



Job stress among resident physicians in Tanta University Hospitals, Egypt

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Abstract

Resident physicians are the first-line health service providers, subjected to prolonged working hours, sleep deprivation and high job demands. Work stress causes reduction in productivity, suboptimal patient care and medical errors. To determine the level of stress among residents and associated factors and stressors. A cross-sectional study at Tanta University Hospitals recruited residents ($n = 278$), between December 2016 and February 2017. Job stress was assessed using a predesigned questionnaire. The mean age was 26.53 ± 1.35 , and 46.4% were males. The majority reported they work more than 48 h/week, do not get a break during work and have a night shift periodically (87%, 83.1% and 94.2%, respectively). Only 4 (1.4%) had low stress while 169 (60.8%) had moderate and 105 (37.8%) had high stress. The study revealed a statistically significant association between high level of stress and being a single resident ($p = 0.017$), belonging to surgical departments ($p = 0.001$) and an absence of break during working hours ($p = 0.001$). The prime sources of stress were underpayment for the job (87.4%), serving to large number of patients (85.2%), disruption of home life due to long hours at work (83.9%), conflict of responsibilities (81.3) and complying with increasing bureaucratic procedures (78.8%) besides no available fund for research (74.8%). Medical residents experienced moderate to high level of job stress. Thus, there is a need for stress management programs during residency training period taking in consideration main sources of stress.

Keywords Job stress · Residents · Physicians · Hospitals · Egypt

Introduction

Occupational stress is a psychological, behavioural and physical disorder that people may experience on a daily basis due to over-increasing demands in their occupations (West et al. 2002). Physicians experience relatively high levels of occupational stress compared to other professionals (Rashid and Talib 2015). On the other hand, in a physician's career, residency is a transitional phase that forms the future physicians and that can strongly influence their behaviours. This transitional phase is very stressful

due to the presence of many stressors such as shifting from being a medical student to being a physician with numerous responsibilities, job instability and continuous contact with diseases, sufferings, distress and death (Kim et al. 2015; Rashid and Talib 2015). Physicians in surgery and emergency departments are usually at increased level of stress due to facing emergencies threatening patients' lives (Al Omar 2003). Again, those working in the oncology department and neuropsychiatric departments and those working with patients suffering from chronic illness are more likely to face more stressful conditions, and hence, work stress is relatively higher than other departments (Kamal et al. 2015).

Work stress causes reduction in productivity, suboptimal patient care and medical errors (Choi et al. 2013). Also, there are continuous conflicts between work roles and family roles (Barber and Santuzzi 2014). Moreover, chronic stress can lead to negative consequences on residents' health and well-being. It leads to chronic fatigue, increased psychiatric morbidity and possibly drug misuse (Anagnostopoulos et al. 2015, Bernburg et al. 2016, Sahasrabudde et al. 2015). This study was carried

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out to determine the level of job stress, its underlying factors and main stressors among resident physicians at different departments in Tanta University Hospitals.

Subjects and methods

Study design and duration

A cross-sectional study was conducted over a period of 3 months from December 2016 to February 2017.

Study settings and population

The study was carried out at Tanta University Hospitals, Gharbia Governorate, Egypt. Tanta University Hospitals accommodate 1932 beds. The hospitals received cases from the Nile delta governorates of an average population of 10 million. The study included all available resident physicians working at clinical departments (surgical (general and special) and medical (general and special) departments) during the study period. Those who worked less than 6 months were excluded.

Study tools

Data was collected by using an anonymous self-administered questionnaire which was an adopted version of The Hospital Consultants' Job stress and Satisfaction Questionnaire (HCJSSQ, 2010) (Teasdale et al. 2008). This version was relevant for all cancer team members, so questions appropriate for residents were used and those questions specific for cancer management were excluded. It was validated by 3 experts. The questionnaire included sociodemographic data, work characteristics and possible stressful conditions at work place. Possible stressors consisted of 34 items. The residents were asked to rate each item according to the extent to which it had contributed to the stress they experienced in their job on a scale of 0 (not at all), 1 (a little), 2 (quite a bite) and 3 (a lot). The level of stress was calculated by summing the total score, and the level of stress was categorized as follows: low with total score ≤ 34 , moderate 35–68 and high 69–102. The relative importance of causes of stress was assessed by calculating the percentage of staff reporting each item as contributing from "not at all" to "a lot" to their job stress. This was categorically analysed according to the percentage of scoring at each point on the scale.

Statistical analysis

Organization, tabulation, presentation and analysis of data were performed by using SPSS for Microsoft Windows version 21. The level of stress was considered as the outcome

variable. Explanatory variables included sociodemographic data and work-related conditions. Each variable was divided into categories, and each observation was presented as frequency number and percentage. The level of stress was categorized as low, moderate and high according to guidelines of the questionnaire. Low and moderate levels were grouped together to give more focus on high level of stress in relation to different explanatory variables. The probability of null hypotheses for the association between the outcome variable and explanatory variables was tested using chi-squared test. When the chi-squared test was not appropriate due to the presence of more than 20% of cells with expected number < 5 , Fisher's exact test was applied. The level of significance adopted was $p < 0.05$.

Compliance with ethical standards

Prior permission from college and hospital authorities was performed. Also, informed consents were obtained from the participants before enrolment in the study. Approval of the ethical committee of Faculty of Medicine, Tanta University, was obtained before starting the study. All authors have no any potential conflicts of interest.

Results

Out of 311 available resident physicians, 278 filled the questionnaire with a response rate of 89.4%. The mean age of participants was 26.53 ± 1.35 which ranged between 24 to 28 years. Out of 278 participant physicians, the majority 169 (60.8%) had a moderate level of stress, 105 (37.8%) had a high level and only 4 (1.4%) had a low level of stress. Among the participants, 53.6% of residents who responded were females and single participants represented 54.7%, about half (51.1%) were junior, 50.4% belonged to medical departments and 46% belonged to surgical ones. Most of the participants (87%) worked more than 48 h/week, and 83.1% do not get a break during their work shift. The vast majority (94.2%) reported that they had a night shift periodically and could not move freely during their work shift (72.3%) (Tables 1 and 2).

Table 1 reveals a statistically significant association between high level of stress and being a single resident ($p = 0.017$). On the other hand, gender was not associated with the severity level of stress.

Table 2 shows that among those having high level of stress 61% were belonging to surgical departments ($p = 0.001$). Among those with high work stress, 93.3% reported absence of break during working hours ($p = 0.001$). Participants described the physician's rest place as a limited area (50.7%) or an area sufficient for one person (38.8%). They (61.2%) usually have to perform their work in certain speed, and only

Table 1 Sociodemographic factors in relation to work stress among studied residents

Characteristics	Low		Moderate		High		Total	
	n = 4	%	n = 169	%	n = 105	%	n = 278	%
								100
Sex								
Male	3	75.0	75	44.4	51	48.6	129	46.4
Female	1	25.0	94	55.6	54	51.4	149	53.6
Marital status								
Married	2	50.0	86	50.9	38	36.2	126	45.3
Single	2	50.0	83	49.1	67	63.8	152	54.7
Resident category								
Junior	4	100.0	86	50.9	52	49.5	142	51.1
Mid-senior	0	0.0	23	13.6	16	15.2	39	14.0
Senior	0	0.0	60	35.5	37	35.3	97	34.9
Department								
Surgical	0	0.0	64	37.9	64	61.0	128	46.0
Medical	4	100.0	98	58.0	38	36.1	140	50.4
Emergency	0	0.0	7	4.1	3	2.9	10	3.6
Working hours/week								
<42 h	0	0.0	11	6.5	2	1.9	13	4.7
42–48 h	0	0.0	16	9.5	7	6.9	23	8.3
>48 h	4	100.0	142	84.0	96	91.4	242	87.0
Break during working hours								
Yes	3	75.0	37	21.9	7	6.7	47	16.9
No	1	25.0	132	78.1	98	93.3	231	83.1
Night shift								
Periodically	4	100.0	156	92.3	102	97.1	262	94.2
Only night shift	0	0.0	6	3.6	3	2.9	9	3.2
No	0	0.0	7	4.1	0	0.0	7	2.5
Moving during work shift								
Move freely/from time to time	2	50.0	53	31.4	22	21.0	77	27.7
Cannot move	2	50.0	116	68.6	83	79.0	201	72.3
Rest area in work								
Big enough area	0	0.0	4	2.4	1	1.0	5	1.8
Limited area	3	75.0	91	53.8	47	44.8	141	50.7
Area for one person only	1	25.0	60	35.5	47	44.8	108	38.8
No area	0	0.0	14	8.3	10	9.5	24	8.7
Work done in a certain speed								
No	0	0.0	4	2.4	0	0.0	4	1.4
Sometimes	4	100.0	70	41.4	30	28.6	104	37.4
Usually	0	0	95	56.2	75	71.4	170	61.2
Taking time before decision making during work								
Yes	4	100.0	38	22.5	14	13.3	56	20.1
No	0	0.0	131	77.5	91	86.7	222	79.9
Following wrong decision								
Decision can be corrected/some problems occur	4	100.0	145	85.8	79	75.2	228	82.0
Results are fatal	0	0.0	24	14.2	26	24.8	50	18.0
Accident or injury during work shift								
Never	1	25.0	23	13.6	8	7.6	32	11.5
Simple accidents	3	75.0	115	68.1	67	63.8	185	66.5
Dangerous accidents	0	0.0	31	18.3	30	28.6	61	21.9

20.1% can take time before decision-making during work. Among the participants, 18% reported that wrong taken decisions are fatal. About one fourth (18%) reported exposure to dangerous accidents. There was a statistically significant association between high level of stress and doing work in certain speed ($p = 0.009$), time taken before taking a medical decision ($p = 0.027$), fatal results after wrong decisions ($p = 0.022$) and exposure to dangerous accidents ($p = 0.05$).

Table 3 summarizes the response (in percentage) of residents' reported sources of stress as contributed "quite a bit" and "a lot" to overall job stress in descending order. The sources of stress as rated by participant residents can be categorized into three categories: personal, institutional and professional stressors. Personal stressors included financial, disruption of home life, work burden stressors and direct patient/relative contact. Financial stressors were being poorly paid

Table 2 Work environment determinants of stress among studied residents

Characteristics	Low/moderate		High		Total		<i>p</i> of χ^2 test
	<i>n</i> = 173	%	<i>n</i> = 105	%	<i>n</i> = 278	%	
Sex							
Male	78	45.1	51	48.6	129	46.4	0.620
Female	95	54.9	54	51.4	149	53.6	
Marital status							
Married	88	50.9	38	36.2	126	45.3	0.017*
Single	85	49.1	67	63.8	152	54.7	
Resident category							
Junior	90	52.0	52	49.5	142	51.1	0.877
Mid-senior	32	13.3	16	15.2	39	14.0	
Senior	60	34.7	37	35.3	97	34.9	
Department							
Surgical	64	37.0	64	61.0	128	46.0	0.001*
Medical	102	59.0	38	36.1	140	50.4	
Emergency	7	4.0	3	2.9	10	3.6	
Working hours/week							
<42 h	11	6.4	2	1.9	13	4.7	0.160
42–48 h	16	9.2	7	6.9	23	8.3	
>48 h	146	84.4	96	91.4	242	87.0	
Break during working hours							
Yes	40	23.1	7	6.7	47	16.9	0.001*
No	133	76.9	98	93.3	231	83.1	
Night shift							
Periodically	160	92.5	102	97.1	262	94.2	0.091 (FE)
Only night shift	6	3.5	3	2.9	9	3.2	
No	7	4.0	0	0.0	7	2.5	
Moving during work shift							
Move freely/from time to time	55	31.8	22	21.0	77	27.7	0.051
Cannot move	118	68.2	83	79.0	201	72.3	
Rest area in work							
Big enough area	4	2.3	1	1.0	5	1.8	0.333 (FE)
Limited area	94	54.3	47	44.8	141	50.7	
Area for one person only	61	35.3	47	44.8	108	38.8	
No area	14	8.1	10	9.5	24	8.7	
Work done in a certain speed							
No	4	2.3	0	0.0	4	1.4	0.009* (FE)
Sometimes	74	42.8	30	28.6	104	37.4	
Usually	95	54.9	75	71.4	170	61.2	
Taking time before decision making during work							
Yes	42	24.3	14	13.3	56	20.1	0.027*
No	131	75.7	91	86.7	222	79.9	
Following wrong decision							
Decision can be corrected/some problems occur	149	86.1	79	75.2	228	82.0	0.022*
Results are fatal	24	13.9	26	24.8	50	18.0	
Accident or injury during work shift							
Never	24	13.9	8	7.6	32	11.5	0.055
Simple accidents	118	68.2	67	63.8	185	66.5	
Dangerous accidents	31	17.9	30	28.6	61	21.9	

*Significance. *FE* Fisher exact test

Table 3 Stressors among the studied resident physicians in descending order

Sources of stress	Response rate (%)
1. Feeling poorly paid for the job	87.4
2. Having to provide medical care to large number of patients	85.2
3. Disruption of home life due to long hours at work	83.9
4. Having conflict of responsibilities (clinical vs. managerial, clinical vs. research)	81.3
5. Having to comply with increasing bureaucratic procedure	78.8
6. Having insufficient formalized time for teaching and research	77.0
7. No available fund for research	74.8
8. Dealing with angry/blaming relatives and distressed patients	74.4
9. Feeling under pressure to meet dead lines	73.4
10. Disruption of home life as a result of being on call	71.6
11. Having inadequate equipment to do job properly	70.0
12. Being responsible for the quality of the work of other staff	68.0
13. Being unable to provide the best treatment	68.0
14. Feeling that skills and expertise are not used well	67.5
15. Being unable to do the job according to standard	66.9
16. Being expected to do tasks that are inappropriate to job	66.6
17. Feeling that clinical priorities are distorted by targets of hospital	66.2
18. Having to work across several hospital sites	65.5
19. Disruption of home life as a result of performing work at home	65.5
20. Patient or relatives' expectations of care that cannot be met	65.5
21. Having to break bad news to patients and their relatives	63.7
22. Keeping up-to-date with current clinical/research practices	63.0
23. Being concerned with missing the right diagnosis (or making medical errors)	62.9
24. Involved with several suffering of patients	62.6
25. Feeling insufficiently supported for emotional demands of the job	62.3
26. Patients or relatives complain about provided care	61.1
27. Providing care of multiple disciplinary teams (different specialities)	60.8
28. Being unable to treat patients quickly	45.7
29. Feeling responsible for drug side effects caused by treatment prescribed	45.3
30. Being unable to cure patients	42.8
31. Caring for patients who refuse treatment	42.8
32. Being unable to control patients' symptoms	40.3
33. Finding difficulties in relationships with junior medical staff	26.3
34. Finding difficulties in relationships with colleagues	23.0

(87.4%) and no available fund for research (74.8%). Disruption of home life results from prolonged working hours (83.9%), being on call (71.6%) and performing work at home (65.5%). Work burden stressors included providing medical care to large number of patients (85.2%), insufficient formalized time for learning and research (77%), working under pressure to meet deadlines (73.4%) and working across several hospital sites (65.5%), as well as feeling insufficiently supported for emotional demands of the job (62.6%). On the other hand, stressors related to direct patient/relative contact were dealing with angry/blaming relatives and distressed patients (74.4%), patients/relatives' expectations of care that cannot be met (65.5%), having to break bad news to patients and their

relatives (63.7%) and being involved physical suffering of patients (62.6%). Institutional administrative stressors included having to comply with increasing bureaucratic procedure, having conflict of responsibilities, lack of resources (inadequate equipment to do job properly) and inability to provide best treatment (78.8%, 81.3%, 70% and 68%, respectively). Also, Table 2 reveals professional stressors for participants like being responsible for the quality of work of other staff (68%), inability to do job tasks according to standards (66.9%), keeping up-to-date with current clinical/research practices (63%), being concerned about missing right diagnosis or making medical errors (62.9%) and providing care of multiple disciplinary teams (different specialists) (60.8%).

Discussion

The epidemiological evidence indicates that job stress is rapidly emerging as the single greatest cause of work-related diseases and injury (Visser et al. 2003). Stress, depression and emotional disturbance among resident physicians are more common than that in the general population (West et al. 2002). Most reports stated that the medical career has been known to be stressful (Zare et al. 2004, Wrenn et al. 2010, Sameerur et al. 2012).

Tanta University Hospitals provide basic care and advanced treatment facilities in all fields of medicine and surgery. Resident physicians are the backbone of this healthcare institution which is obviously overloaded system. The present study revealed the presence of an overall general stress among the studied residents, and this was similar to the finding of Jiang et al. (2019) in China on their study of the prevalence of stress and its determinants among residents enrolled in the China Training Program for Resident Doctor (C-STRD) program. On the other hand, the identified high level of stress among our participant residents was the same as experienced among doctors doing residency (37.3%) in cross-sectional study at a tertiary care hospital in the city of Mumbai (Sahasrabudhe et al. 2015) but it was higher than that detected among residents at Ain Shams University Hospitals, Egypt (29.9%), and in a study in Nigeria (32%) (Adeolu et al. 2016). Also, other worldwide studies documented higher rates: Pakistan 48% (Khuwaja et al. 2004), Netherlands (55%) (Bratt et al. 2000) and Saudi Arabia (58%) (Bahnassy et al. 2018). The high prevalence of job stress was explained that junior physicians are experiencing distress because the hospital environment is complicated and overloaded. Also, medical knowledge and skills are continuously being gained and practiced (Shams and El-Masry 2013; Bahnassy et al. 2018). These changes in the level of stress in different studies could be related to differences in facilities available at the work environment, the level of competency of training of physicians and sociodemographic variables.

The present study revealed a statistically significant association between high level of stress and being a single resident. This could be attributed to the fact that stable emotional and marital relationships might lessen the impact of exposed stress at work. Conversely, some previous studies did not observe any significant differences in depression/anxiety/ stress scores among the married and unmarried studied medical students and physicians (Abdulghani et al. 2014, Gu et al. 2015, Bahnassy et al. 2018). Positive family spillover may help to alleviate work stressors (Ahmad 2008). Also, in our study, residents of surgical departments significantly experienced more stress compared to those working in other departments. This was consistent with other studies, which showed high stress and burnout between surgery residents (Sameerur et al. 2012, Bernburg et al. 2016, Malik et al. 2016, Bahnassy et al.

2018). Surgical residents had significantly more average work-day, job tasks and operational theatre strain than their colleagues in medical departments (Ruitenburg et al. 2013).

In the current study, the high level of stress was significantly associated with the absence of break during working hours; this together with prolonged working hours > 48 h/week, periodic night shift and inappropriate/no rest place was reported by the majority of the respondents. These factors might contribute to the high prevalence of job stress found in this study. Current findings replicate those from previous studies (Abdel Aziz et al. 2015, Adeolu et al. 2016, Bahnassy et al. 2018). A Malaysian study revealed that a lack of adequate comfortable rest room and other facilities for residents was of the five most important stressors reported by residents (Al-Dubai et al. 2013). Continuous working hours with no rest increases the risk for job stress and medical errors (Bahnassy et al. 2018), and break during work is important to get some physical and mental rest (Lebensohn et al. 2013, Adeolu et al. 2016). The influence of prolonged working hours in causing fatigue, sleep deprivation and consequently distress led to the legal restriction of residents' weekly working hours in the USA in 2003, which probably had a positive impact on resident well-being (Zare et al. 2004, Wrenn et al. 2010). In the current study, a high level of stress was significantly associated with doing work in certain speed, no time taken before decision-making and more fatal results occurring as a result of wrong decisions. All these findings were in agreement with other studies that documented a high level of stress where these factors predispose physicians to poor decision-making (Stebbing and Powlest 2007), medical errors and injuries (Issa et al. 2009; Sahasrabudhe et al. 2015; Al Omar 2003).

According to the present study, the prime sources of stress were feeling poorly paid for the job, disruption of home life due to long hours at work, having to service to large number of patients and having to comply with increasing bureaucratic procedure besides no available fund for research. These findings were consistent with many worldwide studies. Stressors during residency period can be categorized into three groups: personal, professional and institutional stressors (Levey 2001). Financial constraint was ranked on top of the stressors in many studies (Ndom and Makanjuola 2004; Adeolu et al. 2016; Jiang et al. 2019). This could be explained as resident physicians struggled with high expenditures for the bare necessities of life and their low income. Also, for personal aspects, disruption of home life as a result of prolonged working hours and being on call were also reported as high rated job stressors in this study like some other studies (Ndom and Makanjuola 2004; Sehlen et al. 2009, Ahmad 2010, Abdel Aziz et al. 2015). Disruption of home life and family conflict stress and burnout among physicians may be due to trying to get a balance between heavy workload and family roles. In addition, a considerable proportion reported low

levels of receiving emotional supportive demands for the job. Related studies also reported low reward, poor work support and lack of feedback in medical career were important for effective improvement in performance (Ohlander et al. 2015; Bernburg et al. 2016).

Work burden stressors specifically “providing medical care to large number of patients”, “insufficient formalized time for teaching, training and research” and “working under pressure to meet deadlines” were highly reported by studied residents, and this could be attributed to the fact that Tanta University Hospitals are public hospitals where a number of served patients and patients’ turnover rate are drastic. The doctors in this study are young in the medical field and are still in training, and they are mostly treating patients of varying presentations and severity; meanwhile, they are responsible for reports presented to supervisors and take orders from them. Sometimes, they are prone to superiors’ negative attitudes, and they are also used to deal with death and dying patients. Comparable findings were reported by similar researches (Alosaimi et al. 2015; Adeolu et al. 2016).

Institutional administrative stressors including complying with increasing bureaucratic procedure and conflict of responsibilities (e.g. clinical vs. managerial, clinical vs. research) were rated as high sources of stress by a significant proportion of residents; these findings were in line with a related study in Nigeria (Adeolu et al. 2016). A lack of resources in the work place is an influential job stressor where a considerable proportion of participants reported inadequacy of equipment to do their job properly and inability to provide the best treatment for patients caused them a great stress at work. The same problems are documented by former studies (Khuwaja et al. 2004, Adeolu et al. 2016).

The current study revealed professional stressors such as being responsible for the quality of the work of other staff and providing care of multiple disciplinary teams, being concerned about missing the right diagnosis, inability to do job tasks according to standards and keeping up-to-date with current clinical/research practices. Former studies showed relations between high job demands and multiple job tasks with poor mental health of hospital physicians that definitely influence.

Stressors related to direct patient/relative contact were dealing with angry/blaming relatives and distressed patients, patients/relatives’ expectations of care that cannot be met and having to break bad news to patients and their relatives.

Residents may be exposed to physical and verbal violence. Kalemoglu and Keskin in their study demonstrated a high level of aggressive behaviour by patients and their relatives in the emergency service. These aggressive acts might comprise personal threats or even use of weapons. This might threaten the safety of all healthcare personnel and facilitate the development of burnout.

Conclusions

Resident physicians at Tanta University Hospitals experienced moderate to high level of job stress. Single residents experienced more job stress compared to married ones. Residents who belonged to surgical departments had higher stress level than their colleagues. Financial issues, home life disruption and work burden were highly rated stressors.

There is a need for stress management programs during residency training period. That requires a culture change for doctors and their organizations in order to obtain wellness and a sense of balance between their work and personal lives.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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