ORIGINAL ARTICLE

# Assessing Family Medicine Residents' Communication Skills in Oman Using the Communication Assessment Tool: A Cross-sectional Study

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## Abstract

**Objective:** Primary care physicians are the first means of access to further healthcare services and act as a doorkeeper for different specialties at the secondary and tertiary levels; thus, communication skills are one of the most vital skills to be taught to residents in the family medicine specialty. This study aimed to evaluate the communication skills of family medicine residents in Oman from the perspective of their patients.

**Methods:** This cross-sectional study was performed at the Family Medicine and Public Health Clinic of Sultan Qaboos University Hospital as well as various Ministry of Health training health centers in Muscat, Oman. An Arabic version of the validated 14-item Communication Assessment Tool (CAT) was used to evaluate patients' perceptions regarding the communication skills of family medicine residents at the end of their consultation. Data were collected between September 2020 and May 2021 from 602 patients who received care or interacted with 60 residents from the Oman Medical Specialty Board (OMSB) Family Medicine Residency Program at different residency levels.

**Results:** The mean percentage of CAT items rated as excellent was 73.8±32.6%. The item "Treated me with respect" was most commonly rated as excellent (84.2%), whilst the item "Involved me in decisions as much as I wanted" was least frequently rated as excellent (62.0%). Various factors were found to significantly affect CAT rating, including residency level, type of clinic, number of times seeing the same resident, and the patient's education level. In contrast, other factors such as time of consultation, the gender of either the resident or the patient, and the nationality of the patient did not affect CAT rating.

**Conclusion:** Some areas of weakness especially with the item "encouraged me to ask questions" and involved me in decisions as much as I wanted" identified in the communication skills of OMSB family medicine residents. These findings are comparable with those reported by similar studies worldwide.

**Keywords:** *Communication skills, primary health care, family medicine, residency, Oman.*

## INTRODUCTION

Traditionally, it was believed that a doctor's job was to gather information about the patient's symptoms and signs and then apply their theoretical knowledge and practical experience to determine the correct diagnosis and come up with a management plan. However, we now understand that every patient is unique; thus, establishing a good understanding of each patient's ideas, concerns, and expectations has become one of the main goals of modern medical consultation [1, 2]. Nonetheless, this is not an easy task and requires effective communication skills that should be taught and practiced by aspiring physicians from the very early years of their medical education [3]. Understanding the importance of such skills and appropriately integrating them into medical consultation is paramount to ensuring patient-physician relations [4, 5].

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Effective communication skills are crucial in many aspects, from ensuring the patient's cooperation and adherence to the treatment plan to gaining their trust, reducing medical errors, improving their psychological health, and increasing the satisfaction of both the physician and the patient [6-8]. In addition, excellent physician-patient relations can enhance the patients' perception regarding the competence of their doctor, thereby improving their psychological status, an important factor in obtaining optimal health outcomes. In general, healthcare providers with strong communication skills are better able to enrich their patients' health; on the other hand, a lack of such skills may negatively influence patient wellbeing. For instance, the disintegration of the patient-provider relationship was the primary cause of diagnostic errors among malpractice claims involving cases of ischemic stroke [9]. Another review of malpractice claims over a five-year period found that miscommunication resulted in nearly 2,000 deaths and cost a total of $1.7 billion, with researchers estimating that such incidents are likely under-reported [10].

Various methods have been utilized to evaluate the effectiveness of communication skills among doctors

in the literature. These include patient satisfaction surveys, 360-degree evaluations, behavioral checklists, and objective structured clinical examinations [11-14]. However, many of these evaluation methods do not focus solely on the communication skills aspect of the consultation and instead conflate the patient's satisfaction with the treatment received with their satisfaction with the physician's communication skills [15]. Moreover, it is necessary that the method used to assess the physician's communication skills takes into consideration all parties involved in the communication process [16]. The Communication Assessment Tool (CAT) is recommended by the Accreditation Council for Graduate Medical Education's Advisory Committee on Educational Outcome Assessment to evaluate communication skills [17]. This tool was developed by Makoul *et al.* and focuses on various elements of basic communication skills in which patients are requested to evaluate an immediate preceding encounter with a physician [18].

Effective communication is an important component of a medical consultation; however, the lack of information on this topic in Oman interferes with appropriate measures to improve this aspect of medical education and training [3]. Thus, this study aimed to assess patients' perceptions at communication skills of residents enrolled in the Family Medicine Residency Training Program at Oman Medical Specialty Board (OMSB) using the CAT. The study also aimed to identify resident and patient-related factors which significantly affected the residents' CAT scores. It is hoped that this study will help to obtain a clearer idea of the communication skills of family medicine residents in Oman to provide guidelines through which areas of weaknesses can be identified and subsequently improved.

## METHODS

This cross-sectional study was performed at the Family Medicine and Public Health (FMPH) of Sultan Qaboos University Hospital (SQUH), as well as several other Ministry of Health (MOH), teaching health centers in Muscat, Oman. The research was carried out in two phases: the first was conducted at SQUH between September and November 2020 and the second was conducted at MOH health centers between March and May 2021. The second phase was delayed due to limited access to MOH health centers as a result of the coronavirus disease 2019 pandemic. All patients of any age group were included in the study, including both new patients visiting walk-in clinics and those who came in for a follow-up to appointment-based clinics. Patients who could not fill out the CAT due to disabilities like deafness or mutism were excluded from the study.

In 2020, the total number of residents enrolled in the OMSB Family Medicine Residency Training Program was 68, comprising 18 residents each in the first and second years of the program and 16 residents each in the third and fourth years. Typically, OMSB residents work at MOH health centers for clinical day release (CDR) once per week as a continuity clinic during the first three years of their training, before working at FMPH during their final year. Thus, assuming that the total number of residents was 60 (excluding those on leave or undergoing training outside of Muscat) and that each resident examined an average of 10 patients per day for four days per month as CDR, the expected number of patients being examined by residents was 2,400. Accordingly, the necessary sample size was found to be 332 patients at a 95% confidence interval and 5% margin of error using the online Raosoft® sample size calculator. Overall, the investigators were able to recruit an average of 10 patients per resident, resulting in a total of 602 patients.

Data regarding the residents' communication skills were collected from the patients using the CAT, a 14-item survey that assesses the interpersonal and communication skills of a physician from the patient's perspective [18]. The CAT can be self-administered by the patient in hard copy format or delivered orally *via* an interview. Each item in this survey is a question that enables the patient to rate various elements of the physician's communication skills on a 5-point rating scale (1 = poor, 2 = fair, 3 = good, 4 = very good, or 5 = excellent). Overall, the CAT has been validated and found to have good reliability (Cronbach's alpha value: 0.96) [18]. One item of the original CAT survey was omitted from the current study as it was deemed irrelevant to medical residents; this item assesses whether the patient was treated respectfully by the doctor's staff [17].

In the current study, the original English-language version of the CAT was translated into Arabic following the criteria of the World Health Organization [19]. The reliability of the translated CAT survey was found to be high (Cronbach's alpha value: 0.95). Subsequently, self-administered hard copies of the translated CAT were distributed by assigned staff to patients at the end of their consultation with family medicine residents at either FMPH or the MOH health centers. Illiterate patients were interviewed by the assigned staff. Patients were instructed to return the completed survey to the assigned staff. It should be noted that the residents were unable to access the completed surveys at this point. The level of residency and gender of the residents were noted for analysis purposes, as were the demographic data of the participating patients, including age, gender, educational status, nationality, time of consultation, and whether the patient had been seen before by the same resident.

The Statistical Package for the Social Sciences (SPSS), version 23 (IBM Corp., Armonk, NY), was used to analyze the data. For each survey, the mean percentage of items rated as excellent was calculated as the percentage of items with scores of 5 out of the total number of items completed in the survey. The overall percentage of excellent scores was then summarized

**Table 1:** Demographic characteristics of patients seen by family medicine residents in Oman (N = 602).

| Characteristic | n (%) |
|---|---|
| **Gender** | |
| Male | 211 (35.0) |
| Female | 391 (65.0) |
| **Age (years)** | |
| ≤18 | 30 (5.0) |
| 18–34 | 204 (33.9) |
| 35–49 | 237 (39.4) |
| 50–70 | 114 (18.9) |
| ≥70 | 17 (2.8) |
| **Education level** | |
| Illiterate | 47 (7.8) |
| Primary school | 30 (5.0) |
| Intermediate school | 49 (8.1) |
| Secondary school | 194 (32.2) |
| University | 206 (34.2) |
| Postgraduate or higher | 76 (12.6) |
| **Nationality** | |
| Omani | 547 (90.9) |
| Non-Omani | 55 (9.1) |
| **Institute of training** | |
| Sultan Qaboos Univeristy Hospital | 204 (33.9) |
| MOH Health Centres | 398 (66.1) |
| **Had the patient been seen by this resident before?** | |
| No | 353 (58.6) |
| Yes, but only once | 127 (21.1) |
| Yes, more than once | 122 (20.3) |

across surveys and stratified by resident-related (*i.e.*, level of residency and the resident's gender), patient-related (*i.e.*, the patient's age, gender, educational status, and nationality), and other (*i.e.*, time of consultation and number of times seeing the same resident) factors. Chi-square test or Fisher-exact test was used to compare excellent ratings for each item according to patients' age, education level, time of consultation, number of times seeing the consultation, residents' gender and level of residency. The level of statistical significance was set at $p < 0.05$.

The Medical Research and Ethics Committee of the College of Medicine and Health Sciences, Sultan Qaboos University (SQU), and the Centre of Studies and Research of the MOH granted ethical approval for this study. Written informed consent was obtained from all patients prior to their participation in the study. If the patient was a child (<18 years old), his/her parents were asked to fill out the consent form. All patients were assured that participation in this study was voluntary in nature and that their responses would be kept anonymous to maintain confidentiality.

## RESULTS

A total of 602 patients seen by family medicine residents between September 2020 and May 2021 were included in the study. Of these, 391 (65.0%) were female, 547 (90.9%) were Omani, and 441 (73.3%) were between 18–49 years old. More than half of the sample size (n=353- 58.6%) had never been seen by the resident before. Most of the residents enrolled in the study were working in MOH health centers in Muscat-Oman (n=398, 66.1%) (**Table 1**). The mean percentage of items rated as excellent was 73.8%. The item most commonly rated as excellent by the patients was "Treated me with respect" (84.2%), followed by "Spent the right amount of time with me" (80.1%) and "Showed care and concern" (79.9%).

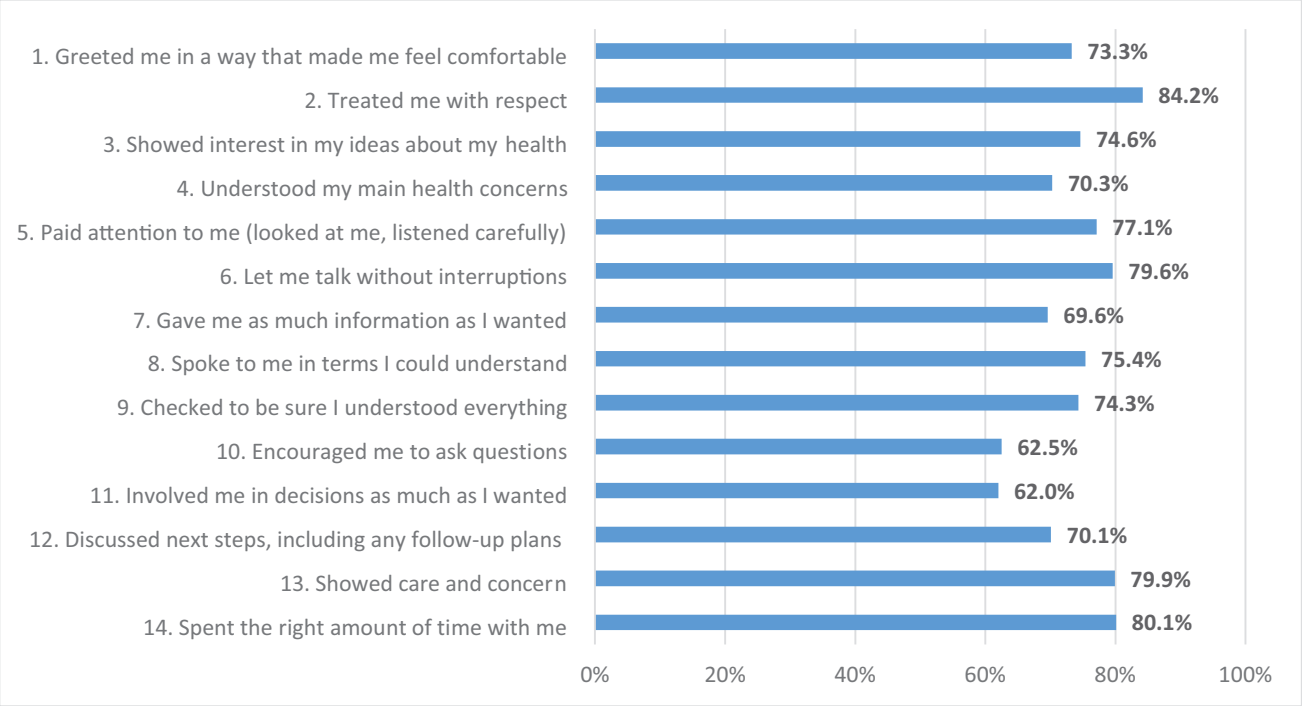


**Fig. (1):** Mean percentages of resident communication skill items rated as excellent according to patients seen by family medicine residents in Oman (N = 602).

**Table 2:** Comparison of excellent ratings of CAT items to residents level (N = 602).

| CAT item | Excellent Ratings | | | | †p-value |
|---|---|---|---|---|---|
| | R1 (n=131) | R2 (n=131) | R3 (n=129) | R4 (n=211) | |
| 1. Greeted me in a way that made me feel comfortable | 95 (72.5 ) | 69.5 (91) | 90 (69.8) | 165 (78.2) | 0.067 |
| 2. Treated me with respect | 102 (77.9 ) | (81.7) | (83.7) | (90.0) | *0.013 |
| 3. Showed interest in my ideas about my health | 100 (76.3) | 89 (67.9) | 91 (70.5) | 169 (80.1 ) | **0.002 |
| 4. Understood my main health concerns | 94 (71.8) | 89 (67.9) | 77 (59.7) | 163 (77.3) | *0.011 |
| 5. Paid attention to me (looked at me, listened carefully) | 99 (75.6) | 95 (72.5) | 95 (73.6) | 175 (82.9) | 0.230 |
| 6. Let me talk without interruptions | 99 (75.6) | 98 (74.8) | 97 (75.2) | 185 (87.7) | *0.015 |
| 7. Gave me as much information as I wanted | 92 (70.2) | 83 (63.4) | 93 (72.1) | 151 (71.6) | 0.066 |
| 8. Spoke to me in terms I could understand | 95 (72.5) | 94 (71.8) | 88 (68.2) | 177 (83.9) | **0.003 |
| 9. Checked to be sure I understood everything | 94 (71.8) | 96 (73.3) | 90 (69.8) | 167 (79.1) | 0.535 |
| 10. Encouraged me to ask questions | 76 (58.0) | 77 (58.8) | 75 (58.1) | 148 (70.1) | *0.027 |
| 11. Involved me in decisions as much as I wanted | 79 (60.3) | 69 (52.7) | 75 (58.1) | 150 (71.1) | 0.070 |
| 12. Discussed next steps, including any follow-up plans | 92 (70.2) | 89 (67.9) | 84 (65.1) | 157 (74.4) | 0.501 |
| 13. Showed care and concern | 105 (80.2) | 98 (74.8) | 102 (79.1) | 176 (83.4) | 0.588 |
| 14. Spent the right amount of time with me | 103 (78.6) | 96 (73.3) | 101 (78.3) | 182 (86.3) | 0.222 |

All values are presented as frequency (%), *Significant at p<0.05, **Significant at p<0.01, CAT = Communication Assessment Tool, assessed using the 14-item Communication Assessment Tool.18 Each item was rated on a 5-point scale (1 = poor, 2 = fair, 3 = good, 4 = very good, or 5 = excellent). †Calculated using Chi-square test.

**Table 3:** Comparison of excellent ratings of CAT items to institute of resident training (N=602).

| CAT Items | Institute of Training | | †p-value |
|---|---|---|---|
| | MOH (n=398) | SQUH (n=204) | |
| 1. Greeted me in a way that made me feel comfortable | 278 (69.8) | 163 (79.9) | **0.006 |
| 2. Treated me with respect | 322 (80.9) | 185 (90.7) | *0.005 |
| 3. Showed interest in my ideas about my health | 287 (72.1) | 162 (79.4) | *0.035 |
| 4. Understood my main health concerns | 268 (67.3) | 155 (76) | *0.011 |
| 5. Paid attention to me (looked at me, listened carefully) | 296 (74.4) | 168 (82.4) | *0.018 |
| 6. Let me talk without interruptions | 300 (75.4) | 179 (87.7) | **0.002 |
| 7. Gave me as much information as I wanted | 272 (68.3) | 147 (72.1) | 0.122 |
| 8. Spoke to me in terms I could understand | 286 (71.9) | 168 (82.4) | **0.005 |
| 9. Checked to be sure I understood everything | 282 (70.9) | 165 (80.9) | *0.026 |
| 10. Encouraged me to ask questions | 230 (57.8) | 146 (71.6) | **0.001 |
| 11. Involved me in decisions as much as I wanted | 227 (57) | 146 (71.6) | **0.001 |
| 12. Discussed next steps, including any follow-up plans | 264 (66.3) | 158 (77.5) | **0.009 |
| 13. Showed care and concern | 305 (76.6) | 176 (86.3) | *0.019 |
| 14. Spent the right amount of time with me | 306 (76.9) | 176 (86.3) | *0.039 |

All values are presented as frequency (%), *Significant at p<0.05, **Significant at p<0.01, CAT = Communication Assessment Tool, assessed using the 14-item Communication Assessment Tool.18 Each item was rated on a 5-point scale (1 = poor, 2 = fair, 3 = good, 4 = very good, or 5 = excellent). ). †Calculated using Chi-square test.

However, the items “Involved me in decisions as much as I wanted” and “Encouraged me to ask questions” were least frequently rated as excellent (62.0% and 62.5%, respectively) (**Fig. 1**).

Overall, 494 patients (82.1%) were seen by female residents and 108 (17.9%) were seen by male residents. No significant differences were observed according to residents’ gender between frequencies of excellent ratings for any of the items in the survey. In addition, no significant association with the frequency of excellent ratings was noted according to the patient’s age, gender, nationality and time of consultation. Similarly, the type of clinic attended by the patient (*i.e.*, appointment-based or walk-in) had a significant impact on the frequency of excellent ratings for the following items: “Understood my main health concerns” (p=0.034) in favors of walk-in clinic and “Discussed next steps, including any follow-up plans” (p=0.015) in favors of appointment clinic.

Level of residency also showed significant associations with many items, with residents at level R4 more frequently rated as excellent compared to junior residents, including: “Treated me with respect” (p=0.013), “Showed interest in my ideas about my health” (p=0.002), “Understood my main health concerns” (p=0.011), “Let me talk without interruptions” (p=0.015), “Spoke to me in terms I could understand” (p=0.003), “Encouraged me to ask questions” (p=0.027) (**Table 2**). Furthermore, the institute of training was found to significantly affect the excellent rating for all items except “Gave me as much information as I wanted” (p=0.122) (**Table 3**).

**Table 4:** Comparison of excellent ratings of CAT items to educational level of patients (N=602).

| CAT item | Rated as Excellent | | | | | | †p-value |
|---|---|---|---|---|---|---|---|
| | Illiterate (n=47) | Primary school (n=30) | Intermediate school (n=49) | Secondary school (n=194) | University (n=206) | Higher educational level (n=76) | |
| 1. Greeted me in a way that made me feel comfortable | 34 (72.3) | 19 (63.3) | 35 (71.4) | 134 (69.1) | 158 (76.7) | 61 (80.3) | 0.151 |
| 2. Treated me with respect | 42 (89.4) | 22 (73.3) | 39 (79.6) | 155 (79.9) | 181 (87.9) | 68 (89.5) | 0.202 |
| 3. Showed interest in my ideas about my health | 34 (72.3) | 20 (66.7) | 34 (69.4) | 138 (71.1) | 161 (78.2) | 62 (81.6) | 0.247 |
| 4. Understood my main health concerns | 37 (78.7) | 13 (43.3) | 37 (75.5) | 122 (62.9) | 154 (74.8) | 60 (78.9) | **0.003 |
| 5. Paid attention to me (looked at me, listened carefully) | 36 (76.6) | 18 (60.0) | 37 (75.5) | 140 (72.2) | 167 (81.1) | 66 (86.8) | 0.051 |
| 6. Let me talk without interruptions | 35 (74.5) | 22 (73.3) | 40 (81.6) | 147 (75.8) | 168 (81.6) | 67 (88.2) | 0.191 |
| 7. Gave me as much information as I wanted | 32 (68.1) | 18 (60.0) | 35 (71.4) | 123 (63.4) | 152 (73.8) | 59 (77.6) | 0.213 |
| 8. Spoke to me in terms I could understand | 34 (72.3) | 18 (60.0) | 38 (77.6) | 130 (67.0) | 169 (82.0) | 65 (85.5) | *0.011 |
| 9. Checked to be sure I understood everything | 37 (78.7) | 19 (63.3) | 34 (69.4) | 135 (69.6) | 161 (78.2) | 61 (80.3) | 0.488 |
| 10. Encouraged me to ask questions | 27 (57.4) | 15 (50.0) | 32 (65.3) | 108 (55.7) | 140 (68.0) | 54 (71.1) | 0.289 |
| 11. Involved me in decisions as much as I wanted | 26 (55.3) | 16 (53.3) | 30 (61.2) | 108 (55.7) | 138 (67.0) | 55 (72.4) | 0.454 |
| 12. Discussed next steps, including any follow-up plans | 33 (70.2) | 20 (66.7) | 35 (71.4) | 122 (62.9) | 146 (70.9) | 66 (86.8) | *0.015 |
| 13. Showed care and concern | 40 (85.1) | 21 (70.0) | 39 (79.6) | 144 (74.2) | 169 (82.0) | 68 (89.5) | 0.259 |
| 14. Spent the right amount of time with me | 36 (76.6) | 23 (76.7) | 37 (75.5) | 148 (76.3) | 168 (81.6) | 70 (92.1) | 0.207 |

All values are presented as frequency (%), *Significant at p<0.05, **Significant at p<0.01, CAT = Communication Assessment Tool, assessed using the 14-item Communication Assessment Tool.18 Each item was rated on a 5-point scale (1 = poor, 2 = fair, 3 = good, 4 = very good, or 5 = excellent). †Calculated using Chi-square test.

**Table 5:** Comparison of excellent ratings of CAT items to patients seen by family medicine residents in Oman (N=602).

| CAT Item | Had the patient been seen by this resident before? | | | †p-value |
|---|---|---|---|---|
| | No (n=352) | Yes, but only once (n=127) | Yes, more than once (n=122) | |
| 1. Greeted me in a way that made me feel comfortable | 267 (75.6) | 85 (66.9) | 89 (73) | 0.0132 |
| 2. Treated me with respect | 309 (87.5) | 99 (78) | 99 (81.1) | *0.029 |
| 3. Showed interest in my ideas about my health | 274 (77.6) | 90 (70.9) | 85 (69.7) | 0.092 |
| 4. Understood my main health concerns | 260 (73.7) | 82 (64.6) | 81 (66.4) | *0.012 |
| 5. Paid attention to me (*i.e.*, looked at me, listened carefully) | 286 (81) | 89 (70.1) | 89 (73) | 0.111 |
| 6. Let me talk without interruptions | 300 (85) | 88 (69.3) | 91 (74.6) | **0.001 |
| 7. Gave me as much information as I wanted | 245 (69.4) | 87 (68.5) | 87 (71.3) | 0.291 |
| 8. Spoke to me in terms I could understand | 289 (81.9) | 83 (65.4) | 82 (67.2) | **<0.001 |
| 9. Checked to be sure I understood everything | 272 (77.1) | 85 (66.9) | 90 (73.8) | *0.045 |
| 10. Encouraged me to ask questions | 225 (63.7) | 73 (57.5) | 78 (63.9) | 0.709 |
| 11. Involved me in decisions as much as I wanted | 227 (64.3) | 71 (55.9) | 75 (61.5) | 0.294 |
| 12. Discussed next steps, including any follow-up plans | 260 (73.7) | 79 (62.2) | 83 (68) | 0.060 |
| 13. Showed care and concern | 297 (84.1) | 92 (72.4) | 92 (75.4) | **0.006 |
| 14. Spent the right amount of time with me | 296 (83.9) | 93 (73.2) | 93 (76.2) | *0.048 |

All values are presented as frequency (%), *Significant at p<0.05, **Significant at p<0.01, CAT = Communication Assessment Tool, assessed using the 14-item Communication Assessment Tool.18 Each item was rated on a 5-point scale (1 = poor, 2 = fair, 3 = good, 4 = very good, or 5 = excellent). †Fisher-exact test was applied

More highly educated patients were found to more frequently rate certain items as excellent compared to less educated patients, including: "Understood my main health concerns" (p=0.003), "Spoke to me in terms I could understand" (p=0.011), and "Discussed next steps, including any follow-up plans" (p=0.015) (**Table 4**). Similarly, patients who had never been seen by the resident before more frequently rated several items as excellent, including "Treated me with respect" (p=0.029), "Understood my health concerns" (p=0.012), "Let me talk without interruptions" (p<0.001), "Spoke to me in terms I could understand" (p<0.001), "Checked to be sure I understood everything" (p=0.045), "Showed care and concern" (p=0.006), and "Spent the right amount of time with me" (p=0.048) (**Table 5**).

## DISCUSSION

Of all medical specialties, family medicine requires a greater emphasis on communication skills, as it is commonly the first point of contact for patients seeking

healthcare [20]. Residency is an optimal stage to evaluate communication skills since the outcomes of such evaluations can guide the training of interns and medical students before graduation [17]. The importance of communication skills during doctor-patient interactions is often recognized by family medicine residents from different residency levels; however, there appears to be a gap between the perceived importance of such skills and their application in clinical practice [21, 22]. As such, additional measures are required to increase the efficacy of communication skills among residents to improve the patient experience and quality of care provided [23].

Various studies have used the CAT to evaluate the communication and interpersonal skills of medical residents. A cross-sectional study conducted in Saudi Arabia gauged the communication skills of family medicine residents in their final year according to the perceptions of 350 patients using the same tool; the findings indicated a significant difference in communication skills between male and female residents, with male residents receiving higher scores (67.8 ± 32.2% versus 72.8 ± 27.2% ; $p<0.005$) [20]. This is contradicting the present study as there were no significant differences in CAT items between both genders. This might be due to the disparity between the numbers of surveys assessing female residents (82.1%) compared to male residents (17.9%). In contrast, a meta-analysis has shown that female physicians exhibit significantly more collaborative and empathic communication compared to male physicians [24]. In addition, another study found that female medical students developed communication skills more rapidly compared to their male counterparts [25].

The differences in residents' levels were higher in many items with more ratings excellent for R4 residents. The experience of R4 residents, which is far better than experience in the first 3 levels of residency can explain this discrepancy. There are no similar studies done in Oman to compare it with our results, however, our results were in agreement with a similar study done in the USA to evaluate the utilization of the CAT in various family medicine residency programs that found more senior residents obtained greater scores compared to residents at lower residency levels [17].

The current study aimed to use the CAT to evaluate the communication skills of family medicine residents in Oman and to explore how such skills were affected by the patient- and resident-related factors. Presenting data as means of a 5-point rating scale can create a ceiling effect, as is typically seen in patient satisfaction surveys [26]. This effect can be reduced by analyzing the data as mean percentages of items rated as excellent. Accordingly, the greatest mean percentage of items rated as excellent was 84.2% ("Treated me with respect"), while the least mean percentage of items rated as excellent was 62.0% ("Involved me in decisions as much as I wanted"). Reducing the ceiling effect leads to better monitoring of changes over time [27]. According to Makoul *et al.* analysis of the CAT results is more meaningful when assessing the mean percentage of items rated as excellent rather than mean scores, as the latter has been found to be inaccurate and misleading [18]. Overall, the mean percentage of items rated as excellent was 73.8%, which is higher than the frequencies reported among family medicine residents enrolled in residency training programs in Saudi Arabia (71%) and the USA (73%) [20, 28].

The present study found that more senior residents (level R4) received significantly greater scores from patients compared to more junior residents (levels R1, R2, or R3) for six items. However, an important factor to keep in mind was that approximately one-third of the surveys (35.0%) assessed R4 residents, while the remaining surveys equally assessed R1, R2, and R3 residents. The results were in agreement with a similar study done in the USA to evaluate the utilization of the CAT in various family medicine residency programs that found more senior residents obtained greater scores compared to residents at lower residency levels [17]. In parallel, the institute of training was found to have a marked effect on mean CAT scores, with residents at SQUH receiving significantly higher scores compared to those at MOH institutes. This can be explained by the fact that R4 residents were trained in SQUH most of the year, while R1–R3 residents were trained in MOH institutions. In contrast, Myerholtz *et al.* study found that first-year residents received higher scores for some CAT items compared to residents at higher levels [17]. The researchers suggested that these unexpected findings were because more junior residents were allotted more time to consult with their patients compared to more senior residents [17].

In the present study, patients who had never been seen before by the resident reported a higher mean percentage of items rated as excellent in comparison to those who had been seen by the same resident before, either once or more than once. This difference was statistically significant for seven of the CAT survey items, including: "Treated me with respect", "Understood my health concerns", "Let me talk without interruptions", "Spoke to me in terms I could understand", "Checked to be sure I understood everything", "Showed care and concern", and "Spent the right amount of time with me". This indicates that residents were more respectful of new patients and gave them more time to speak compared to patients they had seen before and know their medical background before. Moreover, they appeared to try to explain the condition more simply to new patients and involved them more in the decision-making process compared to patients they had seen before. To some degree, such findings are to be expected as the residents would have known less about new patients and needed to hear more regarding their symptoms and history. In general, the residents would have had to establish a

relationship with and earn the trust of new patients, a more difficult task compared to patients for whom trust most probably has already been established. Similarly, this finding is in parallel with the relationship between the mean percentage of items rated as excellent and the type of clinic visited by the patients, as patients who visited walk-in clinics (who usually see the physician for the first time) more frequently rated the following items as excellent: "Understood my main health concerns" which indicate that resident spends more time with patients.

When patients were categorized based on their education level, we found significant differences in the mean percentages of items rated as excellent for items 4, 8 and 12. In general, patients that are more educated tend to have a better understanding of medical terminology compared to illiterate patients. Quintana *et al.* found that patients that are more educated have higher satisfaction scores [29]. Finally, the age of the patient did not seem to have a statistically significant impact on their perception of the communication skills of the residents. This contradicts findings reported by other studies showing that older patients tend to have higher satisfaction scores [29, 30]. Such findings could occur because physicians tend to be more courteous with elderly patients, as shown in an early study exploring patient characteristics that influence physician behavior [31].

The present study has several limitations, particularly as it focuses solely on the assessment of residents enrolled in a single residency program in Oman; thus, our findings cannot provide a clear impression of the communication skills training of all residents in Oman. In addition, Makoul *et al.* advise that at least 20 surveys be gathered per resident when using the CAT to assess communication skills; however, our study collected an average of only 10 surveys per resident [18]. This recommendation is based on the Rasch generalizability theory which describes that in order to reach reliability of 0.96 for data represented as a 5-point scale, an estimated 12–30 ratings per examinee should be collected [18]. Additionally, there was a sizeable variation in the number of surveys collected per level of residency, as more than one-third of the residents surveyed were senior residents (level R4), thus limiting the generalizability of the findings.

## CONCLUSION

Several weaknesses were identified in the communication skills of family medicine residents in Oman. Moreover, significant relationships were noted between such skills and certain patient-related and resident-related factors, including the level of residency, type of clinic, number of times seeing the same resident, and the patient's education level. Such data can be used by the participating residents themselves as a form of feedback to guide self-improvement or by the developers of the residency program to inform modifications to the curriculum and training of medical students. Finally, since this study used the CAT, a well-defined and previously validated tool, to assess the residents' communication skills, the results can be used to compare the communication skills of family medicine residents in Oman with other residents across the world and vice versa.

## ETHICS APPROVAL

The Medical Research and Ethics Committee of the College of Medicine and Health Sciences, Sultan Qaboos University (SQU), and the Centre of Studies and Research of the MOH granted ethical approval for this study. All procedures performed in studies involving human participants were in accordance with the ethical standards of the Helsinki declaration.

## CONSENT FOR PUBLICATION

Written informed consent was obtained from all patients prior to their participating in the study.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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