



Contents lists available at ScienceDirect

Integrative Medicine Research

journal homepage: www.imr-journal.com

Original article

A cross-sectional study of Persian medicine and the COVID-19 pandemic in Iran: Rumors and recommendations

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ARTICLE INFO

Article history:

Received 7 June 2020

Received in revised form 6 July 2020

Accepted 10 July 2020

Available online 23 July 2020

Keywords:

COVID-19

Coronavirus

Traditional medicine

Pandemic

Iran

ABSTRACT

Background: Traditional medicine structures such as Persian medicine (PM) are deeply rooted in the global health system. These modalities, if applied correctly, could help health systems overcome situations such as the coronavirus disease 2019 (COVID-19) pandemic. However, the mismanagement of such traditional structures results in fear, stress, anxiety, and risky behavior among society. The current study aimed to assess the penetration of the recommendations and rumors related to PM during the COVID-19 pandemic and the relationships of these recommendations and rumors with related health factors.

Methods: In a cross-sectional study performed in March 2020 (during the COVID-19 pandemic) in southern Iran, eligible participants were randomly selected. The participants completed a 29-item online questionnaire assessing different aspects of the rumors and recommendations pertaining to PM linked with the COVID-19 pandemic.

Results: In total, 523 participants took part in the survey. The mean fear score was 65.2/100. Approximately 99% of the study population had heard at least one of the rumors/recommendations of PM related to COVID-19. The average scores of disagreement with the rumors and recommendations linked to PM were 16.4/50 and 18.4/35, respectively. The fear score and the level of disagreement with the rumors were significantly related ($p = 0.024$).

Conclusions: The use of PM might be beneficial in the management of the COVID-19 pandemic provided that a revolution occurs in data sharing. Various approaches should be considered in the management of traditional medicine modalities such as PM during disease outbreaks to help overcome the current dilemma.

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1. Introduction

Traditional medicine and complementary and alternative medicine, including Chinese traditional medicine or Persian medicine (PM), might offer innovative approaches and potential treatments for coronavirus disease 2019 (COVID-19) patients.¹⁻³ Nonetheless, the existence of cultural roots, the high availability of traditional health providers to the public, and the stressful atmosphere that comes with such health crises facilitate the abuse of traditional medicine by irresponsible people, generating waves of rumors. Such rumors in the time of a public health crisis can put lives at risk.⁴

Health crises can give rise to a range of mental pressures, such as fear, skepticism, stress, and anxiety.^{5,6} In such situations, a surge of disinformation, rumors, and unpleasant news can spread in society, substantially influencing the mental health of the general population and resulting in distrust of the health system.⁴ In Iran, several rumors regarding PM recommendations for the treatment and prevention of COVID-19 patients (for instance, that drinking camel urine would immunize a human against coronavirus infection) have been spread throughout social media since the commencement of the pandemic, highlighting the capacity of social media to cause distrust of the healthcare system and harm society's public health status.

Simultaneous with such rumors, PM specialists have made some recommendations for the management of COVID-19 patients, the containment of the disease, and the decrease of stress levels during quarantine. Owing to the variety of social media and the massive penetration of virtual communication networks in Iran, it is

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impossible to distinguish between the penetration of rumors and recommendations pertaining to PM. The incomplete distinguishing of rumors from precise evidence can result in irreversible risks for people following PM. Furthermore, factors related to the accessibility/inaccessibility of these rumors and recommendations are unknown. This study aimed to evaluate the penetration of both the correct recommendations made by PM specialists and the rumors related to PM during the COVID-19 pandemic and their relationships with public fear and other influential factors.

2. Methods

2.1. Study design

A cross-sectional survey study was conducted in the Fars Province of Iran during the COVID-19 pandemic in March 2020.

2.2. Setting

Fars Province, with the city of Shiraz (the 5th largest Iranian metropolis) as its capital, is the most populated province in the south of Iran (4,851,274), with an urbanization rate of 71%, a male/female ratio of 1.03, and 80% Fars ethnicity; this province hosts a rich part of the country's history and comprises a major tourist attraction center of the country. Considering the aforementioned data, Fars Province is a good representation of the Iranian population. The COVID-19 pandemic occurred simultaneously with the Persian New Year (*Nowruz*), and Shiraz was expected to be a high-risk location in Iran for the spread of the virus due to its large number of visitors.

2.3. Participants

In this study, literate adults in the age range of 18-60 years were eligible for participation.

Considering our pilot study results, approximately half of the general population has heard rumors related to PM with 10% accuracy, 5% type I error, and a 40% lack of response, and the minimum sample size was estimated to be 520 individuals. The data were collected online to respect the study ethics as the researchers wanted to avoid the spread of the COVID-19 virus through observation of social distancing rules. Considering that many people in the age group of 18-60 use smartphones, online data collection was the best and safest method. Participants in the study were randomly selected according to their cellphone numbers from the list of existing cellphone numbers in Fars Province.

2.4. Data collection

An invitation message to take part in this study was sent, along with the related information and the online questionnaire link, to each participant via WhatsApp or Telegram, which are two highly popular smartphone applications among Iranians. Since it was explained that commencing the questionnaire completion process would produce no harm or benefit for the participants, beginning this process was considered as the provision of willful consent for participation.

2.5. Data instrument

Rumors were defined as any false belief without supporting evidence in one of the PM practices, while PM recommendations were evidence-based comments approved by a PM specialist board council. The data collection tool included 29 questions, including four questions related to demographic features. To design this questionnaire, a list of the most prevalent rumors related to PM was created

by examining the content of news websites; applications such as WhatsApp, Soroush (an Iranian messenger), Telegram, and Instagram; and interviewing people in society. This list was reviewed by a panel of 9 PM specialists, and incorrect and harmful rumors were identified (11 questions). Grounded in the protocols distributed by the Office of Traditional Medicine of the Iranian Ministry of Health and Medical Education in booklet format for general audience that was released in March 2020, certain recommendations were chosen by the PM specialists (7 questions). In this part, the respondent was first asked if they had heard each recommendation/rumor. Then, if they responded that they had heard the recommendation/rumor, their belief was measured based on a five-point Likert scale. In addition, the researchers used a 0-100 visual linear scale to measure the fear level of the respondents (5 questions). Two questions were related to the source of the received information. To observe research ethics and to encourage participants to give honest answers, none of the questions were compulsory (see [supplementary file](#)).

The face and content validity of the questionnaire were evaluated qualitatively by 13 experienced staff members (PM specialists, epidemiologists, and health education and promotion specialists) who work in the field of designing health-related surveys. The content validity index (CVI) and the content validity ratio (CVR) were calculated at 0.85 and 0.87, respectively. Reliability was evaluated using Cronbach's alpha, which was 0.77 for the rumors and recommendations section and 0.78 for the entire questionnaire.

2.6. Statistical analysis

The data were processed using appropriate statistical techniques. The internal and external consistency (including identification of the outlier, implausible, erroneous, and extreme values) of the data and the percentage and patterns of missing values were evaluated. To describe the data, frequencies, percentages, means, and standard deviations were used. The percentage of the people who had heard rumors/recommendations and the mean number of rumors/recommendations heard were calculated and categorized into subgroups. To analyze the data, a chi-squared test was applied to test the correlation of the categorical variables with the penetration rate. To compare the mean of the continuous variables among the groups of participants, two independent samples t-tests and one-way analysis of variance were used. The logistic regression model was also employed for multivariable analysis to determine the independent association of sociodemographics and other potential correlates with disagreements about PM rumors or recommendations. A *p*-value of less than 0.05 was considered statistically significant. The statistical analysis was performed using IBM SPSS (Chicago, IL, USA) version 11.

2.7. Ethics approval

This study was approved by the Ethics Approval Committee of Shiraz University of Medical Sciences (IR.SUMS.REC.1398.1420). Those who did not give consent to take part in the study were excluded.

3. Results

In total, 523 people (response rate: 65%) participated in the study, with a female/male ratio of 0.81. The percentage of missing values or uncompleted questionnaires was zero. The mean age of the participants was 40.5 ± 11.5 . The mean score of fear among the participants was calculated at 65.2 ± 20.1 out of 100. The percentage of people who had heard at least one of the rumors related to PM was higher than 99% ($n = 519$), with only 6.88% ($n = 36$) disagreeing with the rumors. Out of the study population, 99% ($n = 517$) had

Table 1
Mean scores of disagreement with the rumors and recommendations related to Persian medicine (PM) during the COVID-19 pandemic in Iran based on background factors.

Factor	n (%)	PM rumors		PM recommendations	
		Mean \pm SD	p-Value	Mean \pm SD	p-Value
Gender^a					
Male	288 (55)	16.0 \pm 7.7	0.348	17.0 \pm 0.6	0.002
Female	234 (45)	16.6 \pm 7.3		19.0 \pm 0.4	
Education level^b					
Diploma or less	93 (17.7)	18.1 \pm 8.3	0.006	19.6 \pm 7.7	0.023
Diploma to BSc	197 (37.7)	16.82 \pm 7.63		18.9 \pm 7.3	
Higher than BSc	233 (44.6)	15.35 \pm 6.83		17.4 \pm 7.7	
Marital status^a					
Single	114 (22.0)	14.8 \pm 7.2	0.008	15.1 \pm 7.0	<0.001
Married	408 (78.0)	16.8 \pm 7.5		19.3 \pm 7.5	
Morbidity^a (endocrine, cardiovascular, respiratory, gastrointestinal, etc.)					
Yes	363	16.4 \pm 7.6	0.963	17.8 \pm 7.7	0.011
No	160	16.4 \pm 7.2		19.6 \pm 7.2	

^a Two independent sample *t*-test.^b One-way ANOVA.**Table 2**
Factors related to the disagreement of the participants with rumors/recommendations related to Persian medicine (PM) during the COVID-19 pandemic in Iran.

Factor	Crude odds ratio ^a (95% CI)	Adj. odds ratio ^a (95% CI) ^b
PM rumors		
Fear deciles	0.24(0.03, 0.45)	0.25(0.04, 0.46)
Age (10 years)	1.00(0.45, 1.55)	1.03(0.49, 1.58)
Social networks as the main source of information	1.69(0.27, 3.11)	1.72(0.33, 3.11)
Education level (ref.: less than diploma)	-1.05(-1.82, -0.28)	-1.05(-1.82, -0.29)
PM recommendations		
Age (10 years)	1.19(0.63, 1.74)	0.77(0.17, 1.37)
Being male	-2.11(-3.46, -0.76)	-2.16(-3.47, -0.85)
Media inside Iran as the main source of information	1.43(0.05, 2.81)	1.56(0.16, 2.95)
Media outside Iran as the main source of information	-2.39(-5.44, 0.67)	-3.27(-6.31, -0.23)
Healthcare providers as the main source information	2.41(0.42, 4.41)	2.23(0.24, 4.22)
Being married	3.55(2.17, 4.93)	2.47(0.98, 3.96)

^a Multivariable binary logistic regression^b Gender, education level, marital status, comorbidity, fear, different sources of information

heard at least one recommendation, but only 2.9% ($n = 15$) disagreed with the recommendation(s).

The mean score of disagreement with the rumors and recommendations related to PM were calculated at 16.4 ± 7.5 out of 50 (higher scores desirable) and 18.4 ± 7.5 out of 35 (lower scores desirable), respectively. Gender had no significant effect on the score of disagreement with rumors ($p = 0.348$) but did significantly affect disagreement with recommendations, such that this score was higher for women than men ($p = 0.002$) (see Table 1).

A statistically significant link was observed between the score of fear and the level of disagreement with the rumors related to PM ($p = 0.024$) but not with the level of disagreement with the recommendations. Interestingly, the information source had a significant effect on the level of disagreement with the rumors.

Linear multivariate regression revealed that an increased level of public fear, older age, and the use of social media as the information source had direct, significant relationships with disagreement among most participants. The male gender and receiving information related to PM from foreign TV news broadcasts and other foreign agencies were some of the factors that were significantly associated with decreased disagreement with the recommendations related to PM (see Table 2).

4. Discussion

The findings of the current research showed that the fear level caused by the COVID-19 pandemic between the participants was more than 65%, and the rate of penetration of the recommendations/rumors related to PM was extremely high. That is, almost all of the participants were aware of at least one of the recom-

mendations/rumors related to PM during the pandemic. This high penetration rate gains more importance when we understand that the most common tool for receiving PM information and news related to the COVID-19 pandemic was social media and that the information received from national TV and radio channels or healthcare providers led to the decreased acceptance of PM recommendations related to COVID-19.

The results show that both rumors and recommendations expand rapidly among people. However, a significant number of people do not oppose such information. An inadequate level of health literacy may explain why people are trusting such information so easily in the context of the current pandemic.⁶ Presenting accurate information in proper time to the correct audience is one of the priorities of a health system. If this process is done well, people will develop trust toward the health system. This trust, as a multidimensional dynamic, also depends on other factors pertaining to both the trustor and trustee. Increased health literacy, especially during a crisis, is one factor that leads to the development of heightened trust in the health system, thereby averting the dangers related to the spread of rumors.⁷

By examining the mean score and percentage of disagreement with the PM-related recommendations/rumors regarding COVID-19 and by considering the level of agreement/disagreement, it becomes clear that a significant number of participants agree with the rumors but disagree with the recommendations. This finding clarifies the necessity of a direct relationship between PM healthcare providers/educators and the general population.⁸ Developing smart and dynamic public relations, applying virtual teaching in valid directions for the audience during epidemics and pandemics,^{9,10} utilizing evidence-based medical

recommendations,¹¹ and refuting circulating rumors are some of the practical solutions for decreasing fear and reducing the penetration of rumors in society. Furthermore, introducing academic, evidence-based recommendations derived from authentic PM books and evaluated in case reports, case series, case-control studies, and clinical trials seems essential.

While pandemics such as COVID-19 have pushed experts toward the use of novel technologies (e.g., telemedicine),¹² selecting the right medium and appropriate teaching method to communicate with people has gained immense value.¹³ This is in light of the fact that, for instance, the use of foreign media as the main source for PM news related to COVID-19 was the main factor responsible for the acceptance of rumors in our study. This finding, along with the positive effects of the text messages that the Ministry of Health has sent to the general population to oppose PM rumors related to COVID-19, demonstrates the significance of selecting an appropriate and valid medium. The use of advanced methods for informing the public is also important, as our results show that people who received PM recommendations via social networks rejected rumors at a higher rate.

Actively teaching healthcare providers¹⁴ and the utilization of virtual teaching¹⁵ to familiarize them with academic PM is one solution that should be taken into consideration. It has also become clear in this study that participants who received PM information related to COVID-19 from health personnel had the highest rate of disagreement with the related recommendations. This outcome may indicate a lack of awareness about the academic capabilities and functions of PM in the prevention and treatment of disease among healthcare providers, generating distrust among people in society. Publicly presenting academic- and evidence-based findings of PM is one of the approaches through which a country such as Iran, with its huge healthcare coverage,¹⁶ can increase the public's trust and promote the acceptance of valuable recommendations by introducing common platforms for broadcasting trustworthy public health messages.¹⁷

Public fear about getting infected and not knowing many aspects about how to act in relation to a person who can transmit the infection are typical findings during pandemics¹⁸; these findings are also evidenced in the current study. Although fear can sometimes be a trigger for attitude modification and the rectification of bad habits,¹⁹ public fear in the time of a pandemic bears adverse consequences^{20,21}; thus, adequate efforts must be made to minimize public fear by providing correct information. Individual trust, social values, and political attitudes toward the disease are some of the factors that have been introduced as social indices related to public fear.²² Although the identification and analysis of such factors were not part of the study goals, it seems that similar factors play a role in stoking public fear and that the U.S. sanctions on Iran promote political attitudes toward the COVID-19 pandemic.²³

Although quality assurance measures were applied, the limitations of our study include probable smartphone bias and our inability to investigate the link between COVID-19 infection among the participants and their agreement/disagreement with PM rumors or recommendations. Making use of novel technologies (e.g., social media), evidence-based teaching, direct communication with the audience, smart and powerful public relations, academic teaching to healthcare providers, and efforts to gain public trust are some of the approaches that traditional medicine systems such as PM can take to help the fight during epidemics or pandemics such as COVID-19.

The use of traditional medicine during epidemics or pandemics offers excellent potential to enable people to select the most appropriate options for dealing with the conditions, provided that novel methods for informing the public are used, that correct and trusted information is transmitted to the audience, and that existing rumors are identified and rebutted. To conclude, direct public

epidemic communication is the most effective strategy to combat rumors, although this was not applicable for PM recommendations. The penetration of rumors/recommendations linked to PM was also extremely high during the COVID-19 pandemic in Iran.

Author contributions

Conceptualization: HMV and MP. Methodology: HMV, STH and MP. Data Curation: HMV, STH, BD and MP. Formal Analysis: HMV and STH. Investigation: MP, STH and BD. Writing—Original Draft: HMV, BD and MP. Writing – Review & Editing: HMV, STH and MP. Supervision: MP and HMV. All authors read and approved the final manuscript.

Conflict of interest

The authors have no conflicts of interest to declare.

Funding

No funding was received.

Ethical statement

This study was approved by the Ethics Approval Committee of Shiraz University of Medical Sciences (IR.SUMS.REC.1398.1420).

Data availability

Data will be made available upon request.

Acknowledgments

The authors would like to thank all the volunteers who participated in the study.

Supplementary material

Supplementary figure and questionnaire can be found in the online version, at [doi:10.1016/j.imr.2020.100482](https://doi.org/10.1016/j.imr.2020.100482).

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