Factors Affecting Respondents' Strategies in Answering Queries Related to the Field of Health on Social Question Answering (SQA) Websites

Maedeh Kheirabadi[1], Afshin Mousavi Chelak[1]* 🅾, Soraya Ziaei[1], Mohsen Haji Zeinolabedini[2]

Abstract

Background: The study of various aspects of information behavior has attracted the attention of many researchers. This study used the structural equation modeling method to identify factors affecting respondents' strategies in answering health-related questions on social question answering (SQA) websites.

Methods: The study population in this quantitative-applied survey included all respondents answering health-related questions on national and international SQA websites, among whom 431 individuals were selected as the sample using SPSS SAMPLE POWER software and convenience sampling. The data were collected using the Respondents' Motivations and Strategies Questionnaire and the Social Support Questionnaire. The items of these questionnaires are scored on a 5-point Likert scale. The conceptual research model was evaluated using the structural equation modeling method, and the collected data were analyzed in SPSS 26.0 and AMOS 24.0.

Results: The authors identified and analyzed the factors influencing respondents' strategies and the relationships between these factors. Motivations, social support, sex, age, income, level of education, amount of activity per week, and response time are effective on response strategies with factor loadings of 0.61, 0.56, 0.50, 0.53, 0.31, 0.66, 0.53, and 0.65, respectively. The variable determination coefficient of response strategies in the structural equation model is reported to be 0.55 and significant. Finally, response strategies can be predicted based on the independent variables.

Conclusion: In order to enhance response strategies, it is important to promote effective response behaviors, as determined by the components that influence response strategies. The quality of related online services, such as expert question-answering and digital reference services, can be improved with the help of the present findings.

Keywords: Response Strategies, Health Sector, Social Question Answering Websites, Structural Equation Modeling

Introduction

Social question answering (SQA) is an online service developed based on the principles of Web 2.0. The service enables people to answer questions posed by other users in online environments. Human-mediated question-answering (QA) services were established before the development of SQA services. Reference librarians receive clients' questions and help them find the necessary information. New internet technologies have allowed people to

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Corresponding author: Dr Afshin Mousavi Chelak, af.mousavi@pnu.ac.ir

1. Department of Knowledge and Information Science, Payame Noor University, Tehran, Iran
2. Department of Knowledge and Information Science, Faculty of Education and Psychology, Shahid Beheshti University, Tehran, Iran

↑What is "already known" in this topic:
People can use the potential of SQA websites to search and exchange information in their daily lives. Health is one of the fields of social questions and answers, which faces many problems, such as low-quality responses and low participation rates.

→What this article adds:
Motivation, social support, demographic characteristics, and responsiveness behaviors factors affecting respondents' strategies in answering health-related questions on SQA websites can help us recognize the characteristics of respondents. Also, people will find the skill to evaluate the content of the answers and use the answers to solve the problems of daily life.

easily access reference librarians using digital reference services in recent years. While in traditional online QA environments, some information experts, librarians, or consultants with valid certificates answered people's questions, today, there are numerous online SQA services available to internet users.

Unlike traditional QA services, in online SQA websites, users answer all questions. Respondents are those who voluntarily spend their time and energy to answer other people's questions. These individuals purposefully visit SQA service websites, read their favorite topics, select a few questions, and then share their knowledge and experience with others by answering their questions. SQA does not require respondents to have any specific training or certification. In addition, traditional criteria about respondent characteristics are insignificant, and questions are asked of people based on their belief in the Wisdom of Crowds. Despite serious concerns about the validity and accuracy of responses and respondent accountability in online settings, SQA is successfully attracting more and more users (1). QA systems are automated systems designed to answer questions humans pose in natural language. In these systems, the user cannot exchange information with the system to get the desired answer or to receive more information. Therefore, interactive QA systems were created to resolve this problem (2).

On the one hand, the development of information and communication technologies (ICTs) and new tools and approaches for information search have substantially changed people's information needs and behaviors. On the other hand, the growing popularity of online QA communities has influenced people's information-seeking behavior. People behave in QA websites according to their prediction about information acquisition, and their expectations are met based on their perceived values (3).

Information behavior can be defined as the general human behavior about information sources and channels, including active and passive information seeking and information use. Therefore, information-seeking behavior is a more detailed behavior displayed by the searcher in interaction with various information systems. Information-seeking behavior includes all interactions with the system at the human-computer interaction level (eg, using the computer mouse and selecting links) and at an abstract level (eg, adopting a Boolean search strategy or establishing some criteria to decide which of the 2 books chosen from adjacent places on a library shelf is more useful), as well as mental actions, such as judging the relevance of the retrieved data or information (4). Information technology, in particular, has demonstrated the vital role of online knowledge markets in promoting, sharing, and disseminating knowledge. However, users may not be able to choose the best option due to their limited view (5). Users look to friends, family, neighbors, and coworkers who are also on the social network for fulfilling connections, a sense of trust, and things that promote physical and mental well-being. Providing social support between network members is one of the essential functions of social networks, and its extent depends on the social relationships that a person has in the form of links with others or membership in groups and communities. Social support enables people to have the ability to face daily problems and life crises and affects their mental health (6). Therefore, examining respondents' motivations (The word motivation refers to anything that motivates someone to do something. Motivation and motive are often used interchangeably. However, motivation is considered the general driver of a behavior, while motive is the specific cause of a particular behavior (7)) on SQA websites seems necessary.

According to studies, the most common types of support include emotional, informational, and instrumental support and social companionship. Sarason defines social support as the amount of love, companionship, and attention someone receives from family members, friends, and others (8). Actual support refers to the type and frequency of special instrumental, emotional, and informational support and social companionship that a person receives in their interactions with others (9).

QA systems are commonly used in health and healthcare-related domains. Critical health needs and the unavailability of other sources in traditional environments are key drivers of web-based health care information seeking (10). One of the most important aspects of our life is our health (11). If someone has concerns about their health and is unable to see a doctor, they can attempt to discover answers by looking up resources online and reading about other people's experiences who have faced comparable issues. Both human and computer methods are utilized by QA systems, and this study uses the latter. The present study focused mainly on identifying strategies—selecting questions, interpreting questions, seeking information, creating answers, and evaluating answers—adopted by respondents on SQA websites. Respondents must consider the provision of both data and social support for users when answering their questions. Respondents may want to support questioners in various ways, even when they are not asked to do so. They attempt to help questioners by providing accurate and practical answers. Additionally, by revealing their thoughts and feelings regarding the subject at issue, they might wish to show empathy for the questioners. These characteristics of SQA respondents are somewhat similar to how people typically interact with health information. Accordingly, respondents to health questions represent people who support the dual SQA actions, including providing information and social support (Social support refers to the support people receive from small or large networks/systems when they need it (12)).

Conceptual research models clarify the main relationships among research variables and enable researchers to test proposed theories, considering the nature of these relationships (13). Figure 1 presents the conceptual research model. In this study, the recommended model—which explains response behavior—is put to the test. To this end, respondents communicate with multiple questioners, provide them with supporting information, and answer their questions on SQA websites. Respondents try to read questions carefully and tailor their responses to the individuals asking them while also offering social support.

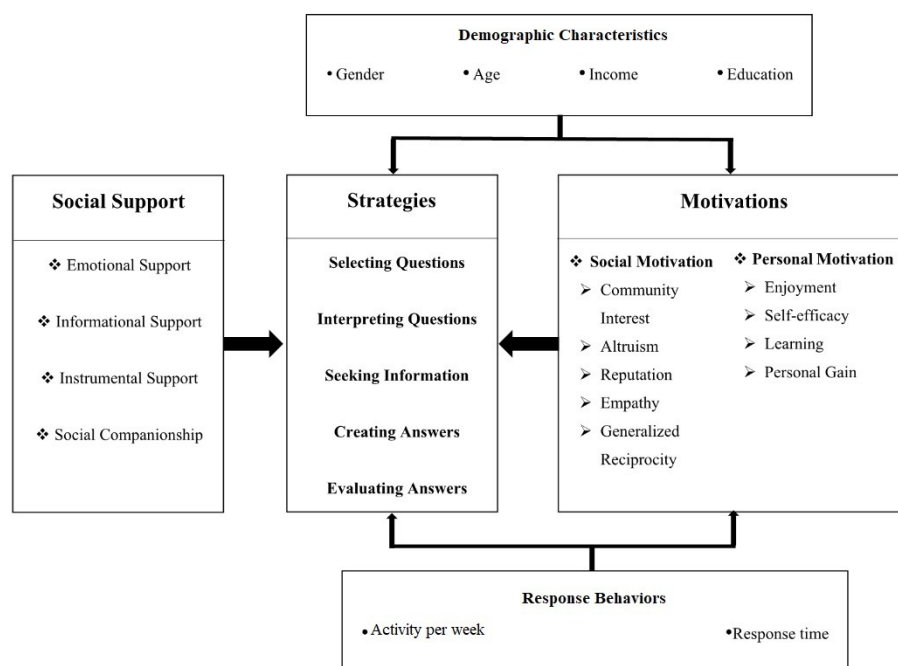By reviewing the literature, we realized that although

Figure 1. Conceptual research model

few studies have been conducted on knowledge-sharing patterns, their results were not clear, or the variables studied were not comprehensive. According to the findings of a study conducted by Ebrahimy et al (14), which looked at how researchers shared knowledge and behaved on the social networking site Researchgate, QA systems provide researchers with a variety of technologies to share their knowledge and encourage international interactions and communications across national and political boundaries. These systems also prepare the ground for developing various specialized scientific fields and facilitate the proliferation of knowledge communities in which knowledge sharing voluntarily replaces knowledge dissemination.

In addition, the study of user knowledge sharing behavior in SQA community (based on Zhihu's social exchange theory) showed that in Zhihu community, self-display, user recognition and recreational learning have significant positive effects on user knowledge sharing behavior. In other words, individuals with more detailed personal information had a greater desire for self-display (15).

Stellefson et al (16) investigated the evolving role of social media in health promotion and explored the updated responsibilities of health education specialists. They concluded that health promotion was becoming more interwoven with internet-based programming. Health education specialists are increasingly asked to become more proficient in computer-mediated communication fields that optimize online and offline consumer health experiences. Health education specialists also need to design social media interventions or campaigns that are tailored to the needs of diverse populations, are economically convenient, and support text, technology, and e-health.

SQA websites offer a new generation of interactive in-

formation services. As these evolving websites currently face many problems, such as low-quality responses and low participation rates, the purpose of the study was to provide insight and understanding of the current state of responders and shed light on ways to promote effective response behaviors in SQA websites by identifying factors that influence respondents' strategies in answering health-related questions on these websites. The proposed conceptual model will be tested by the structural equation modeling (SEM) method to specify the impact of the research components on each other.

Understanding the variables that affect respondents' response strategies can assist those working on this subject in making the required preparations to increase participation and improve the quality of the responses.

Methods

This was a correlational-applied quantitative survey in which the data were collected using the field research method (questionnaire technique). To select the study population, the authors first prepared a list of reputable national and international QA websites, from which those that were free, online, and accessible to Iranians and those that contained health-related questions were selected (Table 1). The amount to which question-and-answer websites are used is indicated by the users themselves, which had an impact on the selection of those sites. Therefore, the study population consisted of all active users of these websites, regardless of their geographic location. Considering the geographic scope of the study and the online nature of QA websites, the study population was unlimited; therefore, 431 individuals were selected as the sample using SPSS SAMPLE POWER software and conven-

Table 1. Selected National and International QA Websites

Row	Websites	Websites Address	Description
1	Able2Know	http://www.able2know.org	International
2	Answerbag	http://www.answerbag.com	International
3	Ask Me Help Desk	https://www.askmehelpdesk.com	International
4	Fluther.com	http://www.fluther.com	International
5	Questions	https://www.question.com	International
6	stackexchange	https://medicalsciences.stackexchange.com	International
7	Wikia	http://wiki.answers.com	International
8	bankpezeshkan	https://bankpezeshkan.com	National
9	javab24	https://www.javab24.com	National
10	hisalamat	https://www.hisalamat.com	National

Table 2. Fitness Indexes

Index	Index Name	Desirable Range
CMIN/DF	Normed chi-square	< 5
RMSEA	Root Mean Square Error of Approximation	< 0.08
CFI	Comparative Fit Index	> 0.90
TLI	Tucker Lewis Index	> 0.90
PCFI	Parsimony Comparative Fit Index	> 0.50
PNFI	Parsimony Normed Fit Index	> 0.50
GFI	Goodness-of-Fit Index	> 0.90
AGFI	Adjusted Goodness-of-Fit Index	> 0.90
NFI	Normed Fit Index	> 0.90
NNFI	Non-normed Fit Index	> 0.90
IFI	Incremental Fit Index	0-1

ience sampling. The data were collected using an online questionnaire of respondents' motivations and strategies and an online questionnaire of social support. Google forms were used to design online research questionnaires. The 5-point Likert scales of these questionnaires were adapted from previous studies (Questionnaire of respondents' motivations and strategies (taken from the questionnaire of Oh's PhD dissertation in 2010); Questionnaire of social support (taken from Sur-meijer et al's research in 1995)), although they were modified in some scales to test answering health questions in social Q&A. To check the content validity of the questionnaires, they were sent to a group of experts familiar with the research subject. The reliability of the research tools was also confirmed with Cronbach's alpha values of 0.77, 0.75, and 0.74 for the variables of motivations, strategies, and social support, respectively. To analyze the research data—such as frequencies and dispersion statistics—SPSS 26.0 was used; and AMOS 24.0 was used to compile the SEM (analysis, covariance matrix) of the research for the overall evaluation of the model and future research decisions.

The SEM method was used to validate the conceptual research model. For this purpose, various factors affecting the studied phenomenon were first identified. Then, the relationships among these factors were predicted based on the research literature. In the next step, each factor was measured using the questionnaire items. Finally, the conceptual research model was validated using the SEM method. There are several Fitness Indexes in SEM that reflect how fit the model is to the data. The information concerning the model fit category and their level of acceptance are presented (17, 18) in Table 2.

Results

Men and women constituted 52.2% and 47.8% of respondents. The most respondents were in the 30-35 age group (n = 139). Respondents had relatively high educational qualifications. Most respondents (91.6%) had at least a college degree, 11.8% had an MD or JD, and 17.6% had a PhD. Most respondents (n = 203) had moderate to high incomes ($50,000 to $74,999). The amount of weekly activities respondents engaged ranged from once per week to more than 3 times per week. Most respondents (43.6%) used SQA websites 3 times per week, and the majority (47.6%) reported spending less than an hour answering user questions each time they visited these websites.

In the following, the conceptual model of the research (Figure 1) was tested using structural equation modeling. In this study, it was assumed that 2 important factors would influence the motivations and strategies of answering questions in SQA: (1) demographic characteristics and (2) response behavior. For this purpose, the demographic characteristics of the respondents and the frequency of the activity level, as well as the participation rate (the response time) with which the respondents were involved in the social question and answer, were investigated as intervening variables. Finally, confirmatory factor analysis was used to assess the degree of association between these 2 components and the respondents' information-giving and social support-providing motivations and strategies. Figure 2 shows the SEM results.

As shown in the above figure, the factor loadings were desirable for all the research paths and indicators.

In Table 3, the factor loadings show the effects of the research variables and items (motivation, social support, gender, age, income, educational qualifications, activity per week, and response time) on the response strategies. The factor loadings calculated for all indicators were acceptable at a significance level of 0.05.

As presented in Table 4, the factor loadings show the effects of the research variables —age, sex, income, educational qualifications, activity per week, and response time—on the second-order factor—personal and social motivation. The factor loadings calculated for all indicators were acceptable at a significance level of 0.05.
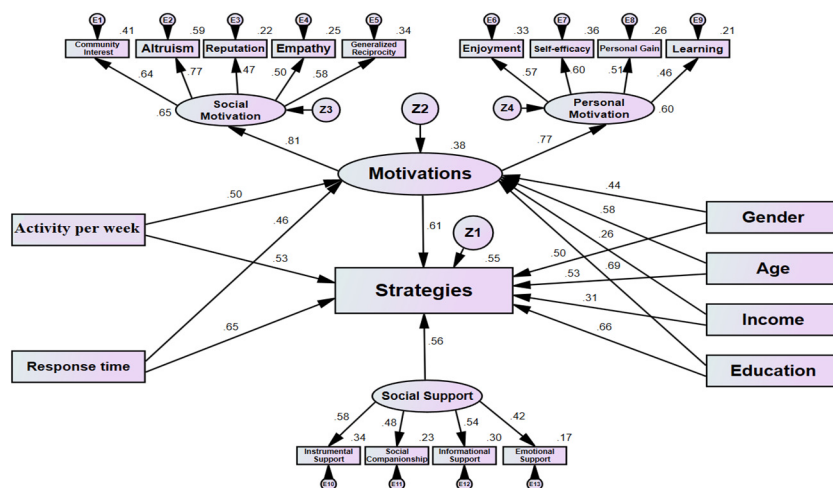
Figure 2. The structural equation modeling results

Table 3. Effect of Research Variables on Response Strategies

Variable	Indicator	Estimate	CR	*P* Value
Personal and social motivation	Effect of motivations on response strategies	0.61	8.36	<0.001
Social support	Effect of social support on response strategies	0.56	8.11	<0.001
Demographic characteristics	Effect of gender on response strategies	0.50	7.88	<0.001
	Effect of age on response strategies	0.53	8.92	<0.001
	Effect of income on response strategies	031	4.25	0.020
	Effect of educational qualifications on response strategies	0.66	8.61	<0.001
Response behavior	Effect of activity per week on response strategies	0.53	8.91	<0.001
	Effect of response time on response strategies	0.65	8.64	<0.001

$(P \leq 0.05*)$

Table 4. Effect of Demographic Characteristics on Personal and Social Motivation

Variable	Indicator	Estimate	CR	*P* Value
Demographic characteristics	Effect of gender on personal and social motivation	0.44	7.51	0.01
	Effect of age on personal and social motivation	0.58	8.25	<0.001
	Effect of income on personal and social motivation	26	4.09	0.030
	Effect of educational qualifications on personal and social motivation	0.69	8.93	<0.001
Response behavior	Effect of activity per week on personal and social motivation	0.50	7.85	<0.001
	Effect of response time on personal and social motivation	0.46	8.60	0.01

$(P < 0.05*)$

The bootstrapping method was used to test the significance of the model's coefficients of determination (R^2 values). The R^2 value was obtained as 0.55 for response strategies (Table 5). The significance level in this test was less than the standard error of 0.05. The upper and lower bounds were greater than Zero, the effects of the independent variables on the dependent research variable were significant, indicating that response strategies can be predicted based on the independent variables of personal and social motivation, social support, sex, age, income, educational qualifications, activity per week, and response time.

All *P* values obtained in the regression model were < 0.05, indicating that the correlation coefficients between all observed and latent variables in the above model were significant at a significance level of 0.05. In addition, in the Table 6 obtained badness of fit indices (CMIN/DF and RMSEA) and goodness of the fit indices (CFI, TLI, PCFI, PNFI, GFI, AGFI, NFI, NNFI, and IFI) showed that the model fits the data well and does not need to be modified.

Discussion

Respondents who voluntarily share their information, experiences, and expertise with others play a crucial role as information providers in online environments. Thus, to better understand the current position of respondents and propose ways to encourage effective response behavior in the future, the current study aimed to identify characteristics affecting information sharing and social support provision strategies. Given the vivid interactions between questioners and respondents on SQA websites and the fact that these platforms are designed to support questioning and answering behaviors, SQA websites were found to be an excellent context for studying respondent behaviors. This study focused on respondents' strategies in answering health-related questions on SQA websites. Different types of motivations affected respondents and their strategies to provide practical answers. Moreover, respondents considered different dimensions of social support when answering questions. Significant positive relationships existed among the variables of motivations, strategies, and social support. The effects of various types of motivations and different components of social support on respondents specified their preferred strategy. Respondents of health questions are representative of the factors influencing re-

Table 5. Coefficient of Determination (R²) and Bootstrapping Rresults for Response Strategies

Indicator	R²	Lower	Upper	P Value
Response strategies	0.55	0.48	0.69	<0.001

Table 6. The Goodness of the Fit Indices for the SEM Model

Index	Value	After Modifying the Model	Overall Model Status
*CMIN/DF	3.98	**	
RMSEA	0.04	**	
CFI	0.92	**	
TLI	0.93	**	
PCFI	0.53	**	The model is desirable
PNFI	0.51	**	
GFI	0.93	**	
AGFI	0.92	**	
NFI	0.94	**	
NNFI	0.91	**	
IFI	0.68	**	

(*CMIN = 975.30; DF = 245)

sponse strategies on SQA websites.

The structural models with standardized and significant coefficients for the first and second-order factors fit the data well; thus, the conceptual research model was confirmed. In addition, all values obtained for the model fit indices were desirable. Therefore, the overall model was confirmed, indicating that the questionnaire items can adequately measure the research variables.

The first-order factor analysis showed that motivation and social support affect response strategies with coefficients of 0.61 and 0.56, respectively. In addition, the variable of social motivation (interaction with others) had a greater impact on response strategies than personal motivation. The second-order factor analysis showed that self-efficacy was the most influential component of personal motivation, while altruism was the most effective component of social motivation.

The amount of time the respondents took to provide answers on these SQA platforms showed that individuals who spend a lot of time answering questions on these websites seem to consider this issue very important. On the other hand, respondents who visit these websites occasionally give their opinions only when they think it is necessary. Some respondents would like to participate more but do not have enough time. Therefore, different situations can influence response behavior. Moreover, the relationships among motivations and response behavior components showed that more extended activity per week and longer response time imply higher motivation levels. In addition, educational qualifications, age, sex, and income affected response strategies with coefficients of 0.66, 0.53, 0.50, and 0.31, respectively. Finally, demographic characteristics also affected motivations.

The SEM method informs researchers about the complexity of social life (the unilateral, bilateral, direct, and indirect impacts of several variables on each other) and the complexity of measuring latent social constructs. Using this approach, the authors of this study identified the main factors that influence respondents' response strategies (selecting questions, interpreting questions, seeking information, creating answers, and evaluating answers), including motivation, social support, sex, age, income, educational qualifications, activity per week, and response

time.

Ebrahimi et al (14) who examined the patterns and behaviors of researchers' knowledge sharing in the scientific social network ResearchGate, concluded that most researchers from European countries sent answers and shared their specialized knowledge, which is consistent with the present study from the perspective of the respondents' geographical range. Also, the results of this research, according to Castells (19), speak of the hidden power of social networks and QA systems in sharing knowledge and expanding knowledge boundaries, which is also in line with respondents' strategies in SQA.

In the study of users' knowledge-sharing behavior in the Zhihu social question-and-answer community, Gao et al (15) argued that in the Zhihu community, self-display, user recognition, social learning, and other dimensions have a positive and significant effect on users' knowledge-sharing behavior. These results align with the present study's findings that the respondents' participation is affected by the components of motivations (personal and social).

In their study of the changing role of social media in health promotion, Stellefson et al (16) noted that while creating interventions or social media campaigns, health education professionals should take into account factors that are appropriate for the majority of the population. These results align with the effect of (social) motivations on respondents' participation and confirm the role of social support in social media.

Limitations

This applied study provided a comprehensive understanding of factors affecting respondents' strategies based on some independent research variables. However, due to the limitations of the user interface in SQA websites, each questionnaire was provided to respondents on these websites in the form of a question because there was no other way for researchers to contact the respondents. Therefore, more interactive and cooperative respondents were more likely to complete the questionnaires than others. To address this limitation and increase the likelihood of participation of less interactive and less cooperative respondents, the researchers uploaded the link to the questionnaire at

other times.

A number of significance tests were performed to assess the relationships among the research variables. However, when too many significance tests are performed, a relationship that does not exist in reality may be confirmed (type II error). To address this limitation, the expected mean in SPSS Sample Power was determined in a way that maximized the sample size, thereby increasing the accuracy of the assessments.

Conclusion

This research showed that several types of motivations influenced the respondents, and their motivations evolved with the influence of demographic factors and response behaviors. Also, respondents develop their strategies to provide effective answers with the influence of social support dimensions. Therefore, factors that encourage respondents to participate and provide quality answers can be developed in different ways.

The present results can be used to promote the quality of similar online services, such as digital reference services and expert QA services. The open and interactive environment of SQA can be used as a model for improving digital reference services provided by libraries. In order to notify individuals that they may also obtain information and community support from digital reference services, digital reference librarians should take part in answering questions in the Q&A community and identify themselves as librarians when doing so. One of the most important implications of the present study is that the results contribute to the body of knowledge about the behaviors of information providers. The model of response behaviors presented in the present study is an attempt to direct researchers' attention to the behaviors of information providers in online environments and prepare the ground for developing a theoretical model of information provider behavior.

According to the findings of this research, it is recommended that health policymakers, health service providers, information technology activists, and physicians, taking into account the interests of their fields, provide appropriate implementation solutions based on the use of social questions and answers to achieve developmental goals in the field of health. It is also recommended that the Ministry of Health, Treatment and Medical Education, as the guardian of providing health services in Iran, form a suitable working group to design quality assurance labels in various formats for valid and approved respondents.

Authors Contribution

M.K.: study concept and design, writing the original draft and editing. A.M.C.: project administration, supervision, reviewing, and editing. S.Z.: supervision, reviewing, and editing. M.H.Z.: advisor, reviewing, and editing. All authors approved the final draft.

Conflict of Interests

The authors declare that they have no competing interests.

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