing performance may become more crucial in pediatric and neonatal intensive care units where the safety of patient and quality of pediatric care are important outcomes of nursing care. The purpose of this study was to assess the relationship between occupational stressors amongst nurses working in pediatric care units and their performance. **Design:** In this descriptive study, a total of 200 nurses working in the pediatric departments from three major hospitals in Khartoum completed the study. Two tools were used to collect data including nursing stress scale and the modified Schwirn Six Dimensions Scale for Nursing Performance. Student t-test, Pearson's correlation coefficient, and stepwise multiple regression analysis were used to analyze the data. **Results:** Overall, most of the nurses suffered from job stressors level above average. The lack of aids, resources and atmosphere in the intensive care units were rated as "high" job stressors amongst nurses. The hospital characteristics were rated "low" job stressors. Among all stressors, the lack of directors' support was negatively correlated with the nurses' performance (P= 0.003, r= 0.21). **Conclusion:** Policy makers should consider development of specific programs targeting stress in pediatric and neonatal intensive care units to enhance nursing performance in pediatric units.

Keywords: *nurse, occupation stress, job performance, Sudan, pediatric, intensive unit*

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1. Introduction

When people go to a hospital, they assume that they will receive quality care and that nurses are well-prepared to help them. Occupational stress is the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker [8]. The WHO defines the occupational stress as "the physiological and emotional responses that occur when workers perceive an imbalance between worker effort and associated reward". Occupational stress has become one of the most severe health problems in the contemporary world, which challenge the nurse ability to cope [28].

Nursing has been considered one of the most stressful professions. Work stress in nursing was first assessed in 1960, when Menzies identified four sources of anxiety among nurses: patient care, decision making, taking responsibility and change [23]. It is well accepted and documented that nurse's work in a high job stress, particularly for nurses who are working in acute and specialized care units [9].

Stress in nursing is attributed largely to the physical labor, suffering and emotional demands of patients and families, work hours, shift work, interpersonal relationships (e.g. inter- and intra-professional conflict), and other pressures that are central to the work nurses do. Factors that have increased stress among nurses since the 1980s include the rising use of sophisticated healthcare technologies, budget cuts, increasing workload, and constant organizational changes in some healthcare environments [33]. Work related stress can be caused by poor management, unsatisfactory working conditions and lack of support from colleagues and supervisors. Stress occurs in a wide range of work circumstances but is often worsened when employees feel they have little support from supervisors and colleagues, as well as little control over work processes [39] Thus, work-related stress can be caused by poor work organization (the way that designed jobs and work systems, and the way that managed them, by poor work design (for example, lack of control over work processes), poor management, unsatisfactory working conditions, and lack of support from colleagues and supervisors [38].

Job stressors and low job control are shown to be risk factors for patients' safety and could lead to poor job performance including reduced quality of nursing care [35]. WHO estimated that the cost of stress and stress-related problems affecting the organizations to be in excess of $150 billion annually [39]. High level of burnout and turn over, and high levels of cortisol in the blood are evident in nurses who often work in the limit of life and death, such as emergency and intensive care units, are more exposed to psychological stress [21].

Stress is one of the main factors affecting one's efficiency as well as staff health and quality of nursing services [37]. Because nurses are the key caregivers in hospitals, they can significantly influence the quality of care provided and, ultimately, treatment and patient outcomes [15].

Pediatric inpatient safety and quality of pediatric care are crucial outcomes of nursing care. Neonatal intensive care unit (NICU) is a unit designed to provide care for sick and premature infants during the transitional period after birth in which the infant faces many physiological changes [37].

The environment of NICU, where many personals are involved in the treatment and care of infants can be stressful for nurses as well as infants and their families [20]. Neonatal specialists nurses, usually a head nurse and primary nurses who are in charge of only one infant and perhaps a clinical nurse specialist trained in neonatal care), residents, and medical, nursing, and even midwifery students are present at any NICU. Among all staff members, nurses are responsible for the majority of everyday care procedures of the infants [18,37]. Furthermore, family members of patients in ICU are usually highly stressed and demanding which may increase stress among nurses [16,17,31]. Violence at workplace is another challenge for nurses that might increase their stress [32].

It is a known fact that Pediatric and Neonatal Intensive Care Units (PNICU) are places that generate tensions and stress, motivated by interpersonal relationships, and intense emotions caused by the constant exposure to risks of dying [13,19], but little is known about the consequences of occupational stressors on the performance of nurses working in pediatric and neonatal intensive care units. This problem may become more evident in countries with limited resources such as Khartoum, the capital of Sudan. The populations of Khartoum State are over five millions. It has three states which are Khartoum, Khartoum North and Omdurman, where little knowledge about nursing stress is known. Investigating this aspect would be a real contribution in research, as it is a seriously neglected issue in Sudan. Furthermore, the extent of the study problem "occupational stress among nurses" is highlighted, and hospital administrators might be able to employ specific strategies to improve nursing work practice environment and this consequently would positively reflect on quality of nursing services provided. Consequently, the aim of the current study was to determine the job stressors amongst nurses in the pediatric and neonatal intensive care units in Khartoum state and their relationship with their performance.

2. Methods

2.1. Study Design

In order to fulfill the aim of the current study, a cross-sectional descriptive correlational design was used utilizing a hospital-based survey in three large hospitals in Khartoum, the national capital of Sudan.

2.2. Setting and Study Sampling Technique

The main hospitals specialized in children were chosen from the three states. One hospital was located in in Khartoum, the second was in Khartoum North, and the last one was in Omdurman. The selection of the three hospitals was based on the fact that they have large number of children in the pediatric department. In terms of the number of nurses, the above mentioned hospitals have larger number of nurses [22].

A multi-stage sampling method was used in recruiting nurses from the previously mentioned hospitals so as to give equal chance to participants and avoid any selection bias. The list of the nurses was obtained from the human resource officers and the names were entered in a ballot in order to select participants randomly and give all the nurses equal chances for inclusion in the current study, thus avoiding selection bias. All female and male nurses with different educational background (i.e. those with diplomas, undergraduate and postgraduate certificates university level were eligible for entry in the study, while auxiliary nurses were excluded.

There are no previous studies conducted in Sudan or Sudanese nurses working overseas with similar study objectives. As such, the following equation was used to determine the sample size for the current study based on studies conducted in neighboring countries such as Nigeria with an incidence of occupational stress of 36.5%.

$$N = Z\alpha 2pq / d2 \text{ [14]}$$

$$N = (1.96)2pq / (0.07)2$$

$$= (1.96)2 \times .365 \times 635 \div 0.07 \times 0.07 = 181$$

Where p value equals (1) and q value =-1- p, N is the number of participants or the sample size. In the current study, a total of 200 nurses working in the Pediatric department were selected.

2.3. Ethical Considerations:

The approval to conduct the current study was sought from the scientific committee at the College of Nursing Sciences at the University of Khartoum. The three selected hospitals were approached and ethical permission was obtained from the General Directors. All nurses participated in the study were those who actually agreed to complete the study.

2.4. Sample Characteristics

The current study recruited 200 participants. Four nurses did not complete the study. As such, the following discussion presents the results of 196 participants. The study included male (n = 48) and female (n = 148) with three of them had a post-graduate degree in Nursing (Table 1). Most of the participants were single, while six of them were divorced, and only three females were widowed. Eighty eight participants had < 5 years of experience and worked in the pediatrics' department mostly as staff nurse Most of the participants aged <31 years of age (Figure 1).

Table 1. Socio-Demographic characteristics of Nurses according to gender (N=196)

Parameters	Levels	Men		Women		Both Genders	
		N	%	N	%	N	%
Qualification	Med Diploma	22	45.8	58	39.2	80	40.8
	University Diploma	19	39.6	36	24.3	55	28.1
	University Certificate	6	12.5	52	35.1	58	29.6
	Post Graduate	1	2.1	2	1.4	3	1.5
Marital status	Single	21	43.8	80	54.1	101	51.5
	Married	25	52.1	61	41.2	86	43.9
	Divorced	2	4.2	4	2.7	6	3.1
	Widow	-	-	3	2.0	3	1.5
Years of Experience (years)	< 1	7	14.6	17	11.5	24	12.2
	1 – 5	22	45.8	66	44.6	88	44.9
	6 – 10	13	27.1	35	23.6	48	24.5
	> 10	6	12.5	30	20.3	36	18.4
Work place (Wards' type)	Pediatrics	24	50.0	60	40.5	84	42.9
	Neonates	16	33.3	37	25.0	53	27.0
	Other departments[#]	8	16.7	51	34.5	59	30.1
Job Position	Head of department	6	12.5	29	19.6	35	17.9
	Staff nurse	37	77.1	103	69.6	140	71.4
	Other positions[*]	5	10.4	16	10.8	21	10.7

#Other departments stands for casualty…… * Other positions include quality management.

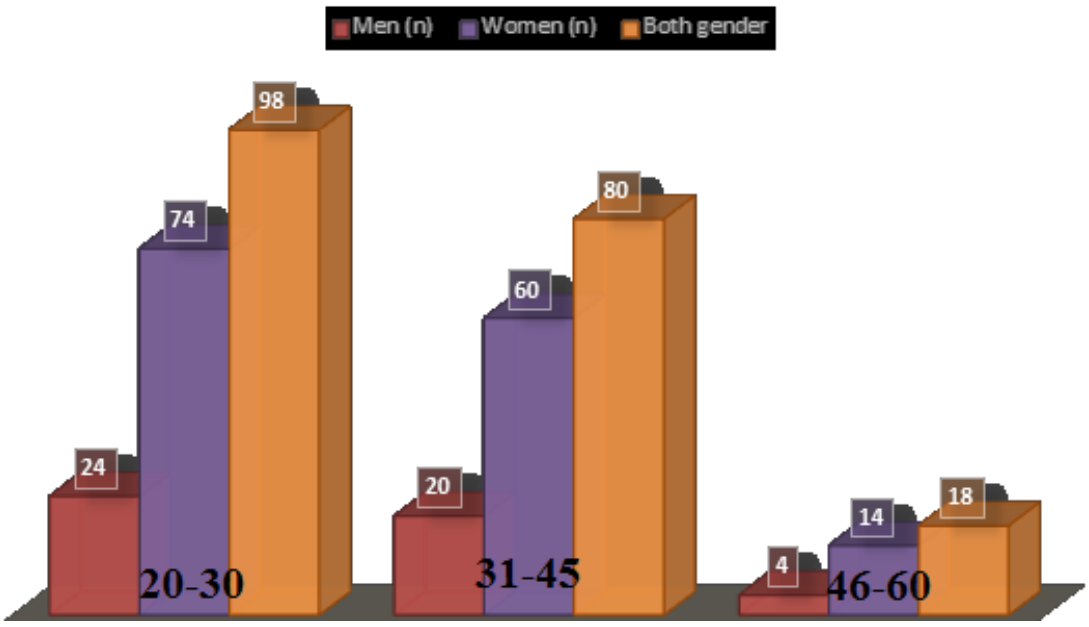

Figure 1. Age distribution amongst male and female included in the study. Most of the participants were less than 31 years old

2.5. Data Collection Tools

Two tools were used to collect data including nursing stress scale and the modified Schwirn Six Dimensions Scale for Nursing Performance [34]. For the purpose of the current study, a 13-item self-administered nursing stress scale was used to measure occupational stressors. The scale is rated on a Likert scale ranges between 1 and 3. The reliability and validity of the tool were assured. The modified Schwirn Six Dimensions Scale for Nursing Performance was used to assess nursing performance i.e. the service provided by them. It included six subtitles utilizing a modified version of the Patria scale.

2.5.1. Validity and Reliability of Data Collection Tools

The reliability of total scores of stressors' subscales in the recent research population was checked by conducting a pilot study consisting of 40 subjects (10 males & 30 females), who were randomly selected from the research population. After scoring the responses, the Cronbach's

Alpha and Spearman-Brown Coefficients were computed for each subscale and for total scale scores. Results were shown on Table 2.

Table 3 Shows determining tested values for judging the level of stressor. The cuts points were determined using the following values (μ), (μ + σ), (μ - σ).

Table 2. Alpha and Spearman-Brown Reliability Coefficients for each subscale and for total scores of stressors scale

Stressors Sub-Scales	No of Items	Reliability Coefficients	
		Alpha	Spearman-Brown Coefficient
The overall atmosphere in the unit children and newborns	14	.613	.620
The characteristics of the hospital	9	.739	.700
Participation in Management	5	.671	.690
Behavior and support the Directoror the Director of Nursing	8	.840	.857
Characteristics and working conditions	4	.544	.604
Ambiguity nursing role	6	.648	.725
Lack of specialization	8	.698	.725
Problems related to the work table	5	.604	.578
Lack of work resources and Aids	4	.546	.683
Problems related to Work relationships	8	.727	.812
Lack of Job Preparation and training	4	.700	.724
Problems related to Dealing with patients	10	.659	.630
Problems related to Job recognition	7	.622	.784
Stressors Total scale	92	.726	.637

Table 3. tested values for judging the level of Stressor

Range of means according to the result of one sample t test	Judgment for Stressors
Greater than (μ + σ)	High
Greater than (μ) up to (μ + σ)	Above Average
A round (μ)	Med
Less than (μ) up to (μ - σ)	Below Average
Less than (μ - σ)	Low

Note back: μ denoted theoretical mean**,** σ denoted theoretical SD.

In order to check the validity of the job performance scale items in the current research population, the data collection tool was applied on a pilot sample consisting of 40 subjects (10 males & 30 females). The sample was selected randomly from the research population. After scoring the responses, Pearson correlation was conducted to estimate correlation coefficients between scores of each item and the total score of the subscale in which the item belonging to. This helped in determining the internal consistency of the scale. The results of these computations were shown on the Table 4 below.

Table 4. Alpha and Spearman-Brown Reliability Coefficients for each subscale of the Job Performance Scale

Job performance sub-dimensions	No of Items	Reliability Coefficients	
		Alpha	S – B
Leadership	6	.920	.866
Planning & Evaluation	6	.845	.702
Communication skills	7	.930	.819
Perform the procedure and Critical Care	13	.914	.778
Family Teaching & Guidance	5	.761	.939
Job Development	5	.899	.789
Job performance Total score	42	.947	.917

2.6. Data Analysis

Data entry and processing were performed by using the Statistical Package of the Social Science (SPSS) Software, version 16.0. Various descriptive and inferential statistical methods were used including Student *t*-test, One Way ANOVA and logistic regression, P value was set at < 0.05.

3. Results

The purpose of this study was to determine the job stressors amongst nurses in the pediatric and neonatal intensive care units and to assess the relationship between occupational stressors amongst nurses working in pediatric care units and their performance. The mean, SD and level of stressors reported by nurses are shown in Table 5. One sample (t) test was used to determine the levels of occupational stressors. The lack of aids and resources and the unit's atmosphere were rated as “high” job stressors, while the hospital characteristics were rated “low” job stressors.

Results indicated that there was no significant relationship between occupational stress amongst nurses working in the pediatric and neonatal care units in Khartoum state hospitals and job performance (Table 6).

Table 5. Occupational stressors amongst nurses working in the Pediatric and Neonatal units

Stressors Sub-Categories	Mean	SD	Tested value	Calculated (t) value	Inference
The overall atmosphere in units	34.58	4.25	32.67	6.303	High
Hospital characteristics	13.80	3.65	15.00	-4.620	Low
Participation in Management	8.37	2.56	10.00	-8.944	Below Average
Behavior& support of Director	16.59	5.10	16.00	1.623	Medium
Work Characteristics & conditions	7.20	2.29	8.00	-4.872	Below Average
Ambiguity nursing role	10.87	3.07	12.00	-5.159	Below Average
Lack of specialization	17.57	4.42	16.00	4.973	Above Average
Problems related to the schedule	11.30	2.90	10.00	6.282	Above Average
Lack of Aids and resources	10.28	2.01	9.33	6.614	High
Work relationships Problems	17.41	3.87	16.00	5.110	Above Average
Preparation and training	8.65	2.68	8.00	3.385	Above Average
Dealing with patients	21.91	4.04	20.00	6.609	Above Average
Job recognition	15.93	3.76	14.00	7.209	Above Average
Stressors Total score	194.5	13.0	184.0	11.267	Above Average

Table 6. Association between job stressors and job performance

Job performance Sub-Categories	r-values	p-value
Leadership	-.087	.112
Planning & Evaluation	.006	.469
Communication skills	.102	.077
Perform the procedure and Critical Care	-.027	.354
Family Teaching & Guidance	-.052	.236
Job Development	-.079	.134
Total score	-.029	.342

There were no statistically significant differences between male and female in terms of the job stressors, except for the working atmosphere where men were suffering more than women (Table 7). Moreover, there were no significant differences between male and female in terms of their social class, job position or work place.

Table 8 shows results of stepwise multiple regression analysis to identify any significance effect of occupational stressors among nurses working in pediatric neonatal and neonatal care units in Khartoum state hospitals on nurses job performance. The results suggested that the director behavior and support was significantly correlated with job performance.

Table 7. results of Mann-Whitney Test to determine the significance of differences in Occupational stressors amongst nurses working in the Pediatric and Neonatal units as differentiated by gender

Stressors Sub-Categories	Gender	Mean of ranks	U Value	Z Value	p-value
Units overall atmosphere	Males	117.57	2637	-2.691	0.004*
	Females	92.31			
Hospital characteristics	Males	108.80	3058	-1.458	0.073
	Females	95.16			
Participation in Mana gement	Males	89.85	3137	-1.236	0.108
	Females	101.30			
Director Behavior& support	Males	105.41	3221	-.974	0.165
	Females	96.26			
Characteristics & conditions of work	Males	104.78	3251	-.903	0.183
	Females	96.46			
Ambiguity nursing role	Males	100.36	3463	-.265	0.396
	Females	97.90			
Lack of specialization	Males	94.45	3358	-.573	0.254
	Females	99.81			
Problems related to the table	Males	106.71	3158	-1.169	0.121
	Females	95.84			
Lack of Aids and resources	Males	104.51	3264	-.898	0.185
	Females	96.55			
Work relationships	Males	99.94	3483	-.203	0.420
	Females	98.03			
Preparation and training	Males	103.39	3318	-.698	0.243
	Females	96.92			
Dealing with patients	Males	102.63	3354	-.582	0.280
	Females	97.16			
Job recognition	Males	99.72	3494	-.173	0.432
	Females	98.10			
Stressors Total score	Males	111.79	2914	-1.869	0.062
	Females	94.19			

Table 8. Results of stepwise multi-Regression analysis

sub-scales entered	Model	Sum of Squares	Df	Mean Square	F	Sig.	R	R Square
Director Behavior & support	Regression	178574.466	1	178574.466	8.832	.003	.209	.044
	Residual	3922547.059	194	20219.315				
	Total	4101121.526	195					

4. Discussion

The aim of the current study was to determine the job stressors amongst nurses in the pediatric and neonatal intensive care units and their relationship with their performance. In the present study, most nurses in the pediatric and NICU reported above average levels of occupational stressors such as the lack of specialization, work relationships' problems, work characteristics & conditions, ambiguity, training, lack of aids and resources as well as dealing with the dying patients.

Occupational stress has been acknowledged as a significant problem in Pediatric and Neonatal Intensive Care Units, due to the specificity of their job. Unsurprisingly, high and moderate levels of stressors among nurses in general have been emphasized in literature [37] and high levels of stress were reported amongst nurses working in the intensive care units [7]. The current study showed that the overall atmosphere in units and the lack of aids and resources were rated as high job stressors among nurses. The units' atmosphere including space, lighting and noise were previously reported by Morrison et al. [27] who found that noise was correlated with several measures of stress including tachycardia and annoyance ratings. Furthermore, Al Omar [4] reported that the first cause of work stress in nursing was the insufficient technical facilities. Similarly, Bailey [5] found that the elements of work environment such as lack of sufficient equipment and inadequate work space were considered as the major sources of stress. Additionally, literature found that the enclosed atmosphere, time pressures, excessive noise were the most common stressors reported by the ICU nurses [12,26]. Finally, the physical aspects of work such as sudden noise from the equipment in the unit were reported as a source of stressors for nurses [27]. Also Al-Omar [4], who studied sources of work stress among hospital staff at the Saudi Ministry of Health, found that the long working hours and short breaks were the most reported source of stress for the nursing staff. Also, the overall atmosphere especially the air conditioning system at the Pediatric, and the NICU caused high levels of stress for nurses [12,13,26]. Moreover, a study done by Mohamed *et al* [26] in Alexandria illustrated that the most stressful items related to the professional and environmental factors reported by ICUs were insufficient functional equipment, which goes on line with the results of the this study.

On the other hand, the current study showed that nurses become stressed and face special feelings when dealing with patients at risk of dying or those who are dead. This agreed with other studies conducted in various countries and revealed that the most common source of nursing stress was related to death or expecting death situation, followed by, uncertainty about treatment, conflict with other nurses, and workload. [10,26]. Nurses working in intensive care units perceived death or expecting death situations as the highest source of stress they face in their work. Similarly, Cole et al. [11] reported that the death or expecting death situations were recognized as important sources of stress by intensive care unit nurses. On the contrary, the present study findings disagreed with the study of Hays et al. [21] who found that the nurses reported minimum to no stress when exposed to the death and dying patients.

Furthermore, consistent with studies of Ling et al. [25], Cronqvist et al. [13] and Valizadeh, et al. [37], taking care of too many patients (2-3 or more) by one nurse was found to cause considerable and high stressors. In the current study, taking care of many neonates (2-3) or critically ill patients and inadequate number of staff nurses and inexperienced staff were perceived to compromise nurse's ability to provide quality care.

In the current study, all the stressors faced by nurses did not affect their job performance except the directors' behavior and support. Literature revealed that job stress among nurses correlated with low job performance [24,36]. However, a study done in Jordan in 2013 by Akif [3] found that there was a significant positive relationship between four stressors and performance as follows: organizational climate had the most influence on performance followed by the economic factors, then Job difficulty and finally peers' competition. The current study did not agree with some of the above studies regarding the relationship between stressors and performance except managers' support probably due to the fact that the Sudanese character and behavior is liable to work in any situation even if it is so hard, if they receive good treatment and surveillance from their managers.

Despite nurses performance was not related to stress, specific programs have to be implemented to control stress in nurses and improve their well-being. Specific programs should target working atmosphere, lack of specialization, problems related to the schedule, lack of aids and resources, work relationships, preparation and training of nurses, dealing with patients and Job recognition. More efficient management models need to be adopted in order to solve the conflicts for the health professionals working in the pediatric department specially ICU. Nurse administrators and nurse managers should be aware of the significance of support in the workplace. Adequate number of nurses in the hospitals can perhaps reduce the intensity of occupational stressors and improved the quality of the work. Nurse administrators should eliminating disproportionate workload and staffing through appropriate scheduling and decreasing unpredicted changes to lower stress levels Periodic round for the staff to solve their problems and share them in management. Furthermore, nurses can play a vital role in assessment and management of psychological symptoms that they experience [30]. Likewise, nursing educators should integrate occupational stress and other related issues into nursing education and research [1,2,31].

Future research may want to examine stress in nurses using larger and more representative sample, and include

additional units such as emergency departments and adult intensive care units. Furthermore, there is a need to test the effectiveness of specific intervention programs on nursing stress in different units to support nurses working in different settings.

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