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Occupational Stress and Job Satisfaction in Medical Laboratory Professionals in Oman: A Cross-Sectional Analysis

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ABSTRACT

Job satisfaction is a key driver of employee productivity, yet when job demands exceed individual capabilities, stress can occur. Identifying the factors that cause dissatisfaction is essential to minimize work-related stress, which negatively affects healthcare service quality. Research exploring stress and job satisfaction among medical laboratory professionals (MLPs) remains limited. This study aimed to examine the relationship between job stress and satisfaction among MLPs in Omani hospitals and to determine the potential correlation between these two factors. A cross-sectional study was conducted involving MLPs across eight hospitals in various regions of Oman. A job satisfaction survey was developed based on prior qualitative research by the authors involving 101 participants. Job stress was evaluated using a survey adapted from the Nurse Stress Index (NSI).Findings revealed a significant association between job stress and satisfaction. Omani MLPs reported higher stress levels than non-Omani staff. Younger professionals were generally less satisfied and experienced higher stress than older colleagues. Among the hospitals, Sultan Qaboos University Hospital showed the lowest job satisfaction and highest stress levels. Key contributors to job stress included inadequate support for professional growth, strained relationships with supervisors and colleagues, and excessive workload. The study highlights the importance of addressing factors that influence job satisfaction to reduce stress among MLPs. Implementing targeted measures to enhance support, improve workplace relationships, and manage workloads can foster a more positive work environment, thereby decreasing job-related stress among medical laboratory professionals in Oman and potentially in broader contexts.

Keywords: Medical laboratory professionals, Job stress, Job satisfaction, Oman

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Introduction

A highly motivated workforce is crucial for delivering efficient and high-quality healthcare services, as motivated employees are more likely to exert sustained effort toward achieving organizational goals. Motivation among healthcare professionals depends on factors such as achievement, recognition, the nature of the work, responsibility, and opportunities for professional growth or advancement [1, 2]. Individuals with higher motivation tend to experience greater job satisfaction [3], whereas job dissatisfaction can trigger work-related stress [4]. Conversely, satisfied employees usually hold positive perceptions of their organizations and demonstrate higher efficiency at work [5].

Therefore, attention to job satisfaction is essential in all organizations, including healthcare settings, because it directly influences service quality [6]. High job satisfaction not only enhances productivity but also improves the standard of services provided [7]. Healthcare staff, including medical laboratory professionals, may fail to contribute positively to patient experiences if their own needs are unmet, highlighting the responsibility of healthcare managers to ensure employee satisfaction [8].

Despite its significance, job satisfaction has not been extensively studied across all healthcare professional groups; research has primarily focused on nurses [9], with limited studies from low- and middle-income countries. For instance, a study from Africa identified low salaries, lack of promotion and training opportunities, poor supervisor relations, unfavorable working conditions, and unjust organizational policies as major contributors to job dissatisfaction among healthcare staff [10]. Demographic variables such as gender, age, education, designation, and marital status, as well as work-related conditions including salary and shift patterns, have also been linked to job satisfaction [11].

Work-related stress arises when job demands exceed the capabilities of the employee [12] and can result from job dissatisfaction, negatively affecting performance. Identifying the sources of dissatisfaction is therefore critical for reducing work-induced stress, as stress can compromise healthcare service quality [13]. The connection between stress and job satisfaction is well established, with dissatisfaction factors such as inadequate salary, excessive workload, poor health and safety measures, lack of recognition, insufficient training, and limited decision-making autonomy contributing to stress [14]. Among Iranian hospital nurses, stress was associated with job dissatisfaction, leading to medical errors, higher turnover, lower retention rates, and diminished work performance [15]. Worker safety, particularly in relation to shift work, has also been shown to affect productivity [16].

In Canada, medical laboratory technicians have been identified as a healthcare group experiencing high job stress [17], and heavy workloads have been linked to dissatisfaction among laboratory staff [18]. Previous studies have highlighted the need for interventions to enhance motivation in medical laboratory professionals to improve healthcare service quality [19].

Overall, research examining the relationship between job stress and satisfaction among medical laboratory professionals, especially in Middle Eastern countries such as Oman, remains scarce. In our prior qualitative study with Omani MLPs, key factors influencing job satisfaction included manageable workload, autonomy, professional status, salary, opportunities for professional development, relationships with colleagues and department heads, health and safety, organizational policies, stress levels, and job security for non-Omani staff. Factors contributing to dissatisfaction included excessive workload, inadequate health and safety measures, unfair promotion practices, limited training opportunities, poor leadership relations, and unrewarding organizational policies, all of which heightened stress [20].

The present study aims to determine whether these findings are representative of medical laboratory professionals across Omani hospitals. It examines differences in overall job satisfaction, its specific components, and job stress according to age, gender, nationality, seniority, and salary. Additionally, it seeks to quantify potential correlations between job stress and job satisfaction, both overall and for individual factors.

Materials and Methods

Study design

This study employed a cross-sectional design involving medical laboratory professionals (MLPs) from eight hospitals across Oman, yielding 336 completed responses. Job satisfaction was evaluated using a survey developed from earlier qualitative research conducted in the same population [20, 21], while job stress was measured through a modified version of the Nurse Stress Index (NSI) [22]. To assess the significance of previously identified job satisfaction factors, participants rated statements on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Job stress responses were recorded on a four-point Likert scale. The hospitals were selected to provide a representative sample across different regions of the country, and all MLPs at these sites were invited to participate.

Before the main survey, a pilot study was conducted at Sultan Qaboos University Hospital with 10 MLPs (including senior, junior, and chief analysts) who were excluded from the main study. This pilot helped refine the questionnaire, resulting in the removal of four unclear items. Participants also recommended that the survey be administered and collected directly by the researcher rather than through hospital administration to maintain confidentiality. The estimated time to complete the questionnaire was 20–30 minutes.

A multidisciplinary panel of experts from Sultan Qaboos University Hospital and the College of Medicine, including specialists in medical laboratory science, psychology, social sciences, and biostatistics, reviewed the survey to ensure content validity. They confirmed that all key themes identified in previous focus group discussions (FGDs) were adequately captured in the questionnaire items. Internal consistency was tested using Cronbach's Alpha, yielding 0.89 for job satisfaction, 0.87 for job stress, and 0.92 overall, demonstrating high reliability. The final questionnaire combined both instruments and included an initial section collecting

demographic and professional information such as age, gender, nationality, work experience, shift pattern, department, marital status, family location, and education level (Part 1).
Part 2 measured job satisfaction with 29 items distributed across eight domains: pay and promotion, autonomy, health and safety, professional status, workload, professional development, organizational policies, and relationships with co-workers and supervisors. Items were presented in random order to reduce response bias.
Part 3 assessed job-related stress through 17 items covering six areas adapted from the NSI: managing workload, organizational support, blood sampling, work environment, work-home conflicts, and confidence or proficiency at work. Responses were recorded on a four-point scale from "not at all stressful" to "extremely stressful."

Setting and participants
The survey was distributed to 539 medical laboratory professionals (MLPs) across nine hospitals: Royal Hospital, Khoula Hospital, Al Nahdha Hospital, Al Masarra Hospital, Nizwa Hospital, Ibra Hospital, Sultan Qaboos Hospital, Salalah site, and Sultan Qaboos University Hospital, covering diverse geographical regions of Oman. Data were analyzed using SPSS version 27.0. Descriptive statistics, including frequencies, means, and standard deviations, were calculated for demographic variables, job satisfaction, and stress scores.
To explore the relationship between job stress and satisfaction, linear regression was performed with job stress as the dependent variable. Factors showing negative correlations in the regression analysis—such as professional development, relationships with co-workers and leaders, and workload—were further examined using Analysis of Variance (ANOVA). Between-subjects ANOVA was employed to evaluate the influence of demographic characteristics on mean stress scores. Significant differences observed across age groups were further analyzed with Post Hoc tests using the Least Significant Difference (LSD) method to identify specific subgroup differences. Statistical significance was set at $p < 0.05$.

Results and Discussion

Response rates
Out of the 539 distributed surveys, 336 were returned, yielding an overall response rate of 62%. Response rates varied by hospital: Al Masarra, Nizwa, and Sultan Qaboos University Hospital reported high participation (100%, 80%, and 74%, respectively), moderate rates were observed in Al Nahdha, Ibra, and Sultan Qaboos Hospital, Salalah site (59%, 59%, and 67%), while the Royal Hospital had a lower response rate of 40%, likely due to staff being on leave.

Demographic characteristics
Among respondents, 64% were female and 36% male. Omani nationals accounted for 56.2%, while 43.8% were non-Omani. The largest age group was 25–34 years, and the smallest was those aged 54 years and above. Approximately half of the participants (50.8%) worked in three-shift schedules, and 79% were married.

Job satisfaction and stress levels
Results are presented according to demographic groups **(Table 1)**, by hospital **(Tables 2 and 3)**, and by individual job satisfaction and stress factors **(Tables 4 and 5).** Job satisfaction scores were categorized as low (29–67), moderate (68–106), or high (107–145), while stress scores were defined as no stress (0–16), very little stress (17–34), moderate stress (35–51), and extreme stress (52–68) [23].
Significant differences in satisfaction and stress were observed across age ($p < 0.05$), gender ($p = 0.05$ and $p = 0.001$), nationality ($p < 0.05$), and salary groups ($p = 0.004$ and $p = 0.001$) **(Table 1).** Shift work influenced job satisfaction ($p < 0.05$) but had no significant effect on stress. Marital status, department, education level, and designation did not show significant differences for either satisfaction or stress.
Older MLPs reported significantly lower stress levels compared to younger staff ($p < 0.05$). Nationality also influenced stress, with Omani professionals experiencing higher stress than their non-Omani counterparts ($p < 0.05$).

Hospital-specific comparisons revealed significant variations in both job satisfaction and stress. Sultan Qaboos University Hospital had the lowest satisfaction and highest stress among the hospitals studied, including when other Ministry of Health hospitals were grouped together ($p < 0.05$) **(Table 3).**

For most job satisfaction factors, mean scores were similar, indicating comparable importance. The highest satisfaction levels were reported for relationships with colleagues and supervisors, as well as perceived professional status. Lower satisfaction was noted for health and safety conditions, pay, promotion opportunities, and workload.

Stress factor scores ranged from 1.39 to 2.16 (on a 4-point scale), with blood sampling perceived as least stressful and coping with workload as most stressful. Overall, these results suggest moderate stress levels across factors, with high total stress likely resulting from the combined effects of multiple factors. Detailed scores for each job satisfaction and stress factor are presented in **Tables 4 and 5.**

Table 1. Comparison of mean scores and SDs for job stress and job satisfaction by sociodemographic 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	
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	
Nationality	Omani	88.22	±15.507	<0.05	32.35	±11.139	<0.05
	Non-Omani	105.95	±12.824		21.43	±9.448	
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.Sc	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	superintendents (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. Comparison of job satisfaction and stress scores of the hospital.

Hospitals	Job satisfaction			Job stress		
	Mean	SD	p value	Mean	SD	p value
Nizwa Hospital	92.44	±18.809	<0.05	31.56	±12.652	<0.05
Almasarraa	102.94	±14.182		29.50	±9.438	
Ibra Hospital	102.71	±17.631		20.57	±10.804	
Royal hospital	93.46	±17.549		28.64	±12.499	
Khoula hospital	90.45	±27.666		25.71	±12.274	
SQUH	91.90	±14.640		29.66	±11.400	
Sultan Qaboos hospital (Salalah)	102.07	±14.134		23.20	±11.051	
Al Nahdha hospital	105.69	±20.946		22.00	±9.670	

Table 3. Impact of workplace on job satisfaction and job stress between the SQUH and Ministry of Health (MOH) hospitals.

Hospitals	Job satisfaction			Job stress		
	Mean	SD		Mean	SD	
SQUH	91.90	±14.640	<0.05	29.66	±11.400	<0.05
MOH Hospitals	96.31	±20.323		26.47	±12.090	

Table 4. Mean and standard deviation of job satisfaction domains

Job Satisfaction Domain	Mean	Standard Deviation (SD)
Compensation and Career Advancement	3.16	0.80
Workplace Health and Safety	2.70	0.80
Organizational Policies	3.44	0.70
Opportunities for Professional Growth	3.54	0.82
Autonomy in Work	3.34	0.73
Professional Recognition and Status	3.72	0.80
Relationships with Colleagues	3.75	0.61
Workload	3.25	0.72

Table 5. Mean and standard deviation of job stress domains (Adapted from NSI)

Job Stress Domain	Mean	Standard Deviation (SD)
Managing Workload	2.16	1.10
Support from Organization	1.52	0.95
Blood Collection Procedures	1.39	0.74
Work Environment Conditions	1.78	0.96
Work-Home Conflict	1.63	1.10
Confidence in Work Skills and Proficiency	1.92	0.86

Relationship between job stress and job satisfaction

The association between job stress (treated as the dependent variable) and overall job satisfaction along with its individual components (independent variables) was examined using multivariate regression analysis. The negative relationship is visually represented in the scatter plot shown in **Figure 1**. The regression model demonstrated a good fit, with an adjusted R^2 of 0.345.

Among the job satisfaction factors, three showed statistically significant correlations with lower stress levels in Omani medical laboratories: professional development, relationships with co-workers and supervisors, and workload. These factors also received the highest ratings in participants' job satisfaction assessments. Other satisfaction components generally exhibited a negative correlation with stress, though these were not statistically significant, except for health and safety, which did not show a meaningful correlation.

Specifically, a one-unit increase in the satisfaction score for professional development was associated with a 1.2-unit reduction in total stress score, holding other variables constant. Likewise, a one-unit increase in satisfaction with relationships with co-workers corresponded to a 2.1-unit decrease in total stress, and a one-unit increase in satisfaction regarding workload resulted in a 1.8-unit reduction in stress, all else being equal.

The relative impact of each job satisfaction component on job stress is summarized in **Table 6.**

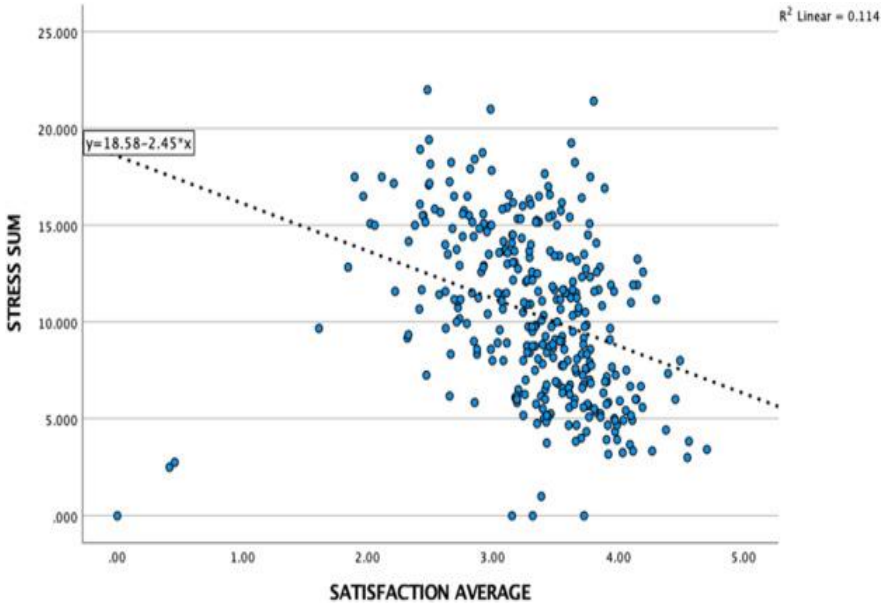

Figure 1. Relationship between job satisfaction and job stress among medical laboratory professionals in hospitals across Oman.

Table 6. Regression analysis: job satisfaction components associated with job stress

Job Satisfaction Domain	Regression Coefficient (B)	Standard Error (SE)	t-value	p-value
Compensation and Career Advancement	−0.48	0.36	−1.34	0.18
Workplace Health and Safety	0.17	0.31	0.55	0.59
Organizational Policies	−0.65	0.43	−1.51	0.13
Professional Growth and Development	−1.24	0.34	−3.65	0.00
Autonomy in Work	−0.01	0.34	−0.02	0.99
Professional Recognition and Status	−0.29	0.38	−0.79	0.43
Relationships with Colleagues and Leaders	−2.15	0.47	−4.62	0.00
Workload	−1.90	0.37	−5.12	0.00

This study revealed notable variations in job satisfaction and stress levels across different age groups, genders, nationalities, and salary levels among medical laboratory professionals (MLPs) in Oman. As anticipated, higher levels of job dissatisfaction were associated with increased stress, a trend also reported among American biomedical analysts [24].

Younger MLPs in Omani hospitals exhibited lower job satisfaction and higher stress compared to their older colleagues. This may reflect unmet expectations within the laboratory setting. Similar observations have been made in Malaysia, where younger laboratory staff reported greater dissatisfaction [18], and in China, where physicians over 41 years of age experienced higher satisfaction and lower stress, likely due to greater work commitment and experience [13].

Gender differences were also evident: male MLPs reported higher satisfaction and lower stress than females. Comparable findings have been reported in hospitals where female physicians experienced more stress and lower satisfaction than male counterparts [25], as well as among nurses in Saudi Arabia, where men scored higher in job satisfaction [26]. These disparities may stem from differing work-life expectations and greater family or social responsibilities among women, which appears relevant in the Omani context.

Regarding nationality, non-Omani staff were more satisfied and experienced less stress than their Omani colleagues. One explanation may be that Omani staff often have family responsibilities and higher expectations for professional development, which were not always fulfilled [20]. In contrast, non-Omanis, many of whom were older, had lower initial expectations and adapted more readily to laboratory conditions, resulting in higher satisfaction. Similar patterns have been observed among nurses in Saudi Arabia, where non-Saudi staff reported higher satisfaction than Saudi nurses, possibly due to unmet expectations and lower social esteem for female healthcare workers [26].

Income was another influential factor. MLPs earning above 2400 Omani Rials, typically senior staff and managers, reported higher satisfaction and lower stress. This aligns with findings from Pakistan and Oman, where higher pay was associated with reduced stress and greater satisfaction [27, 28].

Job dissatisfaction emerged as a key driver of stress, with implications for healthcare quality, as reported among healthcare staff including MLPs in Saudi hospitals [29]. In the Omani context, the most critical factors contributing to satisfaction were positive relationships with colleagues and supervisors, and recognition of professional status. Conversely, dissatisfaction was primarily linked to poor health and safety conditions, low pay, slow career advancement, and high workload.

Inadequate laboratory safety was a significant source of dissatisfaction, echoing findings from Malaysia and Iran [18]. In Kenya, nearly half of laboratory personnel were exposed to hazardous equipment and chemicals, highlighting the importance of safe working environments [30]. Workload was another major stressor, consistent with studies from Saudi primary healthcare centers [29].

Positive interactions with co-workers and recognition by management enhanced overall job satisfaction. However, at Sultan Qaboos University Hospital, perceived low professional status and lack of recognition were significant sources of dissatisfaction [31]. By contrast, studies from Ethiopia indicated that MLPs were generally more satisfied with workplace relationships than other healthcare professionals [32].

Finally, MLPs at Sultan Qaboos University Hospital reported lower satisfaction and higher stress compared to colleagues in Ministry of Health hospitals. This may be due to higher expectations for recognition linked to teaching responsibilities in addition to routine laboratory duties, which they felt were not adequately acknowledged.

Methodological considerations

The study's quantitative assessment of job satisfaction and work-related stress relied on a questionnaire developed from insights gained through qualitative focus group discussions (FGDs). A key strength of this approach was that it incorporated perspectives directly from representatives of the target population, ensuring the relevance of the items included. The content validity of the satisfaction items and propositions was deemed satisfactory. However, a detailed psychometric evaluation of the questionnaire was not conducted, which represents a limitation. The job stress component was adapted from a widely validated stress measurement instrument, and the combined survey demonstrated acceptable statistical reliability.

Another strength of the study is that it included all MLPs from hospitals selected to represent different regions of Oman, achieving an adequate overall response rate. Nevertheless, the cross-sectional design captures participants' views at a single time point, and these perceptions could change over time, limiting the temporal generalizability of the findings. It is also important to note that the results reflect statistical associations rather than causal relationships.

This study is particularly justified given the scarcity of research on job satisfaction and stress among MLPs in Oman. While the findings may not be directly generalizable to other healthcare systems or countries, the alignment of these results with observations elsewhere suggests they can inform broader understanding of the factors influencing job satisfaction, dissatisfaction, and stress in healthcare settings.

Implications for future research

Based on the findings, Herzberg's two-factor theory of motivation provides a relevant framework for exploring job satisfaction among healthcare professionals, including medical laboratory scientists. Future studies can use the concepts of satisfiers and hygiene factors to guide both qualitative and quantitative investigations, but factor definitions and labels should be adapted to reflect the specific organizational and cultural context of the study population.

Conclusion

There is a clear relationship between job satisfaction and work-related stress, both overall and at the level of specific factors, among medical laboratory professionals in Oman. These findings are consistent with studies conducted in other regions, particularly the Middle East and Africa, where expatriates often report higher satisfaction than local staff. Greater experience and seniority are also associated with higher satisfaction, while gender and salary remain influential factors.

Among the dissatisfaction factors, inadequate health and safety measures in the laboratory were most prominent. Conversely, the highest-rated satisfaction components were professional status and positive relationships with co-workers and supervisors. Major contributors to stress included limited opportunities for professional development, poor interpersonal relations with supervisors and colleagues, and excessive workload.

The study underscores the need for targeted interventions to address these dissatisfaction factors while enhancing elements that foster satisfaction. Implementing such measures can help improve the work environment, reduce job stress, and ultimately support better performance among medical laboratory professionals.

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Conflict of Interest: None

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Ethics Statement: 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. The Research and Ethical Review and Approval Committee of the Omani Ministry of Health (MH/DGP/R&S/PROPOSAL, 2016) and the Ethics Committee at the College of Medicine and Health Sciences at the Sultan Qaboos University Hospital (MREC # 1151) approved the study.

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