The Influence of Religious Practices Observed During Ramadan on Motivation to Quit Smoking

Introduction:

Like many other countries, Morocco faces a significant public health challenge related to tobacco use, which affects approximately 18% of the adult population, according to the World Health Organization [1]. Smoking is a major risk factor for several chronic diseases, such as cardiovascular disease, chronic respiratory disease, and cancer, which are among the leading causes of morbidity and mortality in the country [2]. Numerous studies highlight the impact of Ramadan, a period of fasting observed by Muslims from sunrise to sunset, on health-related behaviors. In a study conducted in Egypt, 54.6% of participants attempted to quit smoking or vaping during Ramadan, suggesting that smokers may use this period as an opportunity to quit [3]. Although these efforts are promising, they are often temporary, with smokers resuming their habits once Ramadan is over [4].

In this context, this study seeks to deepen our understanding of the impact of religious practices observed during Ramadan on the motivation to quit smoking. This approach is essential, not only to better understand the mechanisms that encourage smokers to consider quitting in a religious setting, but also to design appropriate and effective public health strategies that respond to the specific characteristics of the Moroccan population.

The aim of this study is to assess the impact of Ramadan on motivation to quit smoking in Morocco in order to guide appropriate prevention policies.

Methods:

1. Type of study:

This research took the form of a cross-sectional analytical study conducted with two groups of participants from the general population. Data were collected at two separate times: in April 2023, during Ramadan, and in July 2023, two months later, in order to observe variations related to this period.

2. Inclusion criteria:

We selected a sample that met the inclusion criteria: Participants in this study were aged 18 or older. They were active smokers or ex-smokers, meaning they had consumed at least one cigarette per day over the past six months. They stated that they observed the Ramadan fast and having a good command of the French language in order to understand the instructions and answer the questionnaires. In addition, they were willing to participate in at least one of the two phases of the study, during or after Ramadan.

3. Exclusion criteria:

The exclusion criteria defined for this study included several conditions aimed at ensuring the quality of the data collected. First, individuals with health problems that made fasting impossible were excluded. Second, occasional smokers or individuals who had quit smoking more than six months prior were not included. Finally, failure to provide an affirmative response to the informed consent question was an exclusion criterion.

4. Choice of language for the questionnaire:

The questionnaire was administered in French for two main reasons. Firstly, the scales used in the study, namely the Fagerström scale to measure nicotine dependence [5]

and the Prochaska and DiClemente contemplation scale [6], are both validated in French and not in Moroccan Arabic dialect.

Furthermore, the French language is widely spoken in Moroccan society, particularly in urban environments [7].

It was this combination of factors, namely the validation of the tools in French and the widespread proficiency in this language among the target population, that motivated the decision to design and distribute the questionnaire in French. This ensures that the data collected is both reliable and representative.

5. Questionnaire:

The questionnaire administered as part of this study included a section devoted to collecting socio-demographic data, including age, gender, income, educational level, and employment status.

The second section of the questionnaire was dedicated to psychometric tools. Two validated scales were included in the questionnaire to assess nicotine dependence and stages of behavioral change.

Fagerström Nicotine Dependence Scale:

The Fagerström scale is a widely recognized tool for measuring smokers' level of dependence [8]. It consists of six questions covering aspects such as:

The time before the first cigarette after waking up

The number of cigarettes smoked per day

The difficulty of abstaining from smoking in specific situations

The scale is rated from 0 to 10 points, as follows:

0 to 2 points: low dependence

3 to 4 points: moderate dependence

5 to 7 points: high dependence

8 to 10 points: very high dependence

Prochaska and DiClemente's contemplation scale (transtheoretical model of stages of change):

This scale measures smokers' motivation and readiness to quit smoking by classifying them according to their stage of behavioral change [9]:

- Precontemplation: The participant is not considering quitting smoking in the near future.
- Contemplation: The participant is thinking about quitting smoking, without any immediate commitment.
- Preparation: The participant is ready to quit soon.
- Action: The participant has recently quit smoking.
- Maintenance: The participant has been abstinent for an extended period [6].

6. Data collection:

The self-administered questionnaire was distributed online to reach a wide range of participants. The link to the Google Forms questionnaire was shared through several channels:

Social media: Platforms such as Facebook and Instagram were used to target interest groups related to well-being and health in Morocco. The questionnaire was also distributed in various WhatsApp groups, including local communities, support groups, and associations.

 Email distribution lists: Emails were sent to interested contacts, including those in professional and community networks, to reach smokers in different sectors.

Comparability of the two populations: In order to ensure the comparability of the two groups of participants (those who responded during Ramadan and those who responded two months later), an analysis was carried out to verify that the two

populations were similar in terms of socio-demographic characteristics. This approach reduced potential biases related to differences in the composition of the two groups, thus ensuring a rigorous analysis of data.

7. Ethical considerations and participant consent:

7.1.Consent:

Before participating in the study, all participants were informed of the nature, objectives, and implications of the research via a clear and understandable statement. Informed consent was collected digitally, with a checkbox for participants to agree to participate in the study with full knowledge of all the implications. This consent included information about the voluntary nature of their participation, the possibility of withdrawing at any time without consequences, and the confidentiality of their responses.

7.2.Anonymity and confidentiality:

The anonymity of participants was strictly respected. However, email addresses were collected so that participants could be contacted again two months after the first phase of the questionnaire, for the second phase of the study (after Ramadan). Email addresses were the only personal information collected and were stored securely. No other personally identifiable information was requested. The data collected was processed anonymously, and the results were presented in aggregate form, without the possibility of identifying participants.

7.3.Data protection:

Access to data was restricted to individuals involved in data collection. Participants were informed that their data would only be used for scientific research purposes.

8. Data Analysis:

The data were inputted using Excel 2016 and analyzed using SPSS version 21. A descriptive analysis was performed to describe the characteristics of the study population. Univariate analyses were performed to explore the distributions of the variables.

The Mann Whitney test was used to compare the means between groups. The CHI-2 and Fisher tests were used to compare the percentages between groups. Finally, Spearman's correlation test was used to explore the relationships between the different variables studied.

Results:

1. Descriptive results:

A descriptive cross-sectional study was conducted with 141 participants (n=141), divided into two groups: one group interviewed during Ramadan (n=98) and a second group interviewed two months afterwards (n=43).

The majority of participants surveyed were men, with 84.7% (n=83) interviewed during Ramadan and 69.8% (n=30) after Ramadan. The number of women was lower, representing 15.3% (n=15) during Ramadan and 30.2% (n=13) after Ramadan. In terms of marital status, the majority of participants were single: 83.7% (n=82) during Ramadan and 69.8% (n=30) after Ramadan. The number of married participants was 11.2% (n=11) during Ramadan and 37.2% (n=16) after Ramadan. Finally, 1% of the population surveyed during Ramadan was divorced (n=1), compared to 2.3% (n=1) after Ramadan.

The median age of participants during Ramadan was 28 years, with an interquartile range of 26.5 to 31 years. For the non-Ramadan group, the median age was slightly higher at 29.5 years, with an interquartile range of 24 to 42 years. The median number of children was 0 for both groups studied. During Ramadan, the interquartile range

was 0 to 0, while among the 43 non-Ramadan participants, 7% had 1 child (n=3) and 2.3% had 2 children (n=1), with an interquartile range of 0 to 1.75.

Regarding attempts to quit smoking, the median was 2 for both groups, indicating that the majority of participants had tried to quit smoking at least twice. The interquartile range of attempts ranged from 1 to 5 during Ramadan and from 0 to 5 away from Ramadan. For the nicotine dependence score measured by the Fagerström scale, the median during Ramadan was 3.5, with an interquartile range of 2 to 5.25. This score reflects moderate nicotine dependence, with scores of 3 to 4 generally associated on this scale. Outside Ramadan, the median was slightly higher at 4, with an interquartile range of 2 to 6. Although this score remains in the moderate dependence category, it suggests slightly stronger dependence among smokers surveyed outside Ramadan (Table I).

Table I: Sociodemographic characteristics of participants

	Size	Ramadan	Non-Ramadan	P-Value
Gender				
Male	113	83 (84,7%)	30 (69,8%)	0,81
Female	27	15 (15,3%)	13 (30,2%)	
Age	141	Median: 28 [26,5 - 31] ans	Median: 29,5 [24 - 42] ans	0,599
Marital status				
Single	112	82 (83,7%)	30 (69,8%)	
Married	27	11 (11,2%)	16 (37,2%)	
Divorced	2	1 (1%)	1 (2,3%)	
Number of children	141	Median: 0 [0 - 0]	Median: 0 [0 - 1,75]	0,041
Socioeconomic status				0,772
Number of attempts to quit smoking	141	Median: 2 [1 - 5]	Median: 2 [0 - 5]	0,863
FagerströmScore	141	Median: 3,5 [2 - 5,25]	Median: 4 [2 - 6]	0,454

Table I*: Characteristics of participants by period (Ramadan vs. non-Ramadan). Median for continuous variables, counts (%) for categorical variables. p indicates the comparison between the two groups.*

2. Analytical results:

The results of the data analysis show that the distribution of participants by gender does not differ significantly between those who smoke during Ramadan and those who smoke outside this period, as indicated by Fisher's test ($p = 0.81$). Similarly, no significant difference was observed in the average age of participants between the two groups, as confirmed by the Mann-Whitney test ($p = 0.599$).

However, a significant difference was observed in the number of children with ($p = 0.041$) according to the Mann-Whitney test.

With regard to other factors such as socioeconomic status, number of attempts to quit smoking, and Fagerström score, no significant differences were found between the two groups. Mann-Whitney tests revealed no significant variations in these variables ($p = 0.772$, $p = 0.863$, and $p = 0.454$, respectively).

However, it was observed that religious practices during Ramadan had a significant impact on the smoking-related behavioral change -stage. Indeed, a significant difference was noted in the distribution of the results of Prochaska and DiClemente's contemplation scale between the two groups, which was confirmed by the Mann-Whitney test ($p = 0.035$). (Table II)

Table II: Summary table of analytical results comparing participants smoking during and out of Ramadan

Variables	Summary of results	Statistical test	p-valeur
Gender	No significant difference between groups	Fisher's test	0,81
Mean age	No significant difference between groups	Mann-Whitney test	0,599
Number of children	Median = 0 for both groups, but different interquartile range (0 to 1.75 outside Ramadan)	Mann-Whitney test	0,041
Socioeconomic status	No significant difference between groups	Mann-Whitney test	0,772
Number of attempts to quit	No significant difference between groups	Mann-Whitney test	0,863

Fagerström score	No significant difference between groups	Mann-Whitney test	0,454
Stage of behavioral change	Significant difference in the distribution of the Proschaska and DiClemente scale	Mann-Whitney test	0,035

Table II: *Summary of tests performed between the Ramadan and non-Ramadan groups, with p-values and variables showing a significant difference ($p < 0.05$).*

Discussion:

The results of this study reveal important insights regarding nicotine dependence and motivation to quit smoking during Ramadan compared to other times of the year.

Nicotine dependence, as measured by the Fagerström score, remains constant between Ramadan and other months of the year, with results indicating no significant variation. This stability shows that the degree of dependence remains relatively unchanged regardless of the period, suggesting that Ramadan does not directly influence participants' level of dependence. This result is consistent with previous research, such as that of John et al. (2017), who observed consistency in nicotine dependence despite contextual variations [10].

The number of previous attempts to quit smoking also did not differ significantly between participants surveyed during Ramadan and those surveyed outside of this period, suggesting a similar experience with regard to attempts to quit in both groups.

In contrast, the results highlight a significant difference in motivation to quit smoking, as measured by Prochaska and DiClemente's contemplation scale. Participants surveyed during Ramadan scored higher on this scale, indicating a greater propensity to seriously consider quitting smoking.

To better contextualize the results of this study, it is relevant to compare them with other studies that have examined the influence of religious or cultural periods on smoking behavior. Several previous studies have highlighted the potential impact of such periods on motivation and smoking behavior.

A study conducted by Evsen et al. (2022) explored the effect of Ramadan on smokers' behavior in predominantly Muslim countries, revealing a significant reduction in tobacco consumption during this period [11]. The study found that smokers felt more motivated to reduce their consumption due to the religious values and ritual practices associated with Ramadan. This research is consistent with our findings, suggesting that the spiritual context and daily restrictions of Ramadan may encourage smokers to reconsider their smoking habits.

In another study conducted in Saudi Arabia, Monshi et al. (2023) observed that the month of Ramadan led to a notable increase in consideration of quitting smoking, particularly among smokers motivated by religious factors [12]. The authors noted that motivation to quit smoking increased during Ramadan, even though this period did not significantly reduce the level of nicotine dependence, a finding consistent with the results of our study. These findings suggest that although Ramadan encourages thoughts about quitting, it does not directly influence smokers' physiological dependence.

Further relevant insights are provided by a research study by Nuraisyah Hani et al. (2017) on the influence of religious and spiritual periods on health-related behaviors. The authors note that individuals most often tend to consider returning to appropriate health behaviors, which is generally due to the potentially introspective and spiritual nature of these periods [13]. These results are consistent with our study, which also observed an increase in motivation to quit smoking during Ramadan. Another study examined the influence of social and religious norms on smoking-related behaviors, finding that the month of Ramadan often prompted smokers to attempt to quit temporarily due to smoking bans during fasting hours [14]. Religious beliefs and social pressure contribute significantly to attempts to quit smoking, even if they do

not always lead to lasting cessation [14]. Ismael et al. (2016) studied the effect of Ramadan on tobacco use among a Malaysian population and concluded that faith-based intervention during Ramadan can have a positive effect on reducing tobacco use [15]. Their study suggests that fasting could play an awareness-raising role in tobacco control efforts. Ismail Panju (2012) conducted a study examining the effect of Ramadan on smokers' motivation to quit smoking. He observed increased motivation to quit smoking during Ramadan and significant demand for support to quit [16]. This research highlights the relevance of mobilizing interventions within public health programs aimed at encouraging behavioral changes during Ramadan. A faith-based behavioral intervention to quit smoking during Ramadan among practicing Malaysians resulted in a sustained reduction in smoking after Ramadan. The results show that Ramadan can serve as a springboard for anti-smoking interventions, particularly in highly religious countries [17].

The importance of social and cultural norms in smoking prevention is also highlighted in a study by Maarof et al. (2018). According to their findings, this environment, which reinforces self-control and aligns with religious observances, may be a contributing factor to increased and potentially successfully smoking cessation attempts during Ramadan. This study supports the notion that interventions based on cultural and spiritual values could be integrated into awareness and smoking cessation programs, which could enhance the effectiveness of prevention strategies in Morocco.

Future Perspectives

The results of this study offer new perspectives for future research. First, it would be interesting to conduct longitudinal studies to examine how smokers' motivation to quit smoking changes before, during, and after Ramadan, taking into account longer observation periods. Second, it would be relevant to explore the impact of additional

factors, such as social pressure or social support, using additional regression analysis. In addition, a comparative study between populations in different countries observing Ramadan would offer the opportunity to better understand cultural similarities and differences in the smoking cessation process.

Study Limitations

Several limitations must be taken into consideration with this study. First, the sample size remains relatively small and cannot be representative of the entire Moroccan population, which limits the generalizability of the results. Social desirability bias, particularly during Ramadan, may also skew respondents' answers. In addition, the online questionnaire may limit participation to people who have access to the internet and know how to use it. Finally, non-responses after the second data collection after Ramadan were handled by selecting a new sample, which may give rise to selection bias.

Conclusion

In conclusion, this study examined the impact of the Ramadan fasting month on motivation to quit smoking in terms of nicotine dependence, cessation attempts, and different stages of behavioral change. The results suggest that the Ramadan fast can boost smokers' motivation to choose to quit smoking permanently, at least in terms of progress through the stages of behavioral change. This evidence suggests that religious and cultural aspects should be taken into account in health awareness and tobacco control efforts.

Conflicts of interest

The authors declare that they have no conflicts of interest in relation to this publication.

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