

# Knowledge, Attitudes and Practices of Primary Care Physicians Regarding Tobacco Dependence Treatment in Muscat Governorate, Oman

## A cross-sectional study

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**ABSTRACT: Objectives:** This study aimed to assess the knowledge, attitudes and practices (KAPs) of primary care physicians (PCPs) regarding tobacco dependence treatment (TDT) and to identify barriers to TDT practice in Muscat, Oman. **Methods:** This cross-sectional study was carried out from September 2019 to December 2019 at all 27 health centres in Muscat. All 313 PCPs working in these health centres were invited to participate. An adapted version of a previously validated 36-item questionnaire was used to assess KAPs regarding TDT services. **Results:** A total of 255 PCPs completed the survey (response rate: 81.5%) and they demonstrated poor knowledge (40%) but positive attitudes (60%) about TDT services. Of these, the majority were female (85.9%), had never smoked (99.2%) and were general practitioners (64.3%). The mean age was  $34.3 \pm 6.3$  years. Only 28.2% had previously received TDT training and less than half displayed accurate TDT-related knowledge, with undergraduate medical school representing the main source of such knowledge (58.8%). While 96.9% of the PCPs agreed on the importance of TDT, only 28.6% reported feeling sufficiently confident to provide such services themselves. Lack of training (83.5%) and time (71.4%) were the main barriers to TDT practice. **Conclusion:** Overall, PCPs in Muscat demonstrated poor knowledge but positive attitudes with regard to TDT; however, further knowledge and training is required in order to ensure the effective and accurate provision of TDT services. These findings provide baseline data which may be of value for further research and in overcoming barriers to TDT practice in Oman; for instance, establishing cessation services as part of the package of care in primary health centres could address the time constraints barriers identified by the PCPs.

**Keywords:** Tobacco Dependence; Smoking Cessation; Primary Care Physicians; Health Knowledge, Attitudes, Practice; Oman.

### ADVANCES IN KNOWLEDGE

- Omani primary care physicians (PCPs) in Muscat demonstrated poor knowledge about (40%) but positive attitudes (60%) towards tobacco dependence treatment (TDT) services.
- A high proportion of respondents (71.8%) had never received basic TDT training which would explain why lack of training was identified as a major barrier to TDT practice.

### APPLICATION TO PATIENT CARE

- The positive attitudes among PCP towards the provision of TDT to their smoking patients provides an opportunity to pilot cessation services in primary care centres in Muscat.
- Establishing cessation services as part of the package of care in primary health centres could address the time constraint barriers identified by the PCPs.

Tobacco use is a major modifiable risk factor for non-communicable diseases and is responsible for six million deaths annually.<sup>1</sup> Worldwide, there are approximately 1.3 billion tobacco users, of which an alarmingly high proportion consist of men in the Eastern Mediterranean (EMR) region.<sup>2,3</sup> While many smokers find it difficult to quit, evidence-based research has shown that support from healthcare providers can increase cessation rates by up to 66–84%.<sup>4,5</sup> Moreover, a meta-analysis found that tobacco dependence treatment (TDT) interventions

significantly reduced tobacco use in the short term while maintaining cessation efforts over time.<sup>6</sup>

The World Health Organization (WHO) Framework Convention on Tobacco Control stipulates that nations should address tobacco dependence by promoting cessation services.<sup>7,8</sup> Common interventions include counselling through regular health services, telephone quitlines and access to pharmacological therapy. Furthermore, specialised TDT clinics should be established and staffed by trained physicians in order to provide appropriate

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motivational counselling and prescriptions for nicotine replacement therapy (NRT), most forms of which are usually available over the counter.<sup>7,8</sup> In June 2019, the price of tobacco products doubled due to the addition of tax; this change is expected to increase demand for tobacco cessation services, particularly in low- and middle-income countries.<sup>3,9</sup>

Assorted tobacco control measures have been implemented in the Gulf Cooperation Council (GCC) region with varying degrees of success.<sup>10</sup> Overall, the majority of GCC countries have made important strides in tobacco control in recent years, such as implementing bans on the advertisement or marketing of tobacco products; moreover, all GCC states, apart from Bahrain, have a national body dedicated to tobacco control measures.<sup>11</sup> However, there is some concern that clinical TDT interventions may not be as effective for Arab populations compared to Western populations.<sup>12</sup> This is possibly because traditional TDT interventions do not take into account the sociocultural norms of this region, such as the strong influence of friends and family members on lifestyle choices.<sup>13</sup> Moreover, TDT measures can be prohibitively expensive; Heydari *et al.* observed that the mean cost of accessible TDT services in the EMR region, such as those involving NRT, was much higher than the price of common tobacco products such as cigarettes.<sup>14</sup>

In Oman, the prevalence of tobacco use among men aged  $\geq 15$  years old was estimated to be 17.9% in 2010; without additional tobacco control measures, this rate is expected to increase to 33.3% by 2025.<sup>15</sup> Moreover, the Global Youth Tobacco Survey showed an alarming level of tobacco use among adolescents in Oman, with 17.8% of boys and 11.3% of girls using various types of tobacco products.<sup>16</sup> The National Tobacco Control Committee is responsible for developing and implementing national policies, laws and regulations for tobacco control as well as raising awareness and supporting TDT-related training and research.<sup>17</sup> In Oman, three smoking cessation clinics offering NRT and psychological motivational therapy were established in Muscat, Nizwa and in the primary health care centre at the main public university in Muscat in 2006, 2009 and 2015, respectively.<sup>15</sup>

Primary care providers (PCPs) are in an ideal position to support tobacco cessation efforts as they represent the first point-of-care for the majority of tobacco users.<sup>5,18</sup> In Oman, health centres are the cornerstone for primary care and provide both preventive and curative services; while primary care services are also provided at renal dialysis units, polyclinics, offices of the Centers for Disease Control and Prevention and small primary hospitals, patients

must first be referred from local health centres. Most PCPs are either non-certified general practitioners (GPs), family medicine residents or certified family physicians. According to statistics from the Ministry of Health (MoH), there were 432 Omani and non-Omani physicians working in primary healthcare institutions in Muscat in 2018, of which approximately 313 PCPs worked in local health centres.<sup>19</sup>

Although tobacco use is a growing problem in GCC countries, few studies have sought to assess knowledge, attitudes and practices (KAPs) and barriers to providing TDT services among PCPs. A recent study from Saudi Arabia showed that, despite their positive attitudes, PCPs had poor knowledge and unsatisfactory practices with regards to smoking cessation counselling.<sup>20</sup> Another study conducted in Armenia found that smoking cessation was limited by several factors, including subpar knowledge and skills.<sup>21</sup> To the best of the authors' knowledge, no previous studies on this topic have been conducted in Oman. As such, this study aimed to identify the KAPs of PCPs in Muscat with regards to the provision of TDT services, determine associations with sociodemographic variables and explore possible barriers to TDT practice.

## Methods

This cross-sectional study was carried out from September 2019 to December 2019 at all 27 health centres in Muscat, Oman. All PCPs working at these health centres were included in the study. The required sample size was calculated to be 243 using the nQuery Advisor<sup>®</sup> software, Version 19 (Statistical Solutions Ltd., Boston, Massachusetts, USA), assuming a margin of error of 0.03 and a confidence interval level of 95%.<sup>22</sup> In order to account for missing responses and attrition, all 313 PCPs currently working at the health centres were invited to participate in the study.

A modified version of a previously published semi-structured 36-item questionnaire was utilised to collect data from the participants.<sup>20</sup> This self-administered questionnaire comprised of three domains, with the first section collecting sociodemographic information, the second assessing responses to items related to TDT-related knowledge ( $n = 12$ ), attitudes ( $n = 7$ ) and practices ( $n = 7$ ) and the third identifying self-reported barriers to TDT practice. The inter-rater reliability of the KAP subscales in the modified instrument was high (Cronbach's alpha: 0.88–0.92). To ensure a high response rate, the research team contacted the heads or deputies of each health centre to ask them to distribute the questionnaire to the members of their teams and encourage them to take part in the study. A reminder

was sent to submit the completed questionnaires within a three-week period. Completed questionnaires were returned to the heads of the health centres before being collected by the research team.

In terms of scoring, correct answers to knowledge items received 1 point, while incorrect answers received 0 points. Attitude items were rated in terms of agreement on a 5-point Likert scale with responses of 'strongly agree', 'agree', 'neither agree nor disagree', 'disagree' and 'strongly disagree'. Positive attitudes (indicated by responses of 'strongly agree' or 'agree') were assigned 1 point, while neutral or negative attitudes (indicated by responses of 'neither agree nor disagree', 'disagree' or 'strongly disagree') received 0 points. Finally, practice items were rated in terms of frequency on a 4-point Likert scale with responses of 'always', 'sometimes', 'rarely' and 'never'. Satisfactory practices (represented by responses of 'always' or 'sometimes') were assigned 1 point, while unsatisfactory practices (represented by responses of 'rarely' and 'never') received 0 points. Responses were grouped in this way to give a clearer indication of positive/satisfactory attitudes and practices. Percentage mean scores were then calculated for each of the knowledge, attitude and practice subscales.

The Statistical Package for the Social Sciences (SPSS), Version 21.0 (IBM Corp., Armonk, New York, USA) was used for data analysis. Descriptive statistics (e.g. frequencies, percentages, means and standard deviations) were used to describe the basic sociodemographic characteristics of the respondents. As appropriate, Chi-squared, Fisher's exact and student's t-tests were used to test for any significant differences or associations between gender and other sociodemographic factors. Subsequently, either an independent t-test or analysis of variance was utilised to determine significant differences in KAP with regards to sociodemographic variables. A *post-hoc* test was performed for pair comparisons. All tests were set at the 5% level of significance ( $P < 0.05$ ).

Ethical approval for this study was obtained from the local Research Ethics Committee of the MoH (MOH-DGS-MG-46/2019). Written informed consent was provided by all PCPs prior to their participation in the study. Identifying information was not collected to ensure privacy and confidentiality.

## Results

Of the 313 PCPs invited to take part in the study, 255 completed the questionnaire (response rate: 81.5%). The mean age was  $34.3 \pm 6.3$  years, with 56.6% of the participants being between 31–45 years of age. The majority of the participants were female (85.9%).

**Table 1: Sociodemographic characteristics of primary care physicians in Muscat, Oman (N = 255)**

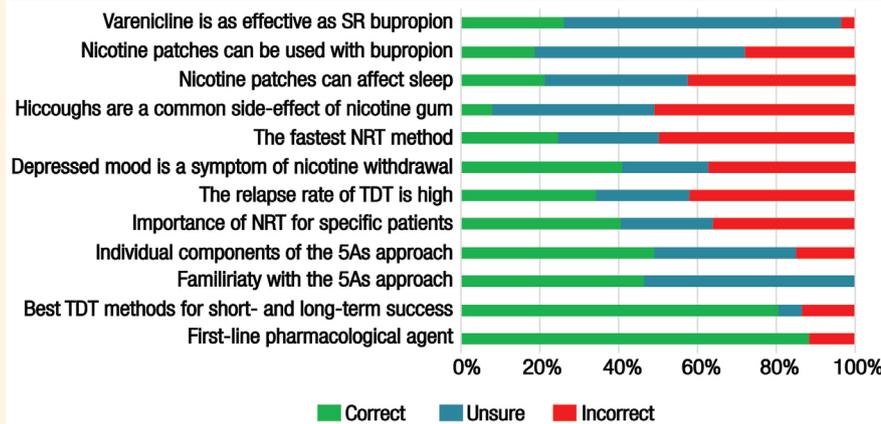
Characteristic	n (%)			P value*
	Total	Male (n = 36)	Female (n = 219)	
<b>Age in years<sup>†</sup></b>				0.278
≤30	76 (33.6)	10 (27.8)	66 (34.7)	
31–45	128 (56.6)	20 (55.6)	108 (56.8)	
>45	22 (9.7)	6 (16.7)	16 (8.4)	
Mean ± SD	34.3 ± 6.3	36.9 ± 8.8	33.8 ± 5.5	0.064
<b>Current position</b>				0.713
GP	164 (64.3)	22 (61.1)	142 (64.8)	
FM resident	38 (14.9)	6 (16.7)	32 (14.6)	
FM specialist	29 (11.4)	6 (16.7)	23 (10.5)	
FM senior specialist	20 (7.8)	2 (5.6)	18 (8.2)	
FM senior consultant	4 (1.6)	0 (0.0)	4 (1.8)	
<b>Previously received TDT training</b>				0.125
Yes	72 (28.2)	14 (38.9)	58 (26.5)	
No	183 (71.8)	22 (61.1)	161 (73.5)	
<b>Smoking status</b>				0.019
Non-smoker	253 (99.2)	34 (94.4)	219 (100.0)	
Ex-smoker	2 (0.8)	2 (5.6)	0 (0.0)	
Smoker	0 (0.0)	0 (0.0)	0 (0.0)	
<b>Type of tobacco used</b>				-
Cigarettes	2 (0.8)	2 (5.6)	0 (0.0)	
Shisha	0 (0.0)	0 (0.0)	0 (0.0)	
Midwakh	0 (0.0)	0 (0.0)	0 (0.0)	
Chewable tobacco	0 (0.0)	0 (0.0)	0 (0.0)	
Other	0 (0.0)	0 (0.0)	0 (0.0)	

SD = standard deviation; GP = Non-certified general practitioner; FM = family medicine.

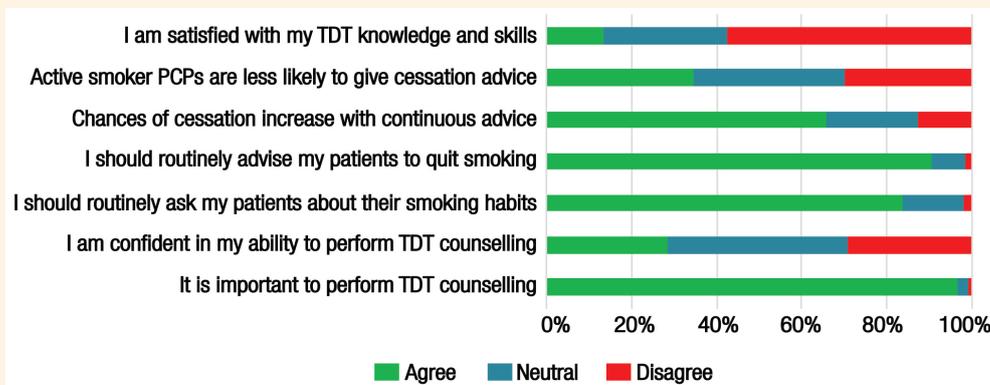
\*Calculated using a Chi-squared ( $\chi^2$ ) test, student's t-test or Fisher's exact test, as appropriate. †Missing data for this variable were reported for 29 participants.

In terms of position, most were non-certified GPs (64.3%), followed by family medicine residents (14.9%) or family medicine specialists (11.4%). Interestingly, only two male physicians were ex-smokers of cigarettes (0.8%). Moreover, only 28.2% of the participants had previously received training in TDT services [Table 1].

The main source of TDT-related information was undergraduate medical school training (58.8%), followed by the Internet (55.7%), textbooks (39.2%), postgraduate studies (37.6%), medical colleagues (37.6%), research studies (28.2%), workshops (20.0%)



**Figure 1:** Knowledge regarding tobacco dependence treatment among primary care physicians in Muscat, Oman (N =255). SR = sustained-release; NRT = nicotine replacement therapy; TDT = tobacco dependence treatment; 5As = Ask, Advise, Assess, Assist and Arrange.



**Figure 2:** Attitudes towards tobacco dependence treatment among primary care physicians in Muscat, Oman (N = 255). TDT = tobacco dependence treatment; PCPs = primary care physicians.

and conferences (14.1%). Crucially, most knowledge questions were answered correctly by less than half of the participants; furthermore, a large proportion indicated that they did not know the correct response to certain questions. Most PCPs were aware of the first-line treatment for tobacco dependency (88.2%) and the best methods for long- and short-term cessation success (80.4%). Moreover, only 118 participants (46.3%) were familiar with the ‘Ask, Advise, Assess, Assist and Arrange’ (5As) approach; However, 29 (24.6%) of them could not accurately identify the five individual components of this approach [Figure 1].

In terms of attitudes, most PCPs (96.9%) agreed on the importance of providing TDT counselling services for their patients; however, only 28.6% felt sufficiently confident to perform such counselling themselves. Furthermore, while the majority of PCPs agreed that they should ask patients about their smoking status (83.9%) and advise patients to quit tobacco use routinely (90.6%), 57.6% of the participants expressed dissatisfaction with their own TDT knowledge and skills [Figure 2].

Concerning actual TDT practices, 38.0% of the PCPs reported always asking and documenting their patients’ smoking status; however, only 13.3% continued updating this information on a regular basis. Most PCPs (99.2%) explained the health-related consequences of tobacco use to their patients and encouraged them to stop smoking. In contrast, few participants (14%) provided information regarding smoking cessation and helped their patients to make plans to quit. Just under half of the PCPs had never prescribed pharmacological TDT agents (48.2%) or scheduled follow-up TDT appointments (45.5%).

The two most commonly reported barriers to TDT practice included a lack of training and time (83.5% and 71.4%, respectively). Moreover, failure to follow up cessation efforts was considered a barrier to TDT practice by 51.4% of participants. Other less commonly identified barriers to providing TDT services included withdrawal symptoms, relapses and the patients’ desire to smoke. Most PCPs recommended that adding tobacco status as a mandatory field in electronic health information systems or to the patient’s

**Table 2:** Mean knowledge scores regarding tobacco dependence treatment according to sociodemographic variables among primary care physicians in Muscat, Oman (N = 255)

Characteristic	Percentage mean score $\pm$ SD in %	F or t value	P value
<b>Age in years</b>		6.684	0.002
$\leq 30$	33.3 $\pm$ 14.3*		
31–45	43.2 $\pm$ 20.9		
>45	37.9 $\pm$ 19.7		
<b>Gender</b>		2.743	0.007
Male	47.7 $\pm$ 21.0		
Female	38.5 $\pm$ 18.2		
<b>Previously received TDT training</b>		7.534	<0.001
Yes	54.4 $\pm$ 21.1		
No	34.1 $\pm$ 14.3		
<b>Current position</b>		22.892	<0.001
GP	34.7 $\pm$ 16.8 <sup>†</sup>		
FM resident	39.6 $\pm$ 13.5 <sup>‡</sup>		
FM specialist	56.9 $\pm$ 20.5		
FM senior specialist/consultant	56.3 $\pm$ 16.7		

SD = standard deviation; GP = Non-certified general practitioner; FM = family medicine.

\*The difference in mean knowledge scores between participants aged  $\leq 30$  versus 31–45 years ( $P < 0.001$ ) was statistically significant. <sup>†</sup>The difference in mean knowledge scores between GPs versus specialists ( $P < 0.001$ ) and GPs versus senior specialists/consultants ( $P < 0.001$ ) was statistically significant. <sup>‡</sup>The difference in mean knowledge scores between residents versus specialists ( $P < 0.001$ ) and residents versus senior specialists/consultants ( $P < 0.001$ ) was statistically significant.

vital signs would encourage more physicians to provide TDT services (73.7% and 65.1%, respectively).

A comparison of mean KAP scores according to sociodemographic characteristics is shown in Tables 2 to 4. Overall, the percentage mean scores for the knowledge, attitude and practice subscales were 39.8%  $\pm$  18.8%, 59.1%  $\pm$  19.6% and 60.0%  $\pm$  25.2%, respectively. There were no statistically significant differences in mean scores between the different age groups with regards to attitude ( $F = 0.990$ ;  $P = 0.373$ ) or practice ( $F = 1.669$ ;  $P = 0.191$ ). However, there was a significant difference in knowledge according to age ( $P = 0.002$ ). According to the *post-hoc* analysis, participants aged  $\leq 30$  years had significantly lower mean knowledge scores compared to those aged 31–45 years (33.3%  $\pm$  14.3% versus 43.2%  $\pm$  20.9%;  $P < 0.001$ ).

In terms of position, specialists and senior specialists/consultants achieved the highest mean knowledge (56.9%  $\pm$  20.5%) and practice (75.8%  $\pm$

**Table 3:** Mean attitude scores regarding tobacco dependence treatment according to sociodemographic variables among primary care physicians in Muscat, Oman (N = 255)

Characteristic	Percentage mean score $\pm$ SD in %	F or t value	P value
<b>Age in years</b>		0.990	0.373
$\leq 30$	56.8 $\pm$ 13.4		
31–45	60.6 $\pm$ 22.2		
>45	59.7 $\pm$ 13.7		
<b>Gender</b>		0.139	0.890
Male	59.5 $\pm$ 21.7		
Female	59.0 $\pm$ 19.2		
<b>Previously received TDT training</b>		1.953	0.052
Yes	62.9 $\pm$ 19.9		
No	57.6 $\pm$ 19.3		
<b>Current position</b>		0.152	0.928
GP	59.0 $\pm$ 18.5		
FM resident	57.9 $\pm$ 17.9		
FM specialist	61.9 $\pm$ 24.7		
FM senior specialist/consultant	58.6 $\pm$ 22.9		

SD = standard deviation; GP = Non-certified general practitioner; FM = family medicine.

18.9%) scores, respectively. Moreover, there was a statistically significant difference in both knowledge ( $F = 22.892$ ;  $P < 0.001$ ) and practice ( $F = 14.609$ ;  $P < 0.001$ ) according to position. However, there was no statistically significant difference in attitude ( $F = 0.152$ ;  $P = 0.928$ ). A *post-hoc* test indicated that GPs had significantly lower mean knowledge scores compared to both specialists and senior specialists/consultants (34.7%  $\pm$  16.8% versus 56.9%  $\pm$  20.5% and 56.3%  $\pm$  16.7%;  $P < 0.001$  each). In addition, GPs also had significantly lower mean practice scores compared to residents, specialists and senior specialists/consultants (52.9%  $\pm$  24.3% versus 69.5%  $\pm$  23.6%, 74.8%  $\pm$  21.3% and 75.8%  $\pm$  18.9%;  $P \leq 0.001$  each).

With regard to gender, there was no significant difference between males and females in terms of either attitude ( $t = 0.139$ ;  $P = 0.890$ ) or practice ( $t = 1.275$ ;  $P = 0.203$ ). However, male physicians had significantly higher mean knowledge scores compared to female physicians (47.7%  $\pm$  21.0% versus 38.5%  $\pm$  18.2%;  $t = 2.743$ ;  $P = 0.007$ ). Previous TDT training was found to significantly affect mean scores for the knowledge and practice subscales. In comparison to untrained physicians, trained physicians demonstrated significantly higher mean scores for knowledge (54.4%

**Table 4:** Mean practice scores regarding tobacco dependence treatment according to sociodemographic variables among primary care physicians in Muscat, Oman (N = 255)

Characteristic	Percentage mean score ± SD in %	F or t value	P value
<b>Age in years</b>		1.669	0.191
≤30	55.5 ± 25.9		
31–45	62.2 ± 25.5		
>45	60.0 ± 20.5		
<b>Gender</b>		1.275	0.203
Male	65.0 ± 22.2		
Female	59.2 ± 25.6		
<b>Previously received TDT training</b>		3.956	<0.001
Yes	69.7 ± 26.5		
No	56.2 ± 23.7		
<b>Current position</b>		14.609	<0.001
GP	52.9 ± 24.3*		
FM resident	69.5 ± 23.6		
FM specialist	74.8 ± 21.3		
FM senior specialist/consultant	75.8 ± 18.9		

SD = standard deviation; GP = Non-certified general practitioner; FM = family medicine.

\*The difference in mean practice scores between GPs versus residents ( $P = 0.001$ ), GPs versus specialists ( $P < 0.001$ ) and GPs versus senior specialists/consultants ( $P < 0.001$ ) was statistically significant.

± 21.1% versus 34.1% ± 14.3%;  $t = 7.534$ ;  $P < 0.001$ ) and practice (69.7% ± 26.5% versus 56.2% ± 23.7%;  $t = 3.956$ ;  $P < 0.001$ ), but not for attitude (62.9% ± 19.9% versus 57.6% ± 19.3%;  $t = 1.953$ ;  $P = 0.052$ ).

## Discussion

The current study was performed in order to assess the KAPs of PCPs in Muscat with regard to the provision of TDT services, determine associations with sociodemographic variables and explore possible barriers to TDT practice. Overall, PCPs demonstrated poor knowledge, satisfactory practices and positive attitudes concerning TDT services. Certain variables were significantly associated with KAP scores including age, gender, position and previous TDT training. The two major barriers to TDT practice identified by the respondents included a lack of training and time. These findings represent a baseline for further research exploring additional barriers to providing such services in Oman as well as potential measures to circumvent these obstacles.

The proportion of participants in the current study who had never received basic TDT training was alarmingly high (71.8%). Al Hosani *et al.* reported that a similar proportion (72.1%) of personnel working in primary care centres in the United Arab Emirates (UAE) had not received specific training on smoking cessation.<sup>23</sup> These findings can be explained by the dearth of properly structured postgraduate TDT training programmes for PCPs in the GCC region. This is an area of training which is paramount to support regional tobacco cessation efforts. According to a previous meta-analysis, healthcare professionals who receive TDT training are more likely to perform smoking cessation tasks compared to untrained controls.<sup>6</sup> Indeed, the present study found that trained physicians scored significantly higher compared to those without training in terms of both TDT-related knowledge and practice. A similar finding was reported in Armenia in which trained physicians were twice as likely to provide assistance to tobacco users compared to non-trained physicians.<sup>24</sup>

Overall, 40% of the PCPs demonstrated poor knowledge of TDT (mean score: 39.8% ± 18.8%). Al-Jdani *et al.* documented a comparable level of knowledge among primary healthcare providers in Saudi Arabia (mean score: 35.25% ± 18.40%).<sup>20</sup> This finding is unsurprising, given that most physicians in the present study reported relying on their undergraduate medical education or the Internet as their primary sources of information regarding TDT. Similar results have been reported in Saudi Arabia with regard to the popularity of online sources of TDT information among primary healthcare professionals.<sup>18,20</sup> In addition, Surrati *et al.* identified a significant association between source of TDT information and awareness of smoking cessation measures.<sup>18</sup> In contrast, Al-Turkstani *et al.* reported that the majority of PCPs (74.4%) in Makkah, Saudi Arabia, were knowledgeable with regard to smoking cessation measures.<sup>25</sup> This may be due to the larger proportion of current or ever-smokers in the latter study (26%); however, this is unlikely to have had an effect as non-smoker physicians were found to demonstrate significantly greater knowledge compared to smokers.<sup>25</sup>

Knowledge of TDT services was significantly affected by several factors in the current study including age, gender and position. Overall, PCPs aged ≤30 years demonstrated significantly lower knowledge scores compared to those aged 31–45 years. Similarly, Al-Turkstani *et al.* noted that PCPs aged 36–45 and >55 years were significantly more likely to exhibit correct knowledge compared to those aged 25–35 years old.<sup>25</sup> In the present study, male physicians exhibited significantly better knowledge

compared to females. Al-Turkstani *et al.* reported the opposite to be true among PCPs in Makkah, where females were significantly more knowledgeable than males.<sup>25</sup> Finally, job position was significantly linked with TDT knowledge in the present study, with GPs demonstrating significantly lower mean knowledge scores compared to physicians in other positions. While Al-Jdani *et al.* also found position to be significantly related to knowledge scores, dentists were found to be least knowledgeable.<sup>20</sup> Position was not found to be significantly associated with knowledge among PCPs in Makkah, while Al-Jdani *et al.* reported that neither age nor gender significantly affected TDT-related knowledge among healthcare practitioners in Western Saudi Arabia.<sup>20,25</sup>

Despite their low levels of knowledge, approximately 60% of the PCPs demonstrated positive attitudes and satisfactory practices with regard to TDT services (mean scores: 59.1%  $\pm$  19.6% and 60.0%  $\pm$  25.2%, respectively). Al-Jdani *et al.* and AlAteeq *et al.* also documented positive attitudes and satisfactory practices among PCPs in Saudi Arabia.<sup>20,22</sup> Variables which were found to affect TDT practices in the current study included position and previous TDT training; however, none of the studied sociodemographic variables were found to affect attitudes. In contrast, previous research has found that attitudes towards smoking cessation among healthcare providers in Western Saudi Arabia are significantly impacted by gender and position.<sup>20</sup>

The generally positive attitudes towards TDT services demonstrated by PCPs in the present study may have something to do with the low prevalence of current smokers in the cohort (0.8%). Indeed, Alsaqry *et al.* reported that smoker and non-smoker PCPs in Northern Saudi Arabia displayed significantly different attitudes with regard to certain tobacco control measures, such as the prohibition of smoking in certain areas, increasing taxes on tobacco products and the routine provision of smoking cessation advice, although not with regard to the prohibition of tobacco advertisements.<sup>26</sup> In contrast, Al Hosani *et al.* noted that the majority of primary care personnel in the UAE (82.8%) had positive attitudes towards smoking cessation services, regardless of their smoking status.<sup>23</sup> Smoker and non-smoker PCPs in Makkah also reported similar TDT attitudes in most regards, except one; there was a significant discrepancy in agreement with the idea that physicians should speak to community groups about smoking (88.2% versus 97.9%;  $P = 0.001$ ).<sup>25</sup>

It is possible that the participants in the present study did not reveal true details of their smoking habits for various reasons. A previous study conducted by Al-

Lawati *et al.* concluded that the prevalence of tobacco use in Oman was 16.4% among male physicians and dentists; this is much higher compared to the current study in which only 5.6% of male PCPs admitted to a history of smoking.<sup>27</sup> However, it is important to note that male physicians represented only 14.1% of the present cohort. Cigarette smoking by women is generally frowned upon in GCC countries and is seen as socially undesirable.<sup>25,26,28</sup> In accordance with this cultural norm, Al-Lawati *et al.* noted that less than 1% of female physicians in Oman were tobacco users.<sup>27</sup> The WHO Framework Convention on Tobacco Control recognises the discrepancy in smoking rates among men and women in certain regions and therefore advocates for gender-specific strategies in the implementation of tobacco control measures.<sup>7</sup>

A lack of training and time were the two major barriers to TDT practice reported by the participating physicians in the current study. Healthcare providers in Northern Saudi Arabia have identified a lack of skills and facilities (e.g. medical resources) to be frequent reasons for not implementing smoking cessation interventions.<sup>26</sup> Monshi *et al.* also underlined that a lack of time, training and resources on the part of clinicians were important barriers to smoking cessation efforts in GCC countries, alongside perceptions of responsibility and discrepancies in TDT-related knowledge.<sup>13</sup> These findings emphasise the importance of providing additional postgraduate TDT training to all PCPs. Moreover, as yet no official guidelines or policies have been published with regards to a national tobacco control programme in Oman. Furthermore, establishing TDT services in primary care provides the necessary grounds to apply the PCP's undergraduate and postgraduate knowledge in daily practice that can enhance their hands on experience and confidence in the field. Until cessation services become a routine part of health service delivery throughout government facilities, it will be difficult for individual practitioners to provide this service. In 2017, it was projected that providing TDT services on its own can influence the prevalence of smoking in Oman by 3.5% in 5 years and 8.7% by 40 years averting 8,870 deaths in 40 years.<sup>15</sup> If combined with the implementation of the complete set of the WHO's 6-points MPOWER initiative, the prevalence will reduce by 35.8% in 5 years and 54.1% in 40 years, saving up to 55,395 lives in 40 years.<sup>15</sup>

Further research is recommended to assess the TDT-related KAPs of PCPs in other regions of Oman. Despite the limited existing tobacco cessation services in Oman, their presence gives a valuable opportunity to study their effectiveness, strengths and limitations that can represent a local view of the overall experience providing essential context-specific

evidence. The importance of this view is raised by the emerging concerns that traditional TDT interventions are not as effective for Arab populations compared to Western populations.<sup>12</sup> Exploring this unique experience will serve as a guide for implementing any further developments in this area in Oman. Moreover, it would be worthwhile to determine the effectiveness of tailored TDT interventions in improving KAPs among physicians, members of the public and tobacco users.

This study was hindered by certain limitations. As the data were collected using a self-administered questionnaire, the results may have been affected by response bias. Moreover, no pilot study was performed to assess the face validity, reliability or comprehensibility of the modified questionnaire or to determine the effect of any relevant cultural issues. In addition, the scoring system used in the present study differed from that employed by the original authors of the questionnaire tool, limiting comparison of the results with previous research.<sup>20</sup> Finally, as the study was conducted in a single governorate of Oman, the generalisability of the results may be limited. However, the current study adds new information to the existing literature regarding the KAPs of PCPs towards TDT services in Oman and reveals commonly reported barriers to TDT practice. These findings may be of use to policymakers and healthcare administrators in the development of a targeted TDT training programme.

## Conclusion

Despite displaying positive attitudes and satisfactory practices, PCPs in Muscat displayed poor knowledge with regards to TDT services. This urgently needs to be addressed in order to ensure the provision of effective TDT services to tobacco users in this region. Furthermore, both lack of training and time were noted to be barriers to TDT practice. Establishing cessation services as part of the package of care in primary health centres could address the time constraint barriers identified by the PCPs. In addition, the latter barrier could be overcome by allotting adequate time during appointment slots for known tobacco users or implementing weekly clinics especially for TDT services. This study is intended as a baseline for further research in Oman focusing on TDT services. These findings will hopefully aid decision-makers and primary healthcare authorities in the implementation of targeted TDT training programmes to enable PCPs to effectively help patients with their tobacco cessation efforts.

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## CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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## AUTHORS' CONTRIBUTION

YA conceptualised the study. YA and BA performed the literature review and drafted the manuscript. MF designed the methodology and reviewed the results. BA, SAS and HA collected the data. YA analysed the data while HA performed the data entry. MF and SAS performed the final review of the manuscript. All authors approved the final version of the manuscript.

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