STUDYING THE ASSOCIATION BETWEEN POSTGRADUATE TRAINEES' WORK HOURS, STRESS AND THE USE OF MALADAPTIVE COPING STRATEGIES

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Background: The growing debate regarding long working hours of postgraduate trainees has been receiving considerable attention recently. This greater workload contributes to increasing stress. Our objective was to specifically study the association between long working hours, stress and the greater use of 'maladaptive' coping strategies. **Methods:** A cross-sectional descriptive study was carried out on all interns and residents at the Aga Khan University Hospital during February to May, 2005. Level of stress was measured by use of *General Health Questionnaire (GHQ-12)* and the use of maladaptive coping mechanisms through *Brief Cope-28*. **Results:** 55.1 % scored over the threshold for mild stress i.e. GHQ > 3, while more than 46% of the trainees scored over the threshold of more than 4 for morbid stress. Trainees under stress reported more working hours on average as compared to those not under stress, 83.8 and 74.7 hours respectively. At the same time, those working for longer hours were more likely to have used these negative coping mechanisms, which would further contribute to more stress rather than relieving it. **Conclusions:** Significant levels of stress have been identified. Along with this, those working for longer hours were more likely to have used these negative coping mechanisms. Reduction of working hours is important. Simultaneously, interventions need to be planned at imparting knowledge, awareness and skills to cope with various kinds of stressors encountered by a trainee during his/her training. Additionally, limits need to be devised for the working hours of the trainees.

Keywords: Postgraduate, resident, intern, working hours, stress, maladaptive coping strategies, GHQ-12, Brief Cope, Pakistan, Medical Education.

INTRODUCTION

The growing debate regarding long working hours of postgraduate trainees has been receiving considerable attention recently.[1] This greater workload contributes to increasing stress and decreases the overall performance and the quality of the life of the affected individuals.[2,3]

At the moment, there is a constant struggle with balancing working hours of residents in Teaching Hospitals in terms of providing appropriate time for maintenance of continuity in patient care and yet avoiding stress.[4]

The Resident Service Committee of the Association of Program Directors in Internal Medicine, Philadelphia, has grouped these stresses into situational, personal and professional stressors.[5]

The prevalence of stress in residents, along with the aforementioned stressors, has been studied in depth recently at our hospital (*Personal communication Dr. Asma Usman)*. Using General Health Questionnaire (GHQ-12) as the screening tool, the author found the prevalence of stress to be around 60%.

Our hypothesis was to see if there is any association between long working hours, stress and the greater use of maladaptive coping strategies. These would have two possible implications. Firstly, it might be important to decrease the workload to enhance the efficiency of the residents. On the other hand, it may be important to identify and discourage the use of 'negative' coping mechanisms, which might further contribute to the stress of these individuals, rather than helping them in relieving it.

These measures would help improve patient's safety as well as in the training, quality of life and education of the residents.[6,7]

METHODS

A cross-sectional descriptive study was conducted on all the interns and residents at the Aga Khan University Hospital (AKUH), Karachi, Pakistan. All residency programs are overseen by the postgraduate medical education (PGME) committee at AKU, which sets common goals and objectives for the trainees or residents. There are now established programs in 16 specialties.

Permission from the PGME was obtained before the start of the project. Additionally, verbal informed consent from each trainee was sought. Confidentiality of records was maintained and the data was only accessible to the 'Working Hours Group'.

Data was collected using a self-administered standardized questionnaire with four sections. It collected information regarding *basic socio-*

demographic characteristics, working hours of the residents, levels of stress by use of *General Health Questionnaire (GHQ-12)* and the use of maladaptive coping mechanisms through *Brief Cope.*

Questions were also asked to address sleep and other hours (i.e. time spent apart from work or sleep).

Estimating the working hours

Being an important variable of the study, it was imperative that the working hours of the residents/interns should be rightly estimated. Ideally, maintaining daily logs or signing in/off of registers at counters would have given us a true estimate of the amount of time spent in the hospital. But considering the constraints and resources available, this step would have been impractical. Plus, it would have been a cumbersome task for the people filling out the forms.

Therefore, we resorted to self-reported data on work hours. A comprehensive literature search was done and standard questions used in previously published studies were carefully chosen.[8,9] Correlates of long working hours identified in previous studies were also selected and included as part of the questionnaire.

Working hours were estimated through three methods:

1. Firstly, a direct open ended question was asked to write down that on an average in the past one month of his/her training, what was the average number of hours worked per week? (Self-reported work hours)
2. Next, through a series of questions in the questionnaire addressing issues such as frequency and duration of call, average number of hours worked per day and number of hours slept while on call (all in the past two weeks), the average number of hours worked was calculated using a formula. (Working hours calculated through formula)
3. A third rough estimate was through a table that the person would be required to fill in to mark the timings of his presence in the hospital. (Working hours calculated through table)

These three values were correlated to use a correct estimate of the working hours.

GHQ-12

The level of stress was measured through the General Health Questionnaire (GHQ-12), which is a measure of current mental health. The questionnaire was originally developed as a 60-item instrument but at present a range of shortened versions of the questionnaire including the GHQ-30, the GHQ-28, the GHQ-20, and the GHQ-12 are available.[10]

The scale asks whether the respondent has experienced a particular symptom or behavior recently. Each item is rated on a four-point scale (less than usual, no more than usual, rather more than usual, or much more than usual). A score of 0-0-1-1 for the 4 responses from left to right, was given. The cut off score would be between 3 and 4, as described by Goldberg. All those who had scored 4 and above were considered to be suffering from psychological morbidity due to stress, and were labeled as "Stressed" and those with the score of 3 and below were labeled as "Not stressed".

There is evidence that the GHQ-12 is a consistent and reliable instrument when used in general population samples and has also been used in similar settings to address stress in consultants and house officers.[11]

Maladaptive coping mechanisms

The frequency of different coping strategies employed by the residents in the past 2 weeks was determined with the Brief COPE – 28.[12] It has 28 items measuring 14 different coping styles (2 questions for each coping method).

The responses to these questions are measured on a 4-point Likert-type scale with responses ranging from 1 ("I've not done this at all") to 4 ("I've been doing this a lot").

These include, for example, 'Active Coping' (I've been taking action to try to make the situation better), 'Religion' (I've been praying or meditating), 'Venting' (I've been expressing my negative feelings) and 'Substance Use' (I've been using alcohol or other drugs to make myself feel better).

As evident, some of these coping mechanisms will have a positive effect on the individual's life and can be termed positive. On the other hand, others that can worsen the situation can be termed as 'maladaptive'.[13] According to our hypothesis, these 'maladaptive' coping mechanisms can be an outcome of long working hours of the residents and if associated with stress as well, they can further increase it if present.

Four of the 14 Brief COPE scales were used to test the hypotheses of this study. These included:

1. **Behavioral disengagement** (e.g., "I've been giving up trying to deal with it"),
2. **Substance use** (e.g., "I've been using alcohol or drugs to make myself feel better"),
3. **Denial** (e.g., "I've been saying to myself, 'this isn't real' "), and
4. **Venting** (e.g., "I've been saying things to let my unpleasant feelings escape").

In the original validation study, the internal consistency reliability coefficients (Cronbach's alpha)

for the four scales were 0.70, 0.90, 0.50, and 0.60, respectively; translating to the fact that the questions are reasonably reliable.

Additionally, several items were modified to refer to psychological stress rather than situations (e.g. "I refuse to believe that it has happened" was changed to "I refuse to believe that I have these symptoms;" "I've been giving up trying to deal with it" was changed to "I've been giving up trying to deal with these symptoms").

Sampling method and sample size calculation
From the PGME, a list of all the available residents and interns was obtained. At the time of the study, there were 272 residents and about 60 interns. Using relative operative curve (ROC) tables and assuming a 50% prevalence of maladaptive coping amongst residents/interns, it was decided that the questionnaire be administered to all residents. This would give us a power of 80% at a 95% confidence interval.

Data Collection and entry
The medical students went to all departments of the hospital where residents work including the wards, clinics, operation room, emergency room, Intensive Care Unit, laboratory, radiology, and others, and distributed a self-administered questionnaire among the residents. It was first inquired if the person could spare 10-15 minutes of time. Only then he was given the questionnaire to administer. If not, his/her pager number was asked and he/she was then re-approached at a later time of his/her convenience.

A mass mail was also sent to all the residents and notices put up on the computers of the learning resource centers of the university encouraging them to participate in the study.
A database was developed in Microsoft Access 2000. The data was imported in Microsoft Excel and Statistical Package for Social Sciences 11 (SPSS 11) for further analysis.

Statistical analysis
Baseline information on demographic and social characteristics was obtained using descriptive statistics, frequencies, means for continuous variables and percentages for categorical variables. For statistical significance, the chi square test would be used for categorical variables, keeping the level of significance (p) at 0.05 and 95% confidence interval (CI) and t-test for continuous variables.

RESULTS

We were able to administer and collect filled questionnaires from a total of 312 postgraduate trainees (153 (49%) males and 159 (51%) females). 68.3% were residents of Karachi. 33.3% were

married. The mean number of years since graduation of the trainees was 4.98 (SD 3.49). At the time of interview, there were a total of 59 interns, 72 R1s, 57 R2s, 34 R3s, 40 R4s, 9 R5s and 19 senior medical officers (SMOs). SMOs were excluded from the final analysis.

Working hours were estimated through three methods, as outlined earlier. Paired t-tests were then conducted to see if there were any significant differences between these working hours calculated. 'Self-reported' working hours were higher (mean - 85.6 hours), while there was no statistically significant difference (p-value < 0.001) between the '*Working hours calculated through the Table*' (mean - 80.2 hours) and the '*Working hours calculated through the formula*' (mean - 79.5 hours). An average of the latter two was therefore used for further analysis.

Figure 1 summarizes the average number of hours worked by residents in different specialties. Data on average number of hours slept and 'other hours' i.e. apart from work and sleep has been superimposed.
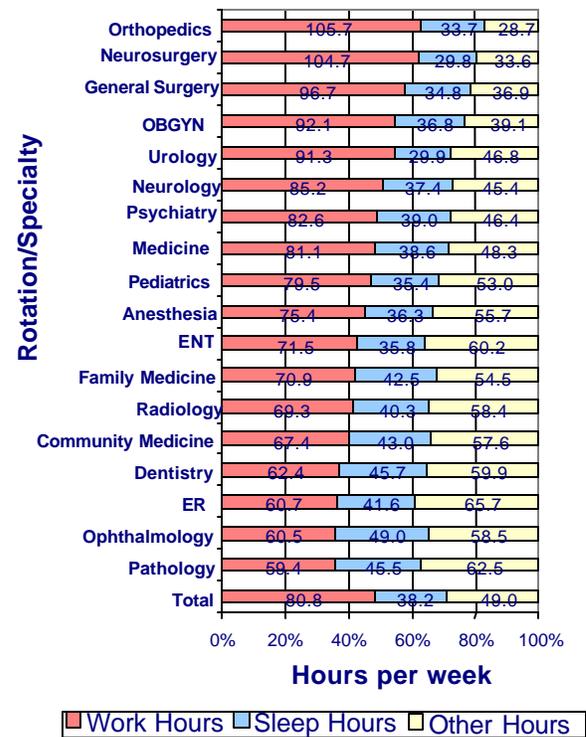

Rotation/Specialty	Work Hours	Sleep Hours	Other Hours
Orthopedics	105.7	33.7	28.7
Neurosurgery	104.7	29.8	33.6
General Surgery	96.7	34.8	36.9
OBGYN	92.1	36.8	39.1
Urology	91.3	29.9	46.8
Neurology	85.2	37.4	45.4
Psychiatry	82.6	39.0	46.4
Medicine	81.1	38.6	48.3
Pediatrics	79.5	35.4	53.0
Anesthesia	75.4	36.3	55.7
ENT	71.5	35.8	60.2
Family Medicine	70.9	42.5	54.5
Radiology	69.3	40.3	58.4
Community Medicine	67.4	43.0	57.6
Dentistry	62.4	45.7	59.9
ER	60.7	41.6	65.7
Ophthalmology	60.5	49.0	58.5
Pathology	59.4	45.5	62.5
Total	80.8	38.2	49.0

Figure 1: Comparison of work, sleep and other hours/week according to rotation/specialty

55.1 % of the trainees scored over the threshold for mild stress i.e. GHQ > 3, while more than 46% of the trainees scored over the tentative threshold of more than 4 for morbid stress.

Trainees under stress i.e. GHQ > 3 reported more working hours on average as compared to those not under stress, 83.8 and 74.7 hours respectively.

The same relationship held true for morbid stress (GHQ > 4) as well, 84.8 and 75.3 hours/week respectively.

Similarly, individuals coping *negatively* reported more mean number of hours worked per week (Table 1). At the same time, individuals practicing maladaptive coping styles were more likely to be stressed as well (Table 2). Substance abuse was reported minimally.

Table 1. Coping mechanisms and the mean number of hours worked/week

Coping mechanism	Mean number of hours worked/week	n	p-value
Denial			
Not at all	79.0	164	**0.04***
Yes	83.3	119	
	Total	*283*	
Substance Misuse			
Not at all	80.9	281	0.51
Yes	72.8	2	
	Total	*283*	
Venting			
Not at all	74.8	106	**<0.001***
Yes	84.4	177	
	Total	*283*	
Behavioral Disengagement			
Not at all	80.0	211	0.18
Yes	83.2	72	
	Total	*283*	

Table 2. The relationship between the different coping mechanisms and mild stress

	GHQ mild stress				
	No	Yes	Total	c^2	p-value
Coping mechanism					
Denial					
Not at all	91	78	169	14.53	< 0.001*
Yes	39	85	124		
	130	163	293		
Substance Misuse					
Not at all	129	162	291	0.026	0.872
Yes	1	1	2		
	130	163	293		
Venting					
Not at all	75	36	111	38.96	<0.001*
Yes	55	127	182		
	130	163	293		
Behavioral Disengagement					
Not at all	116	102	218	26.98	<0.001*
Yes	14	61	75		
	130	163	293		

DISCUSSION

We expected both underreporting and especially over-reporting of the working hours. And as shown, the mean working hours calculated both through the formula and the schedule were lower than those directly reported by the residents in response to an open-ended question. However, there was little or no difference in the hours calculated through the formula and the hours estimated from the table; showing a 'true' estimation of the working hours. Still, the working hours were very long in a number of departments, exceeding the arbitrary limit of 80 hours.

We found significant levels of mild as well as morbid stress in the trainees of the hospital, with every second individual suffering from some degree of stress.

Trainees working for longer hours were more likely to have resorted to using these negative coping mechanisms. This would further add to their stress, rather than relieving it. The reason for low scores on the substance misuse is probably underreporting and the fact that the use of alcohol as such in not a culturally and socially acceptable phenomenon in Pakistan.

As with all studies, our report does have limitations. The most obvious is that the data is self-reported; the figures may thus be over reported or underreported owing to different perceptions of the difficulties of the training years. Since this is a cross-sectional study, we would not be able to establish any causal relationships. Plus the study is conducted in residents from one teaching hospital in Pakistan with characteristics and regulations of its own. The results may be similar to but we would not be able to generalize them to other hospitals.

Our study has a number of implications. Firstly, we have been able to provide estimates of the working hours of the residents. A detailed report has been submitted to the PGME (available on request) regarding working hours of all interns and residents, and it is pleasing to note that a "Working Hours Task Force", which had already been formed before the start of the study, is taking a number of steps to reduce the working hours in some of the departments. In fact in some, actions have already been taken and the number of hours reduced.

We, however, from the above results cannot suggest the limit for the working hours or people who are working 'too much', but taking the 80 hour limit as suggested by the American College of Graduate Medical Education, a lot of individuals are overworked and working beyond this limit, as outlined earlier.

In Pakistan, there is no rule as such to define the upper limit of the working hours. Such data might be useful in devising future regulations and the work time that may need to be reduced.

Secondly, we have been able to show the relationship between working hours, stress and the use of maladaptive coping behaviors. Although these associations need to be studied further, some implications are obvious. The use of these negative coping mechanisms is going to further increase the levels of stress of the residents.

Reduction of working hours is important. At the same time interventions, need to be planned at imparting knowledge, awareness and skills to cope with various kinds of stressors encountered by a trainee during his/her training. However, it would probably be far from now that such an intervention comes underway. The PGME might need to take the initiative to help alleviate the problems of the trainees and improve the overall quality of life of the training resident. This would obviously in turn improve the quality of care provided by the person. The formation of the 'Working Hours Task Force' is an initial step in the right direction.

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