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Correlation between Salivary Immunoglobulin A and stress level among nurses

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Abstract

Background: *Emergency department (ED) nursing is a special type of nursing. In addition to the stressors that nurses face such as workload, dealing with different patients, role conflicts, lack of support, and domestic work struggles, many correlational and longitudinal studies have confirmed that chronic stress can lead to impaired immune function. Thus, ED nurses are at greater risk than others in general wards for decreased secretion of immunoglobulin A (sIgA) in saliva. The current study aimed to investigate the correlation between Salivary Immunoglobulin A and stress level among nurses'* ***Methods:*** *The study was conducted by selecting a non-probability (purposive) sample. The sample size consisted of 45 nurses in the emergency department and 45 nurses in the general ward. Through interviewing each person, the researcher prepared a draft of 57 items in nine domains (Extended Nursing Stress Scale). After the interview, a saliva sample was collected from each participant for (sIgA) analysis by ELISA technique.* ***Results:*** *ED nurses have higher scores than GW nurses. Scores for ENSS subscales such as lack of resources and conflict with other professionals were higher in ED than in GW nurses. The ED nurses had Significantly lower sIgA secretion rates than the GW nurses.* ***Conclusion:*** *ED nurses, who reported moderate level of professional stress, showed significantly lower secretion rates of salivary IgA as compared to GW nurses. As these salivary biomarkers are reflective of the mucosal immunity, results support the inverse relation between stress and mucosal immunity.*

Keywords: *correlation, Salivary IgA, stress level, emergency nurses, general nurses*

Introduction

Various studies have provided support for the hypothesis that chronic psychological stress can lead to impaired immune function, leaving individuals at greater risk of developing an infectious disease [1, 11]. And secretory immunoglobulin A (sIgA) in saliva, which is the major immune defense of mucosal surfaces, has been shown repeatedly to be sensitive to psychological variables, and is thought to represent the functional state of the entire mucosal immune system [2].

Shedding light on some of the challenges that nurses face in emergency departments, which are

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exposed to many problems, including (long work shifts, problems of doctors and colleagues, repeated attacks on them by patients or their families), which makes the profession of emergency nursing a profession that requires physical and emotional effort [3,19] and this puts emergency department nurses under great psychological, emotional and physical pressure, which affects their physical and mental health, as well as behavior with patients, their families or colleagues, as well as a serious damage to their immunity, especially at present; In general, emergency department nursing is a challenging and essential profession, and it is crucial that nurses are supported in their roles to provide the best possible care to their patients [4]. So depending on the definition of stress mentioned is the response of the central nervous system to environmental stimuli that are perceived as a threat to homeostasis [5,18]. The stress response triggers the generation of neurotransmitters and hormones from the hypothalamic-pituitary axis, the sympathetic axis, and the gut-brain axis, and in this way the intestinal immune system is regulated. SIgA is a protein complex consisting of a dimer (dIgA) or an IgA polymer (pIgA) and a secretory component (SC), a peptide derived from the polymeric immunoglobulin receptor (pIgR). Most studies on the molecular and biochemical mechanisms involved in the stress response have focused on systemic immunity [6].

Methods

The study was conducted by selecting a non-probability (purposive) sample. The sample size consisted of (96) nurses from three large hospitals (Al-Manathira General Hospital, Al-Sadr Teaching Hospital, and Al-Hakim General Hospital) at Al-Najaf province included in the study, 45 emergency department nurses and 45 general ward nurses. Through interviewing each person, the researcher prepared a draft of 57 items in nine domains (Extended Nursing Stress Scale). After the interview, a saliva sample was collected from each participant for (SIgA) analysis by Eliza kit. The researcher used the Expanded Nursing Stress Scale (ENSS) developed by French et al. (2000) [20] to measure job stress. ENSS is used to measure the sources and frequency of job stress perceived by nurses in the changing health care delivery and nursing work environments. Previous internal reliability was assessed by using Cronbach's coefficient alpha. The whole ENSS demonstrated the reliability was 0.96. The ENSS is congruent with the current nursing situation and has been found to have a good validity and high reliability. Moreover, it measures all aspects of job related stress and it is in line with the current status in the health care system.

The ENSS consists of a total of 57 Items with nine subscales including 1) death and dying, 2) conflict with physicians, 3) inadequate emotional preparation, 4) problems relating to peers, 5) problems relating to supervisors, 6) workload, 7) uncertainty concerning treatments, 8) patients and families and, 9) discrimination [7].

Results

Table (1.1) illustrates the statistical distribution and difference between the GW and ED groups by their socio-demographic data. This table explains that most of the nurses in GW group are those in the age's group (<=30) years old, while in ED group are those in the age's group (31-35) years

old. In addition, the table shows that the high percentages of participants in both groups are males in the GW and ED groups (57.78 and 68.89 %) respectively.

Concerning the level of education, (46.66%) in the GW have B.Sc. and (40%) in the ED have diploma. Concerning the Marital Status, (84.44%) in the GW and (68.89%) in ED, were married. Regarding the Residence, (75.56%) in the GW and (66.67%) in ED, were in rural area.

Statistically, there is no significant difference between the GW and ED groups (gender, residence, marital status, and achievement education) when analyzed by Fisher's exact probability test, except age groups, it was statistically high significant (p-value < 0.01).

Table (1.1) Distribution of Socio-Demographic Data for both GW and ED Groups Participants (N=90; 55 for each Group)

Demographic data		**Groups**				**C.S.**		
		GW		**ED**				
		Freq.	**%**	**Freq.**	**%**	**Chi-square**	**(df)**	**P-value**
Age groups (Years)	<= 30	20	44.44	10	22.22	12.54	3	0.006 (HS)
	31 - 35	14	31.11	20	44.44			
	36 - 40	2	4.44	11	24.44			
	41 Up	9	20	4	8.89			
Gender	Males	26	57.78	31	68.89	1.196	1	0.274 (NS)
	Females	19	42.22	14	31.11			
Residence	Rural	34	75.56	30	66.67	0.865	1	0.352 (NS)
	Urban	11	24.44	15	33.33			
Marital Status	Married	38	84.44	31	68.89	6.777	3	0.079 (NS)
	Interrupted	0	0	4	8.89			
	Widower	7	15.56	10	22.22			
	Single	0	0	0	0			
	Divorced	0	0	0	0			
Education Level	Middle school Nursing	14	31.11	12	26.67	4.683	4	0.321 (NS)
	Academy (diploma)	10	22.22	18	40			
	Bachelor's degree	21	46.66	15	33.33			
	Master degree	0	0	0	0			
	Doctoral degree	0	0	0	0			
Total		45	100%	45	100%			

%= percentage, freq. = frequency, C.S: comparison significance, p- value= probability value, df degree of freedom, NS= non-significance, HS= high significant.

Table (1.2) demonstrates statistically negative significant weak correlation between the assessment of overall nurses' stress domains and salivary IgA Level in both GW and ED groups (p-values were <0.05).

Table (1.2) Correlation among overall ENSS domains for salivary IgA Level in GW and ED Groups

Overall Domains			Mean±SD	Pearson Correlation	P-value
OverallENSS	GW	Low	281.53±78.21	- 0.307	0.04 (S)
		Moderate	245.08±94.93		
		High	0		
	ED	Low	174.98±138.27	- 0.235	0.019 (S)
		Moderate	188.85±101.06		
		High	195.14±73.73		

Discussion

Emergency department nursing is a more complex and highly technical environment in which nurses provide care to terminally ill patients, compared to GW [8]. In contrast, patients in GW are relatively stable, and the emergency score is low. The main finding of this study showed that the ED nurses had moderate levels of stress significantly compared to the GW nurses with respect to fatigue, depressive moods and a higher tendency toward anxiety [9]. In addition, the emergency department nurses who noted higher levels of stress showed significantly lower levels of S-IGA. A previous study reported that emergency management (ED) nurses also have a high-tech environment where nurses provide care to ill patients reported an association between self-perceived work stress and S-IGA among ED nurses [10]. They clearly showed that emergency department nurses score significantly higher on a mental health-adjusted occupational stress scale than general ward nurses, and sIgA levels in ED nurses were found to be significantly lower than those in GW nurses [11]. In a previous study conducted to assess and compare self-reported work stresses between emergency (PS) and medical department (ME) nurses, and to investigate their relationship with salivary IgA, scores for measures such as workload and conflict with co-workers were higher in PS (3.72 and 3.18) than in non-nurse nurses. ME (3.12 and 2.66). The PS nurses had lower IgA concentrations (mean 123.3 μg/ml) than the ME nurses (mean 221.49 μg/ml). Significant inverse correlations were observed between scores for workload, coworker conflict, and log IgA (respectively r -0.27 e -0.33, both $p < 0.01$). Perceived stress nurses showed significantly lower levels of salivary IgA than ME nurses. Salivary IgA was inversely associated with measures of self-reported work stress [13]. acute stress is often associated with transient increases in immune activation.[14] A few studies have also examined the sIgA response to occupational stress. Zeier and others measured salivary sIgA in air traffic controllers before and immediately after radar working sessions lasting approximately 100 minutes. Counter to the author's expectation sIgA was significantly elevated after the stressful work-session. Other study founded sIgA correlated inversely with self-reported levels of stress among nurses in Singapore. In the United States and Australia, studies on occupational stress in the nursing profession using salivary IgA as a stress indicator have also been conducted. Both studies indicated that the nurses' stress was significantly associated with a decreased salivary IgA secretion rates[15,16]. Salivary IgA has also been reported as

a potential stress marker in humans However, several studies have suggested a negative association between salivary IgA level and psychological stress. Salivary IgA is strongly affected by oral contamination and salivary flow rate, and IgA is more easily affected by bacteria[17].

Conclusion

This study investigated work-related stress in emergency department nurses and compared it with general ward nurses, along with salivary IgA (s-IgA).Depressive moods tended to be significantly higher in ED nurses than in GW nurses, and the Expanded Nursing Stress Scale (ENSS) scored higher stress scores in ED than in GW. This is considered as a result of the stresses that nursing staff in the emergency department are exposed to more than others in general wards, such as workloads with different patients and their moods, difficult situations, lack of support, and conflicts with doctors or colleagues, and this in turn supports existing research that stress weakens the elements of The human immune system, especially salivary Immunoglobulin A (sIgA) , Therefore, ED nurses reported lower SIgA secretion scores than GW patients.

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