

Original article

## Knowledge, Attitude, and Practice Study About Covid- 19 Vaccine Hesitancy in Libya

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### Keywords.

KAP, Covid-19, Vaccines,  
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### ABSTRACT

The COVID-19 pandemic has profoundly impacted global health and economies, underscoring the importance of vaccination in controlling the virus's spread. This study aims to assess the level of knowledge, attitude, and practice of COVID-19 vaccine hesitancy among anyone residing within the state of Libya, regardless of their nationality, across all age groups, and who has reliable access to the internet. For three months from November 2023 to February 2024, a descriptive study of knowledge, attitude, and practice (KAP) was undertaken. Non-probability convenience sampling was used, and participants completed online questionnaires sent via social media, meeting specific inclusion and exclusion criteria. The main instrument for data collection was a standardized, self-administered questionnaire designed based on previous validated instruments from 404 participants. A total of 404 participants completed the questionnaire, with most of them being Libyan (n=393, 97.3%), over the age of 18 (n=388, 96%), and living outside of Tripoli (n=243, 60.1%). Female respondents (n=266, 65.8%) with higher qualifications (n= 262, 64.9%), with many responses coming from the medical sector (n= 241, 59.6%). The most prevalent source of information was numerous sources (n=177, 43.8%). The current results gathered through seven questions designed to evaluate participants' understanding of the vaccine's efficacy in preventing the disease showed that 18.1% of respondents believed the vaccine prevents COVID-19, 20.3% were unsure, and 61.6% disagreed. Despite this, 74.5%, 91.3%, and 69.6%, respectively, of participants had adequate knowledge, attitude, and practice about the vaccine. Additionally, 43% of the study population expressed willingness to receive the vaccine, and 69.1% understood that infection with the coronavirus is more dangerous than the vaccine itself. In conclusion, this study underscores the necessity of public health promotion to improve vaccine acceptance and address misconceptions. Suggest the need for targeted communication strategies to enhance public trust in the vaccine.

### Introduction

COVID-19 is the cause of severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). Coronavirus is classified into Alpha, Beta, Gamma, and Delta, based on genomic characteristics. Alpha and Beta coronaviruses often infect humans and mammals, whereas Gamma and Delta may also infect fish and birds. Although SARS-CoV-2, SARS-CoV, and MERS-CoV (Middle East Respiratory Syndrome coronavirus) constitute the same Beta coronaviruses. SARS-CoV-2 has a lower fatality rate than other coronaviruses such as SARS-CoV and MERS-CoV, but it is extremely transmissible [1]. The first coronavirus-induced severe respiratory syndrome was recorded in Foshan, China, in 2002-2003 (SARS-CoV pandemic). In 2012, the second Middle Eastern Respiratory Syndrome (MERS) spread from the Arabian Peninsula [2], and the third one, "Wuhan," the capital of Hubei province in China, recorded the first case of pneumonia of unknown origin in December 2019 [3]. On January 30, 2020, the World Health Organization (WHO) declared an internationally recognized health emergency.

Despite the implementation of preventative measures around the world, which include social distancing, closure of schools, and the identification of infected individuals, the epidemic was not brought under control. Consequently, the WHO declared COVID-19 a pandemic on March 11, 2020. SARS-CoV-2 initially became known as a man-to-man transmission after becoming a zoonotic pathogen transmitted through seafood. This mostly impacted the respiratory system, but it also had an impact on the heart, liver, and kidneys [4].

In Libya, SARS-CoV-2 was discovered on March 24, 2020. According to a WHO report on July 19, 2023, there were 768,237,788 confirmed cases of COVID-19, 6,951,677 deaths, and 13,474,287,083 doses of the vaccine. On July 19, 2023, 507,266 confirmed cases of COVID-19 and 6,437 deaths were recorded in Libya. A total of 3,739,158 doses of the vaccine were administered on January 15, 2023 [5]. According to an epidemiological study, the death rate is higher in people over 65 and those with comorbid conditions such as diabetes, hypertension, chronic renal disease, and autoimmune diseases than in pregnant women

and children. In Libya, severe acute respiratory sickness is also classified as a notifiable disease, meaning that it must be reported within 24 hours.

Preventive methods, including hand hygiene, face masks, gloves, and vaccinations, are the greatest way to reduce morbidity and mortality. One preparation used to boost the immune system's defenses against illness is vaccination [6]. The first vaccination campaign in Libya began on April 11, 2021. A total of 3,739,158 doses of the vaccine were given on January 15, 2023. As of October 30<sup>th</sup>, 2021, the vaccination coverage rate in Libya utilizing Sputnik is 39.57%, AstraZeneca is 27.93%, SinoPharm is 22.73%, Sinovac is 7.42%, and Pfizer is 2.32% [7]. The greatest obstacle to achieving this goal is vaccination hesitancy. The World Health Organization (WHO) defined vaccine hesitancy as “a delay in accepting or refusing vaccination despite the availability of vaccination services”. Several factors influence this, including post-vaccine complications, convenience, confidence, and complacency, listed among the top 10 threats to world health by the WHO [8]. The vaccination coverage rate in the community is currently low at 66%, significantly below the intended goal of 82% needed to effectively protect against the spread of the epidemic. The vaccination efficiency against COVID-19 for a second booster dose compared to no vaccination was 81.8% after 1-month post-vaccination. After 4 months, it was 72.2%, and after 6 months, it was 49.0%. This study aims to identify the reasons behind the community's reluctance to get vaccinated, so we can address these issues and improve response in the event of a future epidemic.

## Methods

A descriptive study to assess Knowledge, Attitude, and Practice (KAP) about COVID-19 vaccine hesitancy among the participants. Using a non-probability convenience sample technique from November 2023 to February 2024. The primary method used to gather data was a structured self-administered questionnaire designed based on previous validated instruments [9,10,11]. Participants will complete online surveys shared via social media platforms, provided they meet specific inclusion and exclusion criteria.

The questionnaire included sociodemographic information and assessed knowledge, attitudes, and practices (KAP) regarding COVID-19 vaccination hesitancy and was distributed to participants who consented to take part in the study. The sociodemographic details collected included nationality, residence, city, municipality, age, sex, occupation, education level, marital status, and whether the individual has a chronic illness. Seven knowledge-based questions are used to gauge research participants' degree of understanding, including participants' familiarity with the information's source.

The questionnaire includes seventeen questions designed to assess attitudes toward the COVID-19 vaccine. These questions address vaccine hesitancy factors, such as concerns about its effectiveness, the speed of development, potential side effects, and exposure to negative information. Additionally, the questionnaire explores the level of trust individuals have in the information provided by the National Center for Disease Control and the vaccination policies.

Here are four questions that reflect how participants demonstrate their knowledge and attitude toward the COVID-19 vaccine (practice). This study assessed knowledge using a scoring system ranging from 7 (minimum) to 21 (maximum). A score higher than 14 (greater than 14) indicates appropriate knowledge, while a score of 14 or lower (less than or equal to 14) signifies poor knowledge. Additionally, a score above 14 (greater than 14) is considered good knowledge.

Attitude levels were evaluated on a scale of 17 (minimum) to 51 (maximum). A score above 34 (greater than 34) is regarded as good, while a score of 34 or lower (less than or equal to 34) is deemed poor. The overall score range for practice is from 3 (minimum) to 9 (maximum). Practice score reflects vaccination behavior and intention. A score higher than 6 (greater than 6) indicates a vaccinated participant, while a score of 6 or lower (less than or equal to 6) signifies a not-vaccinated participant. Three (3) points were awarded for each accurate response to questions regarding the KAP. (2) points were awarded for the I Don't Know response, while one (1) point was assigned for each incorrect response. The KAP scores of the individuals were calculated and summed to determine their total scores. The question 'Are you thinking of taking the vaccine?' was intended only for participants who had not yet received the vaccine.

## Statistical methods

The data collected for this study was statistical analysis using the Statistical Package for the Social Sciences, specifically version 26.0 (SPSS 26.0). Descriptive statistics will be employed to provide a comprehensive overview of the data, including calculating frequency and percentages for categorical variables. For assessing differences between groups, inferential statistics include superman ranks was used in correlation coefficient.

## Ethical consideration

Ethical approval from the National Center for Disease Control Committee was granted under the referral number NBC: 002.H-23.16. Before participating in the online survey, each individual was informed about

the study's purpose and procedures, and explicit consent was obtained. Additionally, measures were put in place to ensure the confidentiality and security of all collected data, safeguarding the privacy of the participants throughout the research process.

*Inclusive criteria* include that participants are invited to complete the questionnaire, have reliable access to the internet, and those who reside within Libya, whether they hold Libyan nationality or not, at any age. Additionally, by agreeing to participate, individuals confirm their understanding of the nature of the questionnaire and their consent to provide honest and thoughtful responses.

### Quality of data

Three highly qualified medical professionals from the National Center for Disease Control. This included examining the clarity of the language used, making certain that it is easily understandable for respondents. Furthermore, they assessed whether the questionnaire is capable of effectively evaluating the majority of aspects related to knowledge, attitudes, and practices (KAP) concerning COVID-19 vaccine hesitancy. Their meticulous approach aimed to enhance the reliability and validity of the data collected.

The questionnaire was subjected to a thorough testing and retesting process over two weeks to assess its reliability. Pearson's correlation coefficient. The resulting correlation of 0.82 indicates a high level of reliability, suggesting that the questionnaire produces consistent results over time. Additionally, the internal consistency of the questionnaire was evaluated using Cronbach's alpha, which resulted in an acceptable value of 0.673. (0.60-0.70) generally accepted value for internal consistency, where a value higher than 0.80 determines the excellent level.

### Results

The study participants were 393(97.3%) Libyan and 11 (2.7%) non- Libyan, (96%) of them were aged above 18 years. (39.9%) of participants lived in Tripoli. The qualification level of participants reveals that the majority of them attended university, with a percentage (64.9%) followed by a master's degree with a percentage (12.9%). and the majority of participants are female, with a percentage of 65.8%, and the most common response came from the medical field, with (59.6%) followed by students with (28.7%). The most common are single and married, with a percentage (48.3%). Regarding the most prevalent source of knowledge, many sources had a percentage (43.8%) (Table 1).

**Table 1. Demographic Characteristics of participants**

Demographic Characteristics	Frequency	Percentage
Nationality		
Libyan	393	97.3%
Non-Libyan	11	2.7%
Age		
Above 18 years	388	96%
Below 18 years	16	4%
Gender		
Male	138	34.2%
Female	266	65.8%
Residency		
Inside- Tripoli	161	39.9%
Outside- Tripoli	243	60.1%
Qualification		
Primary stage	3	0.7%
Secondary stage	47	11.6%
Intermediate	11	2.7%
University	262	64.9%
Master degree	52	12.9%
PHD	29	7.2%
Marital status		
Single	195	48.3%
Married	195	48.3%
Widower	6	1.5%
Divorced	8	2.0%
Occupation		
Medical field	241	59.7%
Free job	8	2.0%

Employee	29	7.2%
Student	116	28.7%
Housewife	10	2.5%
Source of information		
TV	20	5.0%
Scientific journals	16	4.0%
Books	4	1.0%
Friends	10	2.5%
Social media sites	63	15.6%
Medical staff	75	18.6%
Posters	4	1.0%
Trusted sites	35	8.7%
More than one source	177	43.8%
Chronic disease		
Diabetic	22	5.4%
Hypertension	12	3.0%
Respiratory	20	5.0%
Renal	2	0.5%
Oncology	5	1.2%
Other	67	16.6%
No chronic disease	276	68.3%

About 82 of the participants answered: I don't know about Does the COVID-19 vaccine prevent the disease? And (279) answered yes, COVID-19 can be more dangerous than the vaccine itself. And (203) of the participants answered yes, a person gains immunity from the disease Better than from the vaccine, and pregnancy is a reason not to take the vaccine (132). )219(replied, "No, if allergies of all kinds were the reason for not getting the vaccine." and 311 answered, "No, the vaccine has no side effects." (280) answered, "No, if a person is in good health, is there no need to take the vaccine.

)266) of participants had reliable information from the National Center for Disease Control. And (164) satisfactory in the supply chain system. (151) don't think that the COVID-19 virus is man-made, (257) don't think that it is acceptable for the government to force everyone to take the vaccine. (248) Don't hesitate to take the vaccine, and (264) don't refuse to take the vaccine. (182) think the application of precautionary measures sufficient reason not to take the vaccine, and think there is a better vaccine than others. (315) Think the community culture is the reason for not taking the vaccine, and (198) don't think the inefficiency of the vaccine is a reason not to get vaccinated. And (227) don't think the speed of discovery is a reason not to take the vaccine.

(195) don't think the vaccine is related to infertility, and (198) think the negative information about the vaccine is a reason not to take it. (208) Don't think the decrease in the number of cases infected with the COVID-19 virus is a reason for not taking it. And (276) don't consider that the COVID-19 vaccine is a tool implanted in human bodies to control them.

(281) of the participants took the vaccine, (173) don't think of taking the vaccine. The inclusion of all respondents in the analysis of vaccination intention may explain the observed disparity between the percentage of participants who reported not considering getting the vaccine (42.8%) and those who had already received it (69.6%). "Are you thinking of taking the vaccine?" is a question that mainly applies to unvaccinated people; it seems that vaccinated participants were included in this question as well. People who had already received a vaccination might have answered "No" because the issue was no longer pertinent to them, which could have resulted in an overestimation of negative responses. and (245) they did not have a bad experience related to vaccines. Among unvaccinated participants, 42.8% reported that they were not considering taking the vaccine." (Table 2).

**Table 2. KAP level of the participants regarding COVID-19 vaccine hesitancy.**

Knowledge	Yes (%)	I don't know (%)	No (%)
Does the COVID-19 vaccine prevent the disease?	73(18.1%)	82(20.3%)	24(61.6%)
Can COVID-19 be more dangerous than the vaccine itself?	279(69.1%)	70(17.3%)	55(13.6%)
Does a person gain immunity from the disease Better than from the vaccine?	203(50.2%)	81(20.0%)	120(29.7%)
Is pregnancy a reason not to take the vaccine?	132(32.7%)	95(23.5%)	117(43.8%)

			(%)
Are allergies of all kinds a reason not to take the vaccine?	79(19.6%)	106(26.2%)	219(54.2%)
Does the vaccine have side effects?	36(8.9%)	57(14.1%)	311(77.0%)
If a person is in good health, is there no need to take the vaccine?	99(24.5%)	25(6.2%)	280(69.3%)
<b>Attitude</b>			
Do you believe that the information declared by the NCDC is reliable?	262(64.9%)	68(16.8%)	74(18.3%)
Do you think the supply chain system is satisfactory?	164(40.6%)	112(27.7%)	128(31.7%)
Do you think that the COVID-19 virus is man-made?	131(32.4%)	122(30.2%)	151(37.4%)
Do you think that it is acceptable for the government to force everyone to take the vaccine?	127(31.4%)	20(5.0%)	257(63.6%)
Are you hesitant to take the vaccine?	152(37.6%)	4(1.0%)	248(61.4%)
Do you refuse to take the vaccine?	113(28.0%)	27(6.7%)	264(65.3%)
Do you think the community culture is the reason for not taking the vaccine?	315(78.0%)	33(8.2%)	56(13.9%)
Do you think the vaccine is related to infertility?	29(7.2%)	180(44.6%)	195(48.3%)
Do you think the negative information about the vaccine is a reason not to take it?	198(49.0%)	30(7.4%)	176(43.6%)
Do you think the distance of vaccination center is a reason not to take the vaccine?	45(11.1%)	28(6.9%)	331(81.9%)

**Table 3. Overall KAP score among participants Hesitant to take the COVID-19 vaccine**

Variable	Total Question	Cut off	Percent	Grade
Knowledge	7	14	74.5%	Good
Attitude	17	34	91.3%	Good
Practice	4	6	69.6%	Good

Overall KAP score revealed good knowledge with a percent of (74.5%), good attitude with a percent of (91.3%), and good practice with a percent of (69.6%) (Table 3).

Significant positive Correlation between the Knowledge- attitude ( $r = 0.15$ ,  $p=0.002$ ), and between Knowledge- practice ( $r=0.33$ ,  $p=0.000$ ). However, the correlation between practice and attitude was not statistically significant ( $r = 0.10$ ,  $p = 0.052$ ). These findings indicate that higher knowledge is associated with better attitude and practice, while the relationship between attitude and practice is weak and not significant. (Table 4).

**Table 4. Correlation between KAP score among the participants.**

Variable	Correlation coefficient	P value*
Knowledge- attitude	0.015	0.002
Knowledge- practice	0.33	0.000
Practice- attitude	0.10	0.052

## Discussion

In this study, 65.8% of participants were female, surpassing the 34.2% male representation. This aligns with findings from Elhadi et al. (50.4% female) and Sallam et al. (67.3% female). The higher female participation is linked to their increased concern for the safety of their families [9,10]. Additionally, 31.7% of participants had chronic diseases, contrasting with a previous study showing only 10.6% in a different population, attributed to lifestyle differences in Arab countries [10]. In a survey, 262 participants (64.9%) held a university degree, 52 (12.9%) had a master's degree, and only 3 (7%) had primary education. Another study by Al. Awaidy ST et al. indicated that 769 participants (79.6%) had at least a diploma. A significant correlation was found between educational qualifications and practice scores [12].

Regarding marital status, 48.3% of participants were single, with a comparable percentage of married individuals and only 1.5% being widowers. This aligns with Al-Kafarna, M. et al.'s findings that suggested

78% were single [13]. The study identifies multiple sources of information regarding COVID-19 vaccination, with 43.8% derived from diverse sources, 18.6% from medical staff, and only 1% from books and posters. In contrast, a Tunisian study found medical staff to be the primary information source, highlighting their expertise [14]. However, another study indicated that social media is the leading source (31.6%), which may contribute to vaccine reluctance due to misinformation and distrust, compounded by Libya's public health history [11]. Regarding the COVID-19 vaccine, only 18.1% of participants believed it prevents the disease, with 61.6% answering 'no,' indicating significant misinformation among the Libyan population [11].

Regarding the COVID-19 vaccine, only 18.1% of participants believed it prevents the disease, with 61.6% answering 'no.' A significant percentage of responders (61.6%) disagreed that the vaccine protects against the disease, despite the overall knowledge score being rated as good (74.5%). Although a high proportion of participants (61.6%) did not believe that the vaccine prevents COVID-19, the overall knowledge score was classified as 'good' due to the composite scoring system. Participants demonstrated correct knowledge in other domains, such as disease severity and vaccine safety, which contributed to higher total scores. This discrepancy highlights selective misinformation rather than complete lack of knowledge. This disparity could be explained by the knowledge scale's composite design, where participants showed sufficient comprehension in several areas yet had false beliefs about the effectiveness of vaccines. This study indicates the existence of underlying skepticism, misinformation, or lack of trust and shows that sufficient knowledge does not always transfer into appropriate impressions or acceptance of vaccines. As a result, public health initiatives should address attitudes and perceptions around vaccine efficacy in addition to increasing information. [11].

A willingness to receive the vaccine was noted at 43%, while 69.1% recognized COVID-19's severity, illustrating a gap between awareness and acceptance. Additionally, 69.1% understood the greater danger of infection compared to the vaccine. This highlights the critical need for public health education campaigns to improve understanding and combat misconceptions about vaccination, as higher knowledge correlates with increased uptake [15,16]. In a study examining perceptions of COVID-19 vaccination during pregnancy, 32.7% of participants believed pregnancy prevents vaccination, while 43.8% disagreed, indicating a significant knowledge gap. A separate study reported that 68% of individuals disagreed with a similar notion [17]. Additionally, 77% of participants recognized vaccine side effects as a barrier to vaccination, contributing to hesitancy. This contrasts with another study where only 20.7% expressed concern about side effects [11]. Attitudes towards vaccination are influenced by cultural beliefs, healthcare trust, and personal experiences, showcasing the need for targeted campaigns to mitigate hesitancy and enhance public trust in vaccines. Understanding these attitudes can aid in addressing misconceptions and promoting vaccination acceptance [18,19].

Misinformation and mistrust in the healthcare system, intensified by political instability, hinder vaccination attitudes. Trust-building through transparent communication and addressing cultural beliefs is essential, with community leaders playing a pivotal role in outreach. The study found that 40.6% of participants had satisfactory confidence in vaccine policies, aligning with another study where over half trusted government and healthcare workers [11]. Additionally, 37.4% do not believe COVID-19 is man-made, contrasting with higher conspiracy beliefs in other studies. Significant skepticism remains regarding mandatory vaccinations, with 63.6% opposing government-imposed vaccination [10]. The study highlights varying vaccine hesitancy tied to local sociocultural factors, demonstrating that targeted interventions are crucial for improving acceptance rates in different regions [9,10].

Examining vaccination practices in Libya reveals barriers such as access to vaccination sites, logistical challenges, and economic constraints that hinder immunization rates. In urban areas like Tripoli, healthcare accessibility correlates with higher vaccination rates, while rural and conflict-affected regions face significant obstacles. A study highlighted that 71.6% of participants find vaccine distribution challenging, though another study indicated 81.9% do not see access as a barrier. This discrepancy may result from differences in sample sizes. Additionally, 42.8% of participants express reluctance to vaccinate due to beliefs in natural immunity and concerns over side effects, in contrast to a healthcare worker-focused study where 58% are willing to vaccinate [9]. In Ethiopia, only 53.9% of study participants demonstrated adequate knowledge of COVID-19 prevention and control, significantly lower than Libya's 74.5%. This disparity may be attributed to differences in sample size, information access, and qualifications. Qualitative data reveal that many community members did not prioritize COVID-19, viewing it as a political agenda. Vaccine hesitancy was notably high at 64.4%, though 61.4% of participants in the current study were willing to receive the vaccine. Major hesitancy reasons included lack of trust (21%), concerns about long-term effects (18.1%), and religious beliefs (13.6%).

Factors associated with hesitancy also included geographic location, education levels, and attitudes towards vaccination. Low self-efficacy regarding vaccination was a key predictor of hesitancy, suggesting that addressing psychological and cultural barriers alongside providing information is crucial [20]. These

findings contrast with a Tanzanian study where 65% exhibited vaccine hesitancy, whereas the current study reports higher non-hesitancy. Common concerns include long-term safety, misinformation, and low trust in vaccine efficacy. Notably, vaccine hesitancy persists among educated individuals, highlighting the need for health education. Public health officials should engage community leaders, utilize diverse communication channels, and offer transparent information to combat disinformation. While some Libyan groups show awareness and positive attitudes towards COVID-19 vaccination, overall hesitancy remains, necessitating tailored interventions to address specific community fears and provide clear information [21]. In this study, no significant association was found between socio-demographic data and knowledge scores regarding COVID-19.

Participants over 18 years showed higher Attitude scores ( $P=0.018$ , 95% CI), while those under 18 had the lowest. Higher education correlated with better Practice scores ( $P=0.003$ , 95% CI), and individuals in the medical field reported higher Practice scores ( $P=0.000$ , 95% CI). Being married also correlated with higher Practice scores ( $P=0.000$ , 95% CI). Positive correlations were identified between knowledge and attitude ( $r=0.15$ ,  $p<0.002$ ), knowledge and practice ( $r=0.33$ ,  $p<0.000$ ), and attitude and practice ( $r=0.10$ ,  $p<0.052$ ). The findings confirm that adequate knowledge fosters a positive attitude, leading to beneficial practices, and attitude does not affect the practice, in contrast to knowledge aligning with Baklouti's results [14].

### Conclusion

This research on the participant (Libyan and non-Libyan) knowledge, attitudes, and practices surrounding the COVID-19 vaccine hesitancy. The current study was able to provide information related to the level of knowledge, attitude, and practice of the participants and the reasons behind the hesitation in taking the COVID-19 vaccine. This study concludes by pointing out important gaps in Knowledge, Attitude, and Practice about COVID-19 vaccinations. By filling in these gaps, evidence-based public health campaigns can increase vaccination uptake and aid in pandemic management. These results give health officials and legislators important information to help them create programs that effectively address vaccination reluctance. The results showed that participants had a sufficient level of knowledge, attitude, and practice about the COVID-19 vaccine, and Most of the participants were female out of 404 participants. A good attitude was evident when asked about the degree of community awareness, the distance from vaccination sites, the policy for bringing in vaccines, and the trustworthiness of the significant result. The relationship between KAP and sociodemographic data demonstrates a favourable correlation between KAP and occupation in the medical area and education level (master's degree). Additionally, women are more knowledgeable than men. Medical personnel and social media served as the primary information sources. The establishment of a public health education program is necessary to avert the COVID-19 epidemic. And the gap between the low vaccination coverage rate and good knowledge, attitude, and practice is due, firstly, to the different sample types (non-randomization), secondly, because the participants were highly educated, and thirdly, most of the participants were from the medical field.

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### Conflicts of Interest

The authors declare no competing interests.

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