

Evaluate the Relationship between Stress and Job Satisfaction among Medical Laboratory Professionals in Saudi Arabia 2024

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Abstract:

Background: Job satisfaction has been widely studied across several healthcare disciplines and is correlated with important outcomes such as job performance and employee mental health. Medical laboratory professionals (MLPs) that are satisfied with their jobs are more productive. However, when job requirements do not match capabilities, it causes stress. As a result, it is critical to identify the source of dissatisfaction in order to reduce work-related stress, which has a detrimental impact on healthcare service quality. **The study aimed:** To evaluate the relationships between stress and job satisfaction factors among MLPs in Saudi Arabia hospitals, and to assess a possible correlation between job stress and job satisfaction. **Methods:** A cross sectional study involved all medical laboratory professionals in five hospitals in Saudi Arabia. A survey instrument measuring job satisfaction was developed from the result of earlier qualitative studies. **Results:** The results show a significant statistical association between stress and job satisfaction. The youngest MLPs at hospitals were less satisfied at work and more stressed than their older colleagues. The most important dissatisfaction factors, leading to job stress, are insufficient support for professional development, poor relations with supervisors and co-workers, as well as heavy workload. **Conclusion:** This study underlines the necessity of investing in strategies to satisfy laboratory staff expectations, improve elements that increase satisfaction, and reduce issues that cause dissatisfaction. It provides specific recommendations for such measures and, as a result, coordinates actions aimed at enhancing the work environment in medical laboratories. When adopted, they would minimize occupational stress among medical laboratory specialists in Saudi Arabia, and possibly elsewhere.

Keywords: Job satisfaction, Job stress, Medical laboratory professionals

Introduction:

Clinical laboratories are recognized as integral in ensuring the accuracy of disease diagnosis, management, and mentoring, and maintaining laboratory quality and test availability for every medical testing request is of interest ^(1, 2). In healthcare businesses, a highly motivated workforce is vital for providing high-quality and efficient services. Motivation of health care professionals can encourage them to exert and sustain effort toward organizational goals. Professional staff is motivated by the following factors: achievement, recognition for achievement, the work itself, responsibility, and professional growth or progress ^(3, 4).

A highly motivated individual is more likely to be satisfied with her or his work ⁽⁵⁾. Job discontent, on the other hand, can lead to work-related stress ⁽⁶⁾. Employees that are satisfied have positive impressions of their firms and are more productive at work ⁽⁷⁾. As a result, work satisfaction is crucial in all businesses, including health care professionals, because it influences service quality ⁽⁸⁾. High job satisfaction leads to increased productivity and greater service quality ⁽⁹⁾.

Healthcare workers, particularly medical laboratory professionals, may be unable to contribute to a great patient experience if their own requirements are not addressed. As a result, healthcare managers are responsible for ensuring employee satisfaction ⁽¹⁰⁾. Despite the evident importance of job satisfaction, it has not been studied in all professional groups in healthcare. Earlier research has focused on nurses, with few coming from low- or middle-income countries ⁽¹¹⁾.

A study from Africa found that low compensation, a lack of promotion, training, and growth, strained relationships with supervisors, bad working conditions, and unjust organizational practices were the most common causes of job discontent among healthcare workers ⁽¹²⁾. Gender, age, education level, designation, marital status, and work conditions such as compensation and shift work all have an impact on job satisfaction ⁽¹³⁾. Stress at work is a physical and emotional reaction that occurs when job requirements do not match the worker's ability ⁽¹⁴⁾.

Stress can also be caused by job dissatisfaction, which results in poor performance. As a result, it is critical to identify the source of dissatisfaction in order to reduce work-related stress, which, as previously said, has a detrimental impact on the quality of healthcare services ⁽¹⁵⁾. The relationship between stress and job satisfaction is well recognized. Salary, workload, health and safety, lack of recognition, training development, and lack of decision-making are dissatisfaction factors that lead to stress ⁽¹⁶⁾.

Stress at work was recorded among hospital nurses in Iran, resulting in medical occurrences and was found to be related to job satisfaction, which in turn affected the amount of turnover, reduced retention rate, and, ultimately, work performance ⁽¹⁷⁾. According to Khammar et al., (2017) ⁽¹⁸⁾, worker safety is vital for productivity due to worries about shift work tasks. According to the Canadian Community Health Survey, medical laboratory technologists are one of the healthcare professional groups with the highest occupational stress ⁽¹⁹⁾. Another study found that a high workload caused discontent among medical laboratory professionals ⁽²⁰⁾.

A study found that efforts should be implemented to increase motivation among medical laboratories in order to promote high-quality healthcare services⁽²¹⁾. There is limited previous research on to what extent job stress is associated with job satisfaction and especially among MLPs in Saudi Arabia. Therefore, the aim of this study is to evaluate the relationships between stress and job satisfaction factors among MLPs in Saudi Arabia hospitals, and to assess a possible correlation between job stress and job satisfaction.

Methods:

This is a cross-sectional study directed at all MLPs in the five Saudi Arabia hospitals, with 336 responding, applying a survey instrument measuring job satisfaction developed from results of qualitative studies^(22, 23). In addition, job stress was assessed using a survey based on the Nurse Stress Index⁽²⁴⁾. To measure the importance of each job satisfaction factor identified in the previous study, a proposition was constructed and a response as to agreement was measured with a five-point Likert scale (strongly disagree = 1, disagree = 2, neutral = 3, agree = 4, strongly agree = 5).

As to job stress, the Nurse Stress Index⁽²⁴⁾ was used, with responses measured on a four-point Likert scale. All MLPs in the five hospitals were invited to participate in the survey. Before distributing the survey questionnaire, a pilot study was performed at Hospital among 10 % study participants chosen randomly (being senior, junior and chief analysts) and who were not to be included in the main study.

The researcher discussed the questionnaire with a panel of experts in related field, representing medical laboratories, psychology, social sciences and biostatistics, reviewed the content validity of the job satisfaction questionnaire of this study to ensure that the questions were understandable. Four questions were felt to be unclear and were removed.

As a measure of internal consistency, we calculated Cronbach's Alpha. It was 0.90 for the job satisfaction questionnaire and 0.89 for the job stress questionnaire with an overall value of 0.92. These values indicate that the questionnaire is statistically reliable. We combined both instruments into one questionnaire form, and added an initial part seeking information on age, gender, and years of experiences, shift pattern, department, marital status, family location, and education level (Questionnaire Part 1).

Part 2 of the questionnaire measured job satisfaction. For twenty-nine items the participants were asked to rate their level of satisfaction in eight areas (factors), characterizing their work arrangements and environment: pay and promotion, autonomy, health and safety, professional status, workload, professional development, organization policies, and relationships with co-workers and leaders. The questions were distributed randomly in the questionnaire.

Part 3 of the questionnaire measured experienced job stress in the six areas adapted from the Nurse Stress Index (NSI)⁽²⁴⁾, which were presented as coping with workload, organizational support, blood sampling, working environment, home/work discordance, and confidence/proficiency at work. Seventeen questions were randomly distributed to be answered on a four-point Likert scale ranging

from “not at all stressful” to “extremely stressful.”

Personal integrity was guaranteed. Participation was voluntary, and informed consent was obtained from all the participants after fully disclosing the purpose of the study. Data storage and handling complied with the requirements of Swedish legislation on research ethics and personal data. Ethical committee of University approved the study. The questionnaire was distributed to 539 MLPs working in Hospitals in Saudi Arabia. The data were analyzed using SPSS version 28.0. Descriptive statistics were performed for demographic data, job satisfaction and stress scale scores which are presented as frequencies, means and standard deviations. The association between job stress and job satisfaction was evaluated by linear regression, considering job stress as the dependent parameter.

Analysis of Variance (ANOVA) using job stress as the dependent factor analyzed the job satisfaction factors that showed negative correlations with linear regression, like Professional development, Relationship with co-workers and leaders, and workload, for significance. The impact of demographic characteristics and the mean stress value of subjects were analyzed by using Between-Subjects ANOVA. Statistically significant impacts observed between age groups of subjects were then subjected to Post Hoc analysis using Least Significant Difference (LSD) to identify the significant differences between subgroups. The level of statistical significance was set at $p < 0.05$.

Results:

A total of 336 participants returned the survey. The response rate was 62 %. Sixty-four percent of the respondents were female. The biggest age group was 25–34 years of age and the smallest 54 years and older. Half of the respondents did three-shift work (50.8 %). Seventy-nine percent were married.

Table (1) shows that there were significant differences between age (p -levels <0.05), gender (0.05 and 0.001 respectively). Shift work has an impact on job satisfaction ($p < 0.05$) but not on stress. For marital status, specialty (department), qualification level and designation no significant differences in neither job satisfaction nor job stress were found. The level of stress depends on the age group of medical laboratory scientists. The pairwise comparisons of the different age groups show that the older staff has significantly lesser stress on average compared to the younger ones ($p < 0.05$).

Table (1): Comparison of mean scores and SDs for job stress and job satisfaction by socio-demographic characteristics

Demographic characteristics	Job Satisfaction			Job stress		
	Mean	SD	P value	Mean	SD	P value
Age						
<25	95.00	±10.322	<0.05	30.58	±14.969	<0.05
25–34	91.40	±16.193		30.24	±11.829	
35–44	97.03	±17.374		26.46	±10.740	
45–54	104.87	±13.582		23.51	±11.555	
>54	109.20	±17.126		17.80	±7.084	
Gender						
Male	100.45	±15.123	<0.05	24.57	±10.811	0.001
Female	93.52	±17.327		29.20	±11.942	

Demographic characteristics	Job Satisfaction			Job stress		
	Mean	SD	P value	Mean	SD	P value
Marital status						
Single	96.77	±12.774	>0.05	28.17	±11.023	>0.05
Married	95.85	±17.851		27.49	±12.008	
Divorced	91.50	±11.269		26.50	±7.594	
Shift Pattern						
One shift	93.97	±15.840	<0.05	27.32	±10.651	>0.05
Two shifts	96.60	±15.455		29.57	±11.904	
Three shifts	98.04	±17.961		27.09	±12.509	
Others	87.69	±13.130		32.54	±10.381	
Salary						
800–1100	97.92	±16.569	0.004	25.86	±11.944	0.001
1200–1500	93.90	±17.310		28.76	±10.667	
1600–2000	86.04	±15.126		34.56	±11.332	
2100–2400	94.67	±14.304		35.42	±8.240	
>2400	107.40	±9.607		27.40	±10.877	
Highest degree						
Diploma	92.37	±16.387	>0.05	28.49	±12.018	>0.05
B. S c	97.76	±15.994		26.62	±11.573	
Masters	91.85	±19.320		30.34	±12.333	
Ph. D	111.00	±8.485		27.50	±2.121	
Others	98.50	±7.778		21.00	±7.071	
Specialty						
Hematology	95.68	±29.46	>0.05	29.46	±11.390	>0.05
Pathology	96.52	±25.94		25.94	±9.967	
Biochemistry	96.27	±28.66		28.66	±13.332	
Microbiology	93.15	±29.28		29.28	±11.124	
Genetics	89.00	±23.38		23.38	±6.239	
General medical lab sciences	99.05	±26.38		26.38	±13.189	
Designation						
Supervisors	92.36	±13.040	>0.05	34.00	±6.618	>0.05
Chief BMS	99.44	±13.290		29.83	±13.156	
Senior BMS	94.42	±17.983		28.71	±12.180	
Junior BMS	97.29	±14.981		26.31	±10.951	

Table (2) Mean and standard deviation of job satisfaction components.

For most factors, mean satisfaction scores lay within a range of 0.4; an indication that those factors are of equal importance. The highest level of satisfaction was with the relationships with co-workers and leaders and the perceived professional status. There was less satisfaction with health and safety conditions in the laboratories pay levels and promotion opportunities as well as workload.

Table (2): Mean and standard deviation of job satisfaction components

Job satisfaction factors	Mean	SD
Pay and promotion	3.16	.80
Health and safety	2.70	.80
Organization policies	3.44	.70
Professional development	3.54	.82
Autonomy	3.34	.73
Professional status (appreciation and recognition)	3.72	.80
Relationship with coworkers	3.75	.61
Workload	3.25	.72

Table (3) shows that mean and standard deviation of job stress components. The mean scores of stress factors varied between 1.39 and 2.16 (4 being most stressful), the lowest related to blood sampling and the highest to coping with workload. Overall, those scores indicate a moderate level of stress related to each factor. Consequently, overall high stress levels might be the result of interactions of all factors.

Table (3): Mean and standard deviation of job stress components

Stress factors	Mean	SD
Coping with workload	2.16	1.1
Organizational support	1.52	.95
Blood Sampling	1.39	.74
Working environment	1.78	.96
Home/work discordance	1.63	1.1
Confidence of the proficiency at work	1.92	.86

Table (4) shows that the relationship between job stress (dependent variable) and job satisfaction and its components (independent variables) was studied by multivariate regression analysis. The negative correlation is well illustrated. The three most important job satisfaction factors, showing statistical significance that correlated to reduced stress in medical laboratories are: Professional development, relationships with co-workers and leaders, and workload. Those were also the components with highest scores when responders rated job satisfaction. The other satisfaction components were also negatively correlated to stress, although not significantly, with the exception of health and safety.

These results indicate the following: For every one unit of increase in satisfaction score for professional development, the stress sum score decreases by 1.2 units, assuming all other variables are held constant. Similarly, for every one unit of increase in score for relationship with coworkers, the stress sum score decreases by 2.1 units, assuming all other variables are held constant. For every one unit of increase in score for workload, stress sum score decreases by 1.8 units, assuming all other variables are held constant.

Table (4) Job satisfaction components correlated to stress.

Job satisfaction factors	B	Std. Error	t-test	t
Pay and promotion	— .48	.36	— 1.34	.18
Health and safety	.17	.31	.55	.59
Organization policies	— .65	.43	— 1.51	.13
Professional development	— 1.24	.34	— 3.65	.00
Autonomy	— .01	.34	— .02	.99
Professional status (appreciation & recognition)	— .29	.38	— .79	.43
Relationship with co- workers and leaders	— 2.15	.47	— 4.62	.00
The Workload	— 1.9	.37	— 5.12	.00

Discussion:

The current study discovered that there were considerable disparities in job satisfaction and stress across age groups, genders, countries, and wage strata. High levels of stress were noted as job discontent grew. This is consistent with what has been discovered among American biomedical analysts⁽²⁵⁾. The youngest MLPs in hospitals reported lower job satisfaction and higher stress levels than their older colleagues. One possible explanation is that their laboratory environment does not meet their high expectations. Similar findings have been observed in Malaysia, where younger age groups of laboratory staff are more dissatisfied⁽²⁰⁾.

In line with this recent study, Chinese physicians over the age of 41 reported higher job satisfaction and lower stress than their younger counterparts⁽¹⁵⁾. The researchers explain that older and more experienced professionals have a greater devotion to their work. According to the present statistics, men are more contented than women and experience less stress at work. Similarly, a hospital research found that female doctors were much less satisfied and experienced greater stress than their male counterparts⁽²⁶⁾.

This finding is consistent with the outcomes of studies conducted among Saudi nurses, which found that men scored higher on job satisfaction than women⁽²⁷⁾. Male and female workers may have different expectations for work-life balance, which explains the disparity. Another possible explanation is that women have greater social commitments in their family lives than men, which may lead to lower job satisfaction and increased stress.

It's no wonder that MLPs earning more than 2400 RS were more content and less stressed at work than their lower-paid counterparts. This group consisted of managers and senior personnel who were dedicated to improving the work environment. A similar effect was reported in Pakistan: good salary reduces stress⁽²⁸⁾. In example, a comparable research of physicians found that reduced salary was the primary cause of dissatisfaction⁽²⁹⁾.

Job dissatisfaction issues contribute to higher levels of stress at work. This has an impact on the quality of health care, as demonstrated for healthcare workers, including MLPs, in Saudi hospitals⁽³⁰⁾. The most important job satisfaction elements in laboratories, according to this survey, were relationships

with coworkers and bosses, as well as professional position. On the other hand, dissatisfaction factors included a lack of health and safety, low income, slow career advancement, and an excessive workload. A lack of health and safety in the laboratories was also a source of unhappiness, which corresponded to findings in a study conducted among MLPs in Malaysia and Iran, where inadequate laboratory safety was one of the top sources of job dissatisfaction ⁽²⁰⁾.

A study in Kenya reported that 49.5 % of laboratory personnel suffered from dangerously placed equipment and chemical hazards in the laboratories, emphasizing the importance of adequate and safe working conditions ⁽³¹⁾. The most important factor also causing dissatisfaction among MLPs in our study was workload. To have to cope with a heavy workload is an important stress factor. This finding is consistent with the results of a previous study conducted in Saudi Arabia among healthcare workers in primary health care centers ⁽³⁰⁾.

Constructive relationships with co-workers and appreciation shown by management contributed to overall job satisfaction. On the other hand, perceived low professional status and poor recognition in hospitals were a major dissatisfaction factor among MLPs employed there ⁽³²⁾. However, a study from Ethiopia showed that MLPs were more satisfied with relationships at work than other healthcare professionals ⁽³³⁾. Finally, MLPs at hospitals were less satisfied and had higher stress levels than colleagues. A possible explanation is that the hospitals have higher expectations of recognition as they contribute.

Conclusions:

Job satisfaction and job stress are correlated among medical laboratory personnel, both overall and by factor. These findings are supported by studies conducted elsewhere, particularly in the Middle East and Africa. In many of those countries, expatriates represent a key part of the workforce, and they are generally happier than citizens. More experienced and senior employees report higher levels of satisfaction. Gender and pay levels are also important. The most important dissatisfaction factor among MLPs is health and safety in the laboratories. The satisfaction components with highest scores were professional status and relationships with co-workers and leaders.

The most important dissatisfaction factors, leading to job stress, are insufficient support for professional development, poor relations with supervisors and co-workers, as well as heavy workload. This study emphasizes the importance of investing in measures to meet the expectations of laboratory staff, to strengthen factors that increase satisfaction and eliminate dissatisfaction factors. It gives concrete advice on what those measures should be and, consequently, guides actions on improving the work environment in medical laboratories.

References:

1. Regan M, Forsman R. The impact of the laboratory on disease management. *Dis Manag.* 2006;9(2):122-30. doi: [10.1089/dis.2006.9.122](https://doi.org/10.1089/dis.2006.9.122).
2. Wians FH. Clinical Laboratory Tests: Which, Why, and What Do The Results Mean? *Lab Med.* 2009;40(2):105-13. doi: [10.1309/LM4O4L0HHUTWWUDD](https://doi.org/10.1309/LM4O4L0HHUTWWUDD).
3. Herzberg, F. One more time: how do you motivate employees? *Harv. Bus. Rev.* (1976) 17–32, https://doi.org/10.1007/978-1-349-02701-9_2.
4. Berumen S.A., Pe´rez-Megino L.P., Ibarra K.A., Extrinsic motivation index: a new tool for managing labor productivity, *Int. J. Bus. Sci. Appl.*

- Manag. 11 (2016) 1–17.
5. Borzaga C., Torita E., Worker motivations, job satisfaction, and loyalty in public and nonprofit social services, *Nonprofit Volunt. Sect. Q.* 35 (2) (2006) 225–248, <https://doi.org/10.1177/0899764006287207>.
6. Butt R.S., Wen D.X., Hussain R.Y., Pervaiz S., Effect of job stress, benefits and salary on employee job satisfaction based on mediating and moderating role of work environment and leadership: evidence from telecom sector, *Int. J. Eng. Manag. Res.* 10 (2020) 121–230, <https://doi.org/10.31033/ijemr.10.3.19>.
7. Adamopoulos I.P., Syrou N.F., Associations and correlations of job stress, job satisfaction and burn out in public health sector, *Eur. J. Environ. Public Health.* 6 (2022) em0113, <https://doi.org/10.21601/ejeph/12166>.
8. Khadka D., Chaulagain N., Factors influencing job satisfaction among healthcare professionals at Tilganga eye centre, Nepal, *Int. J. Sci. Technol. Res.* 1 (2018) 32–36.
9. Aruasa W.K., Chirchir L.K., Chebon S.K., Determinants of physicians and nurses' professional satisfaction at the moi teaching and Referral Hospital, Eldoret, Kenya, *J Health Med. Nurs.* 64 (2019) 6–17.
10. Cox C.A., Nurse Manager job satisfaction and retention: a home healthcare perspective, *Nurs. Manag.* 50 (2019) 16–23, <https://doi.org/10.1097/01.NUMA.0000558512.58455.68>.
11. Abdullah M.I., Huang D., Sarfraz M., Ivascu L., Riaz A., Effects of internal service quality on nurses' job satisfaction, commitment and performance: mediating role of employee well-being, *Nurs Open* 8 (2021) 607–619, <https://doi.org/10.1002/nop2.665>.
12. Abate H.K., Mekonnen C.K. Job satisfaction and associated factors among health care professionals working in public health facilities in Ethiopia: a systematic review, *J. Multidiscip. Healthc.* 14 (2021) 821–830, <https://doi.org/10.2147/JMDH.S300118>.
13. Li K., Chen H., Tan Z., Yin X., Gong Y., Jiang N., Yang F. Job satisfaction and its related factors among emergency department physicians in China, *Front. Public Health* 10 (2022) 925686, <https://doi.org/10.3389/fpubh.2022.925686>.
14. Winiar W., Kusumapradja R., Hilmy M.R., Arief S.T. How job stress can improve job satisfaction nurse, in: *Proceedings of the 1st International Conference on Recent Innovations*, 2018, p. 2802, <https://doi.org/10.5220/0009952928022807>. –2807.
15. Birhanu M., Gebrekidan B., Tesefa G., Tareke M., Workload determines workplace stress among health professionals working in Felege-Hiwot referral hospital, Bahir Dar, Northwest Ethiopia, *J. Environ. Public Health.* 2018 (2018) 6286010, <https://doi.org/10.1155/2018/6286010>.
16. Baker O.G., Alshehri B.D., The relationship between job stress and job satisfaction among saudi nurses: a cross-sectional study, *Nurse Media J. Nurs.* 10 (2020) 292–305, <https://doi.org/10.14710/nmjn.v10i3.32767>.
17. Poursadeghiyan M., Abbasi M., Mehri A., Hami M., Raei M., Ebrahimi M.H. Relationship between job stress and Anxiety, depression and job

- satisfaction in nurses in Iran, *The Social Sciences* 11 (2016) 2349–2355.
<https://www.researchgate.net/publication/311351564>.
18. Khammar A., Moghimia M., Ebrahimi M.H., Abbasi M., Baneshi M.M., Yari A.R., Hami M., Poursadeghiyan M., Effect of bright light shock on sleepiness and adaptation among night workers of a hospital in Iran, *Ann. Trop. Med. Publ. Health* 10 (2017) 595–599,
https://doi.org/10.4103/ATMPHATMPH_108_17.
19. Gohar B., Nowrouzi-Kia B., The forgotten (invisible) healthcare heroes: experiences of Canadian medical laboratory employees working during the pandemic, *Front. Psychiatry* 13 (2022) 854507,
<https://doi.org/10.3389/fpsyt.2022.854507>.
20. Fadaei N., Zainuddin H., Hassan S.S., Job dissatisfaction and its related factors among laboratory staff, Iran J. Public Health 43 (2014) 142–147.
21. Al-Qathmi A., Zedan H., The effect of incentive management system on turnover rate, job satisfaction and motivation of medical laboratory technologists, *Health Serv. Res. Manag Epidemiol.* 8 (2021) 2333392820988404, <https://doi.org/10.1177/2333392820988404>.
22. Alrawahi S., Sellgren S.F., Alwahaibi N., Altouby S., Brommels M., Factors affecting job satisfaction among medical laboratory technologists in University Hospital, Oman: an exploratory study, *Int. J. Health Plan. Manag.* 34 (2018) e763–e775, <https://doi.org/10.1002/hpm.2689>.
23. Alrawahi S., Sellgren S.F., Altouby S., Alwahaibi N., Brommels M., The application of Herzberg's two-factor theory of motivation to job satisfaction in clinical laboratories in Omani hospitals, *Heliyon* 6 (2020) e04829, <https://doi.org/10.1016/j.heliyon.2020.e04829>.
24. Harris P.E., The nurse stress index, *Work. Stress* 3 (1989) 335–346,
<https://doi.org/10.1080/02678378908256952>.
25. Garcia E., Kundu I., Kelly M., Soles R., Mulder L., Talmon G.A., The American society for clinical pathology's job satisfaction, well-being, and burnout survey of laboratory professionals, *Am. J. Clin. Pathol.* 153 (2020) 470–486, <https://doi.org/10.1093/ajcp/aqaa010>.
26. Coplan B., McCall T.C., Smith N., Gellert V.L., Essary A.C. Burnout, job satisfaction, and stress levels of PAs, *J. Am. Acad. Physician Assist.* 31 (2018) 42–46, <https://doi.org/10.1097/01.JAA.0000544305.38577.84>.
27. Al-Haroon H.I., Al-Qahtani M.F. The demographic predictors of job satisfaction among the nurses of a major public hospital in KSA, *J. Taibah Univ. Med. Sci.* 15 (2020) 32–38,
<https://doi.org/10.1016/j.jtumed.2019.11.003>.
28. Danish R.Q., Draz U., Ali H.Y. Impact of organizational climate on job satisfaction and organizational commitment in education sector of Pakistan, *Am. J. Mob. Syst. Appl. Serv.* 1 (2015) 102–109.
29. Burney I.A., Al Sabei S.D., Al-Rawajfah O., Labrague L.J., AbuAlrub R. Determinants of physicians' job satisfaction: a national multi-centre study from the Sultanate of Oman, *Sultan Qaboos Univ. Med. J.* 1 (1) (2022),
<https://doi.org/10.18295/squmj.8.2022.050>.
30. Halawani L.A., Halawani M.A., Beyari G.M. Job satisfaction among Saudi healthcare workers and its impact on the quality of health services, *J. Fam. Med. Prim. Care* 10 (2021) 1873–1881,

https://doi.org/10.4103/jfmmpc.jfmmpc_2236_20.

31. Muriuki F.N., Mburu C., Gikunju J., Occupational safety and health status of medical laboratories in Kajiado County, Kenya, Pan. Afr. Med. J. 29 (2018) 65, <https://doi.org/10.11604/pamj.2018.29.65.12578>.
32. Alrawahi S., Sellgren S.F., Altouby S., Alwahaibi N., Brommels M. The application of Herzbergs two-factor theory of motivation to job satisfaction in clinical laboratories in Omani Hospitals, Heliyon 6 (9) (2020), <https://doi.org/10.1016/j.heliyon.2020.e04829>.
33. Temesgen K., Aycheh M.W., Leshargie C.T. Job satisfaction and associated factors among health professionals working at Western Amhara Region, Ethiopia, Health Qual. Life Outcomes 16 (2018) 65, <https://doi.org/10.1186/s12955-018-0898-7>.