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Research Article

Evaluation of Influencing Factors of Security Information Behavior of Online Medical Consultation Users

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In China, online medical consultation is regarded as part of the "Internet + medical treatment" and has gradually become an accepted way for people to seek medical advice. However, many factors can affect users' security information behavior during the consultation process. In order to explore and evaluate the factors influencing the security information behavior of online medical consultation users, this paper firstly adopted semistructured interviews to collect data concerning the influencing factors originating from users themselves, other personnel, and the environment. Secondly, the Delphi method was used to determine the evaluation index system of the factors influencing the security information behavior of online medical consultation users based on the interview data. In this system, there are three first-level indexes, nine second-level indexes, and twenty-three third-level indexes. Finally, the weight of each evaluation index was calculated by the analytic hierarchy process (AHP) in the index system. This study improves and deepens the theoretical system of influencing factor evaluation of security information behavior. In addition, it also provides theoretical guidance and support for the more rational development of online medical consultation information services.

1. Introduction

Currently, there are problems with patient medical treatment in China due to shortages and uneven distribution of medical resources, meaning that large hospitals are crowded while small hospitals are not visited enough [1, 2]. In this context, as the development of the Internet progressed, online medical consultation came into being and began to be widely used. As a key link in the "Internet + medical services," online medical consultation can optimize the use of medical resources and facilitate the medical treatment of patients or public users, but they also bring new security problems. Bauer et al. [3], Lewis and Wyatt [4], and others found that running unverified smartphone applications and using unverified health consultation platforms can cause medical harm and potentially endanger patient safety. Tatsumi et al. [5] investigated the status quo of network medical use in Japan and found that both the information provided online and the ways in which it is used may pose certain security risks. Palosse-Cantaloube et al. [6] studied online chats about drugs and pregnancy in France to evaluate the quality and reliability of the information shared by Internet users and ultimately determined that relying on information in online chats about drugs and pregnancy could be harmful to pregnant women. Gupta [7] argued that phone consultations should only be provided when the patient was properly informed and face-to-face consultations had already been conducted but suggested that even such consultations can have dangers such as misdiagnoses and inappropriate prescriptions. Ploug and Holm [8] found that users tend to automatically agree to the terms and conditions of use and data protection policies of websites or platforms when conducting online medical consultation. However, by doing so, they may miss important information, their personal rights and interests may be infringed upon, and it may become difficult for them to defend their rights. Vasconcellos-Silva and Castiel [9] found that users may have problems identifying and expressing their

symptoms during online medical consultation. Luger et al. [10] found that the elderly among a user group usually have more complex healthcare needs, and a lack of accuracy of expression may lead to a greater risk of misinterpreting symptoms when they are diagnosed through the Internet. McCluskey and Swinnen [11] argued that most users are "rationally ignorant" about healthcare information, as they rationally choose healthcare information that they do not fully understand because the price of information or the opportunity cost of processing this type of information is too high compared to its marginal benefits—this may, however, affect users' security behaviors during consultations.

Both personal factors related to the users themselves and external environmental factors related to security risks may threaten users' security behavior during online medical consultation. The main motivation of this paper is to explore the factors influencing the security information behavior of online medical consultation users and to evaluate these factors in an effort to reduce the security risks as well as to provide a basis for management decision making for the sound development of online medical consultation platforms. Although previous studies on the security of online medical consultation provide references for this study, there are still limitations in the following respects:

(1) Most current research studies on the evaluation of behavioral influencing factors are in the field of security science, and few studies have attempted to evaluate the factors influencing user security information behavior from an information studies perspective

(2) So far, few studies have focused on the evaluation of the factors influencing the security information behavior of online medical consultation users

(3) There is no systematic account or analysis of how these factors affect users' security information behavior in online medical consultation or their level of influence, and there is a lack of empirical research on this topic

The research carried out in this paper to evaluate the factors influencing the security information behavior of online medical consultation users has important theoretical and practical significance. Its main contributions can be summarized as follows:

(1) It supplements the extant research on the factors influencing the security information behavior of online medical consultation users from the perspective of information science, thus expanding the scope of research on how to evaluate these factors in this context

(2) It focuses on evaluating the factors influencing users' security information behavior in the field of online medical consultation and constructs a corresponding evaluation index system

(3) It calculates weights for each evaluation index according to the AHP

The remainder of this paper is organized as follows. Section 2 reviews domestic and international research results related to the factors influencing users' security behaviors during online medical consultation and the evaluation of the factors influencing users' security behaviors. Section 3 extracts the factors that influence the security information behavior of online medical consultation users. Section 4 constructs an evaluation index system for the factors influencing the security information behavior of online medical consultation users and calculates index weights according to the steps of AHP. Section 5 presents the paper's conclusions, compares them with similar studies, and discusses its limitations and prospects for future research.

2. Related Work

This section presents a literature review of studies on the influencing factors of security behavior of online medical consultation users and the evaluation of influencing factors of security behavior. A comprehensive review of related studies is presented to highlight the main contributions of this study.

2.1. Research on the Influencing Factors of Security Behavior of Online Medical Consultation Users. Even though security issue in online medical consultation is an area of focus for scholars, so far, few studies have been conducted on the specific factors influencing the security information behavior of online medical consultation users. The security issues examined by scholars contain general factors that affect the security of user behavior, but most scholars have not looked at them as "influencing factors." Therefore, this section takes security issues in online medical consultation as a starting point for exploring the factors that influence users' security information behaviors during online medical consultation. In addition, in online medical consultation, the participants include the platform, the doctors, and the users (mainly patients) [12], and all three parties have influence on the security of user behavior. Therefore, the following section compares the relevant literature concerning these three parties (see Table 1 for details).

Through a review of the previous relevant literature, we can find that both Chinese and international research studies on the factors influencing users' security behavior in online medical consultation are fragmented, and research studies on the completeness of the factors influencing users' security information behavior in online medical consultation are also relatively scarce. Some of the influencing factors are not comprehensive, and most scholars only mention that a certain factor may threaten users' own security while not systematically revealing or analyzing how these factors may affect users' security information behavior in online medical consultation or their degree of influence. In addition, there is a lack of empirical research on this topic.

Therefore, this study attempts to extract the factors influencing users' security information behavior during online medical consultation from the perspective of their own security information behavior. This study will

Table 1: Summary of influencing factors of security behavior of online medical consultation users.

Delineated dimensions	Influencing factors	Literature sources
Influencing factors from the consultation platforms	Platform operation factors	Bauer et al. [3], Lewis and Wyatt [4], Buijink et al. [13]
	Platform access factors	Zhang et al. [14], Huang [15]
	Platform information quality factors	Tatsumi et al. [5], Palosse-Cantaloube et al. [6], Cui [16]
	Platform data confidentiality factors	Kmucha [17], AlOsail et al. [18]
Influencing factors from doctors	Fraud and irresponsibility by doctors	Zhang and Cheng [19], Feng et al. [20]
	Misdiagnosis by doctors	Gupta [7], Yu et al. [21]
Influencing factors from users	Demographic factors	Zhang and Li [22], Sun et al. [23]
	Protective awareness	Ploug and Holm [8], Zhang et al. [24]
	Information power	Li and Huang [25], Luger et al. [10], McCluskey and Swinnen [11], Almeida et al. [26]
	Emotional factors	Chen et al. [27]
	Knowledge and experience	Poortinga and Pidgeon [28], Haluza et al. [29]
	Disease factors	Chen and Wang [30], Jiang et al. [31]

supplement research on the factors influencing users' security information behavior in online medical consultation from the perspective of information science while laying the foundation for the evaluation of the factors influencing users' security information behavior in online medical consultation.

2.2. Research on the Evaluation of Influencing Factors of Security Behavior. To date, few studies have evaluated the factors influencing the security information behavior of online medical consultation users. Those studies that have been conducted on how to evaluate influencing factors such as patient security and medical security related to the medical field involve more factors such as the behavior of medical personnel and hospital security management. Meanwhile, there are abundant studies on how to evaluate the factors influencing security behavior in other situations or fields. Therefore, this section summarizes the existing research on the evaluation of the factors influencing human security behavior in order to provide a reference for the evaluation of the factors influencing the security information behavior of online medical consultation users.

As for the objects of evaluation, most studies evaluating the factors affecting security behavior have tended to be concerned with coal miners. Next, many scholars have taken construction personnel, including port operators, underground workers, construction workers, and so on, as evaluation objects. Some scholars have also evaluated drivers, including bus drivers and car drivers. In addition, some scholars have evaluated the factors influencing the security behavior of navigators, pilots, civil aviation controllers, and laboratory personnel.

In terms of evaluation steps and methods, most studies on the evaluation of the factors influencing security behaviors first analyze the factors influencing the security behaviors of the evaluation object, then establish an evaluation index system for the factors influencing the security behavior of the evaluation object, and determine the weight of the index. Finally, various methods are used to evaluate the factors influencing security behavior and sometimes to directly evaluate it.

In analyzing the influencing factors of the security behavior of the evaluation object step, both Chinese and international scholars have extracted or analyzed these influencing factors in different ways. For example, to investigate the relationships between drivers' noise exposure and occupational stress, unsafe behavior, and traffic accidents, Golmohammadi et al. [32] adopted a sound level meter, work pressure questionnaire, personal characteristics questionnaire, security behavior sampling technology, accident list, and other methods to extract the influencing factors. Jorgensen [33] designed a security behavior psychometric scale for laboratory personnel, investigated the internal structure of the scale through exploratory and confirmatory factor analysis, and verified that the influential factors in the scale could identify unsafe behaviors before the occurrence of an accident, injury, or damage. Luo [34, 35] optimized the factors influencing coal mine employees' security behaviors through principal component analysis and factor analysis. Wang and Zhao [36] analyzed various factors leading to unsafe behaviors by construction workers based on the human-machine-ring-tube system used in construction.

In establishing the index system and determining the weight step, An et al. [37] used a network analytic hierarchy process to study the interrelationship among indexes and calculated the weights of the indexes using this method. Chen [38] and You et al. [39] used the order relation method and combined it with an expert investigation to determine the weight coefficients of each evaluation index. Other scholars determined the index weights by the grey relational analysis [40], structural equation modeling [41], analytic hierarchy process [42], and information entropy method [43].

In evaluating the factors influencing security behavior step, some scholars have combined more than two methods. For example, Cheng et al. [44] established a comprehensive

evaluation model based on a grey-fuzzy-improved momentum BP algorithm to evaluate the factors influencing the security behavior of coal mine employees. Xu [45] and Zhang and Xu [46] established a cluster evaluation model for the central point triangular whitening weight function for the fuzziness of behavior and the grey measurement. Other scholars have used various methods to evaluate the factors that influence security behaviors. For example, Meng et al. [47] constructed a risk assessment model by assessing the risk value of factors influencing unsafe behavior by coal miners. Their risk assessment model consisted of probability, importance, and loss, with the risk value being the product of the three factors. Tong et al. [48] and Zheng and Han [49] proposed a comprehensive evaluation method for unsafe behaviors using set-pair analysis theory. In addition, the fuzzy evaluation method [50], conventional multi-index synthesis method [51], data envelopment analysis (DEA) [52], normal cloud model comprehensive evaluation method [53], and BP neural network method [54] have also been used by some scholars to evaluate various types of personnel security behaviors or behavioral influencing factors.

As this literature review demonstrates, there has been an accumulation of research on how to evaluate the factors influencing human security behavior in the existing literature, mostly from the perspective of security science, but few studies have focused on how to evaluate the factors influencing users' security information behavior in the field of online medical consultation. As online medical consultation is becoming a new method of medical treatment, there is an urgent need to study the factors influencing users' security information behavior during this process.

3. Extraction of Influencing Factors of Security Information Behavior of Online Medical Consultation Users

In the literature review, some of the factors influencing user security behavior have been extracted. To extract the specific factors influencing the security information behavior of online medical consultation users, this study adopts qualitative research methods to investigate their security information behavior and excavates potential influencing factors through interviews to provide a basis for the selection of subsequent evaluation indexes.

3.1. Research Strategy. In order to further explore the factors influencing the security information behavior of online medical consultation users, a grounded theory research strategy is adopted in this research, and data analysis is carried out from the bottom up, trying to extract the most comprehensive influencing factors possible from the primary data.

Grounded theory is a research strategy that specifically generates theories, emphasizing the importance of empirical field research and the need for any data interpretation to be very close to what is happening in "real-world" situations [55]. In this study, Strauss and Corbin's programmed grounded theory version was used to encode the interview data at three levels.

3.2. Research Samples. Between early September 2021 and early November 2021, the researchers sampled 16 interviewees, including 4 online medical consultation users and 7 doctors (4 online doctors who can conduct online diagnosis and treatment activities; 3 general doctors who cannot conduct diagnoses or give treatment online), 2 platform staff, and 3 researchers. According to the statistics of Internet users in "the 50th Statistical Report on China's Internet Development," the group aged 20–49 accounts for 56.6% of total Internet users [56]. This indicates that users in this age group are the primary users of the Internet, have more opportunities to carry out online medical consultation activities, and are more representative of users of the Internet in general. Therefore, this research focused on selecting online medical consultation users in this age group for interviews. The diversity of the interview results was increased by interviewing different types of doctors. Moreover, interviews with the staff working on the online medical consultation platforms were conducted because they can provide more reliable and accurate data support for the interview results, thanks to their deep knowledge of the platforms. Regarding the interviews with researchers, due to the limitations of our sample sources, only graduate students were selected because they not only are representative of Internet users in general but also may have conducted in-depth research on relevant fields. The basic information about the interviewees is detailed in Table 2.

Due to limitations of geographical distance, formal interviews were conducted in the form of face-to-face interviews, telephone interviews, and other forms, and the interview duration was between 30 and 70 minutes. Prior to the interviews, the researchers sent or submitted an interview invitation letter and informed consent form to the interviewees and explained the purpose of the research. The interviews were recorded with the consent of the interviewees and then transcribed for analysis. The interview records and sorted materials were returned to the interviewees for confirmation to correct any omissions.

3.3. Data Encoding and Analysis. Based on grounded theory, this study conducted a three-level coding analysis of the data collected: open coding, associated coding, and core coding until theoretical saturation.

In the process of open coding, the interviewees' original words were used as the code as far as possible to explore the initial concepts and then classify the initial concepts and name the categories. By repeatedly analyzing and rearranging the interview data, 78 initial concepts were obtained, and 27 subcategories were obtained through induction and classification.

Associated coding is the process of discovering and establishing relationships between categories through continuous comparison to develop the main categories. On the basis of open coding, this study continued to

Table 2: Basic personal information about the interviewees.

Number	Identity	Gender	Age	Educational background	Medical title/job position/ research direction	Doctor's department/platform staff's platform
A-F-1	Online medical consultation user	Female	26	Bachelor's degree	—	—
C-M-2	Network doctor	Male	43	Master's degree	Attending physician	Anesthesiology
E-F-3	Researcher	Male	26	Master's degree	Information behavior	—
B-F-4	General doctor	Female	29	Master's degree	Resident physician	Digestive medicine
D-M-5	Platform staff	Male	27	Bachelor's degree	Interactive designer	The Good Doctor (haodf.com)
A-M-6	Online medical consultation user	Male	24	Bachelor's degree	—	—
C-F-7	Network doctor	Female	29	Bachelor's degree	Chinese medicine resident	Chinese medicine dermatology
E-F-8	Researcher	Female	24	Master's degree	Information behavior	—
A-M-9	Online medical consultation user	Male	18	Senior high school	—	—
B-F-10	General doctor	Female	27	Bachelor's degree	Resident physician	Pediatric comprehensive
C-M-11	Network doctor	Male	52	Doctoral degree	Chief physician	Cardiovascular internal medicine
A-F-12	Online medical consultation user	Female	34	Master's degree	—	—
B-M-13	General doctor	Male	48	Special secondary school	Attending physician	General internal medicine
D-F-14	Platform staff	Female	26	Bachelor's degree	Software developer	The Good Doctor (haodf.com)
C-M-15	Network doctor	Male	47	Bachelor's degree	Associate chief physician	Neurosurgery
E-M-16	Researcher	Female	23	Master's degree	Security behavior	—

In the "number" column, the first letter represents the identity of the interviewee (where A represents the online medical consultation user; B represents the general doctor; C represents the network doctor; D represents the platform staff; and E represents the researcher); the second letter represents the gender (F represents female; M represents male); and the third number represents the order of the interview.

compare, classify, and summarize concepts and finally formed 11 categories and 3 main categories through integration. The main category was divided according to the sources of the factors influencing security information behavior, including the influencing factors from users themselves, other personnel, and the environment. Among them, the influencing factors from users themselves included personal characteristics, security awareness, security knowledge and experience, security information ability, role perception, emotional tendency, and disease status; the influencing factors from other personnel included physician influencing factors and non-physician influencing factors; the influencing factors from the environment included factors influencing the consultation environment and those influencing the non-consultation environment.

Core coding is the process of extracting the core category from the main categories by analyzing the relationships between the main categories and the core category. Based on open coding and associated coding, this study determined that the factors influencing the security information behavior of online medical consultation users are considered the core category of this research (see Table 3 for details).

To test whether theoretical saturation had been reached, we subsequently interviewed two more interviewees, who still coded the data according to the above coding method. No new concepts were found, and the coding results were consistent with the relationships presented in the original coding. Therefore, the study is considered to have reached theoretical saturation.

4. Construction of Evaluation Index System and Determination of Index Weights for Influencing Factors of Security Information Behavior of Online Medical Consultation Users

According to certain index system design principles, this section selects appropriate influencing factors from existing research results and interview research results as evaluation indexes, uses the Delphi method to select and determine evaluation indexes, and builds an evaluation index system for the factors influencing the security information behavior of online medical consultation users. At the same time, AHP was selected as the method for determining the index weights, and the weights in the evaluation index of the factors influencing the security information behavior of online medical consultation users were calculated.

4.1. Construction of Evaluation Index System for Influencing Factors of Security Information Behavior of Online Medical Consultation Users. Sections 2 and 3 have extracted the factors influencing the security information behavior of online medical consultation users. In this section, the index system design principle is followed to select suitable influencing factors as evaluation indexes and to establish an evaluation index system for the factors influencing the security information behavior of online medical consultation users.

According to the Delphi method, this process can be divided into the following three steps: first, the "Expert

Table 3: Core coding of influencing factors of security information behavior of online medical consultation users.

Core category	Main categories
Influencing factors of security information behavior of online medical consultation users	Influencing factors from users themselves Influencing factors from other personnel Influencing factors from the environment

Opinion Survey on an Evaluation Index System for Influencing Factors of Security Information Behavior of Online Medical Consultation Users (first draft)" is sent to each expert through various communication channels, inviting them to comment on the description of the index system's structure and examples and put forward suggestions for modification; second, the experts' opinions about modifications are collected, and the index system is modified and improved according to their suggestions (marked in the document), and then it is fed back to the experts, who are invited to put forward their opinions on the modified index system again and further evaluate each index; third, step 2 is repeated until the experts have reached consensus.

Online medical consultation users are considered the research object of this study. The experts hired should have a full understanding of online medical consultation and users' security information behavior in order to put forward specific and practical opinions regarding an index system for the factors influencing the security information behavior of online medical consultation users. Therefore, the experts selected in this research were mainly selected from the following three categories: first, doctors with at least five years of experience working in online medical consultation; second, researchers who have conducted in-depth research in the fields of Internet medical treatment, information behavior, and security behavior; and third, platform staff engaged in software development and content editing of online medical consultation platforms. Ultimately, 15 people were selected as expert group members for the Delphi method (see Table 4 for details).

Two rounds of an expert consultation survey were conducted in this study. A total of 15 consultation questionnaires were distributed in each round, and 15 consultation questionnaires were recovered, with a recovery rate of 100%. Finally, an evaluation index system for the factors influencing the security information behavior of online medical consultation users was formed through expert consensus, which is composed of 3 first-level indexes, 9 second-level indexes, and 23 third-level indexes (see Table 5 for details).

4.2. Determination of Evaluation Index Weights for Influencing Factors of Security Information Behavior of Online Medical Consultation Users. Index weights are considered an important part of an evaluation index system, and their function is to measure the importance of the target. Generally, they include the following factors: the importance of the target by the decision maker, the degree of difference, and the degree of reliability of each target attribute value [57]. In the multi-index comprehensive evaluation procedure, determining the index weight is the key link. Whether the index weights are reasonable has a major effect on the scientific accuracy and correctness of a comprehensive evaluation.

At present, AHP is considered the most effective method for hierarchical weight decision analysis [58], which can help decision makers choose solutions that satisfy their preferences in complex decision problems. It is also a common multi-criteria decision-making (MCDM) method. MCDMs have been widely studied by researchers because of their decision characteristics [59]. Their main idea is how to evaluate a set of alternatives according to multiple criteria, which can be roughly divided into two categories: multi-attribute decision making (MADM) and multi-objective decision making (MODM) [60]. MCDM includes more than 20 application methods. Besides AHP, scholars have tended to concentrate on the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) [61, 62], Elimination and Choice Expressing Reality (ELECTRE) [63], and VlseKriterijuska Optimizacija I Komoromisno Resenje (VIKOR) [64], among others.

The AHP method in multi-criteria decision making uses a tree-like hierarchical structure to decompose the problem of comparing schemes on multiple criteria into the comparison of single criteria, which makes the decision process more interpretable [65]. This method designs a judgment matrix through pairwise comparison at each level, which can dilute the background and improve the accuracy of the target weight setting. At the same time, the evaluation index system constructed in this research reflects a hierarchical structure, and there is a subordinate relationship between the upper and lower levels and there is no particular disparity between the indexes. Therefore, this study selected AHP as the weight measurement method.

According to the implementation steps of AHP, the weight of each evaluation index was calculated step by step.

4.2.1. Establishment of the Hierarchical Structure Model. The evaluation index system in this study reflects a hierarchical structure, so there is no need to establish another hierarchical structure. The hierarchies in AHP are generally divided into the target layer, criterion layer, and index layer. In this study, the target layer includes the factors influencing the security information behavior of online medical consultation users, the criterion layer is composed of first-level indexes, the subcriterion layer is composed of second-level indexes, and the index layer is composed of third-level indexes.

4.2.2. Construction of the Judgment Matrix. Since the hierarchical structure model determines the relationship between the upper and lower elements, pairwise

Table 4: Basic information about the experts.

	Expert occupational area			Professional title				Education background		
Subclass	Network doctor	Related researcher	Platform staff	Senior	Deputy senior	Intermediate	Primary	Doctoral degree	Master's degree	Bachelor's degree
Quantity	9	3	3	3	5	3	4	3	7	5
ratio (%)	60%	20%	20%	20%	33%	20%	27%	20%	47%	33%

Table 5: Evaluation index system for influencing factors of security information behavior of online medical consultation users.

First-level indexes	Second-level indexes	Third-level indexes	Connotation of third-level indexes
Evaluation indexes of users' own influencing factors	Security awareness	Physical fitness awareness	The user's degree of security awareness regarding the protection of their physical health
		Information security awareness	The user's degree of security awareness regarding the protection of the security of their personal information
		Property security awareness	The user's degree of security awareness regarding the protection of the security of their personal property
	Knowledge and experience	Domain knowledge	The user's domain knowledge reserve, such as their scope of consultation knowledge, knowledge of related drugs, healthcare products, or diseases
		Security experience	The user's experience and richness of habits in online medical consultation will affect the security of their access to information
	Security information ability	Ability to search for security information	The user's ability to view information about online medical consultation in a variety of secure ways
		Ability to express security information	The user's ability to express information related to online medical consultation in various safe ways (including current illnesses or other medical problems such as medication dosage, medication precautions, drug interactions, adverse drug reactions, and Chinese medicine decoction)
		Ability to select security information	The user's ability to securely select information about their online medical consultation
		Ability to understand security information	The user's ability to understand information related to online medical consultation in a secure manner
		Ability to adopt security information	The user's ability to safely adopt information related to online medical consultation
	Emotional tendency	Attitude tendency	The user's identification with and attitudes toward the use of online medical consultation
		Reaction tendency	The tendency by users to seek convenience and blindly follow the crowd in online medical consultation
	Self-disease status	Disease urgency	The degree of urgency of the user's illness during online medical consultation
		Disease type	The disease type of the user during online medical consultation
Evaluation indexes of other personnel's influencing factors	Physician influencing factors	Doctor communication mode	The physician communicates with the user in real time or in a delayed manner (often in the form of a graphic interview)
		Number of doctor communications	The frequency of communication between doctors and users during online medical consultation
	Non-physician influencing factors	Online personnel evaluation situation	Comments made by users and patients with similar diseases to doctors on online medical consultation platforms
		Offline personnel evaluation situation	Friends' opinions regarding online medical consultation

Table 5: Continued.

First-level indexes	Second-level indexes	Third-level indexes	Connotation of third-level indexes
Evaluation indexes of environmental influencing factors	Consultation environment influencing factors	Consultation form	This refers mainly to the form of consultation in the consultation environment, which can be divided into graphic consultation, voice consultation, and video consultation and can also be divided into free consultations and paid consultations
		Quality of consultation information	This is mainly reflected in the quality of content and collection and expression of consultation feedback information. Content quality refers to the objectivity and correctness of consultation feedback information (suggestions or prescriptions). Objectivity is the doctor's objective and scientific analysis of the user's condition or other problems, setting personal feelings and prejudices aside; correctness means that the feedback provided by the doctor should conform to medical industry norms and standards. Collection quality refers to the relevance and completeness of consultation feedback information. Relevance means that the feedback provided by the doctor is closely related to the condition or other problems described by the user; completeness means that the feedback provided by the doctor includes all content related to the user's condition or other problems. The quality of expression refers to the timeliness and ease of understanding of the feedback information of the consultation. Timeliness means that doctors should respond to users as soon as possible; ease of understanding means that the feedback provided by the doctor should be easy for the user to understand. Thus, it is helpful for users to understand or adopt feedback information safely and correctly.
		Consultation platform guidance	This mainly refers to the guidance function provided by the platform for users to express information safely and quickly in the consultation environment
	Non-consultation environment influencing factors	Policy support	This mainly refers to the provision, support, encouragement, and supervision of current national policies for online medical consultation; the degree of support may affect users' safe choices or adoption behaviors
		Technical support	The network system shall maintain continuous, reliable, and normal operation, which means that users shall not experience unsafe behaviors due to network or payment failures

judgment matrices of different levels can be constructed according to criterion C of the previous level. In this study, the Delphi method was adopted to construct a judgment matrix, and 15 expert group members were invited to score the importance of each indicator according to a scoring standard on a 1–9 scale. The specific meanings are shown in Table 6. The scale of each index was determined based on the arithmetic average of each expert's scores for each index.

Through the collection and calculation of weight data, the final judgment results at each level are obtained. For the sake of saving space, only the judgment matrix for the first-level indexes is given here, as shown in Table 7.

4.2.3. Calculation of Weight Values. Given that the judgment matrix of n elements $x_1, x_2, \ldots, x_n$ for criterion C is $\mathbf{Z}$, find the relative weight of $x_1, x_2, \ldots, x_n$ for criterion C $\omega_1, \omega_2, \ldots, \omega_n$, and its vector form is $\mathbf{W} = (\boldsymbol{\omega_1}, \boldsymbol{\omega_2}, \ldots, \boldsymbol{\omega_n})^{\mathbf{T}}$.

There are usually two methods for weight calculation: the asymptotic normalization coefficient (ANC) and the characteristic root method. In this research, the ANC is adopted, and the specific calculation steps are as follows.

Each column of elements of the judgment matrix $\mathbf{Z}$ is normalized:

$$\overline{a}_{ij} = \frac{a_{ij}}{\sum_{k=1}^{n} a_{kj}}, \quad (i, i, \ldots, n). \tag{1}$$

Table 6: Scale and meaning of AHP.

Scale	Meaning
1	Indicates that two factors are of equal importance compared to each other
3	Indicates that one factor is slightly more important than the other
5	Indicates that one factor is significantly more important than the other
7	Indicates that one factor is particularly important than the other
9	Indicates that one factor is extremely more important than the other
2, 4, 6, 8	Represents the median of the two adjacent judgments described above
Reciprocal	The comparison between factor i and j results in a_{ij}, and the comparison between factor j and i results in $a_{ji} = 1/a_{ij}$

Table 7: Judgment matrix of the first-level indexes.

Evaluation indexes	A1	A2	A3
A1: evaluation indexes of the user's own influencing factors	1	4	7
A2: evaluation indexes of other personnel's influencing factors	1/4	1	4
A3: evaluation indexes of environmental influencing factors	1/7	1/4	1

Table 8: Weight results of first-level indexes.

Evaluation indexes	Index weight value (W_i)
A1: evaluation indexes of the user's own influencing factors	0.6892
A2: evaluation indexes of other personnel's influencing factors	0.2335
A3: evaluation indexes of environmental influencing factors	0.0773

The normalized judgment matrix **Z** is added by row:

$$\overline{W}_i = \sum_{j=1}^{n} \overline{a}_{ij}, \quad (i, i, \ldots, n). \tag{2}$$

Normalize the vector $\overline{W} = (\overline{W_1}, \overline{W_2}, \ldots, \overline{W_n})^T$:

$$W_i = \frac{\overline{W}_i}{\sum_{k=1}^{n} \overline{W}_i}, \quad (i, i, \ldots, n). \tag{3}$$

The resulting vector $W = (W_1, W_2, \ldots, W_n)^T$ is the weight.

The weight results of the first-level indexes can be obtained according to the above formula, as shown in Table 8.

4.2.4. Consistency Check for Matrices. Calculate the consistency index:

$$C.I. = \frac{\lambda \max - n}{n - 1}. \tag{4}$$

Calculate $\lambda_{\max} = 3.0985$ and $C.I. = 0.0493$ in the first-level indexes.

Find the corresponding average random consistency index.

Table 9shows the average random consistency index (*R.I.*) value of 1–15-order judgment matrix. It can be seen that $R.I. = 0.58$.

Calculate the consistency ratio:

$$C.R. = \frac{C.I.}{R.I.}. \tag{5}$$

When $C.R. \leq 0.10$, it is generally considered that the judgment matrix has satisfactory consistency (that is, the degree of consistency of the judgment matrix is within the allowed range); otherwise, pairwise comparison should be reperformed, and elements of the judgment matrix should be adjusted until satisfactory consistency is reached.

According to the above steps, $C.R. = 0.0849$ is calculated, and the consistency check has been passed.

According to the above calculation method, the weights of the second and third-level indexes and their total weight values are calculated, and the total ranking weight of the weights of the indexes at each level is calculated. After processing, the weights of each index are shown in Table 10.

After calculation, a consistency check of the subcriterion layer relative to the criterion layer shows that $C.R. = 0.0886 < 0.1$, passing the consistency check. A consistency check of the index layer relative to the subcriterion layer shows that $C.R. = 0.0437 < 0.1$, passing the consistency check.

It can be seen from Table 10 that A1 has the largest weight among the first-level indexes, indicating that the most important factor influencing the security information behavior of online medical consultation users is the users' own factor; among the second-level indexes, A11 and A15 are the indexes with the largest weights, indicating that users' personal security awareness and disease status are the major factors influencing users' security information behavior in online medical consultation; among the third-level indexes, A111, A151, and A211 are the indexes with the large weights, indicating that physical fitness awareness, disease urgency, and communication mode with doctors in the third-level

Table 9: Values of the average random consistency index (R.I.).

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
R.I.	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.52	1.54	1.56	1.58	1.59

Table 10: List of evaluation index weights of influencing factors of security information behavior of online medical consultation users.

Criterion layer (first-level indexes)	Subcriterion layer (second-level indexes)	Index layer (third-level indexes)
A1 (0.6892)	A11 (0.2612)	A111 (0.1711)
		A112 (0.0552)
		A113 (0.0349)
	A12 (0.1176)	A121 (0.0588)
		A122 (0.0588)
	A13 (0.0873)	A131 (0.0229)
		A132 (0.0311)
		A133 (0.0138)
		A134 (0.0111)
		A135 (0.0084)
	A14 (0.0420)	A141 (0.0315)
		A142 (0.0105)
	A15 (0.1811)	A151 (0.1358)
		A152 (0.0453)
A2 (0.2335)	A21 (0.1946)	A211 (0.1459)
		A212 (0.0486)
	A22 (0.0389)	A221 (0.0240)
		A222 (0.0149)
A3 (0.0773)	A31 (0.0476)	A311 (0.0261)
		A312 (0.0100)
		A313 (0.0115)
	A32 (0.0297)	A321 (0.0099)
		A322 (0.0198)

indexes are the major factors influencing users' security information behavior.

5. Conclusions and Discussion

5.1. Conclusions. This study aimed to evaluate the factors influencing the security information behavior of online medical consultation users and to understand the current situation regarding users' security information behavior in online medical consultation.

Through a literature review and interview coding and based on the sources of influencing factors, the influencing factors from users themselves, other personnel, and the environment were finally extracted. Among them, the influencing factors from users themselves included personal characteristics, security awareness, security knowledge and experience, security information ability, role perception, emotional tendency, and disease status; the influencing factors from other personnel included physician influencing factors and non-physician influencing factors; the influencing factors from the environment included the influencing factors from the consultation environment and the influencing factors from the non-consultation environment.

According to certain index system design principles, the appropriate influencing factors of online medical consultation users' security information behavior were selected as evaluation indexes, and finally 3 first-level indexes, 9 second-level indexes, and 23 third-level indexes were obtained after selecting and optimizing the indexes by the Delphi method. After AHP was used to measure the weight of each index, it was found that among the first-level indexes, the weight of "A1 (user's own influencing factors)" was the largest; among the second-level indexes, "A11 (security awareness)" and "A15 (self-disease status)" were the indexes with the greatest weights; among the third-level indexes, "A111 (physical fitness awareness)," "A151 (disease urgency)," and "A211 (doctor communication mode)" were the indexes with the greatest weights.

5.2. Discussion. Compared with relevant extant studies, this study found that in terms of research objects, there have been few studies on the evaluation of the factors influencing the security information behavior of online medical consultation users, both in China and internationally, but there have been evaluation studies of the factors influencing the security behavior of other types of groups. This kind of research mainly belongs to the field of security science, and most studies have taken coal miners as their evaluation objects. This study focused on users of online medical consultation, and those users who had conducted online medical consultation activities were selected as the research

objects in order to better reflect the factors influencing the security information behavior of Chinese users of online medical consultation.

In terms of research methods, as for the extraction of the factors influencing the security information behavior of online medical consultation users, this study obtained data through interviews based on a literature review and extracted the influencing factors according to the principles of grounded theory. This qualitative method emphasizes human factors and pays more attention to specific situations, thus putting the entire research process in a more open environment, which is conducive to digging for deep views and obtaining in-depth and extensive data. In similar studies, some scholars extracted influencing factors by means of questionnaires or measurement scales [32, 33]. In addition, some scholars used only literature reviews to summarize relevant articles and then summarized the influencing factors. In combination with scholars' historical research results and the actual situation of coal mine security management, Yang et al. [66] classified the factors affecting unsafe behavior by coal miners in detail in terms of individual factors, organizational management factors, and environmental factors. Chen et al. [67] classified the factors influencing (un)safe building behaviors into four levels: individual, group, organization, and society. Both methods lack a certain degree of humanistic care. Some scholars have directly analyzed the current situation of the user environment through field observation. For example, Sheng [68] used the STOP behavior observation method to obtain data on employees' unsafe behaviors, and Zhang et al. [69] used the BBS behavior security observation method to control the unsafe behaviors of coal miners, which lacked a certain theoretical basis.

In addition, to evaluate the factors influencing the security information behavior of online medical consultation users, the AHP method was selected as the index weight measurement method in this study, and the weight of the standard was determined using a pairwise comparison matrix. However, for other MCDM methods, such as TOPSIS and ELECTRE, there is no special weight assignment method [70].

5.3. Research Limitations and Prospects. This study has some limitations that may be addressed and improved on in subsequent studies.

First, although the "Evaluation Index System for Influencing Factors of Security Information Behavior of Online Medical Consultation Users" constructed in this study is based on a literature review and first-hand interview data coding and was established by layers of evaluation by experts using the Delphi method, it is still unknown how effective it is in practical application. In the future, appropriate evaluation methods (such as the fuzzy comprehensive evaluation method) can be selected to empirically evaluate the factors influencing the security information behavior of online medical consultation users.

Second, the interview coding process used in this study may have been affected by subjective factors, such as the individual knowledge structure and ability level of the researchers, resulting in inaccurate analysis. At the same time, the Delphi method adopted will also be constrained by the subjective understanding of the experts consulted. In future research, more rigorous and objective logical methods can be explored to deepen the research and reach more scientific conclusions.

Finally, the effectiveness of the AHP method depends on the accuracy of the judgment matrix and whether the evaluation index system is reasonable. However, it is difficult to avoid subjective bias in a judgment matrix determined by the subjective judgment of experts, which will affect the weight and the objectivity and robustness of the final calculation results. In addition, using a 1–9 scale is also one of the limitations of this weighting method. In the future, we can choose a more objective and reliable method to comprehensively evaluate the index system.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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