

Older adults' intend to discontinue using an online paid health consultation platform

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Abstract: The main objective of this study is to gain a deeper understanding of the factors that influence older adults' discontinuous usage of online health consultation platforms. A questionnaire was used to collect data from older adults covering aspects including price value, privacy concern, perceived trust, habit, technology anxiety, dissatisfaction and discontinuous usage intention of the older adults with online paid health consultation platforms. The collected data from 254 valid samples were analyzed by SPSS software. The model fitting test of the structural equation model was carried out by AMOS software. The results show that price value, privacy concern, perceived trust, habit and technology anxiety positively impact the dissatisfaction and discontinuation usage intention of adults respectively. These factors will lead to dissatisfaction which positively impact their discontinuous usage of the online paid health consultation platform. This study provides empirical references for the optimization of online paid health consultation platforms. This study also provides valuable suggestions for the government to ensure an online medical service environment and to promote better use of online health consultation platforms by older adults, thereby improving their quality of life and social participation.

Keywords: *Discontinuous usage intention, Dissatisfaction, Influencing factor, Older adults, Online paid health consultation platform, Technology anxiety.*

1. Introduction

In recent years, the online health consulting industry has risen rapidly with the gradual improvement of online healthcare levels and the increasing demand for people's health. At present, major stakeholders such as mobile operators, device suppliers, healthcare providers, content participants, foundations and governments have launched multiple mobile healthcare services and applications worldwide [1]. However, the users of online paid health consultation platforms are still mainly young people [2] and older users rarely use such convenient online health consultation services. The aging population in China is steadily increasing as a result of the aging phenomenon's profound implications. The demand for medical care is also increasing with age [3]. The aforementioned data indicate that the need for health counseling services among older persons is particularly high and essential [4]. Healthcare practitioners and welfare organizations are offering and will continue to offer an increasing number of online support services for older adults [5].

Improving the online medical service system to adapt to the aging ability, building a relatively complete older adults health service system, expanding the quality of older adults' online health consulting services, providing accurate health consulting services to older adults with different needs and promoting online health consulting services for the aging are the inevitable requirements of promoting healthy aging. Therefore, considering the increasing trend of aging in China and the urgent

need for medical services among older adults studying their intention to discontinue the use of online paid health consultation platforms is of great practical significance.

Researchers have achieved rich research results in surveys of online paid health consultation platforms and studies on the willingness of older users to continue using them. However, there is relatively little research on the psychological factors, price value and habits of older users to explore their intention to discontinue using them. Many studies focus on the psychological aspect. There are few systematic and complete empirical studies.

The purpose of this study is to investigate how the influencing factors affect older adults' discontinuous use of online paid health consulting platforms and explore how to optimize the online paid health consulting platform to provide strategic suggestions for medical care providers and policy makers so that older adults can better enjoy the application results of the rapid development of the Internet and ensure the health and happiness of older adults. This study constructed a model of older people's intention to discontinue the use of online paid health counseling platforms and proposed research hypotheses that the price value, privacy concern, perceived trust, habit and technology anxiety of older people have a positive impact on dissatisfaction and discontinuation use intention and dissatisfaction with online paid health counseling platforms has a positive impact on the willingness of older people to discontinue use. We can gain a deeper understanding of the usage behavior of older people towards online paid health consultation platforms. In a nutshell, this study can provide a scientific basis for platform optimization, promote the popularization and development of online health consultation services and have significant practical significance for addressing the challenges of aging society and improving the health level of older adults.

2. Literature Review

2.1. Online Paid Health Consultation Platform

The network-based online medical information service system has achieved significant construction and development in recent years [6] and has achieved rich research results. In this field, some studies have explored how the online health consultation interface of artificial intelligence intervention affects the views of its users [7]. In addition, some researchers have used deep learning techniques to generate accurate and interpretable doctor recommendations on healthcare consulting platforms [8]. Mobile health platforms have broad application prospects that can be used to increase the coverage of effective information for healthcare professionals, reduce erroneous information and effectively implement recommended measures [9]. The study of user behavior on online medical websites is also an important research direction in this field which involves user adoption behavior [10] doctor-patient communication [11], service usage and transformation, willingness to share information between patients, doctor-patient trust and doctor contribution behavior in online medical communities.

2.2. Older Adults' Discontinuance Usage Intention

Current research has found that privacy issues, user habits, trust, technology anxiety and other factors directly or indirectly affect the willingness of older users to continue using. Among them, technology anxiety negatively impact the usability of older people [12]. They are unable to fully utilize the potential benefits of information technology [13] and may even gradually give up using these systems due to concerns about potential privacy issues due to the high concern of older people for privacy. It is worth noting that habits have a positive impact on the willingness of older people to use them [14]. In addition, some studies have also shown that the personal willingness of users has a significant impact on their privacy concerns, perceived trust and willingness to disclose personal medical and health information online [15]. Older adult users may lack a correct understanding of the Internet, with weak learning abilities and a weaker ability to accept fresh objects compared with young users. All these factors will deepen the gap between older adult users and the Internet and have a negative impact on the continuous use of online health services [16]. There are various research methods, including exploring the characteristics, credibility and functions of online health counseling

services through text mining and content analysis as well as using electronic questionnaire surveys to analyze user engagement and psychological resilience. These methods also help us gain a deeper understanding of various behaviors and influencing factors among users of different age groups. Although many studies on patient satisfaction have been conducted through questionnaire surveys, interviews [17] and examinations [18]. There are still relatively few studies that use user evaluation data from online medical platforms for analysis [19]. It is necessary to further strengthen research in this field, deeply analyze the factors that affect older people's discontinuance usage intention of online paid health consultation platforms, and provide strong support for improving system design, enhancing user experience, and service quality to have a more comprehensive understanding of the behavior and needs of older users.

2.3. Hypotheses and Research Model

2.3.1. Price Value

Users will focus on price when using online paid health consulting platform services but they will also be more concerned about the reliability of medical services. In addition, China's online medical service is constantly commercialized and users are losing trust in the reliability of online medical services [20]. The following assumptions are proposed:

H_{1a}: The price value of online paid health consulting platforms has a positive impact on the dissatisfaction of adults.

H_{1b}: The price value of online paid health consultation platforms has a positive impact on adults' willingness to use them discontinuously.

2.3.2. Privacy Concerns

The Internet, the government and other social entities advocate using artificial intelligence (AI), cloud computing services, big data and other high-tech technologies to provide accurate aging transformation which not only requires interaction but also requires full consideration of the internal needs of the adult's users. Therefore, the online paid health services platform needs to strengthen the Internet aging technology but it widely and carefully collects user information records. The health application privacy policy is difficult to evaluate which caused older adults' privacy concerns leading to their discontinuance using online paid health consulting platforms. For example, smart devices always monitor the health status of older adults and the recording of fingerprints, facial recognition and other information also involves the privacy of the older adults. Telemedicine requires patients to upload their physiological data and even private pictures and some online doctors show the treatment process and results [18]. In the case of the continuous improvement of the degree of aging transformation, individual privacy data is collected more comprehensively and the risk of privacy invasion is rising. The issue of privacy protection under intelligent information products has also been widely discussed by scholars at home and abroad. Some foreign scholars believe that the process of using online medical treatment will lead users to lose control of their information privacy [21]. These problems will undoubtedly raise concerns for users. The following assumptions are proposed:

H_{2a}: Privacy concerns about online paid health consulting platforms have a positive impact on the dissatisfaction of older adults.

H_{2b}: Privacy concerns about online paid health consulting platforms have a positive impact on adults' willingness to use them discontinuously.

2.3.3. Perceived Trust

Residents with higher education and income levels will have higher social trust. Social participation has a positive effect on promoting residents' social trust. The higher the frequency with friends and the more they participate in social activities, the higher the trust in society [22]. Trust is an important component of technology [14]. Older people may have a crisis of confidence. On the other hand, when adults use the online paid health consultation platform services, they may distrust the medical level,

payment security and information security of doctors, resulting in dissatisfaction with the online paid health consultation platform and increasing their willingness to use the platform continuously. Adults may pay more attention to the personalization and privacy of medical services. It may be difficult for adults to have enough trust leading to dissatisfaction and continuous use due to the non-face-to-face nature of online paid health consulting platform services. Therefore, the following hypotheses are proposed:

H_{3a}: Perceived trust in online paid health consultation platforms has a positive impact on the dissatisfaction of adults.

H_{3b}: Perceived trust in the online paid health consultation platform has a positive impact on adults' willingness to use it discontinuously.

2.3.4. Habit

The habits of adults have a crucial impact on the continuous use of online paid health consultation platforms. Studies have shown that habit has a direct impact on older adults' intention behaviour and usage of information and communication technology (ICT) [23]. Adults may not rely on using online paid health consultation platforms to obtain professional medical advice and solutions. It may be due to distrust and they may be used to choosing traditional hospital practices. The following assumptions are proposed:

H_{4a}: Habit has a positive impact on the dissatisfaction with online paid health consultation platforms among adults.

H_{4b}: Habit has a positive impact on adults' willingness to discontinue online paid health consultation platforms.

2.3.5. Technology Anxiety

Technology anxiety may somewhat reduce the willingness of adult users to use online medical treatment [24]. Technology anxiety is a concern one has when facing the possibility of practical technology. Since aging is a specific process that older adults are facing with the gradual loss of their sensory and motor systems, adults will face more difficulties when using technology [25]. The discomfort will affect the dissatisfaction of older adults and their willingness to continuously use online paid health counseling platforms. Therefore, the following assumptions are proposed:

H_{5a}: Technology anxiety on online paid health consultation platforms has a positive impact on dissatisfaction among adults.

H_{5b}: Technology anxiety in online paid health consultation platforms has a positive impact on adults' willingness to use them discontinuously.

2.3.6. Dissatisfaction

Users often expect a product or service before adopting it and then form a false evaluation of the actual performance of the product or service based on the expectation of uncertainty. When the real performance is significantly better than expected, positive assurance or satisfaction is felt; when the real evaluation is considerably lower than anticipated, negative uncertainty or dissatisfaction is experienced. Some studies have also found that there is a positive relationship between the satisfaction generated by users and their willingness to continue to use it [26]. In recent years, the increasing popularity of online health consultation platforms driven by mobile technology and online health services has enabled many people to access online platforms that can be used for health consultation, inquiring about medical information, purchasing medical services or finding doctor needs. However, these problems also directly or indirectly affect the satisfaction and continuous willingness of older adult users to use the online paid health consultation platform due to the challenges that online health consultation platforms face including lack of supervision, information asymmetry and trust. The following assumptions are proposed:

H₆: The dissatisfaction with online paid health consultation platforms has a positive impact on adults' willingness to use them discontinuously.

Based on the above analysis, this study builds a theoretical model of older adults' discontinuous usage intention of an online paid health consultation platform as shown in [Figure 1.0](#)

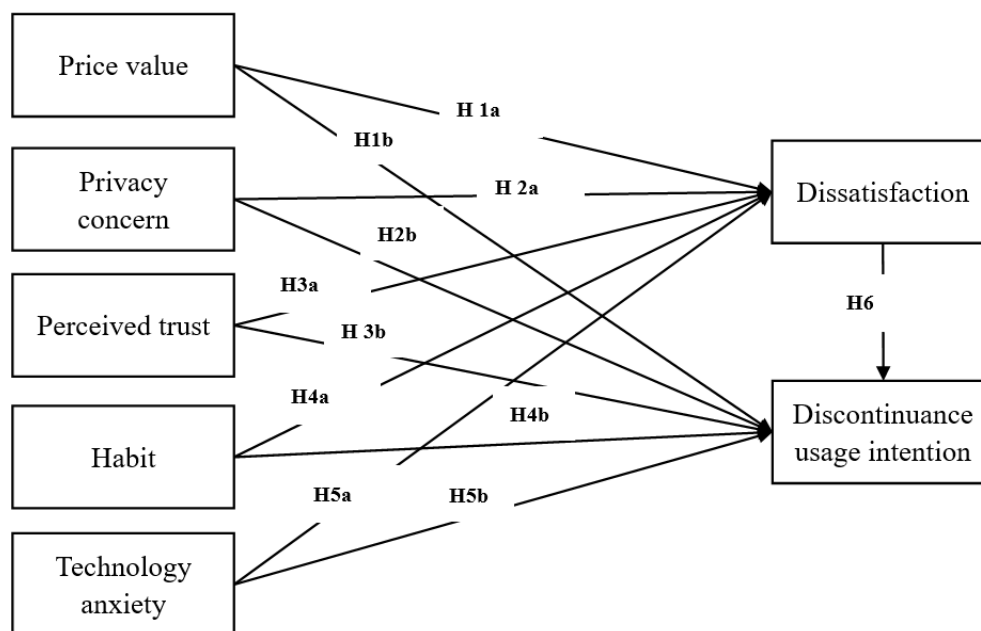


Figure 1.
The proposed research model.

3. Methodology

3.1. Measurement

A questionnaire was used to test the hypothesis which included demographic information and the items measuring variables in the theoretical model. The specific measurement items and sources of the literature are shown in [Table 1](#).

Table 1.
Variables and scales.

Variable	Measuring items	Reference
Price value	PV1. I can use the services of the online paid health consulting platform at a reasonable price.	Alam, et al. [20] and Venkatesh, et al. [27].
	PV2. Online paid health consulting platform service value for money.	
	PV3. At current prices, the online paid health consulting platform provides good value.	
Privacy concern	PC1. Using an online paid health consulting platform will lead me to lose control of my information privacy.	Suh and Li [21].
	PC2. Using an online paid health consulting platform can lead to my privacy disclosure because my personal information may be used without my knowledge.	
	PC3. Using an online paid health consulting platform may let others control my personal information.	
Perceived trust	PT 1. I think the online paid health consultation platform	[22]; Khan, et

Variable	Measuring items	Reference
	is reliable.	al. [28] and Dinev, et al. [29].
	PT 2. I think the online paid health consultation platform is trustworthy.	
	PT 3. I believe that the online paid health consultation platform can provide a good service.	
Habit	H1. The use of the online paid health consultation platform has become a habit for me.	Venkatesh, et al. [27].
	H2. I am addicted to using an online paid health consultation platform.	
	H3. I must use the online paid health consultation platform.	
	H4. It's only natural for me to use an online paid health consulting platform.	
Technology anxiety	TA1. Using an online paid health consulting platform will make me very nervous.	Xue, et al. [25].
	TA2. Using an online paid health consulting platform may make me uncomfortable.	
	TA3. Using online paid health consulting platforms may be disturbing and confusing to me.	
Dissatisfaction	D1. I am not satisfied with my overall experience of using the online paid health consulting platform.	Zhang, et al. [26] and Fu, et al. [30].
	D2. I am not happy with my overall experience of using an online paid health consulting platform.	
	D3. I am discontented about my overall experience of using an online paid health consulting platform.	
	D4. I am not delighted about my overall experience of using an online paid health consulting platform.	
Discontinuance usage intention	DUI 1. I will use the online paid health consulting platform less in the future.	Zhang, et al. [26].
	DUI 2. I will use other forms of health consultation (such as offline physical medical institutions).	
	DUI 3. Sometimes, I briefly stop using the online paid health advice platform for a while and then use it again.	
	DUI 4. If I can, I will stop using the online paid health consultation platform.	

3.2. Process

The questionnaire in this study uses the seven-point Likert scale to raise questions about the willingness of respondents not to continuously use the online paid health consultation platform and was distributed to people aged at least 50 years old in China. The questionnaire was generated on the platform Wenjuanxing and distributed online through WeChat. A total of 265 questionnaires were distributed and 254 were returned with an effective rate of 92%. The final data collected were processed by analysis with SPSS and AMOS. Firstly, the descriptive characteristics of the samples were analyzed. Then, the reliability and validity of the questionnaire were tested respectively. Finally, we tested the fit of the structural equation model and each hypothesis.

4. Results

4.1. Descriptive Analysis

Questionnaire data showed that the number of male (50.8%) and female (49.2%) respondents was essentially equal. In terms of the age distribution of the respondents, the number of respondents aged from 50 years (inclusive) to 54 years accounted for 48%. The education level of university undergraduate and primary school students and those below accounted for about 26% respectively. Most of the respondents had an annual family income of 100,000 yuan or less (62.2%). The current physical condition of respondents was healthy (55.9%).

In this study, the Cronbach's alpha coefficient was calculated using SPSS. The combined reliability (CR) and mean-variance extraction values (Average Variance Extracted) were calculated in AMOS using validation factor analysis and the convergent validity of the questionnaire was tested. AVE values above 0.6 indicate good convergent validity of the scale based on previous studies [31].

The reliability of the questionnaire is good with the reliability of all the scale measurement items above 0.7 and the combined reliability of all seven variables above 0.8 indicating that the consistency of the scale is good. In addition, the standard factor loading of each item in the scale is greater than 0.7 which indicates a high relationship between the scale measurement items and the various concepts. The calculation and analysis of the alpha coefficient, combined reliability and average variance extracted value in this questionnaire show that the scale used in this study has good reliability and validity (see Table 2).

Table 2.
Reliability and validity tests.

Variables	Items	Loadings	Cronbach's alpha	CR	AVE
Price value	PV1	0.841	0.864	0.865	0.681
	PV2	0.833			
	PV3	0.801			
Privacy concern	PC1	0.773	0.867	0.869	0.688
	PC2	0.885			
	PC3	0.827			
Perceived trust	PT1	0.835	0.870	0.871	0.699
	PT2	0.832			
	PT3	0.83			
Habit	H1	0.844	0.891	0.891	0.677
	H2	0.896			
	H3	0.771			
	H4	0.774			
Technology anxiety	TA1	0.763	0.826	0.842	0.643
	TA2	0.845			
	TA3	0.796			
Dissatisfaction	D1	0.814	0.871	0.869	0.624
	D2	0.79			
	D3	0.768			
	D4	0.787			
Discontinuance usage intention	DUI1	0.827	0.875	0.863	0.613
	DUI2	0.767			
	DUI3	0.777			
	DUI4	0.76			

4.2. Structural Equation Model Test

Model fit tests were performed on the structural model. All indicators in Table 3 are within the acceptable recommended range [32] showing that the fit of the model in this study is good. The C.R and P values and the path coefficients of each hypothesis were analyzed. The result is significant when the P value is smaller than 0.05. All the hypotheses in Table 4 are approved.

Table 3.
Model fit index.

Metric	Evaluation criterion	Fits of this model
CMIN/DF	<3	1.252
GFI	≥0.9	0.916
AGFI	[0.7-0.9]	0.891
NFI	≥0.9	0.920
RFI	≥0.9	0.905
CFI	≥0.9	0.983
RMSEA	<0.10	0.032

Note: CMIN: Chi -squared; DF: Degree of freedom; GFI: Goodness of fit index; AGFI: Adjusted goodness of fit index; NFI: Normal of fit index; RFI: Robust fitting index; CFI: Comparative fit index; RMSEA: Root mean square error of approximation.

The standard pathway coefficient for each hypothesis, C.R values and P-values were presented as shown in Table 4 to demonstrate the results of pathway analysis. A P-value less than 0.05 in the table indicates that the path is significant and the hypothesis is approved. If the hypothesis is approved, the normalization coefficient with a positive value indicates a positive correlation and the normalization coefficient with a negative value indicates a negative relationship.

Table 4.
Model hypothesis judgments.

Hypotheses	Path	Estimate	Standard error	C.R.	P value
H1a	PV→D	0.22	0.078	2.824	0.005
H2a	PC→D	0.222	0.082	2.697	0.007
H3a	PT→D	0.163	0.063	2.59	0.01
H4a	H→D	0.192	0.058	3.294	***
H5a	TA→D	0.216	0.077	2.792	0.005
H1b	PV→DUI	0.173	0.064	2.718	0.007
H2b	PC→DUI	0.216	0.068	3.198	0.001
H3b	PT→DUI	0.128	0.051	2.49	0.013
H4b	H→DUI	0.129	0.048	2.703	0.007
H5b	TA→DUI	0.212	0.063	3.35	***
H6	D→DUI	0.313	0.067	4.705	***

Note: *** Statistically significant at $p < 0.001$.

5. Discussion

Examining the optimization path of online paid health consultation platforms and promoting a more compassionate online medical service environment is particularly significant because of the aging population and the increasing demand for online medical services among older people. This study proposes a model of discontinuous usage intention for online paid health consultation platforms which includes six factors: price value, privacy concern, perceived trust, habit, technology anxiety, and dissatisfaction after integrating existing research results. These factors will affect the continuous usage

intentions of older users towards online paid health consultation platforms. A total of 254 valid data were collected through a questionnaire survey and the collected data was processed in SPSS and AMOS software. The results of reliability and validity tests can prove the reliability and accuracy of the research results and the hypothesis is verified through structural equation modeling tests.

The results indicate that factors including price value, privacy concern, perceived trust, habit and technology anxiety will have a positive impact on older users' dissatisfaction and intention to discontinue the use of online paid health consultation platforms as indicated in previous studies [14, 23, 24]. Dissatisfaction with online paid health consultation platforms positively impact the willingness of older people to discontinue continuous use similar to previous research findings [26]. The research results indicate that for adults' continuous usage of online paid health consultation platforms, practitioners need to start with six aspects: price value, privacy concern, perceived trust, habit, technology anxiety and dissatisfaction, to create a safe, convenient, affordable and considerate online medical service environment for adults. The aging population can only progress in this manner, learning more about health and using the wonderful outcomes that the Internet offers.

6. Conclusion and Suggestion

6.1. Conclusion

This study provides valuable empirical insights for the optimization of online paid health consulting platforms from six aspects: price value, privacy concern, perceived trust, habit, technology anxiety and dissatisfaction. This study helps relevant personnel such as online health consultation platforms, medical personnel and governments understand the concerns of older users when using online paid health consultation platforms, thereby improving the online medical environment adjusting the price structure and making older people willing and comfortable to use online medical consultation platforms.

6.2. Suggestion

This study proposes the following suggestions based on the above research conclusions:

In terms of privacy concerns, the government should provide more professional and specific market regulatory policies to ensure the online medical service environment and reduce the privacy concerns of older adults. At the same time, more authoritative online health platforms should also be recommended to adults to protect their basic privacy rights and interests.

The interface design of online health platforms should be easy and simple to grasp because older people are less experienced with using computers and mobile devices. The icons and words should be visible and the operation steps should be as simple and smooth as possible. It is suggested to provide enlarged fonts, volume settings and overdue listening interfaces to ensure that older adults can smoothly access online health consultation services considering the practical needs of older adults. It is suggested to add the payment on delivery and advance payment as adults have a strong distrust of online payment. The government should increase the supervision and audit of the platforms and registered doctors to boost adults' trust in online health consultation platforms. Some inherent defects in the network such as the anonymity and virtuality of the subject also make the trust risk and the consequences of trust rupture in network communication more serious. It is often very difficult to investigate, punish the network risk makers and relieve the network risk victims [33].

In terms of price and value, online health consultation platforms and doctors should provide medical consultation services at a reasonable price so that adults can feel value for money which will improve their satisfaction and willingness to continue to use online health consultation platforms.

Platforms should provide doctor information and physician details to help them make better choices regarding technology anxiety considering that older people may need more information to make decisions when choosing doctors. Secondly, platforms should provide consultation services classified by diseases to facilitate older adults finding the doctors and consultation services they need more quickly. Finally, it is suggested that platforms provide professional technology support and customer service to

appropriately alleviate the technology anxiety of older adults and improve their satisfaction and continued using an online health consultation platform.

6.3. Limitations

Although this study provides valuable conclusions and recommendations, there are still certain limitations. Firstly, this study mainly focuses on the sustained willingness of older people to use online paid health consultation platforms in China. Future research can expand the scope of research such as in developed countries, developing countries and Asian regions. In addition, the variables selected in this study are only a part of the factors that affect the use of online medical platforms by older people. In the future, other influencing factors can be explored such as the Technology Acceptance Model (TAM) model and the Unified Theory of Acceptance and Use of Technology (UTAUT) model which are commonly used to explain people's acceptance of information technology and usage behavior and the variables included in social norms, perceived ease of use, perceived usefulness and community influence [34-36]. This study mainly conducts surveys from the perspective of older users. In the future, research can also be conducted from the perspective of online paid health consultation platforms or medical staff to study the factors that affect the sustainable development of the platform and provide more targeted platform optimization suggestions.

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Institutional Review Board Statement:

The Ethical Committee of the Nanjing University of Posts and Telecommunications, China has granted approval for this study.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Competing Interests:

The authors declare that they have no competing interests.

Authors' Contributions:

All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

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Appendix: Scale items.

Variable	Measuring items
Price value	PV1. I can use the services of the online paid health consulting platform at a reasonable price
	PV2. Online paid health consulting platform service value for money
	PV3. At current prices, the online paid health consulting platform provides good value
Privacy concern	PC1. Using an online paid health consulting platform will lead me to lose control of my information privacy
	PC2. Using an online paid health consulting platform can lead to my privacy disclosure because my personal information may be used without my knowledge
	PC3. Using an online paid health consulting platform may let others control my personal information
Perceived trust	PT 1. I think the online paid health consultation platform is reliable
	PT 2. I think the online paid health consultation platform is trustworthy
	PT 3. I believe that the online paid health consultation platform can provide a good service
Habit	H1. The use of the online paid health consultation platform has become a habit for me

Variable	Measuring items
	H2. I am addicted to using an online paid health consultation platform
	H3. I must use the online paid health consultation platform
	H4. It's only natural for me to use an online paid health consulting platform
Technology anxiety	TA1. Using an online paid health consulting platform will make me very nervous
	TA2. Using an online paid health consulting platform may make me uncomfortable
	TA3. Using online paid health consulting platforms may be disturbing and confusing to me
Dissatisfaction	D1. I am not satisfied with my overall experience of using the online paid health consulting platform
	D2. I am not happy with my overall experience of using an online paid health consulting platform
	D3. I am discontented about my overall experience of using an online paid health consulting platform
	D4. I am not delighted about my overall experience of using an online paid health consulting platform
Discontinuance usage intention	DUI 1. I will use the online paid health consulting platform less in the future
	DUI 2. I will use other forms of health consultation (Such as offline physical medical institutions)
	DUI 3. Sometimes I briefly stop using the online paid health advice platform for a while and then use it again
	DUI 4. If I can, I will stop using the online paid health consultation platform