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Public Knowledge, Attitude, and Practice toward COVID-19 among the Iranian Population: A Systematic Review of the Literature

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Abstract

Background: The COVID-19 pandemic has led to significant public health and humanitarian crises, impacting the health and livelihoods of individuals worldwide. This study aims to investigate the knowledge, attitudes, and practices (KAP) of the Iranian population regarding the COVID-19 pandemic and the associated factors.

Materials and Methods: In this systematic review, a search of online databases (Medline, EMBASE, Scopus, Web of Science, Cochrane Library, CIVILICA, and Google Scholar) was conducted for related studies without any time limit up to July 2022. Two reviewers assessed the quality of the eligible studies, and the quality of the information was evaluated using the STROBE tool.

Results: A total of 14 relevant studies involving 21,484 participants were included in the review. Overall, 64.8% of participants demonstrated appropriate knowledge (range: 56.5% to 73.17%), 62.3% exhibited favorable attitudes (range: 52.6% to 72%), and 71.4% reported good practices (range: 51.8% to 91%). Factors associated with the knowledge, attitudes, and practices (KAP) of the population included age, gender, marital status, household size, education level, employment status, being a housewife, location of residence, social deprivation, and income level ($p < 0.05$).

Conclusion: The mean scores of good knowledge, positive attitude, and good practice of the population were above average and estimated as 64.8%, 62.3%, and 71.4%, respectively. Providing correct scientific information through mass media and healthcare providers and continuous encouragement of people about the observance of preventive measures are emphasized.

Key Words: Attitude, COVID-19, Iran, General population, Knowledge, Practice.

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1- INTRODUCTION

COVID-19 is a highly contagious infectious disease, and the COVID-19 pandemic has disrupted the lives of people, leading to illness and death for thousands around the world, including Iran (1-4). The pandemic has resulted in public health and humanitarian crises, negatively impacting the lives, health, and livelihoods of individuals in all countries (5). In Iran, the spread of the coronavirus began in the city of Qom, quickly affecting many northern regions and neighboring provinces. The government's official declaration regarding the pandemic was issued at the beginning of March 2020, and by April 16, 2023, a total of 7,597,982 people had been infected in Iran, with 145,571 deaths reported (6).

The emergence and widespread prevalence of COVID-19 have led to severe consequences across various dimensions (7). From an economic perspective, the spread of COVID-19 and the subsequent increase in the number of patients and complications have imposed overwhelming direct and indirect costs on patients, the healthcare system, and governments (8). Experience has shown that implementing preventive measures to control the disease requires widespread social awareness among both government officials and the public to manage the pandemic safely and effectively (9, 10).

Since the outbreak of COVID-19, extensive efforts have been made to gain a better understanding of the virus and control the disease in Iran. Several national and global KAP studies have investigated the relationship between knowledge, attitudes, and behaviors regarding COVID-19. The results indicate that a higher level of knowledge positively correlates with preventive behaviors (11-18). Furthermore, knowledge and attitudes toward COVID-19 correlate with fear and panic levels, complicating outbreak control efforts (19, 20). Additionally, people's attitudes positively influence preventive behaviors (14, 15, 17, 18). Therefore, it is essential to evaluate knowledge and attitudes to tailor education for better implementation of health policies and ultimately prevent disease transmission (21). Understanding people's attitudes also aids in predicting and influencing their behavior (22). Given the understanding of COVID-19 and the ongoing rapid outbreak, information gaps among the public can lead to misperceptions, rumors, and panic. It is critical to gather and act on community feedback and concerns to provide relevant life-saving information, adjust operational responses, and build long-term trust. Such assessments help in understanding people's knowledge, beliefs, and actions in response to COVID-19, serving as a community engagement tool to listen to individuals and enhance measures. Identifying the public's level of knowledge, their reactions to this information, and their reasons for resistance to change can aid in developing effective, targeted strategies, fostering dialogue with communities, and promoting positive behavior (5). The general population in Iran can be protected by assessing people's knowledge, attitudes, and practices (KAP), enabling health providers to identify which areas to target or enhance (23). The present study aimed to review the knowledge, attitudes, and practices of the Iranian population and the factors related to them regarding the COVID-19 pandemic.

2- MATERIALS AND METHODS

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist was used as the template for this review (24).

2-1. Eligibility criteria

The Participants, Interventions, Comparators, and Outcomes (PICO) framework was used to formulate the

review objective and inclusion criteria (25):

- **Participants:** Iranian public population.
- **Interventions:** The included studies are non-interventional, meaning there is no comparison group.
- **Comparators:** Not applicable, as there is no comparison group.
- **Outcomes:** Knowledge, attitudes, and practices (KAP) regarding COVID-19.

2-2. Inclusion criteria

The review included studies that reported any form of quantitative assessment, measurement, or evaluation of knowledge, attitudes, and practices (KAP) regarding COVID-19 in the general population across any region of Iran. The inclusion criteria specified that studies must focus on knowledge, attitudes, and/or practices related to COVID-19, be published up to July 2022, be written in English or Persian, and have full text available.

2-3. Exclusion criteria

Studies were excluded if they focused solely on specific groups, such as healthcare workers, medical students, pregnant women, or individuals with comorbidities. Additionally, reviews or meta-analyses, letters to the editor, editorials, short reports, case reports, and briefs were also excluded.

2-4. Information sources

A systematic search of electronic databases—including Medline, EMBASE, Scopus, Web of Science, Cochrane Library, CIVILICA, and Google Scholar—was conducted. Two reviewers independently performed the search in duplicate, and any disagreements between them were resolved by the supervisor.

2-5. Search

The main keywords for the search strategy included "knowledge," "attitude," "practice," "Iran," and "COVID-19."

2-6. Study selection

A database search was conducted to identify potential studies. Study abstracts were screened for eligibility, full-text articles were obtained and assessed, and a final list of included studies was compiled. References were organized and managed using EndNote software (version X8).

2-7. Data collection process

A researcher’s form was developed and used for each study. Two reviewers independently collected the data, which were then combined and compared for accuracy. Any discrepancies were resolved by a third reviewer. The collected data included the authors' names, publication period, study setting, design, population, sample size, data collection tool, and main findings of the study.

2-8. Risk of bias in included studies

The quality of cross-sectional studies was assessed using the Newcastle-Ottawa Scale (NOS) for non-randomized studies (26). This scale utilizes a star system, allowing a maximum of nine stars to be awarded based on evaluations in three main categories: selection (up to four stars), comparability (up to two stars), and outcome (up to three stars). Two reviewers conducted the assessment independently and in duplicate, with any discrepancies resolved by a third reviewer.

2-9. Synthesis of results

A meta-analysis was not conducted due to the variability in reported results (e.g., percentages and means with standard deviations), differences among study populations, and the utilization of diverse data collection methods.

2-10. Ethical considerations

No ethics committee approval was required for this secondary analysis of publicly available articles. The study adhered to copyright laws and maintained methodological transparency.

3- RESULTS

A total of 14 articles involving 21,484 participants, published between January 1, 2020, and July 27, 2022, were selected (**Figure 1**). Overall, the quality of the cross-sectional studies was moderate. The results indicated that the mean scores for knowledge, attitudes, and practices (KAP) regarding COVID-19 were above average. Several variables demonstrated a significant relationship with the population's KAP toward COVID-19 (**Table 1**). The main characteristics of the selected studies are summarized in **Table 2** and in the following sections:

Table 1: Factors related to KAP among the general population.

Variables Related to Knowledge	Variables Related to Attitude	Variables Related to Practice
Gender	Gender	Gender
Age	Age	Age
Employment Status	Marital Status	Marital Status
Location of Residence	Education Level	Education Level
Education Level	Location of Residence	Income Level
Socioeconomic Status	Employment Status	
Number of Household Members	Housewives	

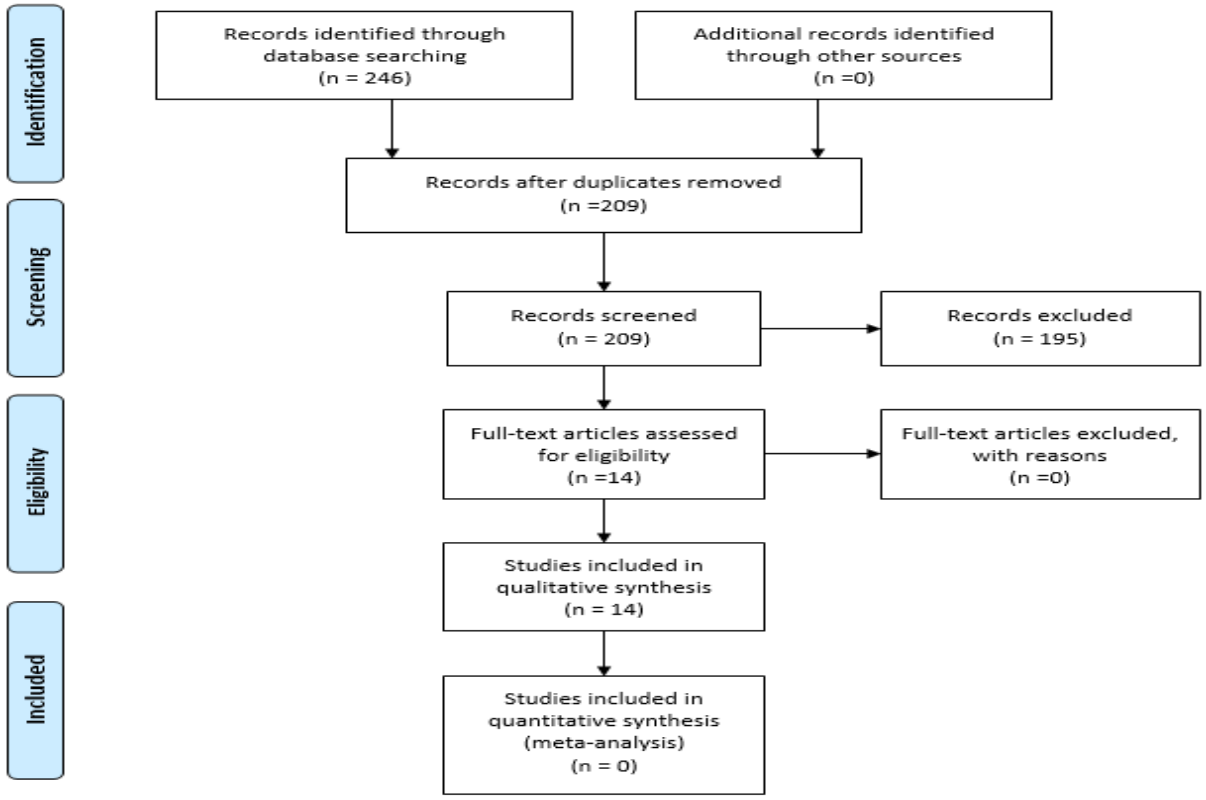

Fig.1: PRISMA flowchart.

1. A cross-sectional web-based study aimed to estimate COVID-19 awareness, attitudes, and perceived anxiety among the general Iranian population. The results indicated that most participants had substantial knowledge about the disease, with 87.4% aware of the ways the virus is transmitted. However, only 33% were knowledgeable about the major signs and symptoms of the infection. The majority of participants expressed a favorable attitude toward handwashing, social distancing,

self-quarantine/isolation, and government policies related to COVID-19 (27).

2. A descriptive cross-sectional study in Jahrom, southern Iran investigated attitudes, awareness, and preventive behaviors. Mean scores showed above-average knowledge (68.14±8.57), attitude (78.73±10.04), and practice (79.68±11.44). Multiple linear regression revealed male gender and household size had significant inverse effects on awareness, while age, education, and marital status positively influenced awareness (p=0.001, F=28.057). For attitude, male gender showed inverse effect, age and education direct effects (p=0.001, F=6.78). Male gender also inversely affected practice (p=0.002, F=3.30) (28).

3. A cross-sectional descriptive-correlational survey aimed to investigate knowledge, attitudes, and practices regarding COVID-19 among adults in Ardabil. The results indicated that 73.17% of participants had appropriate knowledge, 61.19% exhibited favorable attitudes, and 69.53% demonstrated adequate practice behaviors. Knowledge was associated with gender, employment status, and location of residence. Attitudes were influenced by age, marital status, education level, and location of residence, while behavior was associated with age, gender, and marital status. The findings from linear regression analysis revealed that both knowledge and attitudes significantly influenced behavior (29).

4. A cross-sectional descriptive-analytical study aimed to investigate the attitudes, practices, and perceived self-efficacy of Iranians regarding COVID-19 preventive behaviors. The results revealed a significant direct correlation between participants' attitudes and their practices ($r= 0.23$, $p < 0.05$), as well as with perceived self-efficacy ($r = 0.21$, $p < 0.001$) concerning coronavirus preventive behaviors. Additionally, there was a significant direct relationship between self-efficacy and practice ($r = 0.46$, $p < 0.001$). The results of the univariate regression analysis indicated that occupation, marital status, attitude, and self-efficacy were significant predictive variables for participants' practices related to coronavirus preventive behaviors ($p<0.05$) (30).

5. A cross-sectional study aimed to determine the knowledge, attitudes, and practices regarding COVID-19 in the general population of Qazvin province. The results indicated that participants scored 68% for knowledge, 72% for attitudes, and 91% for practice. Knowledge ($p = 0.007$) and practice ($p = 0.028$) scores increased with age. Higher education levels were associated with increased knowledge ($p < 0.001$), while attitude scores decreased ($p= 0.001$). Male participants had significantly lower scores in knowledge ($p = 0.002$), and practice ($p < 0.001$), whereas rural residents exhibited higher attitude scores compared to urban residents ($p = 0.002$) (31).

6. A cross-sectional descriptive study aimed to investigate the awareness, attitudes, and practices of people in Mashhad regarding COVID-19 in 2020. The results indicated that the mean scores for awareness, attitudes, and practices among participants were above average, estimated at 78.57 ± 9.22, 78.68 ± 9.78, and 83.83 ± 10.19, respectively. The average level of trust in various media sources (including radio, virtual media, magazines, and publications) was 50.31% (32).

7. A cross-sectional web-based nationwide study aimed to determine the knowledge, attitudes, and practices of the Iranian population in the context of COVID-19. The results showed mean knowledge scores of 23.2 (SD 4.3) out of 30. Participants' attitudes toward COVID-19 were predominantly positive, with the majority believing that the pandemic would eventually be controlled. The mean

practice score among participants was 20.7 (SD 2.2) out of 24. Almost none of the respondents traveled, and 92% reported washing their hands before touching their faces (33).

8. A cross-sectional analytical study aimed to investigate people's knowledge and behaviors regarding COVID-19, as well as their views on public policies implemented to combat the virus in Maragheh, a city in northwestern Iran. The results indicated that the mean scores for knowledge (6.42 ± 1.2 out of 9) and health behaviors (34.8 ± 3.9 out of 36) were moderate. Knowledge ($\beta = 0.23$) and male gender ($\beta = -0.27$) were identified as predictors of health behaviors ($p < 0.001$, $F = 12.47$). Participants' views on COVID-19 control policies were assessed at a medium level (48.2 ± 7.5 out of 65). According to participants, the most effective policies against COVID-19 included lockdown measures (96.4%), school closures (95.9%), and restrictions on intercity travel (91.3%) (34).

9. A cross-sectional study aimed to investigate the knowledge and preventive practices of Iranians regarding the COVID-19 pandemic. The results indicated a moderate level of knowledge and preventive practices among most respondents, with scores of 56.8% and 56.5%, respectively. According to multiple regression analysis, knowledge had the most significant effect on participants' practices ($\beta = 0.479$). The coefficient of determination ($R^2 = 0.509$) indicated that approximately 51% of the variance in practice was explained by gender, occupational status, knowledge, the cost of hand sanitizer, and belief in the effectiveness of using such necessities (35).

10. A cross-sectional study aimed to investigate the knowledge, attitudes, and practices of older Iranians regarding COVID-19. The results showed that the mean scores for knowledge, attitude, and practice among older adults were 92.3 ± 10.8, 89.1 ± 14.3, and 90.4 ± 13.4, respectively, with no significant differences based on sex or history of underlying diseases ($p > 0.05$). The generalized linear model indicated a significant relationship between education level and knowledge score ($p < 0.001$), as well as between age and attitude, and age and practice ($p < 0.05$), after adjusting for individuals over 80 years old (36).

11. A cross-sectional population-based study in Shiraz aimed to determine people's knowledge, attitudes, risk perceptions, and practices regarding COVID-19 to provide field-based evidence for policymakers and assist in managing the pandemic. The results indicated that the mean scores for knowledge and practice were 15.9 ± 3.5 and 55.1 ± 8.1, respectively, with 63% of participants demonstrating good knowledge and 78% exhibiting good practices. Males, individuals with lower education levels, and the elderly had lower knowledge and poorer practices. Knowledge was also found to be lower among marginalized (socially deprived) individuals. Responses from 69.1% of participants indicated that the pandemic had extremely negative effects on their routine activities. Overall, the findings suggest that adults' knowledge and practices regarding COVID-19 were reasonably appropriate; however, practices were not correlated with knowledge in two-thirds of the participants (37).

12. A cross-sectional study aimed to assess knowledge, attitudes, and practices regarding COVID-19. The results indicated that 56.5% of participants had adequate knowledge, 52.6% had a positive attitude, and 51.8% exhibited appropriate practices toward COVID-19. Pearson's correlation test revealed significant positive correlations between knowledge and attitude ($r = 0.114$, $p = 0.026$), knowledge and practice ($r = 0.224$, $p =$

0.011), and attitude and practice (r = 0.281, p = 0.005). Knowledge levels among urban residents were significantly higher than those of the rural population (p= 0.018). Additionally, attitudes among married individuals (p = 0.001), employees, and housewives were significantly more favorable than those of other groups (p = 0.006). Participants with lower incomes demonstrated poorer practices (p = 0.001) (38).

13. A cross-sectional web-based study aimed to investigate the knowledge, attitudes, and practices of the general Iranian population during the COVID-19 pandemic. The results indicated that participants exhibited high levels of knowledge, positive attitudes, and effective practices related to COVID-19. Specifically, the mean knowledge score was 23.2 out of 30, and the mean practice score was 20.7 out of 24. Despite these positive findings, the study also identified some misconceptions among participants regarding the disease. The study highlighted that social media was a primary source of information for many respondents, which may have contributed to both their awareness and misconceptions. Although most participants recognized the importance of preventive measures such as handwashing and social distancing, there were still gaps in understanding certain aspects of the virus and its transmission (39).

14. A cross-sectional study conducted on 471 citizens aged 15 years and older in Isfahan aimed to assess their knowledge, attitudes, and behaviors regarding COVID-19. The findings revealed that the mean score for knowledge about COVID-19 was 17.22 ± 2.9 (range: 5-21), indicating a generally high level of understanding among participants. The mean attitude score was 23.66 ± 3.56 (range: 13-30), reflecting a positive outlook towards preventive measures and concerns related to the pandemic. Additionally, the average performance score was 2.99 ± 1.01 (range: 0-5), suggesting that most individuals engaged in appropriate behaviors to mitigate the spread of the virus. Despite the overall high levels of knowledge and positive attitudes, the study also identified certain misconceptions among participants regarding COVID-19. These misconceptions could potentially hinder effective preventive practices, underscoring the need for targeted public health education (40).

Table-2: The general characteristics of included studies (n=14).

Authors, Reference	Study period	Setting	Study design	Study population	Sample size	Main findings
Ghasemi et al., 27	2020	Iran	cross-sectional web-based study	general population	375	Most people had substantial knowledge about the disease, and the majority of participants had a favorable attitude towards the prevention of COVID-19.
Kalani et al., 28	2020	Jahrom	cross-sectional study	general population	1570	The mean score of knowledge (68.14±8.57), attitude (78.73±10.04), and practice (79.68±11.44) of participants were above average.
NeJhaddadgar et al., 29	2021	Ardabil	cross-sectional descriptive-correlational study	general population	384	Based on the results, 73.17% of participants had appropriate knowledge, 61.19% had favorable attitudes, and 69.53% had enough practice behavior.
Joveini et al., 30	2020	Iran	cross-sectional descriptive-analytical study	general population	387	The results indicated the participants' positive attitude, high self-efficacy, and proper practices in adopting preventive behaviors against COVID-19 disease.
Hosseinkhani et al., 31	2020	Qazvin province	cross-sectional study	general population	1223	The scores of knowledge, attitudes, and practice were 68%, 72% and 91%, respectively.
Ebrahimi et al., 32	2021	Mashhad	cross-sectional descriptive study	general population	614	The mean scores of the knowledge, attitude, and practice of participants towards COVID-19 were estimated at 78.57±9.22, 78.68±9.78, and

						83.83±10.19, respectively.
Abbasi-Kangevari et al., 33	2020	Iran	cross-sectional web-based nationwide study	general population	12332	Knowledge of COVID-19 among people in Iran was nearly sufficient, their attitudes were mainly positive, and their practices were satisfactory.
Salavati et al., 34	2020	Maragheh	cross-sectional, analytical study	general population	672	The mean scores of people's knowledge (6.42 ± 1.2) out of 9, and health behaviors (34.8 ± 3.9) of 36, were moderate.
Heydari et al., 35	2020	Iran	cross-sectional web-based study	general population	925	Acceptable rates of knowledge and practice were observed in most Iranians.
Rahimi et al., 36	2020	Isfahan	cross sectional study	general population	249	The mean scores of knowledge, attitude and practice of the older people were 92.3 ± 10.8, 89.1 ± 14.3 and 90.4 ± 13.4, respectively, and were not significantly different from the sex and history of underlying diseases ($p > 0.05$).
Honarvar et al., 37	2020	Shiraz	cross-sectional and population-based study	general population	1331	The mean score of knowledge was 15.9 ± 3.5, while the mean score of practices was 55.1 ± 8.1, showing 63% of participants had good knowledge and 78% good practice.
Nourmoradi et al., 38	2020	Iran	cross-sectional web-based study	general population	558	Based on the results, 56.5% of the participants had adequate knowledge, 52.6% had a good attitude, and 51.8% had appropriate practice related to COVID-19.
Kakemam et al., 39	2020	Iran	cross-sectional web-based study	general population	1480	The people's knowledge and attitude toward COVID-19 at the time of its outbreak was at a high level.
Bahrami et al., 40	2020	Isfahan	cross-sectional study	general population	384	The knowledge, attitude and practice of the citizens of Isfahan in the use of electronic services are higher than average.

4- DISCUSSION

COVID-19 is a highly contagious infectious disease that has significantly disrupted lives worldwide, causing illness and death for thousands, including in Iran (41-43). This systematic review aimed to investigate the knowledge, attitudes, and practices (KAP) of the general population concerning the COVID-19 pandemic. The results indicated that the majority of participants demonstrated adequate knowledge, favorable attitudes, and appropriate practice behaviors regarding COVID-19. Additionally, knowledge was found to be associated with various factors including gender, employment status, education level, social privileges, number of households, marital status, and location of residence. Attitudes were linked to age, marital status, gender, education level, location of residence, employment status, and being a stay-at-home wife. Furthermore, practice behaviors were related to age, gender, marital status, education level, and income level.

The findings highlight the importance of understanding the factors influencing knowledge, attitudes, and practices in order to design effective public health interventions. While many individuals demonstrated a strong understanding of COVID-19 and adhered to preventive measures, there were still misconceptions that could adversely affect overall public health efforts. Addressing these misconceptions through targeted educational campaigns is essential for improving community responses to health crises. The study underscores the need for continuous monitoring of KAP within the population to adapt strategies that enhance public awareness and compliance with health guidelines during ongoing and future pandemics.

The outbreak of the new coronavirus, which led to the third pandemic of the 21st century, has now escalated into a global emergency. The disease has impacted 230 countries, challenging the global health system as well as economic, psychological, and social foundations worldwide (44, 45). The pandemic has affected various aspects of people's lives, including physical, social, emotional,

behavioral, and economic health, becoming an international concern (46, 47). A fundamental measure to control pandemics is to increase awareness and improve societal attitudes toward the disease. The lack of awareness and understanding has hindered prevention efforts and facilitated the virus's spread (48-51). Therefore, health education and awareness are critical strategies for effective disease management (52-54). Since the onset of COVID-19, extensive efforts have been made in Iran to enhance understanding of the virus and control the disease, with public education identified as one of the most effective measures in disease control (16). To facilitate better general education, it is essential to assess the KAP levels of the target population regarding COVID-19.

Understanding the knowledge, attitudes, and practices of the population is crucial for developing effective public health strategies. Insights gained from assessing KAP can inform targeted educational campaigns aimed at correcting misconceptions and enhancing compliance with health guidelines. Since misinformation can significantly impact public behavior during a health crisis, addressing these gaps is vital for improving community responses. Continuous monitoring of KAP levels will enable health authorities to adapt their strategies effectively and ensure that public health messages resonate with various demographic groups. Ultimately, fostering a well-informed population is essential for mitigating the impacts of COVID-19 and preparing for future pandemics.

The findings of this review indicated that the majority of the Iranian population had adequate knowledge about COVID-19, with a reported rate of 73.17%. In a national study conducted online at the beginning of the pandemic in Iran, most participants stated that they were aware of the common symptoms of the disease and the warning signs that necessitate hospitalization (18). Similarly, Olapegba et al. demonstrated that most Nigerians possessed relatively high knowledge about COVID-19, aligning with the results of the present study (55). Conversely, a study in Bangladesh revealed that while participants were highly aware of COVID-19 transmission, 14% lacked knowledge about the symptoms of infection (56).

In contrast, research by Wolf et al. (2020) in the United States estimated that adults with underlying health conditions had insufficient knowledge regarding COVID-19 (57). Additionally, a study by Srichan et al. (2020) found that knowledge about COVID-19 among Thai individuals was poor (58). Meanwhile, Roy et al. (2020) reported that Indians had moderate knowledge about COVID-19 and its symptoms, but their understanding of preventive measures was satisfactory (59). Li et al.'s study across Chinese provinces demonstrated that Chinese individuals exhibited a moderate level of knowledge about COVID-19 (60).

In the present study, most participants exhibited a positive attitude (72%) toward COVID-19 prevention, and the majority believed that the pandemic would eventually be controlled, which aligns with findings from a study conducted in Wuhan, China (61). A separate study found that 86% of individuals in Egypt considered COVID-19 to be dangerous (62), while only 20% of participants in a study in Pakistan believed the disease posed a significant threat (63). The findings from similar studies indicate that various populations across different countries generally maintain a positive attitude toward COVID-19 (64-70).

These results underscore the importance of public perception in managing health crises. While many individuals recognize the seriousness of COVID-19 and support preventive measures, disparities exist in

how different populations perceive the threat level of the virus. Understanding these attitudes is crucial for tailoring public health messaging and interventions to effectively address misconceptions and enhance community engagement in preventive practices. Overall, fostering a well-informed public is essential for controlling the spread of COVID-19 and mitigating its impacts on health systems globally.

Currently, most Iranians have been vaccinated against the coronavirus, and the number of patients and hospitalizations is decreasing. This trend can foster a more optimistic attitude toward the pandemic within the general population. Improved knowledge of the disease, combined with a positive attitude, is essential for curbing the ongoing pandemic (51). Studies examining the level of awareness and attitudes toward the COVID-19 pandemic and vaccination in Nigeria, Pakistan, and Egypt have reported high awareness and positive, optimistic attitudes (51, 71, 72). A systematic review by Hesaraki et al. indicated that more than 70 percent of respondents had a positive attitude toward COVID-19 (17).

These findings suggest that as vaccination rates increase and public understanding improves, communities are likely to adopt more proactive stances regarding health measures. The correlation between knowledge and attitude emphasizes the importance of continuous public health education to maintain and enhance these positive perceptions. By addressing misconceptions and providing accurate information about COVID-19 and its prevention, health authorities can further strengthen community resilience against future outbreaks.

The present study found that most participants demonstrated good practices regarding COVID-19 (91%). Additionally, both attitude and knowledge were correlated with practice ($p = 0.001$). Olum et al. reported that 69% of individuals had sufficient knowledge, 21% had a positive attitude, and 74% exhibited proper performance regarding COVID-19 (73). In China, Wand et al. found that most Chinese individuals, particularly women, had reasonable knowledge, an optimistic attitude, and appropriate behaviors toward COVID-19, which aligns with the results of the present study (74). Effective prevention and control of COVID-19 require not only sufficient knowledge but also a favorable attitude toward preventive measures against the disease (75). Various studies have reported good practices of protective behavior against COVID-19 (76-79). White et al. indicated that their participants displayed good knowledge, attitudes, and performance regarding coronavirus prevention (80). However, a study in Bangladesh by Haque found that the knowledge, attitudes, and practices of Bangladeshi men were inadequate (81).

The evident differences in knowledge, attitudes, and practices observed in various studies may be attributed to variations in timing and the composition of participants (82). The present study demonstrated that the levels of knowledge, attitudes, and practices regarding COVID-19 among participants were generally appropriate. Significant differences were found in knowledge, attitudes, and practices based on factors such as age, gender, loss of a loved one to COVID-19, education level, marital status, number of household members, history of COVID-19 infection, income level, and place of residence ($p<0.05$). The knowledge levels of female participants and individuals living in urban areas were higher than those of their counterparts. Conversely, males, married individuals, those with lower education levels, socially deprived individuals, and the elderly exhibited lower levels of knowledge and poorer practices. Additionally, people with low incomes demonstrated weaker practices compared

to others. Attitude scores were significantly higher among married individuals, the elderly, employed persons, rural residents, and stay-at-home wives compared to other groups.

The results of the present study revealed that women's knowledge about COVID-19 was significantly higher than that of men. This heightened awareness may be linked to women's greater sense of responsibility for their own health and that of their families. As a result, educational and prevention programs should prioritize outreach to the male population. However, it is important to note that different studies in this area have reported varying findings (16, 83, 84).

According to the present study, average knowledge about COVID-19 increased with age, with individuals under 20 years exhibiting the lowest levels of knowledge. Older respondents also demonstrated acceptable levels of attitude and practice regarding COVID-19. This improvement in attitude and performance is likely due to the heightened sensitivity of older individuals toward their health. Additionally, married participants displayed a more favorable attitude toward COVID-19 compared to single individuals, indicating that marital status is an important social determinant of health (85).

In the current study, individuals with moderate to good social and economic well-being demonstrated significantly better practices for COVID-19 prevention and control compared to others. Interestingly, the attitudes of rural residents were more positive than those of urban residents, despite the former having lower access to the Internet and social media than their urban counterparts. Several studies have indicated that Internet access and penetration in rural areas of Iran are inferior to those in urban regions. The critical role of the Internet and virtual social networks in enhancing public knowledge about COVID-19 may contribute to poorer awareness among rural residents (86-88). Since the announcement of the COVID-19 outbreak in Iran, the Ministry of Health and Medical Education (MOHME) has developed extensive guidelines to combat the disease (89). The findings of the present study indicate that the Iranian population has successfully adhered to MOHME guidelines for the prevention and control of COVID-19.

5- CONCLUSION

The present study found that the majority of participants exhibited adequate knowledge (73.17%), favorable attitudes (72%), and appropriate practice behaviors (91%) regarding COVID-19. Additionally, knowledge was associated with factors such as gender, employment status, education level, social deprivation, household size, marital status, and location of residence. Attitudes were connected to age, marital status, gender, education level, location of residence, employment status, and being a stay-at-home wife. Meanwhile, practice behaviors were related to age, gender, marital status, education level, and income level. The results indicate that while participants demonstrated acceptable levels of knowledge and attitudes as well as favorable practices, the variations in knowledge, attitudes, and practices (KAP) among individuals—attributable to factors such as age, gender, education, occupation, economic status, family size, and place of residence—highlight the need for tailored educational programs that address the specific needs of the community. The fight against the spread of the coronavirus is not only a medical issue but also a broader social and cultural responsibility. Effective control of such collective behavior relies on active social participation to break the transmission chain of the virus from multiple angles.

6- CONFLICT OF INTEREST: None.

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