The Relation between Job Demands, Stress and Burnout among Nursing Staff regarding their Knowledge about Climate Changes

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Abstract

Background: Numerous reasons, including growing diseases, technology advancements, and epidemiological changes, have contributed to the recent increased the demand for healthcare services. The health care demands are always changing, and staff nurses' everyday job is greatly impacted by legislative actions, system changes, and reduced funding. **Aim**: This research aimed to assess the relation between job demands, stress and burnout among nursing staff regarding their knowledge about climate changes. **Design:** Descriptive correlative design was adopted to achieve the current study aim. **Setting:** the research carried out in two hospitals and four MCHs Centers located at Minia City – Minia Governorate, Egypt. **Subjects:** Convenience sample including all nurses (n=392) who share in data collection and who were on duty employed in afforded work settings. **Research Tools**: Four tools were utilized for data collection; I. Nurses Knowledge about Climate Changes, II. Copenhagen Psychosocial Questionnaire, III. The Perceived Stress Scale and IV. Maslach Burnout Inventory-Human Services Survey. **Results:** more than fifty percent of nurses had "fair" level of total knowledge about climate changes as well as most of them had "high" grade regarding their job demands. Also, more than half of the nurses perceived "moderate" work stress level, while above fifty percent expressed "high" level of burnout. Statistically significant positive correlations were existed between the degree of job demands, work stress and burnout, while no statistical relation were found between total knowledge about climate changes and any of other study variables. **Conclusion:** Nursing staff frequently overwhelming with excessive job demands. **Recommendations:** Activities reducing stress and burnout should be carried out by nursing staff. Nurses should participate in seminars and in-service training about climate change.

Keywords: Nursing Staff – Job demands – Work stress – Burnout – Climate Changes.

Introduction

Numerous causes, including the aging population, changes in epidemiology, advancements in technology, and the emergence of epidemics like COVID-19, had contributed to the recent increase in the demand for healthcare services. The government initiatives, system modifications, and reduced funding have all had a significant influence on the daily tasks performed by staff nurses in the health care delivery system. The health care sectors are subject to frequent changes. The primary difficulties facing staff nurses today and in the next decades will be the shortage of nurse's staff, rising job expectations, growing patient health requirements, as well as the requirements of industrial health concerns **(Almenyan, et al., 2021).**

In addition, nursing is one of the hardest jobs and is essential to all healthcare institutions. But because of the demanding nature of their jobs, these professionals frequently experience emotional, physical, and mental exhaustion. This could manifest as a lack of motivations, emotional exhaustion, frustration, strained relationships with coworkers, extended workdays, and a lack of autonomy. As a result, the hospital should offer a pleasant atmosphere with a secure area where nurses may work without feeling pressured. In addition to the enormous demands of healthcare, the nursing profession is currently experiencing another shortage period, which makes this issue even more urgent **(Wu, et al., 2020)**.

The foundation of the healthcare industry is the nursing. Despite the pressures of their jobs, nurses put in a lot of effort and worry. The performance and safety of nurses are also impacted by these expectations. Job demands are viewed as problems or difficulties that must be resolved at work or that will lead to difficulties to carry out their tasks. Demands from the workplace could also turn into stresses if they require a lot of work and come with a large price

tag. This might result in depressive, anxious, or even burnout feelings. Meeting patient requirements, covering personnel during specific hours, or the specific work obligations allocated to oneself (e.g., patient care, management activities, etc.) are a few examples of employment expectations. Workplace requirements are classified as either obstacles or challenges **(Breevaart & Bakker, 2018).**

One of the main causes of physical and mental wellbeing issues among healthcare employees and decreased productivity in healthcare organizations is job stress. It could have an impact on healthcare quality, particularly for nurses. When an individual is faced with expectations and pressures at work that are unrelated to their knowledge, skills, and talents and become difficult for them to handle, job stress could result. This could have detrimental physical and emotional effects. Because nursing is a dangerous and demanding profession, workplace stress among nurses occurs frequently **(Unaldi et al., 2020).**

Physical, mental, and emotional health are just a few of the areas of a person's wellness that are significantly harmed by burnout. At the end, it lowers life's general quality. Several self-reported markers of psychological discomfort, including physical tiredness, trouble sleeping, increased drug use, problems in marriage and family relationships, which seem to be linked to burnout. Because burnout could induce cognitive impairments, such as poor focus, memory issues, and lower productivity, it may have an impact on mental health as well **(Tziner et al., 2019).** Additionally, when people are unable to balance their responsibilities at work and home, burnout is linked to work-family conflicts. An increase in obligations at work, miscommunications in relationships, and a lack of time spent at home are only a handful instances of how conflicts between job as well as family life could exacerbate emotions of exhaustion job as well as melancholy **(Shanmugam et al., 2020).**

Climate change poses a fundamental hazard to human health. It affects many aspects of human and natural systems, including the functioning of the health systems and the social and economic settings, in addition to the physical environment. Consequently, it escalates the risk and has the power to reverse decades of progress

in medical science. The frequency and intensity of many weather and climate events are increasing due to changes in climatic circumstances, including storms, extreme heat waves, floods, droughts, and wildfires. These hazards associated with climate change and weather had an effect on health directly and indirectly, increasing the likelihood of noncommunicable diseases, development and spread of infectious diseases, mortality rate, and medical emergencies **(Nicholas et al., 2021).**

Among all health professions, nurses, represent 59%, which make them the biggest occupational group in health care companies. The International Council of Nurses (ICN) states that nurses are in the front lines when it arrives to the health effects of climate change. Therefore, registered nurses must address climate adaptation (lower sensitivity to harmful effects of climate change) and mitigation (decrease or minimize emissions of greenhouse gases), just as they are committed to protecting and enhancing the health of their patients. Additionally, the ICN stated that nurses must be prepared to cope with climate change and to have awareness about it **(ICN, 2019).**

Because of the numerous roles that nurses are expected to play in clinical practice, nursing is a stressful profession that negatively impacts patient care and increases the risk of job burnout. Burnout negatively impacts employees' perceptions of job demands and resources, which raises absenteeism rates. **(Sarazine et al., 2021).** Nurses should educate patients on the impact of environmental alteration on their wellbeing, promote sustainable lifestyle opportunities that minimize emissions of greenhouse gases, assess the dangerous, and provide tools to prevent or lessen environmental wellbeing issues **(Masson-Delmotte, 2021).**

Significant of the study

Globally, there is a significant rate of burnout among nurses, which raises their desire to quit since burnout is linked to worse patient care quality scores that nurses recorded, with more absenteeism, and higher intention to leave the profession. Fatherly burnout is a response to persistent conflict or psychological strain. Research from the past had indicated that burnout significantly influences the intention to leave a job. There is no denying that the global nurse

turnover rate is rising and ranges from 13 to 37percent. Meanwhile, roughly 17.5percent of new nurses seem to quit their employment after one year of experience **(Sasso et al., 2019).**

Furthermore, the biggest threat to human health is climate change, whose detrimental effects are expected to produce an additional 250,000 death between years 2030 to 2050. Furthermore, it is projected that the direct costs of climate change to health would reach $2–$4 billion annually. In addition, **(UNDP Egypt, 2020)** discovered that the detrimental effects of climate change on environmental sustainability, like "drought" or "water scarcity," had a negative effect on human health as well as put a significant burden on hospitals to provide care for those affected population; as a result, healthcare systems need to address climate change and its potential ramifications (**WHO, 2022).** The current research aimed to overshadow the relation between job demands, stress and burnout among nursing staff regarding their knowledge about climate changes.

Research Aim:

The present study aimed to assess the relation between job demands, stress and burnout among nursing staff regarding their knowledge about climate changes.

Research questions:

1- What is the degree of job demands perceived by the studied nursing staff?

2- What are the levels of work stress and burnout among the studied nursing staff ?

3- What is the studied nurse's level of knowledge about climate changes?

4- Is there a relation between the degree of job demands, level of stress, knowledge about climate changes and burnout levels among the studied nursing staff?

Subjects and Methods

Design: A descriptive correlative design was utilized to achieve the aim of the current research.

Setting: The study was conducted at two hospitals (Minia Fever Hospital & Minia Chest Hospital) which are connected to the Ministry of Health. Simple random sampling technique was used to select representee (30 percent) from all seven hospitals based on formula of **(Issac& Micheal, 1995)** which is calculated by (N= P*30/100); as well, the study involved all four MCHs Centers located at Minia City – Minia Governorate, Egypt

Sample: A convenient sample included all nurses working in the previously mentioned health care settings, who were on duty during data collection time and who accepted to share in the research.

Tools for Data Collection

Data was gathered using four tools:

Tool 1: Nurses' Knowledge about Climate Changes Questionnaire:

This questionnaire constructed by the researchers depend on the studies of **(Anåker et al., 2021; La Torre et al., 2020; & Buriro, et al.,2018)** selected after comprehensive reviewing of relevant literature covering this topic. It composed of **three basic parts**; **part 1: Nurses Demographic information:** This part constructed to collect data reliant to nurses' demographics as (gender, age, educational qualifications, social status, workplace, department, workload, as well as years of experience, in addition to working shift type and duration).

part 2: composed of 5 Yes \ No questions regarding nurses' prior knowledge about health effects of climate changes and the source of these knowledge; attendance of training courses about climate change; in site existence of organizational guidelines regarding climate changes and whether they are aware of these guidelines; last at this part, there was one question asking about nurses view on how important is the knowledge about climate changes at response variables included (very important, moderately important , or I am not sure).

part 3: structured by the researchers as one dimension in table form outlining 16 statements against a three-point Likert Scale as follows (I know equal two, I am not sure equal one, &I don't know equal zero) to evaluate the nursing staff's knowledge about climate changes. - Subject's responses for this dimension were summed up to give total score ranges from 0 to 32 which furtherly inverted to a percentage score. If the

percentage score was ≥ 75% (24- 32) considered as **"Satisfactory"**, and if the percentage score lied between 50% to 74% (16-23) considered **"Fair"**, while percentage score < 50% (less than 16) considered **"Unsatisfactory "**level of nurse's knowledge about climate change.

Tool 2: Copenhagen Psychosocial Questionnaire (CPQ):

The CPQ that employed in the current study consisted of 32 items created by **(Kristensen et al., 2005)** to evaluate the degree that nursing staff perceived their job physically and emotionally demanding uniquely in five categories: quantitative, cognitive, emotional, hiding emotions, and sensory. Response choices generally are: (4) Always, (3) Often, (2) Sometimes, (1) Seldom, (0) Never/hardly ever, but for some items, the response choices are: four indicate to a very large extent, three indicate to a large extent, two indicate to Somewhat, one indicates to a small extent, zero indicate to a very small extent. A simple scoring process applied for CPQ used in the current study as each response item includes a scoring value that would be added with that of the other items in the scale to collect total score for its all items. This total score ranges from (0-128) which also classified as scores from (0-43) is low degree, scores from (44-85) is moderate degree, while scores from (86-128) is high degree of perceived job demands.

Tool 3: Perceived Stress Scale (PSS-14):

The PSS which employed in the current study adopted from **(Clinger, 2021)**. It is a 14-item assessment that uses a Likert scale to evaluate the degree to that individual considers their life to be stressful. Also, the scale uses 0 grade for (Never) and 4 grade for (Very Often) Likert scale was used to assess the nursing staff' self-assessment about the frequency of a particular emotion during the last month. The scale determines recent perceived stress. Its total score ranges from (0-56) which also classified into three levels as scores from (0-19) is "low" level, scores from (20-37) is **"moderate"**, while scores from (38-56) is "high "level of perceived stress.

Tool 4: Maslach Burnout Inventory-Human Services Survey (MBI-HSS) Questionnaire:

This tool adopted from **(Tziner et al., 2019)**. The MBI-HSS included 22 items uniquely measures burnout in 3 dimensions: Occupational Exhaustion, Depersonalization, as well as Personal accomplishment assessment. The scale determines recent perceived occupational burnout as evidenced by how individuals perceive their work; are they feel exhausted; to what extent could they mold relationships with others; and how much they are content with their personal lives. On a7- response choices are as the following: six indicate Every day, five indicate Several times a week, four indicate Once a week, three indicate Several times a month, two indicate At least once a month, one indicates At least a few times a year, and zero indicate Never.

The score total for the overall scale ranges from (0-132) and classified into three levels as scores from (0-44) is "low level", scores from (45-88) is "moderate", while scores from (89-132) is "high level "of burnout.

Validity and Reliability of Tools

Study tools were examined for face validity by 5 professions in the nursing administration as well as community health fields. Reliability analysis of the study tools was estimated by the Cronbach's Alpha Coefficient test and its values were (.864) for CPQ, (.915) for PSS, (.954) for MBI-HSS, & (0.881) for Nurses' Knowledge about Climate Changes Questionnaire).

Ethical considerations:

- The Minia University Faculty of Nursing's Research Ethics Committee granted an official letter.

- Administrative Approvals were collected from Directors of the two hospitals as well as the four MCHCs included in the study.

- Prior to conducting the pilot study and the main research, nurses who were willing to participate in the study were asked orally after being informed about its nature and objectives.

- The study participant is guaranteed the freedom to decline participation or to leave the study at any time without given a reason. Privacy of study participants was considered when gathering data.

- Participants also guaranteed that all their data would be kept confidentially and will be used for the study purposes only. Anonymity and privacy were assured.

Pilot Study:

A pilot study was performed on (10%) of the whole sample (40 nurse) randomly selected from all work settings included in the study; to assess feasibility, completeness, clarity, adequacy, objectivity, as well as applicability of the study scales, as well to detect possible issues in the methodological approach or scales and estimate the time required to fill in the study tools. According to the pilot study there are no major changes in the study tools, so nurses who participate in the pilot study were included in the study sample.

Research Procedure:
- Comprehensive review to the relevant related literature covering the study topics was done by the researchers.
- The study scales were adopted as well as translated into Arabic; next offered to field experts for revision and approval to use.
- Permissions were given from directors of the hospitals as well as the MCHCs post discussions of the nature of the research and its aim. Oral agreement from the participants was obtained.
- Data collection time lasted for 4 months; beginning from the start of September to the end of December 2021.
- The researchers approached the study participants at their workplace and ask them to fill in the research tools after discussion the nature as well as objective of the research.
- The researchers arranged to visit each department at each hospital as well as to each of the four MCH centers based on the work schedules of all work settings.
- The study tools were distributed individually to each nurse directly by the researchers and they were given around 30 minutes to fill in the tools. The researchers were available to answer any questions needed by any of the nursing staff.

Results:

Table (1): presented that (43.9%) of nurses are aged between 30 to 40 years old and (43.3%) are less than 30 years old with mean 30.452+7.036 years, also (65.8%) of them are females, in addition (65.6%) are resided in rural villages and (74.2%) are married. Regarding the educational preparation of the studied nurses (43.3%) hold diploma degree, (30.4%) have technical institute in nursing and (26.3%) hold bachelor's degree in nursing sciences. The same table also presented that (46.9%) of the nurses are working in out-patient clinics, while (41.6%) of them had more than 10 years of experience with mean 19.0 ± 6.7 yrs.

Figure (1): displayed that (53.3%) of the studied nurses viewed that the average workload is frequently above the moderate level, and (31.1%) viewed it as being within the moderate level, while (15.6%) viewed it as being below the moderate level.

Figure (2): indicated that (90.6%) of the studied nurses had "high" degree of job demands as well as (7.7%) of them were having "moderate" degree, while (1.8%) had "low" degree of job demand. As regarding to the work stress level, this figure showed that (51.5%) of the studied nurses had "high level" of work stress, also (42.1%) had "moderate level", and (6.4%) had "low level" of work stress. The same figure also illustrated that (53.3%) of them had "high level" of burnout moreover (32.7%) had "moderate level", while (14.0%) had "low level" of burnout.

Figure (3): illustrated that (56.6%) of the studied nurses get "fair" level of knowledge about climate changes, while (28.6%) of them get "satisfactory" knowledge level about climate changes, and only (14.8%) get "unsatisfactory" level.

Table (2): showed that (71.1%) of the studied nurses had prior knowledge about climate changes, and (43.4%) of them know it from sources as Media and (26.9%) get their information from health care team members while (29.8%) from WHO or Organizational Guidelines. Also, this table showed that (76.0%) of the studied nurses had no prior training while (24.0%) of them had prior training about climate changes.

The same table also illustrated that (86.0%) of the studied nurses don't know about presence of organizational guidelines regarding climate changes. And (70.9%) did not known about the organizational guidelines regarding climate changes. Additionally, it showed that (39.5%) of the studied nurses viewed knowledge about climate changes as "very important" and (37.8%) view it as "moderately important", and (22.7%) of them were "not sure" of its importance.

Table (3): revealed that there is high statistically significant variation regarding the

degree of job demands and the level of burnout among the studied nurses at the different work settings with p-value equal (0.000) with mean score (86.76 ± 13.211; 33.73 ± 3.661 respectively) it was higher among nurses working in Minia Fever Hospital. Also, there is statistically significant variation regarding the work stress level with mean score (38.47 ± 10.086) which was higher among the studied nurses who were working in MCHs. Additionally, this table illustrated that there is no statistically significant variation regarding the total knowledge about climate changes among the different work setting.

Table (4): indicated that statistically significant variation was found regarding the level of burnout in relation to prior training about climate changes with (P value =.040). While there is no statistically significant variation regarding

the degree of job demands or in the level of work stress among the studied nurses either prior knowledge or training regarding climate changes with (P value = (.445) – (.377) & (.173) – (.613) respectively).

Table (5): showed that there are weak positive correlation exists between that degree of job demands and burnout level with (P value .004), and strong positive correlation exists between work stress and burnout level with (P value = .000), while there is no statistically significant correlation between the degree of job demands and the work stress level with (P value = .061). The same table also showed that, there is no statistically significant correlation between total knowledge about climate changes and any of other variables of the study.

Table (1): Demographic characteristics of the studied nursing staff (N= 392).

| Demographic Information		No.	%
Age	**< 30 yrs.**	170	43.3
	30-40 yrs.	**172**	**43.9**
	> 40 yrs.	50	12.8
Mean ± SD		30.452+7.036 yrs.	
Gender	**Male**	134	34.2
	Female	**258**	**65.8**
Residence	**Urban**	135	34.4
	Rural	**257**	**65.6**
Social Status	**Single**	101	25.8
	Married	**291**	**74.2**
Educational Preparation	**Diploma**	**170**	**43.3**
	Technical institute	119	30.4
	Bachelor's degree	103	26.3
Work setting	**Minia Chest Hospital**	137	34.9
	Minia Fever Hospital	119	30.4
	MCH Centers	136	34.7
Work Department	**Critical Care Units**	121	30.9
	In- patent Wards	87	22.2
	Out- patent Clinics	**184**	**46.9**
Years of Experience	**≤ 5 yrs.**	101	25.8
	6- 10 yrs.	128	32.6
	> 10 yrs.	**163**	**41.6**
Mean ± SD		19.0 ± 6.7 yr.	
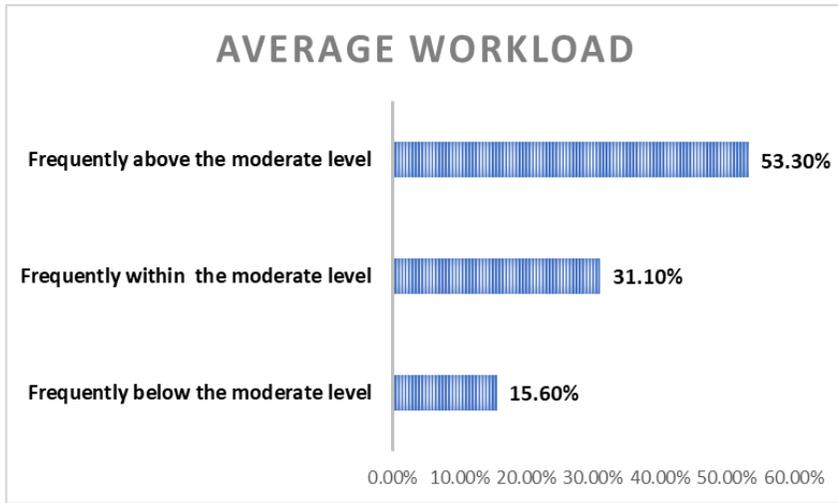
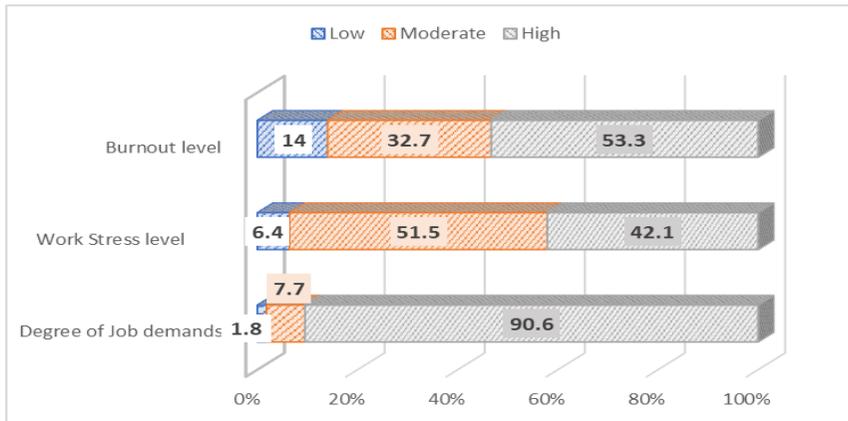**Figure (1):** Average workload among the studied nurses (n = 392)

Figure (2): Distribution of job demands, work stress and burnout among the studied nurses (n= 392).
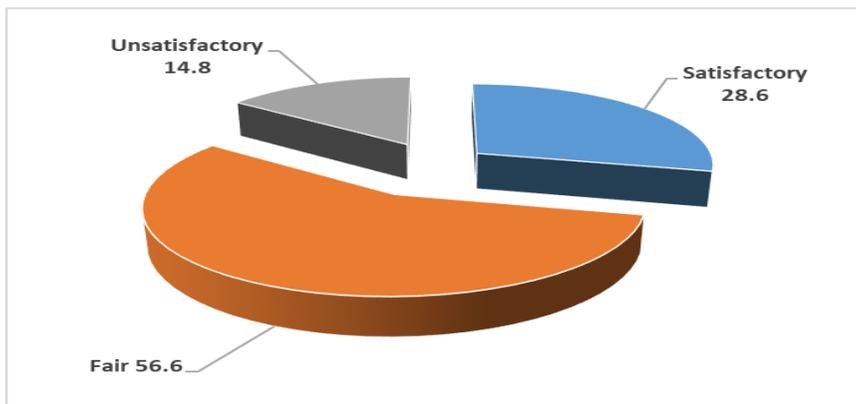

Figure (3): Percentage score of nurses' total knowledge about climate changes (n=392)

Table (2): Studied nurses' responses regarding structured items for knowledge about climate changes (N= 392).

Items		No.	%
Prior knowledge about climate change health effects	**Yes**	**282**	**71.9**
	No	110	28.1
Source of knowledge about climate change	**Media**	**170**	**43.4**
	Health care team	**105**	**26.8**
	WHO \ Organizational Guidelines	**117**	**29.8**
Prior training about climate changes	Yes	94	24.0
	No	**298**	**76.0**
Knowing the organizational guidelines regarding climate changes	Yes	114	29.1
	No	**278**	**70.9**
Presence of organizational guidelines regarding climate change effects	Yes	38	9.7
	No	17	4.3
	Don't Know	**337**	**86.0**
Importance of knowledge about climate changes	**Very Important**	**155**	**39.5**
	Moderately Important	148	37.8
	Not sure	89	22.7

Table (3): Comparison of the study variables among the studied nurses at the Different Work settings (n=392).

Work setting / Study Variables		Minia Chest Hospital (n= 137)			Minia Fever Hospital (n= 119)			MCH Centers (n= 136)			Test of significance X^2 (P value)
		No	%	Mean ± SD	No	%	Mean ± SD	No	%	Mean ± SD	
Degree of Job Demands	**Low**	7	5.1	77.61 ± 20.381	8	6.7	**86.76 ± 13.211**	0	0.0	86.67 ± 12.931	**40.771** (.000)
	Moderate	110	80.3		93	78.1		128	94.1		
	High	20	14.6		18	15.2		8	5.9		
Work Stress Level	**Low**	22	16.1	31.89 ± 13.543	13	10.9	36.95 ± 10.476	0	0.0	**38.47 ± 10.086**	**67.402** (.000)
	Moderate	68	49.6		54	45.4		63	46.3		
	High	47	34.3		52	43.7		52	53.7		
Burnout level	**Low**	24	17.5	21.86 ± 8.134	18	15.2	**33.73 ± 3.661**	42	30.9	19.44 ± 3.947	**174.063** (.000)
	Moderate	113	82.5		52	43.5		94	69.1		
	High	0	0.0		49	41.3		0	0.0		
Total Knowledge about Climate Changes	unsatisfactory	11	8.0	2.36 ± .793	14	11.8	2.40 ± .722	15	11.0	2.51 ± .669	**7.010 (.135)**
	Fair	39	28.5		41	34.4		40	29.4		
	Satisfactory	87	63.5		64	53.8		81	59.6		

Table (4): Differences in the degree of job demands work stress and burnout levels among the studied nurses according to their prior knowledge and training about Climate Changes (n=392)

Items / Study Variables			Prior Knowledge about Health Effects of Climate Changes		X^2 (p-value) df.	prior Training about Climate Changes		X^2 (p-value) df.
			Yes (n=108)	No (n=284)		Yes (n=94)	No (n=298)	
Degree of Job Demands	Low	No.	1	6	1.618 (.445) 2	1	6	1.952 (.377) 2
		%	14.3	85.7		14.3	85.7	
	Moderate	No.	101	254		82	273	
		%	28.4	71.6		23.1	76.9	
	High	No.	6	24		10	20	
		%	20.0	80.0		33.3	66.7	
Work Stress level	Low	No.	3	22	3.504 (.173) 2	5	20	.978 (.613) 2
		%	12.0	88.0		20.0	80.0	
	Moderate	No.	60	142		52	150	
		%	39.6	60.4		25.7	74.3	
	High	No.	45	120		36	129	
		%	27.2	72.8		21.8	78.2	
Burnout level	Low	No.	13	42	1.091 (.580) 2	17	38	6.133* (.040) 2
		%	23.6	76.4		30.9	69.1	
	Moderate	No.	62	147		55	154	
		%	24.8	75.2		26.3	73.7	
	High	No.	33	95		21	107	
		%	25.8	74.2		16.4	83.6	

Table (5): Correlations of the study variables among the studied nurses (n=392).

Variables		Degree of Job Demands	Work Stress level	Burnout level	Total Knowledge about Climate Changes
Degree of Job Demands	R		.076	.116**	-.054
	p-value		.061	.004	.282
Work Stress level	R	.076		.438**	-.046
	p-value	.061		.000	.360
Burnout level	R	.116**	.438**		-.019
	p-value	.004	.000		.392
Total Knowledge about Climate Changes	R	-.054	-.046	-.019	
	p-value	.282	.360	.392	

Discussion:

Staff nurses may be safe in their work by using the notion of job demands to identify the obstacles and problems they encounter daily **(Wang, 2020)**. Workplace outcomes, such as staff nurse engagement, burnout, performance, citizenship, resistance to work behaviors, and workplace safety, usually had been linked to job expectations. Additionally, staff nurses must always find additional energy to fulfill their expectations due to high job demands, which puts a continual strain on their bodies and minds. Excessive stress leads to weariness and emotional elation **(Downes et al., 2020)**. Thus, this study aimed to assess the relation between job demands, stress and burnout among nursing staff regarding their knowledge about climate changes.

Regarding the demographics' characteristics of the study nurses, less than half of nurses aged between thirty to forty years old. Around sixty-six of them are females as well as are living in rural villages. Regarding the social state, about three-quarters of the study nurses married, near to fifty percent of them hold diploma degree and thirty percent hold technical institute in nursing while more than one-quarter hold bachelor's degree in nursing sciences. The current study results should that near to half of the studied nurses are working in out-patient clinics. Regarding the years of experiences, the highest percentage of them had more than ten years of experience.

Regarding workload, the current study illustrated that more than fifty of the nursing staff view that the average workload is frequently above the moderate level, and about one-third of them view it as being within the moderate level, while fifteen percent view it as being below the moderate level. This result indicated that most of the studied nurses agree that they had heavy workload during their caring for patients and this may be due to nurses' shortage, excessive patients care, shortage of time and resources to perform their care efficiently.

This result is agreed with a study finding done by **Shoja et al. (2020)** who assess nurses' workload during COVID-19 and confirmed that nurses had heavy workload above average level. Also, this result is in line with the findings of a study done by **Pourteimour et al. (2021),** who documented that the average workload of nurses in hospital is among patients with COVID-19 in Urmia as well as in a study done by Hamedan who cared for patients with COVID-19 and reported that workload in caring of such group of patients is high which indicated it as above average level. In addition, this result agreed with the finding of a study done by **Othman et al. (2022)** who assessed nursing workload as well as work design and revealed that fewer than ten percent of individuals had an average workload, and fewer than five percent had a low burden. While the majority of participants had high workloads.

Regarding job demands, the current study revealed that much of the nurses had "high"

degree of job demands, as well as near to ten percent of them had "moderate" degree, while proportion of them had "low" degree of job demands. This result could be due to average workload that nurses had, also highest percentage of nurses live in rural area which require them to travel to the gob place, excessive workload, the work environment climate that may not be safe, as well as there is limited of resources.

This outcome is consistent with a study done by **Lindfors & Hansen, (2018)** conducted at the Stockholm County Council in Sweden, which backed up the current investigations by showing that the nurses under investigation had higher perceptions of the overall job demands in private hospitals. However, this finding is consistent with a study conducted by **El-zohery et al., (2022)** regarding the job demands of staff nurses at Dikirnis General Hospital, which offers medical services to seven centers within the Dakahlia governorate. The study's findings indicated that the staff nurses under investigation had moderate to total job demands.

As regard to the **work stress level**, the finding of the current study showed that more than fifty percent of the studied nurses had "moderate level" of work stress and forty two percent of them had "high level", while lowest percent had "low level" of work stress. This finding could be due to the heavy workload that nurses reported as well as almost all of them had high degree of job demands which require from them to work efficiently while there is shortage of resources and nurses staff as well.

This result agrees with the finding of a study done by **Ali & Mohamed, (2021)** about workplace violence, job satisfaction and work stress and their results revealed that the highest percentage of understudy psychiatric nurses reported a moderate amount of stress. In addition, this result is matched with the finding of a study done by **Abdelaal et al.,** (2021) who reported that the majority of the nurses in the study had high perceived levels of stress, while more than half had moderate levels.

Moreover, regarding burnout the current study presented that, more than fifty

percent of the nursing staff had "high level" of burnout and about one-third had "moderate level'', while lowest percentage had "low level" of burnout. This result indicated that the rest of the studied nurses had from moderate to high level of burnout which due to their perception of work stress and the heavy workload they had. Also, this may be due to the more job demands that required from them in the work.

This result is in congruent with the finding of a study done by **Colby et al., (2018)** who illustrated that the highest number of participants with high levels of reported burnout. In addition, this finding agrees with the finding of study done by **Abd-el-latief et al. (2018)** which carried in different hospital at Minia City and mentioned that health care providers reported high level of burnout especially regarding the emotional exhaustion and depersonalization subscales. Also, this is matched with the finding of a study done by **Feleke et al. (2022)** who assess nurses' levels of burnout in non-governmental hospitals at Ethiopia and showed that two hundred seven as the highest percentage of nurses reported afflicted with a high level of burnout. Moreover,

The current study findings regarding climate changes showed that above fifty-five percent of the studied nurses had "fair" level regarding their total knowledge about climate changes, while more than quarter of them had satisfactory level, and only near to fifteen percentile had unsatisfactory total knowledge about climate changes. However, there were near to three-quarters of the nursing staff did not had prior knowledge about health effects of climate changes, while more than one-quarter of them know about the effects of climate changes on health. Also, it was observed from the current research results that higher three-quarters of the nursing staff do not got any prior training about climate changes, while near to one-quarter of them resaved prior training about climate changes.

These results could be due to that the nurses always were busy in their work and its heavy load, which affects their information and perception of the climate and the environment around them. Also, this result may be because

that the hospitals in which the nurses work do not provide enough training programs about the climate changes and its effect on the hospital work environment and also how to deal with the climate changes.

These findings not agree with the finding of a study done by **van –Wijk et al., (2020)** who demonstrated a study for about half million individuals from general public and illustrated that almost half had prior knowledge about the impact of climate change. Also, this result was against the finding of a study done by **Almulhim, (2021)** who reported a little more than a quarter of the studied nurses reported high levels of knowledge, comprehension, as well as awareness that related to climate change beside it was reported that around third of the study sample had inadequate awareness about the reasons and impact of climate change. Moreover, in a study done by **Chowdhury et al., (2021)** who looked at how educators in public and private schools in the Bangladeshi city of Sylhet perceived climate change and came to a different conclusion than the present study: as educators in the public institutions are more cognizant and knowledgeable about climate change than those in private institutions.

Further, it was noted from the current study findings that, around thirty percent of the nursing staff had previous knowledge about climate changes from sources as Media and WHO or organizational guidelines and more than one quarter of them had previous knowledge from health care team members. In addition, there were nearly forty percent of the studied nurses' views that knowledge about climate changes was "very important" and above one third view it as "moderately important" and less than quarter viewed it as "not sure" of its importance. Furthermore, it was observed that majority of the nursing staff didn't know about existence of organizational guidelines regarding climate changes and more than two-thirds of them had not known about these guidelines regarding climate changes.

These results indicated that the studied nurses get their knowledge about climate changes from media and their peers which could result in little perception about the climate changes importance among them. Also,

the study results indicated that the studied nurses had poor awareness about their hospital climate changes guidelines that come from insufficient training programs offered form their hospitals to them. Also, this may be due to the ineffective leaders who work with whose group of nurses and provide little information about hospital climate changes guidelines.

These results com in line with **Buriro, et al., (2018)** who reported that the majority of nurses in their study on nurses' perceptions of climate change reported weak perceptions and insufficient knowledge about the detrimental health effects of the phenomenon. Social media was cited as the primary source of information, and internal training programs and curriculum upgrades could improve nurses' knowledge of these issues. Also, these findings are in line with **Almulhim, (2021)** who carried out research in Dammam, Saudi Arabia, and found that while more than twenty five percent of the sample showed strong knowledge and awareness about climate change at the posttest, one-third of study participants had low understanding about the causes and implications of climate change at the pretest.

Regarding the **difference between the study settings**, the current research indicated that there was statistically significant variation between the degree of job demands and burnout among the studied nurses in the different work settings as it was higher among nursing staff working in Minia Fever Hospital. This result could be due to the nature of work and job demands become sophisticated after COVID-19 pandemic and Fever hospital was one of the isolated hospitals in Minia city which require nurses to perform many tasks than before the pandemic and this put burden on nurses which increase their perception about job demands and more feeling of burnout.

Also, there was statistically significant relation between the work stress level with high mean score among nursing staff working in MCHs. This result may be due to the working environment of MCH which had continuous and daily follow up of clients who are changed in daily bases, had different cultures and asking for more services; so, nurses working there could express more work stress than others who working in hospitals.

Added to that, current study results indicated no statistically significant relation between nurses' prior knowledge regarding climate changes and job demands degree, level of work stress and level of burnout respectively. Also, there were no statistically significant relation between nurses' prior training regarding climate changes with degree of job demands and level of work stress respectively. While significant statistical relation was found between the level of burnout prior to training about climate changes. This result explained that the knowledge about climate changes had no effect on nurses' perception about job demands, stress and burnout. Also, the training on climate changes had an impact on stress and job demands but increase the level of burnout which could be due to more awareness about the new changes and more environmental requirements around us that requires more workload.

This was supported by the finding of study done by **(Anåker & Elf, 2021)** who said that although nurses had a basic duty to address climate and environmental issues, other demands on their jobs were deemed to be more important than developing an ecologically friendly method of patient care. This result was also similar to the finding of a study done by **Buriro et al., (2018)** who reported that nurses' perceptions were strong about changing the climatic patterns that had harmful consequences on health and which diseases are sensitive to weather change. A significant number of nurses believed that an increase in vector-borne, food-borne, water-borne, and air-borne diseases may be due to global warming. They concluded that, overall, nurses' knowledge and perception were weak regarding climate and its adverse effects on health, as well as the institutional and government sources were lacking.

Also, Leal- Filho et al., (2021) who affirmed the necessity of climate change education by pointing out that students are eager to learn about climate change and that there is a rising need for individuals who are expert in such field. As a result, the need for climate change education expected to expand in the future. They provided evidence that knowledge about climate change opens up greater professional options. The most

commonly mentioned obstacle to adopting climate improvements is the absence of financing for studies connected to climate change.

Regarding correlations among the study syllables, the current research showed that there was weak positive correlation existed between the degree of job demands and burnout, as well, strong positive correlation existed between the work stress and burnout level, while there was no statistically significant correlation found between the degree of job demands and the work stress level.

These results indicated that the higher job demands lead to higher burnout and not affect level of stress. Also, the more level of stress the more level of burnout. This could be explained that the nurses who had more workload and job demands led them to have burnout feeling and sometimes stress, so when nurses had stress level their burnout consequently increased, and this could be due to lack of resources and poor leadership that they had.

This result come in line with **Montgomery et al., (2015)** who had evidence supporting the positive relation between job demands and burnout. Also, this study result is approved by **Dawood, et al., (2017)** who discovered that high stress levels among psychiatric nurses had an adverse effect on their physical and psychological well-being and lead to a high prevalence of work burnout due to lack of resources, which had an immediate negative impact on the quality of care provided by nurses.

In addition, this result is congruent with the finding of a study done by **Heijden et al., (2019)** who found that higher levels of perceived stress were associated with higher levels of burnout, but higher levels of work meaning were associated with lower levels of burnout in their study title "the effect of job demands and resources on nurses' burnout and occupational turnover intention." Additionally, research seems that higher levels of perceived effort and burnout were caused by increased expectations, emotional, quantitative, and physical demands, as well as family-work conflict as a job requirement.

Also, in a study done by **Thapa et al., (2019)** their findings were consistent with the current study finding, as they evaluated the resources, job demands, and health outcomes of nurses working in Sweden's public and private healthcare systems. They found that higher job demands in terms of psychological strain and job efforts were linked to higher levels of burnout, higher levels of self-rated health, and higher rates of sick leave, while higher levels of emotional demands were linked to higher levels of burnout. Moreover, this finding supports the notion that there is a positive correlation between occupational stress and surgical nurses' degree of work burnout and is consistent with the findings of a research conducted by **Li et al., (2021)** about the link between occupational stress, job burnout, and quality of life.

In contrast, the finding of a study done by **Akbari et al., (2017)** was not in line with this result in which they mentioned a significant connection between level of job stress as well as level of job demands. Also, this result is not congruent with the finding of a study done by **Jamal et al., (2021)** who discovered that high job demands, task interdependence, professional isolation, and family interference lead to burnout and additional stress; in contrast, with autonomy, schedule flexibility, and access to adequate technology resources which enhance employee work-life balance, productivity, and job satisfaction.

Finally, findings of the current study demonstrated that, there was no statistically significant correlation between total knowledge about climate changes and any of other variables of the study including degree of job demands and both levels of work stress and burnout. This is congruent with the finding of a study done by **Anåker et al., (2021)** who perform a qualitative study concluded that there was an incongruence between environmental and climate change challenges and nurses' day-to-day responsibilities.

In contrast, the finding of a research done by **Anker et al., (2015) & La Torre et al., (2017)** who found that nurses perceived the nursing profession as having a clear role and responsibilities in engaging in the issue of climate change. Moreover, the finding of a

study done by **Aronsson et al., (2020)** who affirmed that climate change affects people's health and their ability to deliver healthcare, on both a practical and policy level, so nurses need to be ready to adapt to the new challenges.

Conclusion:

Nursing staff frequently overwhelming with excessive job demands and workload of patient care responsibilities as such more than half of the nursing staff view that the average workload is frequently above the moderate level and most of them have "high" degree of job demands. Also, more than half perceived "moderate" work stress while above fifty percent expressed "high" burnout with higher mean scores favored to nurses working at Fever Hospital. Above half of the studied nurses had "fair" level of total knowledge about climate changes. Additionally, statistically significant positive correlations existed among the degree of job demands as well as the work stress and burnout, while no statistical relation found between total knowledge about climate changes and any of other study variables.

Recommendations:

1. Healthcare institutions should provide in-service training programs and workshops for their nurse leaders and nurses staff on how to identify and recognize their stressors early to help them decreasing burnout as well as manage and mitigate their stress effectively.

2. Stress relieving and burnout mitigation activities should be implemented by nursing personnel.

3. Integrate climate change in nursing preliminary courses as well as continuing education programs, so future nurses will have sufficient awareness and right perception and attitudes about the impact of climate change on health as well as the role of nursing in resolving the problem.

4. Trialing novel uses of technology, such as, artificial intelligence allometries telemedicine or new and more efficient methods of documentation, may reduce job demands and workload which thereby reduce work-related burnout through minimizing the burden of non-nursing tasks on nurses.

5. Effective utilization of additional ancillary and supportive staff for providing indirect care responsibilities may be a cost-effective alternative to decreased patient-to-nurse ratios so minimize job demands and workload which reduces the perceived stress and burnout among nurses.

6. Future research is also recommended for further exploration of contributing factors and verifying health care professionals' perceptions and attitudes toward climate changes.

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