

## Evaluation of the relationship between testosterone levels and burnout levels and job satisfaction in emergency department female employees: A prospective study

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### Abstract

**Objective:** To evaluate the effect of testosterone on the status of burnout and job satisfaction.

**Methods:** The prospective study was conducted at the Kanuni Sultan Suleyman Education and Research Hospital, Istanbul, Turkey, from April 1 to May 1, 2019, and comprised all female employees working in the emergency department. Data was collected using the Maslach Burnout Inventory and Minnesota Job Satisfaction Scale. Blood samples 5 cc were taken to measure the testosterone hormone level. Data was analysed using SPSS 20.

**Results:** There were 95 females with a mean age of  $33.6 \pm 7.1$  years (range: 18-53 years). The level of exhaustion was high in 64(67.3%) subjects, intermediate in 20(21%) and low in 11(11.5%). the difference among the groups in relation to testosterone levels was significant ( $p < 0.05$ ). Though the difference in testosterone levels in the groups in terms of job satisfaction was also noted, it was not statistically significant ( $p > 0.05$ ).

**Conclusion:** Hormone levels released from endocrine systems were found to be affected by psychosocial factors.

**Keywords:** Testosterone, Burnout Syndrome, Job satisfaction. (JPMA 71: 272; 2021)

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### Introduction

Burnout is an insidious process which develops with time and reflects in emotional, mental and physical exhaustion.<sup>1,2</sup> The concept of burnout, first introduced by Fredeunberg in 1974, is defined as emotional exhaustion, which means that people cannot fulfill the requirements of their work as a result of excess work.<sup>3</sup> Job burnout is a specific disorder resulting from prolonged exposure to high job demands in the absence of enough resources to compensate for their effects.<sup>4</sup> It is emphasised that burnout is usually seen in jobs that require face-to-face interaction with people.<sup>5</sup> Since 24 hours of uninterrupted service is provided in emergency departments, exhaustion of healthcare providers has been increasing as they try to meet the needs of the patients and their relatives who present to the emergency services. In a study conducted in mental health workers, they started energetically, but burnout set in due to the low number of employees and intensive treatment services.<sup>6</sup>

As emphasised in studies, healthcare currently is one of the most risky occupations for burnout syndrome. Intensive work, stress, need to provide emotional support to patients and relatives, care for the severe and fatal patients, disturbance of the sleep system and the high number of on-call duties have been considered major

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stressors on healthcare providers.<sup>7,8</sup> In a study on stroke caregivers, severe patient care was shown to increase burnout.<sup>9</sup> A similar study showed that burnout increased in home-care providers.<sup>10</sup> In addition, problems in professional relations, challenging patients in terms of difficult diagnosis and treatment, inadequate hospital resources, having to deal with relatives of the patients and inadequate time devoted to the self and private life together cause stress and tension related to work.<sup>11-13</sup> According to two different studies of burnout syndrome, there are three basic factors related to this syndrome divided into three sub-categories as emotional burnout, insensitivity and personal success.<sup>2,14</sup> Emotional exhaustion is defined as feelings of job overload and exhaustion due to one's own job. Insensitisation is a condition in which the individual demonstrates attitude and behaviour that lacks emotion when dealing with people they give care and service to. On the other hand, personal success is defined as overcoming a problem with success and finding self as adequate.<sup>15</sup> The concept of job satisfaction, first introduced in the 1920s, was defined as a reflection of the feelings of the employees about their work. The importance of job satisfaction was unknown until 1940s. Job satisfaction is affected by environmental factors, such as low salaries, minimal benefits and absence of job security.<sup>16</sup> Job satisfaction is an emotional response even if influenced by environmental factors.<sup>17</sup> Emotional exhaustion is associated with job satisfaction.<sup>18</sup> Burnout and job satisfaction are concepts that affect the human brain psychologically. Neuroendocrine systems

are in reciprocal interaction in terms of mood. The stress factors in human life affect the neuroendocrine system which is controlled by brain neurotransmitters.<sup>19</sup> The effects of testosterone, the male sex hormone and a part of the neuroendocrine system, on behaviour and mood in humans have been known since long.<sup>20</sup> The possible relationship between depressive disorders and testosterone in women has been investigated in many studies in adult women.<sup>21,22</sup> The current study was planned to evaluate the effect of testosterone on the status of burnout and job satisfaction.

## Subjects and Methods

The prospective study was conducted at the Kanuni Sultan Suleyman Education and Research Hospital, Istanbul, Turkey, from April 1 to May 1, 2019. After approval from the ethics review board of the University of Istanbul Health Sciences, all female employees working in the emergency department (ED) of the hospital were approached, including doctors, nurses, medical secretaries and cleaning personnel. Written consent was sought from all of them, and those who volunteered to participate were included. Pregnant workers and those using hormone replacement were excluded. Anonymous questionnaires were administered to the participants seeking demographic and job-related data. Age, marital status, residential area and spouse's occupation were demographic variables. Work-related variables were department, designation, length of service, rota and doing private work. Also used were Maslach Burnout Inventory (MBI), which was developed in 1981 and was translated into Turkish.<sup>23</sup> MBI consists of 22 sentences.<sup>24</sup> The Turkish version changed MBI answers because of its ease of implementation. Each item consists of a 5-point rating scale.<sup>23</sup> It has subscales, such as emotional exhaustion, personnel success and desensitisation.

Total burnout was calculated using the formula:<sup>25</sup>

$$\text{Total burnout} = \text{Emotional Exhaustion} + \text{depersonalisation} - \text{personal accomplishment.}$$

As regards individual components of burnout, emotional exhaustion was stratified as mild <16, moderate 16-27 and severe >27. Depersonalisation was stratified as mild <6, average 7-12 and severe >13. Personal accomplishment was stratified as high >39, average 38-32 and low <31. A high degree of composite burnout was revealed in high scores on the emotional exhaustion and depersonalisation subscales, and in low scores on the professional accomplishment subscale.

Also used was the Minnesota Job Satisfaction (MJS) scale which was developed in 1967 and was translated into

Turkish<sup>26</sup> with a Cronbach alpha value of 0.77. It is a 5-point Likert-type tool having 20 items. The neutral satisfaction point of the scale is 3. The job satisfaction is evaluated as low and high when the point of the scale is <3 and >3. In the current study, MBI was grouped as high burnout, intermediate burnout and low burnout levels, while MJS scale was divided into 3 groups as high job satisfaction, intermediate and low job satisfaction.

Blood samples 5cc were taken from the participants to measure the testosterone level. The samples were stored at -80°C after separation of serums. Testosterone levels were measured within two months of the collection.

Data was analysed using SPSS 20. Descriptive values were calculated. Kolmogorov Smirnov test and skewness-kurtosis method were used to evaluate the normal distribution of variables. Normal distribution of data was evaluated by histogram. Categorical data was reported as mean  $\pm$  standard deviation (SD). Compliance with parametric test criteria was evaluated statistically. The data was not statistically parametric. For this reason, Kruskal Wallis-H tests were used for groups of three and more from statistical evaluations based on categorical (nominal or sequential) and binary variables. Spearman rank correlation method was used for non-parametric data.  $P < 0.05$  was set as mark of of statistical significance.

## Results

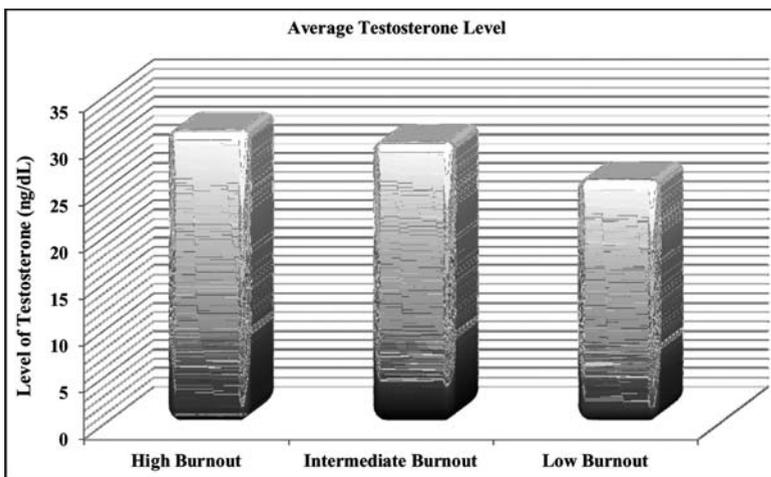
Of the 101 women staff in ED, 95(94%) were included. The mean age was  $33.6 \pm 7.1$  years (range: 18-53 years). Overall, 59(61%) were single, 34(32.7%) were married and 3(2.9%) were widowed. Of the total, 17(17.9%) were physicians, 42(44.2%) were nurses and 36(37.9%) were other healthcare personnel, like medical secretary, janitors and security staff (Table).

According to MBI scores, the level of exhaustion was high in 64(67.3%) subjects, intermediate in 20(21%) and low in 11(11.5%). High emotional exhaustion was found in 62(65.3%), high insensitisation 79(83.8%) and low personal success was reported by 20(2.1%). Among the laboratory data, The mean level of testosterone was  $29.4 \pm 11.7$  ng/dl (range: 2.5-80). Mean testosterone level was  $31.3 \pm 9.5$  ng/dl,  $30 \pm 10.4$  ng/dl and  $26 \pm 9.1$  ng/dl in participants with high, intermediate and low burout levels respectively (Figure-1). The difference among the groups in relation to testosterone levels was significant ( $p=0.044$ ).

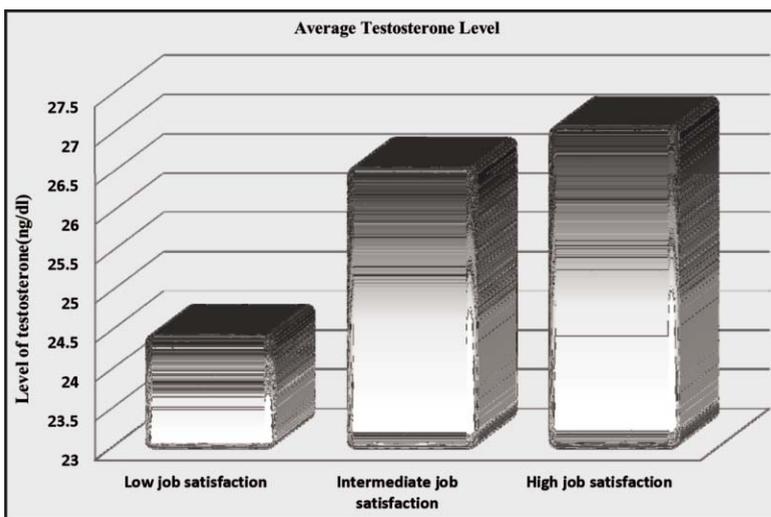
Testosterone level and MBI showed a linear relationship ( $r_s:0.665$ ,  $p=0.045$ ). Testosterone level analysed by marital status and number of children showed negative weak and intermediate significant correlations respectively ( $r_s:-$

**Table:** Demographic characteristics.

Demographic Characteristics	Name of Characteristics	Number	Percent (%)	Mean± Sdt. Dev	Scale
Gender	Female	95	100		
Age(years)		95	100	33.6±7.1	18-53
Marital Status	Married (1)	34	35.7		1-3
	Single(2)	58	61.0		
	Widow (3)	3	2.9		
Profession of the participants	Physicians (1)	17	17.9		
	Nurse (2)	42	44.2		
	Other health (3)	36	37.9		
Mean values of test. for burnout	High Burnout (1)	70	67.8	31.30±9.5	1-3
	Intermediate Burnout (2)	23	22.2	30.0±10.4	
	Low Burnout (3)	12	10.0	26±9.1	
Mean values of test. for job satisfaction	High Job satisfaction (1)	24	25.2	27.12±15.7	1-3
	Int. Job satisfaction (2)	43	45.2	26.6±11.2	
	Low Job satisfaction (3)	28	29.4	24.47±12.6	



**Figure-1:** Average testosterone level according to burnout levels.



**Figure-2:** Average testosterone level according to job satisfaction levels.

0.237,  $p=0.002$ ;  $rs:-0.321$ ,  $p=0.000$ , respectively). Mean testosterone was  $33\pm 10.2$  ng/dl,  $29.6\pm 8.9$  ng/dl and  $23.1\pm 9.5$  ng/dl in those who were in the job for 0-4 years, 5-9 years and 10-15 years, respectively. On a 1-5 scale, with 3 taken as neutral, 28(29.4%) subjects had job satisfaction <3 and 24(25.2%) had >3. There was no significant relationship of job satisfaction with marital status and number of children ( $p>0.05$  each). A positive correlation was found between job satisfaction and burnout ( $rs:0.266$ ,  $p=0.009$ ). The mean testosterone level was  $24.47\pm 12.6$ ng/dl in those with job satisfaction score <3,  $26.6\pm 11.2$ ng/dl in those with job satisfaction score 3, and  $27.12\pm 15.7$  ng/dl in workers with job satisfaction score >3 (Figure-2). Although there was difference in testosterone levels between the groups in terms of job satisfaction, it was not statistically significant ( $p=0.850$ ).

**Discussion**

Testosterone is a steroid derived from cholesterol. Steroid hormones are produced in organs such as adrenal glands, gonads and placenta, and can pass the blood-brain barrier easily and play a major role in the growth, development and maturation of the brain.<sup>27</sup> Previous studies showed burnout characterised by physical and emotional fatigue, insensitisation and decreased productivity when exposed to long-term stressful work conditions affecting job and life satisfaction of the physicians and increasing their level of exhaustion.<sup>1,3,28</sup> A study showed burnout has

harmful effects on human health.<sup>29</sup> The present study was planned since no study was found exploring the association of hormones, burnout and job satisfaction. The level of exhaustion was found high among female ED workers. Testosterone level was found to be high in workers with a high level of exhaustion and low in workers with a low level of exhaustion. The testosterone level in women was demonstrated to have a tendency to increase in depression in previous studies.<sup>30-33</sup> On the other hand, some conflicting results were also reported in several studies, suggesting that both low and high levels of testosterone were associated with depression in women.<sup>31</sup> In one study, both low and high testosterone levels were reported to suggest mental changes in women.<sup>34</sup> Many studies suggested that the participants were more exhausted in terms of emotional burnout and desensitisation and less exhausted in terms of personal success.<sup>20,35-37</sup> The current study's findings were compatible with literature. Classical steroids, such as progesterone, estradiol and testosterone, are also neuroactive since they can act as functional antagonists in ligand-coated ion channels or different glutamate receptors.<sup>38</sup> In the present study, when the working principles of the neuroendocrine systems were considered, the hormonal equilibrium was suggested to be variable among the external factors. Although the effects of oestrogen and progesterone are more marked on behaviour and mood in women, androgens, such as testosterone, are also considered to have major effects. Increased androgens in women result in aggression and antisocial behaviour. This can be associated with depression in women.<sup>39</sup> Job satisfaction is an important factor affecting exhaustion. Institutional and environmental conditions, such as the content of the job performed, wages policy and labour conditions, affect job satisfaction in addition to the personal features, such as age, gender, marital status and education.<sup>40</sup> Similar to another structured study, job satisfaction was not associated with marital status.<sup>41</sup> According to a study, being a director at the workplace and increased time of vacation were found to contribute to job satisfaction while increased hours of work was found to have negative effect.<sup>42,43</sup> In the present study, when the association of job satisfaction and testosterone level was evaluated, the mean level of testosterone was found to be high in individuals with high job satisfaction and low in individuals with low job satisfaction. Testosterone has been reported to be associated with cognitive functions, such as visual memory, visual-spatial attention and especially visual perception.<sup>44</sup> In this context, when burnout and job satisfaction status was evaluated, mean testosterone, contradictory to expectations, was found to

have no parallel association with both conditions. This demonstrates that testosterone hormone might have different effects. A statistically significant change was observed in testosterone hormone level when marital status and number of children was evaluated. Testosterone level was found to decrease with increasing years of working, which is ageing.

The small sample size is a limitation as it comprised only female staff from ED at a single hospital.

## Conclusion

Hormone levels released from endocrine systems were found to be affected by psychosocial factors. By adding testosterone levels to the burnout levels, new scales can be created.

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**Conflict of Interest:** None.

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