ABSTRACT

Objectives  One effective approach of tobacco control is to encourage the role and the participation of healthcare workers in the prevention efforts against tobacco use. This study aimed to determine the prevalence of tobacco use among governmental healthcare workers in Qatar, to assess healthcare workers’ knowledge, attitude and practice of tobacco cessation and to predict factors associated with above average tobacco cessation practice scores.

Design  A cross-sectional survey study was conducted among healthcare workers working in Hamad Medical Corporation and Primary Healthcare Centres in Qatar using a self-administered online questionnaire in 2019.

Setting  Hamad Medical Corporation and Primary Healthcare Centres in Qatar.

Participants  Governmental healthcare workers aged 18 years and above (n=7214).

Results  The response rate of our online survey was 20.6% (7214/35 000). Of the 7214 healthcare workers, 16.3% (n=1178) were current tobacco users. In particular, the prevalence of tobacco use among physicians was 11.0%. Fifty-two per cent of healthcare workers (n=2338) attained an average knowledge score (12–17), 71.8% (n=3052) attained positive attitude scores (8–12) and 57.1% (n=3052) attained above average practice scores (12–26). Among the different professions, physicians were having the highest mean knowledge (15.3±4.7), attitude (9.4±1.9) and practice (13.7±6.1) scores. Multivariate analysis showed that having good knowledge (adjusted OR=2.8; p<0.0001) and training (AOR=2.4; p<0.0001) were the strongest factors associated positively with above average tobacco cessation practice scores.

Conclusions  Healthcare workers in Qatar have a relatively similar prevalence of tobacco use than earlier studies with no significant increase. Investing more in training programmes for healthcare workers are needed to root out this negative behaviour and to increase their skills to assist users to quit.

INTRODUCTION

The global tobacco epidemic is one of the main public health threats that our world has ever faced. One effective approach of tobacco control is to encourage the key role of healthcare workers (HCWs), to promote cessation and treatment using evidence-based tobacco cessation guidelines. They have a unique position to provide information about the benefits of quitting, since they can reach large number of patients. As health promoters, HCW should set an example by not using tobacco as most patients perceive them as their role models, in line with the guidelines of WHO Framework Convention on Tobacco Control (FCTC) Article 14. Nevertheless, HCWs who are using tobacco represent an important challenge, as they may have negative attitudes that prevent them from providing advice on the benefits of quitting.

Research indicates that implementation of tobacco cessation intervention is impeded by inadequate training and staff support for HCWs, lack of knowledge about the effects of tobacco on health, and lack of experience...
in providing counselling and tobacco cessation assistance.

Qatar, has ratified the WHO FCTC since 2004, where tobacco legislation has been introduced and comprehensive tobacco control measures are being implemented to reduce tobacco consumption and its hazards, in line with Qatar National Vision 2030.

On 2003, 603 physicians in Qatar completed the WHO Health Professionals Survey, where only 7% smoked occasionally and just 5% smoked regularly. To update the current prevalence of tobacco use among HCW in Qatar, Tobacco Control Centre, a WHO Collaborative Centre at Hamad Medical Corporation (HMC) aimed to conduct an online survey specifically, (1) to determine the prevalence of tobacco use among HCW representative of the governmental healthcare sector in Qatar, (2) to determine the knowledge, attitude, and practice of tobacco cessation of HCW in Qatar and (3) to predict factors associated with above average tobacco cessation practice scores to assess training needs of HCW on tobacco cessation programmes.

METHODOLOGY
Study design and population
This was a cross-sectional research study representative of governmental HCW including physicians, nurses, pharmacists, dentists and others (allied health support staff and employees) in Qatar. To be eligible to participate, participants had to be at least 18 years old, working in HMC, a large Joint Commission International accredited group of tertiary hospitals in Qatar, or in Primary Healthcare Centres (PHCC), providing its services through 27 centres. The number of HCW at the time was around 30,000 in HMC, while it was about 5,000 in PHCC. The study was conducted between 13 October 2019 and 30 November 2019.

Recruitment
A self-selected sampling strategy was applied. Participants were recruited voluntarily to participate through the weekly HMC/PHCC newsletter announcements, which contained the web link to the online questionnaire. The newsletters are published on HMC/PHCC online portals, where employees can access them through their corporate emails. A total of seven survey announcements were issued beginning of each week every Sunday starting on 13 October 2019 till 24 November 2019. It included a description of the survey explaining the purpose of the study and specific instructions for completing the anonymous online questionnaire. Several survey reminders were sent through text messages. Once the respondent filled out the online survey, we considered that the respondent agreed to participate in the study and provided the informed consent. Completing the questionnaire took an average of 15 min.

Instrument and measures
The self-administered online survey was constructed based on WHO Global Health Professional Survey that was previously used in Qatar, with modifications to assess the knowledge, attitudes, and practice patterns of HCW in relation to tobacco cessation based on validated instruments used in prior studies. To make sure that the instrument was suitable for the population, it was pilot tested with random 20 HMC HCWs and was modified according to their comments. It was suggested to define what is daily just under the survey question as a footnote. The wording of some questions and statements were edited.

The online survey consisted of two parts. The first part collected information about HCW’s: sociodemographic characteristics and tobacco use. In the present study, the definition of current tobacco use includes both daily and occasional use. Daily use meaning at least one tobacco product every day (regular) and occasional use at least one tobacco product not every day measured weekly (social). The second part of the survey involved only HCW who had direct patient care in order to assess their current tobacco cessation practice based on the model ask, advise, assess, assist and arrange follow-up, attitude towards their role in counselling patients, and knowledge towards provision of tobacco cessation. For reasons of length, a selected number of these items are discussed in the present study.

Practice scores were derived from 12 questions, where two points were awarded for ‘always’, 1 point for ‘sometimes’ and 0 points for ‘never’. Possible scores ranged from 0 to 24 (≥12 were classified as ‘above average’ practice, while ≤11 as ‘below average’). Knowledge scores were derived as the sum of the correct responses to 24 questions, with 1 point assigned for each correct response and 0 for each incorrect/don’t know response. Respondents scoring ≥18 were categorised as having ‘good knowledge’, those scoring 12–17 as having ‘average knowledge’ and those ≤11 as having ‘poor knowledge’.

Attitude scores were derived from 12 questions. A score of 1 was given for responses agreeing with positively worded statements/disagreeing with negatively worded statements, while a score of 0 was given for responses disagreeing with positively worded statements/agreeing with negatively worded statements. Respondents with a total score of ≥8 were categorised as having ‘positive attitudes’ and those with a total score of ≤7 as having ‘negative attitudes’.

Patient and public involvement
There was no patient or public involvement in the study design or conduct of this study. We shared a newsletter thanking all the participants for their time and effort. We intend to share our findings in the media after publication.

Data analysis
SPSS V.26 was used for statistical analysis. The t-test was used to determine whether there was a significant difference between the means of knowledge, attitude and practice scores. Pearson’s $\chi^2$ test was used to determine the
association of various variables with level of practice of smoking cessation. The multivariate logistic regression method was used to predict factors associated with above average tobacco cessation practice scores. A p<0.05 was considered significant.

RESULTS
Sample characteristics
Of the 7897 questionnaires, 683 were incomplete and were excluded from the analysis leaving a total of 7214 questionnaires (HMC=6232, PHCC=982), proportional to the actual sample sizes of both institutions of about 20% and giving a response rate of 20.6% (7214/35 000).

The sample included 3185 (44.2%) males and 4029 (55.8%) females, giving a male to female ratio of about 1 to 1. Almost half of the respondents (46%) were between 25 and 34 years of age. About half of the respondents (48.8%) had been in practice for more than 10 years. Only 12.0% of the respondents had zero hours of patient care per week. Sixty-two per cent of the participants were nurses, physicians (8%), pharmacists (3%), dentists (1%) and others (27%) (table 1).

Current tobacco use
The prevalence of current tobacco use among HCW was 16.3% (n=1178), with 7.7% (n=557) reporting as daily users and 8.6% (n=621) as occasional users. In particular, the prevalence of tobacco use among physicians was 11.0%, 10.9% among nurses, 29.5% among dentists, 12.7% among pharmacists and 17.6% among others. Out of the 3185 males, 30.7% (n=978) reported that they were current tobacco users and out of 4029 females only 5.0% (n=200) reported current tobacco use. Table 1 shows sample characteristics by current tobacco use.

Knowledge, attitude and practice scores on tobacco cessation
Knowledge of HCWs on tobacco cessation
Knowledge scores ranged from 0 to 23 (Mean=12.4; SD=4.2; N=4477). Almost 40% (n=1710) of the respondents attained a poor knowledge score (0–11), 52.2% (n=2338) attained an average knowledge score (12–17), while 9.4% (n=429) attained a good knowledge score (18–24) (figure 1). Eighty-three per cent of the respondents stated that they do not have enough time to advice all tobacco users and only 17.8% stating that they always set up a date to review the progress of their patients (table 2).

Attitude of HCWs on tobacco cessation
The attitude scores ranged from 0 to 12 (mean=8.75; SD=1.96; N=4309). Most respondents (71.8%; n=3094) attained positive attitude scores (8–12), while 28.2% of the respondents’ (n=1215) attained negative attitude scores (0–7) (figure 1).

Almost all respondents agreed that it was their responsibility to motivate (94.5%), assist patients to quit (93.1%) and discuss benefits of tobacco cessation (94.0%). Most respondents (88.7%) perceived that counselling improves the relationship with patients, however, 51.0% thought that patients are not receptive to receiving tobacco cessation. Eighty-four per cent reported that their patients’ health problems take precedence over tobacco cessation counselling, with 57.1% reporting that they do not have enough time to advice all tobacco users (table 2).

Practice of HCWs on tobacco cessation
The practice scores ranged from 0 to 26 (mean=13.34; SD=7.4; N=5343). Forty-three per cent (n=2291) of the respondents obtained below average practice scores (0–11) while, 57.1% (n=3052) attained above average practice scores (12–26) (figure 1).

Half of the respondents inquired about the patients smoking status and always recorded the patient’s smoking status. More than half of the respondents (51.5%) stated that they always advised smokers to quit, with half of them discussing risks and benefits of quitting with them. One-fifth of the respondents stated that they always discussed the use of nicotine replacement therapy and medications, while only 17.8% stating that they always set up a date to review the progress of their patients (table 2).

There were statistically significant differences in the mean knowledge (p<0.0001), attitude (p<0.0001) and practice (p<0.0001) scores among the different professions (table 3A). The mean knowledge scores were 12.3 (±3.9), 15.3 (±4.7), 10.4 (±5.2), 14.9 (±3.8), 11.2 (±4.4) for nurses, physicians, dentists, pharmacists and others, respectively. The mean attitude scores were 8.8 (±2.0), 9.4 (±1.9), 8.1 (±2.7), 8.7 (±2.1), 8.3 (±2.3) for nurses, physicians, dentists, pharmacists and others, respectively. The mean practice scores were 14.4 (±7.4), 13.7 (±6.1), 11.5 (±6.7), 11.2 (±6.3), 9.9 (±7.2) for nurses, physicians, dentists, pharmacists and others, respectively (table 3A).

There were statistically significant differences in the mean knowledge (p<0.0001), attitude (p<0.0001) and practice (p=0.014) scores among HMC and PHCC HCWs (table 3B). The mean knowledge score for HMC was 12.2 (±4.1) and 13.6 (±4.7) for PHCC. The mean attitude score was 8.7 (±2.0) for HMC and 9.0 (±1.9) for PHCC. The mean practice score was 13.2 (±7.4) for HMC and 14.0 (±7.4) for PHCC (table 3B).
Predictive factors for above average tobacco cessation practice scores

In multivariate analysis (table 4), respondents with good knowledge scores were three times (adjusted OR (AOR)=2.8; p<0.0001), and those with average knowledge scores were two times (AOR=1.7; p<0.0001), more likely to have above average practice scores as compared with those with poor knowledge scores.

HCWs who were using tobacco were less likely to have above average practice scores as compared with non-smokers, specifically daily smokers (AOR=0.7; p=0.026). Males were more likely to have above average practice scores as compared with females (AOR=1.4; p<0.0001). Nurses were three times (AOR=2.9; p<0.0001) and physicians were about two times more likely (AOR=1.6; p=0.001) to have above average practice scores as compared with others.

Respondents who stated that they had received training on tobacco cessation and who stated that pamphlets were available in healthcare facilities were more likely to...
have above average practice scores (AOR=2.4; p<0.0001; AOR=1.6; p<0.0001), respectively.

**DISCUSSION**

Using an online cross-sectional survey, we determined the prevalence of tobacco use among governmental HCWs in Qatar, fortunately, 83.7% reported that they had never used tobacco at all. We assessed HCWs’ knowledge, attitude and practice of tobacco cessation and predicted factors associated with it—all for the purpose of informing decision making in tobacco control programmes involving HCW for reducing smoking prevalence and improving public health. Mainly, the results demonstrated that major gains can be attained through better knowledge and training of HCW to increase cessation intervention practice and quit attempt. To our knowledge, such an analysis has not been carried out in Qatar before and provides a foundation for future research.

The results of this study showed that 16.3% of HCW were current tobacco users, however current tobacco use, among physicians only was 11.0% lower than earlier studies conducted among physicians in 2003 (12% smoking; daily 5% and occasionally 7%) and in 2007 (15.8% current smoking). It was slightly higher than studies reporting prevalence among physicians in Bahrain (8.6%) and in Oman (6.9%). Moreover, low current tobacco use was also reported among nurses in our sample (10.9%), where 36.1% of nurses and 46.9% of physicians in Jordan were current smokers, and 25.6% of nurses and 35.9% of physicians at the Prince Mohammed Bin Abdulaziz Hospital in Riyadh, Saudi Arabia were smokers. Furthermore, current tobacco use of HCW was less than a worldwide pooled prevalence of tobacco use in HCWs, based on a systematic review and meta-analysis (21%). Much lower than other regional studies, where 26.3% of governmental HCWs in Abha city were tobacco users and 22% of Saudi dental students were smokers. High rates of smoking among physicians and other HCWs may compromise their ability to effectively treat patients addicted to smoking, fortunately this is not the case in Qatar. The observed decreasing trend may be related to the expansion of the tobacco dependence treatment services across Qatar such as primary healthcare facilities, hospitals, specialised cessation centres with full cost of cessation support and treatment.

The prevalence of tobacco use among males was six times higher than the prevalence among female respondents consistent with previous studies, where smoking among women is not generally accepted culturally in Qatar, similar to a trend observed in other Arab countries.

Overall, half of HCW had an average level of knowledge on tobacco cessation. Large number of HCW had a positive attitude towards the provision of smoking cessation (72%), projecting a positive image to the patients and to the society in Qatar; while more importantly, about 60% of HCW routinely provided tobacco cessation interventions to their patients, whereby being effective in helping users to quit. This could be due to the collective efforts of Tobacco Control Centre- WHO Collaborating Centre, the Ministry of Public Health in Qatar and PHCC, which has been remarkably active in organising multiple regional training sessions to build capacities on nicotine dependence treatment among HCW with the collaboration of international organisations like WHO and others.

**Figure 1** Summary of knowledge, attitude and practice scores of tobacco cessation of healthcare workers.
The impact of these trainings was evident when comparing the mean knowledge, practice and attitude scores among the different professions, where there were statistically significant differences, with physicians having the highest mean scores. Physicians and pharmacists had the highest mean knowledge scores followed by nurses, dentists and others. Physicians and nurses had the highest mean practice scores followed by dentists, pharmacists and others. All professions somewhat had comparable mean attitude scores with physicians scoring the highest. HCW in HMC and PHCC had comparable mean knowledge, practice and attitude scores.

Most HCWs in our study were familiar with the chronic and addictive nature of tobacco (82.6%). This ensures that they motivate their patients to keep trying even after relapse, since users require continuous efforts rather than onetime care. They were also aware of the benefits of providing advice about quitting (84.8%) in agreement with a study conducted among healthcare professionals in Jordan. However, 70% of HCW reported that brief intervention is ineffective. It is important that they offer brief advise as part of their routine consultations increasing the chances of success attempts to quitting, in line with the Offer help to quit tobacco use measure of MPOWER.

The lack of awareness of medications used to assist users to quit limits the ability of HCW to effectively discuss such treatment options with smokers. Similar findings were observed in a study among nurses and physicians working in a tertiary hospital in Armenia, where awareness about pharmacological cessation aids was limited.

HCW had a positive attitude towards their role comparable to a study among healthcare providers in Palestine, where more than 80% of the sample agreed that they should advise patients to quit smoking. However, 51.0% of HCW reported that patients were unwilling to receive...
advice on smoking cessation. Some smokers desire to maintain personal control over their smoking behaviour and other heavy smokers are more resistant to accepting quitting support and among many other factors. It is therefore important to address how to handle such barriers in future trainings.

In our study, 57.1% perceived that they did not have enough time to provide advice to smokers and 83.5% agreed that patients’ other health problems took precedence to provision of smoking cessation counselling. This could be explained by lack of appropriate training on tobacco cessation counselling as found in another study, where oncologists used to delegate the counselling role to other specialists, such as primary healthcare providers or cardiologists. This suggests the need to sensitise HCW that even minimal intervention of 1 min would increase overall tobacco abstinence rate when compared with no intervention at all. Concerns about time constraints and competing health priorities need to be addressed by training HCW, which are frequently reported as major barriers.

The first step in the provision of tobacco cessation is the identification and documentation of a patient’s tobacco use status, which is still not a common practice in the region. Half of the respondents reported always asking patients about their smoking status and routinely advised them to quit, same as another study in Jordan. Lack of knowledge on tobacco cessation medications by the study participants may account for the high number of HCW that never discussed the use of pharmacotherapy. Consistent with other studies, beyond screening for smoking and offering advice to quit further efforts are needed to assess, assist and arrange follow-up with patients to quit smoking.
Our study showed that above average tobacco cessation practice scores was associated with knowledge level, training, organisational support, gender, smoking status and profession as confirmed in the literature.\(^6\)\(^,\)\(^2\)\(^,\)\(^1\)\(^5\)\(^,\)\(^3\)\(^5\)\(^,\)\(^3\)\(^7\)\(^,\)\(^3\)\(^8\) Having good knowledge and training were the strongest factors associated positively with tobacco cessation practices among HCW in Qatar. HCW need to be trained for using counselling skills, medication and other tobacco cessation strategies to assist tobacco users quit successfully.\(^3\)\(^9\)

It is established that non-price policies such as stop smoking treatment programmes help smokers quit smoking. Comprehensive cessation policies include financial coverage of treatments, quit lines, and health-care provider interventions.\(^3\)\(^9\)\(^,\)\(^4\)\(^0\) Cessation treatment policies stand-alone increase quit success. However, they may act synergistically with other policies that increase quit attempts, which is what is needed. Though Qatar has been expanding and subsidising stop smoking treatment programmes, however, media campaigns may be needed to publicise cessation programmes. Further increase in outreach activities of HCWs to implement tobacco cessation programmes through training to encourage their patients to quit successfully.

Among the study limitations, HCW in the private healthcare sector were not included in the study. Potential bias could be contributed to the fact that some of our respondents were less likely to be surveyed than others, since it was a voluntary survey, based on self-selection. The vast majority of HCW in Qatar use the internet, however online engagement varies among respondents. However, to reduce sampling bias and non-response bias, we shared our survey through text message, and we sent several survey reminders. The participation in the current online survey was somewhat acceptable similar to what is usually obtained in online surveys 17% in long version and 25% in short version\(^4\)\(^1\) and can reach up to 33.1%\(^4\)\(^2\).

### CONCLUSION

HCWs in Qatar have somewhat a similar prevalence of tobacco use with no significant increase comparing to earlier studies. Fifty-two per cent of HCW attained an average knowledge score, most of them attained positive attitude scores (72%); while almost 60% provided tobacco cessation interventions to patients. Further training is needed to create a health promoting culture that would contribute to a non-smoking behaviour and

### Table 4  Predictive factors for above average tobacco cessation practice scores for healthcare workers†

| Predictors                              | N    | Adjusted OR | 95% CI          | P value |
|-----------------------------------------|------|-------------|-----------------|---------|
|                                         |      |             | Lower           | Upper   |
| Knowledge levels                        |      |             |                 |         |
| Poor                                    | 1625 | 1.0 (Ref)   |                 |         |
| Average                                 | 2263 | 1.669       | 1.457           | 1.912   | <0.0001* |
| Good                                    | 421  | 2.769       | 2.122           | 3.615   | <0.0001* |
| Attitude levels                         |      |             |                 |         |
| Negative                                | 1215 | 1.0 (Ref)   |                 |         |
| Positive                                | 3094 | 1.149       | 0.994           | 1.327   | 0.06    |
| Gender                                  |      |             |                 |         |
| Female                                  | 2552 | 1.0 (Ref)   |                 |         |
| Male                                    | 1787 | 1.356       | 1.169           | 1.573   | <0.0001* |
| Smoking status                          |      |             |                 |         |
| Not at all                              | 3775 | 1.0 (Ref)   |                 |         |
| Daily                                   | 260  | 0.729       | 0.551           | 0.963   | 0.026*  |
| Occasionally                            | 274  | 0.906       | 0.692           | 1.187   | 0.474   |
| Training                                |      |             |                 |         |
| No                                      | 3874 | 1.0 (Ref)   |                 |         |
| Yes                                     | 435  | 2.394       | 1.867           | 3.068   | <0.0001* |
| Pamphlets/brochures                     |      |             |                 |         |
| No                                      | 2679 | 1.0 (Ref)   |                 |         |
| Yes                                     | 1630 | 1.621       | 1.41            | 1.864   | <0.0001* |
| Profession                              |      |             |                 |         |
| Other                                   | 795  | 1.0 (Ref)   |                 |         |
| Nurse                                   | 2998 | 2.913       | 2.441           | 3.476   | <0.0001* |
| Physician                               | 378  | 1.603       | 1.221           | 2.104   | 0.001*  |
| Dentist                                 | 36   | 1.336       | 0.657           | 2.717   | 0.424   |
| Pharmacist                              | 102  | 0.901       | 0.578           | 1.404   | 0.644   |
| Current workplace                       |      |             |                 |         |
| PHCC                                    | 572  | 1.0 (Ref)   |                 |         |
| HMC                                     | 3737 | 0.845       | 0.685           | 1.042   | 0.114   |

*Factors with p<0.05 were considered statistically significant.
†Includes also allied health support staff and employees who had direct patient care.
HMC, Hamad Medical Corporation; PHCC, Primary Healthcare Corporation.
would increase their competency for a better delivery of tobacco cessation therapy.

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Contributors AA conceived and led the design of the study. SK contributed to the design of the study, conducted data analysis and wrote the manuscript with input from AA. NE contributed to the administrative support of the research project. All authors have read and approved the final manuscript.

Competing interests None declared.

Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Not required.

Ethics approval The study procedures were approved by the Institute Review Board at the Medical Research Centre in Hamad Medical Corporation in Qatar (01-18-198).

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available on reasonable request.

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ORCID iD
Silva Koyoumjian http://orcid.org/0000-0003-1675-6067

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