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Factors influencing patient's medical choice behavior on Internet Medical: The perspective of trust

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ABSTRACT

Based on the source credibility model and trust transfer theory, this study examined the influence of physician's personal attributes and word-of-mouth on patients' medical choice in online healthcare communities, and explored trust transfer from online to offline channel as well as the moderating effect of disease risk on the influence of ability trust and honest trust. Using data from Good Doctor Online, the results revealed that ability trust, benevolence trust, honest trust, and transference trust based on word-of-mouth all had a positive impact on the patients' medical choice despite slight differences between channels in terms of specific proxies and degree of influence. Disease risk moderated the relationship between ability trust and honest trust and patients' medical choice. Trust transfer from online channel to offline channel had not been verified.

Keywords: Internet medical, trust source, trust transfer, medical choice.

INTRODUCTION

With the rapid development of communication technology and the continuous improvement of people's health awareness, online healthcare has become popular. Online healthcare refers to medical consultation or service on the Internet, which provides convenient and efficient medical knowledge popularization and medical services through various forms such as medical information inquiry, remote consultation and treatment. Internet medical industry breaks the boundaries of time and space and thus effectively improves the scarcity and unbalanced distribution of medical resources, providing possibility for patients with low income or limited mobility to use high-quality medical services and creating a basic condition for medical and healthcare service equity. However, online healthcare faces a series of challenges in its development process, as F. Yang et al. (2021) have noted, "problems such as user privacy, qualifications of practitioners, and responsibilities and obligations of both doctors and patients have become prominent". Consequently patients may face difficulties ascertaining service quality in order to make choices about their available treatment options, which hinders patient trust in Internet medical services. Healthcare service is a high-credence service, in which trust has a profound impact on the physician-patient relationship and thus affects the sustainability and market competitiveness of online healthcare. Therefore, it is an urgent demand and a key challenge for online healthcare communities to understand patients' psychology of selecting physicians so as to improve patients' trust to promote consulting intention.

However, existing research on patients' medical choice in online healthcare community mainly focuses on the influencing factors of online word-of-mouth, merely explores other attributes on online healthcare platform and considers trust transfer from online to offline channel. Lu and Wu (2016) solely focused on patients' ratings of physicians' technical quality and functional quality, yet more physician-related information is presented on online healthcare websites, such as number of provided services and physicians' profiles and specialties, how these factors affect patients' medical choice has not been demonstrated. Most of existing studies focus on patients' online behaviour in online healthcare, ignoring patients' behaviour of online booking through online healthcare websites and service in hospital. Zeng (2019) only considered patients' online medical choice measured by increment of online consultations and explored the influence of various factors on patients' selection of physician. In addition, most existing studies viewed from the perspective of patients, for instance, Hong (2020) explored the antecedents and outcomes as well as evolutionary process of physician-patient trust combined the whole process of using Internet medical from the patient's perspective, while there has been very little research exploring from the trustee's perspective (i.e., physician's perspective). Since physician-patient trust is mutual, it is necessary to study its influencing factors from the perspective of the trusted party and consider both online and offline patients' behaviour.

This paper focuses on patients' medical choice on the website, develop a theoretical model of patients' online and offline medical choice from the perspective of trust. Using data from the *Good Doctor Online* platform, this study aims to 1) examines the influencing factors of patients' online consultation and office appointment, 2) explores the trust transfer from online to offline channel, 3) the moderating effect of disease risk on physician's ability trust and honest trust.

LITERATURE REVIEW AND HYPOTHESES

Physician-patient Trust in Online Healthcare

Trust is the cornerstone of interpersonal interactions, and physician-patient trust is especially important in online healthcare. Research of user trust on the Internet have a long history both at home and abroad and have already obtained a wealth of results. Srinivasan (2004) pointed out the role of trust in e-commerce from the perspective of transaction. Zhang and Zhong (2012) used the basic theories and methods of social network analysis to study the trust relationship in e-commerce. However, only a few researchers have been interested in investigating online healthcare communities and their research has been mainly based on online text data. For example, Huang et al. (2019) developed a model that examined the relationships between three dimensions of social capital and the provision of informational and emotional support, and engagement in companionship activities in healthcare virtual support communities and tested it based on user-generated text. Hao and Zhang (2016) used "an automated text-mining approach to analyze a large amount of unstructured textual data of Web-based physician reviews" to understand the voice of health consumers. However, online text data is only part of the information source in online healthcare community, and patients collect information from various sources such as physicians' patient experience and number of articles shared by physicians in personal public account, to reduce their decision-making risk and make medical choice. Therefore, it is insufficient to focus only on online text data such as comments. Other quantitative attributes displayed on the website should also be taken into account. However, only a very limited number of studies incorporate these attributes on patient trust.

Furthermore, existing research on patient trust in online healthcare communities has been mainly conducted from the perspective of the trust-giver to study patients' subjective perceived trust. For example, Mun et al. (2013) considered patients' perceptions and found that perceived information quality and perceived risk significantly affected users' trust in online healthcare information. Deng and Hong (2017) also explored from patients' perspective and found that personal trust tendency, credibility of physicians, hospitals and platforms, perceived risk and perceived benefit jointly had significant effects on patient trust online. However, in the physician-patient trust relationship, the trustees (i.e., physicians) are not passive that they can take initiative to win more patients' trust by enhancing self-presentation in their homepages in online healthcare community. Therefore, to better understand how to enhance patients' trust in physicians, more studies from the trustee's perspective are needed.

Finally, existing studies have mainly focused on the patients' online medical choice, ignoring office appointments through online healthcare communities and service in hospital. However, *Good Doctor Online*'s office appointment has reached 4.95 million as of July 2022, indicating a large group of patients book online service in hospital and deserve corresponding attention. Therefore, this paper attempts to explore how physicians' information attributes and online word-of-mouth affect patient trust and thus medical choice from the trustee's perspective, and considers both patients' online consultation and offline appointment.

The Source Credibility Model and Hypotheses

Trust source is one of the key issues in trust domain. McAllister (1995) conducted in-depth study based on the results of previous studies and proposed a source credibility model which is widely recognized by scholars and widely used. The model has three dimensions namely ability, benevolence, and integrity, which can effectively explain the trust source credibility (Mayer et al., 1995).

According to Mayer et al. (1995), ability trust refers to trust received by the trustee due to influential skills or talents to do a certain job in a particular field or ability to provide better products or services to the trust-giver. Benevolence trust is the trustee's willingness to provide help or service to the trust-giver out of altruistic motives. When feeling the friendliness of the trustee, the trust-giver will enhance trust and maintain a long-term trust relationship with the trustee. Honest trust refers to the trustee's initiative to show sincere and honest attitude by presenting reliable information to the trust-giver, which reduces the risk of information asymmetry and thus enhances trust-giver's perceived trust.

These three dimensions can be directly reflected from trustee's attributes. McKnight and Chervany (2001) noted that "if the trustor has high beliefs in the competence, integrity, benevolence, and predictability of the trustee, then the trustor will have the highest level of willingness to depend on the trustee". According to Kuan and Bock (2007), "customer believes that the retailer's online operations is able (because of competence) and willing (due to benevolence and integrity) to deliver the products purchased" which increases their purchase intention. In the field of online healthcare, physician providing online medical services is an important trust source and various information presented in online healthcare community is a driving force of trust. Thus physician's personal attributes and website's information attributes reflect the trust source credibility.

The impact of ability trust

Ability trust influences patient choice. Patients' expectations for future treatment outcomes raise with the physician's high degree of medical skills and competence.

Physician's medical title is ranked by his/her academic level, patient experience and professional qualification, which can reflect the physician's competence level and is one of the sources of ability trust (Zeng, 2019). It enhances patients' acceptance and trust in physicians and promotes their medical choice. In this regard, this paper proposes the following hypothesis.

H1a: Physician's medical title positively influences patients' medical choice (a: online medical choice, b: offline medical choice).
Patient experience is the result of a physician's combination of medical theory and clinical practice and innovation over the years, which can be reflected by the total number of existing patients which is presented in online healthcare community. The higher the total number of patients is, the more experienced the physician is, which reflects his/her medical ability. Therefore, the following hypothesis is proposed.
H1b: Physician's patient experience positively influences patients' medical choice (a: online medical choice, b: offline medical choice).
Hospital level is a classification of hospitals based on hospital size, scientific research direction, scientific talent and medical hardware and equipment. In the traditional medical environment, patients tend to go to better hospitals. Higher-level hospital usually has more advanced equipment and medical skills as well as more abundant medical resources, which can enhance patients' expectations for treatment results. Accordingly, the following hypothesis is proposed.
H1c: Hospital level positively influences patients' medical choice (a: online medical choice, b: offline medical choice).
Wan et al. (2021) found that medical resources are highly correlated with regional GDP and pointed out that "medical resources are unevenly distributed in each province, with the top cities typically showing overconcentrations". People tend to believe that more economically developed the city where the hospital is located, the more abundant its medical resources are, which in turn promotes patients' medical choice. Therefore, this paper proposes the following hypothesis.
H1d: City economic level positively influences patients' medical choice (a: online medical choice, b: offline medical choice).

The impact of benevolence trust

In online healthcare communities, physicians can take initiative to publish articles in their personal public account, such as guide to medical treatment and knowledge sharing, facilitating patients' appointment and follow-up visit and answering disease-related questions that patients are concerned about, which shows their consideration for patients and helps to win patients' benevolence trust. Therefore, number of shared articles can reflect the benevolence of physicians (Lin, 2020), reducing patients' perceived risk of opportunistic behaviours committed by physician and making them believe that physician will not harm their interests. Based on this, this study proposes the following hypothesis.
H2a: Number of articles shared by physicians positively influences patients' medical choice (a: online medical choice, b: offline medical choice).
Physicians can choose which online healthcare service to open out of his/her own will, such as consultation through telephone, question-and-answer, consultation with image. It can be implied that a physician who provide more kinds of service is more considerate for patients. Therefore, higher number of provided services implies higher physician's benevolence, enhancing patients' trust and promoting medical choice. Accordingly, the following hypothesis is proposed.
H2b: Number of provided services positively influences patients' medical choice (a: online medical choice, b: offline medical choice).
Report after hospital visit is an exclusive benefit provided by physicians to outpatients. Outpatients can report by scanning the physician's QR code and receive a free consultation package (usually includes three free replies from the physician and valid for one month). Through report after hospital visit, patients can regularly give feedback to and timely consult with the physician, and physician can in turn send the patient attention points regularly. In this regard, number of reports after hospital visit reflects the physician's consideration for the patients, which enhances benevolence trust. Since the total number of reports after hospital visit correlates with how long the physician's website has been opened, monthly average number of reports after hospital visit can serve as a better signal of how often the physician provides the convenient service to patients. This study proposes the following hypothesis.
H2c: Average monthly number of reports after hospital visit positively influences patients' medical choice (a: online medical choice, b: offline medical choice).

The impact of honest trust

In e-commerce environment, public disclosure of merchants' truthful information can influence consumers' purchase intentions (Oliveira et al., 2017). Similarly, information disclosure reflects a physician's honest attitude in online healthcare environment and patients prefer physicians with high information disclosure since medical choice is related to the patients' health condition. Therefore, this paper proposes the following hypothesis.
H3: Information disclosure positively influences patients' medical choice (a: online medical choice, b: offline medical choice).

Trust Transfer theory and Hypotheses

Trust transfer process is a cognitive process in which a subject's trust in a familiar target can be transferred to another target by virtue of certain associations that "when the trustor trusts in the third person and there is a close relationship between the trustee and the third person, the trustor's trust in the third person will be transferred to the trustee". It is an effective mechanism for trust construction, which refers to the cognitive process of formed maintainable trust transferring between credible entity and unknown entity or between familiar environment and unfamiliar environment and building new trust. It has been revealed that trust transfer affects purchase decisions. Kuan and Bock (2007) claimed that a customer's online trust in a brick and click retailer can be formed due to other individuals' experiences with the retailer, leading to purchasing.

On the *Good Doctor Online* platform, patients can express gratitude to physicians by writing thank-you letters for free or buying virtual gifts. The virtual gift reflects existing patients' acceptance of the physician's medical skills and service attitude.

Virtual gift rate is the ratio of the total number of virtual gifts received by the physician to the total number of his/her patients. Higher ratio implies larger proportion of existing patients are willing to pay extra money and time to express their appreciation to the physician, which shows a higher trust level of existing patients. According to trust transfer theory, this will enhance potential patients' perceived trust in the physician and thus promote medical choice. Therefore, this paper proposes the following hypothesis.

H4a: Virtual gift rate positively influences patients' medical choice (a: online medical choice, b: offline medical choice).

Online review is experience or feedback after consultation or after hospital visit. Previous research has revealed a positive correlation between the number of online reviews and product sales. Chevalier and Mayzlin (2006) examined the effect of consumer reviews on relative sales of books on Amazon.com and BarnesandNoble.com and proposed that "an increase in the number of reviews at Amazon relative to BN.com continues to improve sales at Amazon relative to BN.com". In general, consumers are more willing to share their consumer experience by making online reviews if they perceive better attitude of the seller. In the Internet medical field, higher rate of online reviews means larger proportion of patients are willing to actively evaluate the physician out of acceptance of the physician's service, which provides potential patients with more information about the physician's service and reduces trust risk, thus promotes medical choice. Accordingly, this paper proposes the following hypothesis.

H4b: Review rate positively influences patients' medical choice (a: online medical choice, b: offline medical choice).

It has been confirmed that online ratings can promote purchase behaviour. Hanauer et al. (2014) surveyed a nationally sample of the US population about their knowledge and use of online ratings for medical selection and fifty-nine percent of respondents reported physician rating sites to be important when choosing a physician. Similarly, in healthcare, online ratings have an impact on patients' medical choice. The recommendation level is calculated by the website based on patients' votes in the past two years and physician's service ratings, which values between 0 and 5. The higher it is, more recommended the platform for the physician is, which indicates higher existing patients' satisfaction and platform's acceptance for the physician and promotes potential patients' medical choice. Therefore, this paper proposes the following hypothesis.

H4c: Recommendation level positively influences patients' medical choice (a: online medical choice, b: offline medical choice).

According to channels, the process of trust transfer can be divided into intra-channel one and inter-channel one. The former refers to trust transfer between different objects in the same channel while the latter refers to trust transfer between different environments. Whatever type of trust transfer, trust accumulated in one channel may affect the evaluation of products or services in the same channel or another channel over time (Lee et al., 2007).

In e-commerce, studies have demonstrated that trust offline can be transferred to initial trust online through process integration. Similarly, in online healthcare, inter-channel trust transfer may also exist. Patients develop trust in the physician who provides medical service in an online healthcare website, which may be transferred from online to offline and form trust offline. This study will specifically analyze whether trust developed online can be transferred to offline environment. The following hypothesis is proposed.

H5: Patients' online medical choice positively influences patients' offline medical choice.

The Moderating Effect of Disease Risk and Hypotheses

In an online healthcare domain, the influencing mechanism of patients' medical choice can be influenced by disease type. Patients with high-risk diseases require higher quality services compared to those with low-risk diseases (H. Yang et al., 2015). Their psychological characteristics vary with different disease risks. High-risk patients will be more motivated by the hope of finding a higher quality physician (Lu & Wu, 2016) . Because of its association with mortality, patients with high-risk diseases are more rational and cautious and care more about objective facts about physicians, and have more motivation to undertake more cognitive effort to attain a better physician (Cao et al., 2017). McAllister (1995) divided organizational trust into affective trust and cognitive trust based on different mechanisms of interpersonal trust building. The former is based on human interaction and attraction (Chua et al., 2008); while the latter is based on rational calculation and mutual exchange and refers to belief in each other's ability, honesty and other personal characteristics based on rational judgment (McAllister, 1995). According to this definition, it is clear that ability trust and honest trust in the source credibility model belong to cognitive trust. Patients with high-risk diseases will undertake more cognitive effort to process objective factual information and build cognitive trust. They may pay more attention to the perception of ability and honesty of physicians, that is, they hope to find physicians with higher medical skills or more information transparency, rather than solely a physician with high benevolence. Based on this, the hypotheses about moderating effect of disease risk are proposed.

H6a: Disease risk positively moderates the relationship between physician's medical title and patients' medical choice (a: online medical choice, b: offline medical choice).

H6b: Disease risk positively moderates the relationship between physician's patient experience and patients' medical choice (a: online medical choice, b: offline medical choice).

H6c: Disease risk positively moderates the relationship between hospital level and patients' medical choice (a: online medical choice, b: offline medical choice).

H6d: Disease risk positively moderates the relationship between city economic level and patients' medical choice (a: online medical choice, b: offline medical choice).

H6e: Disease risk positively moderates the relationship between physician's information disclosure and patients' medical choice (a: online medical choice, b: offline medical choice).

According to the above hypotheses, a hypothetical model of patients' medical choice in online healthcare community is constructed. The conceptual model is depicted in Figure 1.

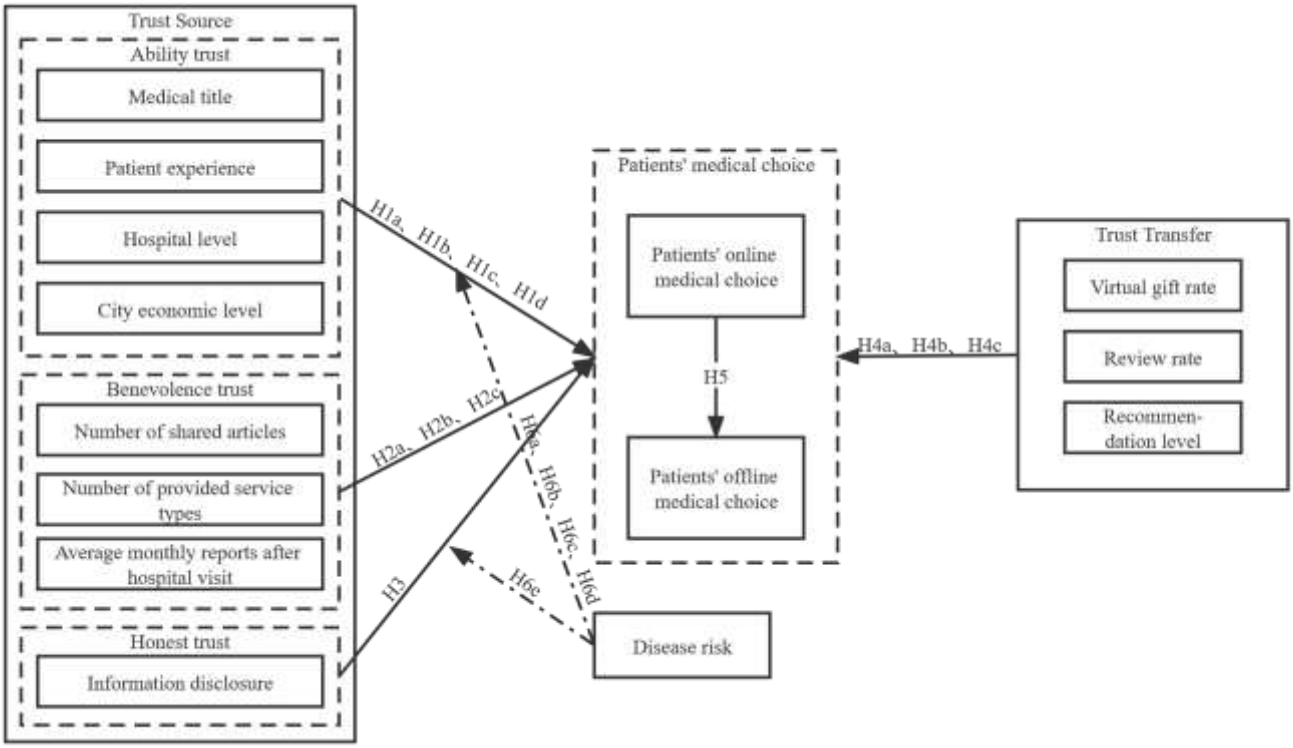

Figure 1: Conceptual Model.

DATA AND VARIABLES

Data Collection

Good Doctor Online is a leading online healthcare community in China. As of April 2022, 890,000 physicians from over 10,000 regular hospitals in China have been listed on the *Good Doctor Online*, of which 245,890 physicians have completed real-name registration to provide online consultation. Patients can use its appointment platform to register with 2883 hospitals and 22,879 physicians at home and it has helped more than 4.87 million patients with hospital visits successfully. Thus *Good Doctor Online* platform is chosen for our empirical research.

The research used Houyi collector to crawl data by defining rules. First, this research collected the URLs of all physicians in the recommendation list for each disease and then crawled the specific data in the physician's personal homepage through the URLs, including the physician's name, medical title, number of online consultations, the hospital where s/he works, number of shared articles in his/her personal public account, number of reports after hospital visit, number of thank-you letters and gifts, number of reviews and opening time of his/her homepage. The research accessed the website of the hospital in which the physician works for hospital level and location, accessed the service page for service types provided by the physician, accessed the mobile appointment page for the number of appointments, and accessed the physician's profile page for the text of his/her profile and specialty.

The research collected 16 disease categories with 23,555 physicians' website data from April 7, 2022 to April 8, 2022 and collected again after two weeks to calculate the increment of new patients. Excluding the samples with missing values, the cross-sectional data numbered 10,931, which was used to explore the influencing factors of patients' online medical choice.
Few physicians opened both online consultation and office appointment services in the *Good Doctor Online* platform, so this paper screened out a total of 4,042 physicians who opened both online and offline services from the above data sample, to explore the influencing factors of patients' offline medical choice and trust transfer from online to offline channel.

Variables

The dependent variables were patients' online medical choice (OnlinePatient) and patients' offline medical choice (OfflinePatient). Patients' online medical choice (OnlinePatient) was also an independent variable in Model 3 and Model 4. According to Zeng and Guo (2018), two-week online consultation increment can serve as a proxy for patients' online medical choice. Average monthly office appointment was used to measure patients' offline medical choice.

Based on the studies of Hong (2020) and Zeng and Guo (2018)), the following independent variables were constructed and measured. Physician's medical title (MedicalTitle), patient experience (TotalPatient), hospital level (HospitalLevel), and city economic level where the hospital locates (CityGDP) represented ability trust; number of shared articles (Article), number of provided service types (ServiceNum), and average monthly reports after hospital visit (AveReport) represented benevolence

trust. Information disclosure (Disclosure) represented honest trust. Virtual gift rate (TotalGiftRate), review rate (ReviewRate) and recommendation (Recommend) were proxies for trust transfer. Qualitative variables were quantified: medical titles were mapped into integers, with chief physician, chief technician and chief rehabilitator as 4, deputy chief physician, deputy chief technician and deputy chief rehabilitator as 3, attending physician as 2, physician as 1, and the rest as 0. Hospital level was judged by the country as Level 3 (best), 2, and 1 (worst). City economic level was measured by GDP per capita of each province in the seventh census data. Average monthly reports after hospital visit was the ratio of the number of reports after hospital visit to number of months since the physician's homepage has been opened (i.e., average monthly reports after hospital visit = number of reports after hospital visit / number of months since the physician's homepage has been opened). Information disclosure was measured by word count of the physician's specialty and profile. Virtual gift rate was the ratio of the total number of virtual gifts to physician's total number of patients (i.e., virtual gift rate = (number of thank-you letters + number of gifts) / total number of patients). Review rate was the ratio of the number of reviews to total number of patients (i.e., review rate = number of reviews / total number of patients).

The disease risk (Risk) was selected as a moderator variable. According to the *Chinese Health Statistics Yearbook in 2020*, which lists the mortality rate of various diseases, eight high-risk diseases and eight low-risk diseases were selected in this paper. The high-risk diseases included coronary heart disease, diabetes, cerebral infarction, leukemia, liver cirrhosis, nephritis, arrhythmia and pancreatitis. The low-risk diseases included liver disease, menstrual disorders, hypertension, hyperlipidemia, insomnia, gastritis, headache and depression. High-risk diseases and low-risk diseases were expressed as 1 and 0, respectively. To control the effect of other possible factors on patients' medical choice, the research included how long the physician's homepage has been opened (OpenYear) as control variable.

The definitions and specific measurements of each variable are shown in Table 1.

Table 1: Variables description.

Variable type	Variable name		Description	Abbreviation
Dependent variable	Patients' medical choice	Patients' online medical choice	Two-week online consultation increment	Online Patient
		Patients' offline medical choice	Average monthly office appointment, i.e., total number of office appointment / number of months since the physician's homepage has been opened	Offline Patient
Independent variable	Ability trust	Medical title	The physician's medical title, chief physician, chief technologist, chief rehabilitator is 4, deputy chief physician, deputy chief technologist, deputy chief rehabilitator is 3, attending physician is 2, physician is 1, the rest is 0	MedicalTitle
		Patient experience	Total number of consultation	TotalPatient
		Hospital level	Hospital level which the physician works in, judged by the country as Level 3 (best), 2, and 1 (worst)	Hospital Level
		City economic level	Measured by GDP per capita of each province based on data from the 7th Census data	CityGDP
	Benevo-lence trust	Number of shared articles	Total number of articles shared by physician on personal public account	Article
		Number of provided service types	Number of service types provided by physicians in online healthcare community	ServiceNum
		Average monthly reports after hospital visit	Average monthly number of reports after hospital visit, i.e., number of reports after hospital visit / number of months since the physician's homepage has been opened	AveReport
	Honest trust	Information disclosure	Word count of the physician's specialty and profile	Disclosure
	Trust transfer	Virtual gift rate	Rate of received virtual gifts, i.e., (number of thank-you letters + number of gifts) / total number of patients	TotalGift Rate

		Review rate	Review rate of physicians, i.e. number of reviews / total number of patients	ReviewRate
		Recommendation level	Recommendation level provided by platform, with values between 0 and 5	Recommend
Moderator variable		Disease risk	When the disease is high-risk, the variable equals to 1. Else equals to 0	Risk
Control variable		Opening year	How long has the home page existed	OpenYear

Variables Description

Dependent variables (i.e., patient's online medical choice and patient's offline medical choice) and some independent variables (i.e., patient experience, number of shared articles, average monthly reports after hospital visit, information disclosure, virtual gift rate, and review rate) show positive skewers distribution, so the research transformed these variables by taking logarithm $(ln(x+1))$ to make the data scaled to the same magnitude and correct the skewness. Hospital level shows negative skewers distribution, so this study first converted it to a positively skewed distribution with the formula: $HospitalLevel\_reflect = MAX(HospitalLevel) - HospitalLevel$, and then logarithmically transformed the mapped value. The skewness of most variables were controlled to be below 3 after the logarithmization process.

Descriptive statistics of online sample and offline sample are shown in Table 2 and Table 3, respectively.

Table 2: Descriptive statistics of online sample

VARIABLES	N	mean	sd	min	max	skewness
lnOnlinePatient	10,931	0.806	1.164	0	7.042	1.392
MedicalTitle	10,931	3.545	0.666	0	4	-1.340
lnTotalPatient	10,931	5.528	2.212	0.693	11.19	-0.390
lnHospitalLevel_reflect	10,931	0.009	0.0868	0	1.099	10.08
CityGDP	10,931	10.78	4.410	3.600	16.49	0.132
lnDisclosure	10,931	5.873	0.840	2.079	9.206	-0.965
lnArticle	10,931	1.498	1.575	0	11.46	0.790
ServiceNum	10,931	2.350	1.088	0	8	-0.677
lnAveReport	10,931	1.053	1.171	0	6.546	1.003
lnTotalGiftRate	10,931	0.162	0.255	0	3.784	4.664
lnReviewRate	10,931	0.273	0.466	0	4.111	3.163
Recommend	10,931	3.563	0.387	2.400	5	1.626
Risk	10,931	0.415	0.493	0	1	0.344
OpenYear	10,931	7.971	3.635	0	14	-0.162

Table 3: Descriptive statistics of offline sample

VARIABLES	N	mean	sd	min	max	skewness
lnOfflinePatient	4,042	0.732	0.812	0	5.599	1.434
MedicalTitle	4,042	3.566	0.608	0	4	-1.245
lnTotalPatient	4,042	6.531	1.818	0.693	11.19	-0.725
lnHospitalLevel_reflect	4,042	0.0112	0.0985	0	1.099	9.188
CityGDP	4,042	12.16	4.239	3.600	16.49	-0.437
lnArticle	4,042	2.046	1.654	0	8.130	0.378
ServiceNum	4,042	2.669	0.959	0	7	-0.950
lnAveReport	4,042	1.474	1.221	0	6.546	0.524
lnDisclosure	4,042	6.046	0.772	2.079	8.861	-0.973
lnTotalGiftRate	4,042	0.124	0.173	0	3.784	7.582
lnReviewRate	4,042	0.160	0.288	0	4.111	5.545
Recommend	4,042	3.720	0.446	2.700	5	1.224
lnOnlinePatient	4,042	1.325	1.305	0	7.042	0.729
Risk	4,042	0.381	0.486	0	1	0.488
OpenYear	4,042	8.219	3.637	0	14	-0.286

According to the descriptive statistics, in the dimension of ability trust, physician's medical title and hospital level have high mean values and negative skewness (i.e., distributed in a left-skewed distribution), which indicates that physicians and hospitals of the platform are of high level. As for physician's patient experience, its standard deviation and range are both large, indicating obvious differences between different physicians' patient experience. In the dimension of benevolence trust, number of shared articles is highly discrete, showing stark differences between physicians' attitudes toward sharing articles. As for number of provided service types, its mean value is between 2 and 3, with 8 being the maximum value, which shows that most physicians have only opened a few services. In the dimension of honest trust, physicians' information disclosure is discrete,

showing that physicians' attitudes toward personal profiles and specialties differ greatly. In terms of trust transfer, virtual gift rate and review rate both show a right-skewed distribution.

The mean value of the control variable opening year is close to 8, indicating that physicians in *Good Doctor Online* platform have been in place for a long time overall and the platform have been developed for a long time. The dependent variables patients' medical choice have significant differences and great discretion, so studying the influencing factors of patients' medical choice has strong practical implications.

No variance inflation factor (VIF) statistics for the variables are greater than 6, which indicates the absence of multicollinearity. The correlations of variables are shown in Table 4 and Table 5, respectively. Main independent variables are correlated significantly with the dependent variable, consistent with the hypotheses. In the online sample, 97.80% of the correlation coefficients are below 0.7, and the vast majority are below 0.4; in the offline sample, 98.06% are below 0.7, and the vast majority are below 0.4. Thus, there isn't high linear correlation between independent variables and it is suitable for regression model.

Table 4: Correlations of variables of online sample.

	lnOnline Patient	Medical Title	lnTotal Patient	lnHospital Level_ reflect	CityGDP	lnArticle	Service Num
lnOnlinePatient	1						
MedicalTitle	-0.038***	1					
lnTotalPatient	0.600***	-0.00100	1				
lnHospitalLevel_reflect	0.017*	-0.043***	0.028***	1			
CityGDP	0.070***	-0.077***	0.077***	0.0100	1		
lnArticle	0.402***	0.037***	0.601***	0.061***	0.049***	1	
ServiceNum	0.355***	-0.109***	0.327***	0.030***	-0.085***	0.255***	1
lnAveReport	0.672***	-0.122***	0.716***	0.027***	-0.052***	0.452***	0.339***
lnDisclosure	0.164***	0.427***	0.279***	-0.033***	0.0110	0.347***	0.041***
lnTotalGiftRate	-0.177***	0.047***	-0.467***	-0.023**	0.035***	-0.193***	-0.175***
lnReviewRate	-0.266***	0.111***	-0.674***	-0.031***	-0.0110	-0.326***	-0.242***
Recommend	0.654***	0.099***	0.515***	-0.060***	0.132***	0.363***	0.183***
Risk	-0.169***	0.00700	-0.228***	-0.026***	-0.037***	-0.128***	-0.066***
OpenYear	-0.040***	0.343***	0.159***	-0.026***	0.083***	0.219***	-0.083***

	lnAve Report	lnDisclo-sure	lnTotal GiftRate	lnReview Rate	Recom-mend	Risk	OpenYear
lnAveReport	1						
lnDisclosure	0.128***	1					
lnTotalGiftRate	-0.204***	-0.043***	1				
lnReviewRate	-0.338***	-0.054***	0.804***	1			
Recommend	0.622***	0.276***	-0.052***	-0.136***	1		
Risk	-0.218***	-0.044***	0.081***	0.100***	-0.109***	1	
OpenYear	-0.181***	0.317***	-0.00500	0	0.072***	-0.0120	1

Table 5: Correlations of variables of offline sample.

	lnOffline Patient	Medical Title	lnTotal Patient	lnHospital Level_ reflect	CityGDP	lnArticle	Service Num
lnOfflinePatient	1						
MedicalTitle	0.152***	1					
lnTotalPatient	0.539***	0.072***	1				
lnHospitalLevel_reflect	-0.0230	-0.0140	0.0210	1			
CityGDP	0.157***	-0.055***	-0.099***	0.00400	1		
lnArticle	0.246***	0.063***	0.571***	0.071***	-0.064***	1	
ServiceNum	0.0120	-0.111***	0.317***	0.0120	-0.198***	0.256***	1
lnAveReport	0.436***	-0.126***	0.699***	0.00700	-0.180***	0.410***	0.309***
lnDisclosure	0.218***	0.341***	0.331***	0.0190	-0.037**	0.387***	0.079***
lnTotalGiftRate	-0.091***	0.00400	-0.382***	-0.035**	0.114***	-0.122***	-0.163***
lnReviewRate	-0.172***	0.036**	-0.585***	-0.029*	0.128***	-0.265***	-0.251***
Recommend	0.407***	0.063***	0.540***	-0.035**	0.0220	0.366***	0.167***
lnOnlinePatient	0.383***	-0.032**	0.604***	0.0120	-0.070***	0.371***	0.293***
Risk	-0.184***	-0.046***	-0.225***	-0.00500	0.00400	-0.105***	-0.053***
OpenYear	0.091***	0.361***	0.254***	-0.0200	0.043***	0.251***	-0.0180

	lnAve Report	lnDisclo-sure	lnTotal GiftRate	lnReview Rate	Recom-mend	lnOnline Patient	Risk
lnDisclosure	1						
lnTotalGiftRate	0.137***	1					
lnReviewRate	-0.125***	-0.062***	1				
Recommend	-0.261***	-0.110***	0.820***	1			
lnOnlinePatient	0.652***	0.261***	0.0100	-0.082***	1		
lnAveReport	0.656***	0.154***	-0.153***	-0.235***	0.630***	1	
Risk	-0.209***	-0.056***	0.109***	0.098***	-0.100***	-0.168***	1
OpenYear	-0.169***	0.311***	0.00500	-0.040**	0.072***	-0.038**	-0.0220

	OpenYear
OpenYear	1

MODEL AND ANALYSIS

Model Estimation

This study built multiple linear regression models of patients' online and offline medical choice respectively. Considering the moderating effect of disease risk on the relationship between ability trust or honest trust and patients' medical choice, the study firstly centralized disease risk (Risk), physician's medical title (MedicalTitle), physician's patient experience (lnTotalPatient), city economic level (CityGDP), hospital level (lnHospitalLevel_reflect), and information disclosure (lnDisclosure). Centralizing the above variables before multiplying them to derive cross terms aimed to avoid multicollinearity.

To test hypotheses about the direct and moderating effects on patients' medical choice, this study created four empirical models as follows:

$$\begin{aligned}\ln OnlinePatient=&\alpha_0+\alpha_1 OpenYear+\alpha_2 MedicalTitle+\alpha_3 lnTotalPatient+\alpha_4 lnHospitalLevel\_reflect+\alpha_5 CityGDP+\alpha_6 lnArticle\\&+\alpha_7 ServiceNum+\alpha_8 lnAveReport+\alpha_9 lnDisclosure+\alpha_{10} lnTotalGiftRate+\alpha_{11} lnReviewRate+\alpha_{12} Recommend\\&+\alpha_{13} Risk+\varepsilon\end{aligned} \tag{1}$$

$$\begin{aligned}\ln OnlinePatient=&\beta_0+\beta_1 OpenYear+\beta_2 MedicalTitle+\beta_3 lnTotalPatient+\beta_4 lnHospitalLevel\_reflect+\beta_5 CityGDP+\beta_6 lnArticle\\&+\beta_7 ServiceNum+\beta_8 lnAveReport+\beta_9 lnDisclosure+\beta_{10} lnTotalGiftRate+\beta_{11} lnReviewRate+\beta_{12} Recommend\\&+\beta_{13} Risk+\beta_{14} Risk\times MedicalTitle+\beta_{15} Risk\times lnTotalPatient+\beta_{16} Risk\times lnHospitalLevel\_reflect\\&+\beta_{17} Risk\times CityGDP+\beta_{18} Risk\times lnDisclosure+\mu\end{aligned} \tag{2}$$

$$\begin{aligned}\ln OfflinePatient=&\chi_0+\chi_1 OpenYear+\chi_2 MedicalTitle+\chi_3 lnTotalPatient+\chi_4 lnHospitalLevel\_reflect+\chi_5 CityGDP+\chi_6 lnArticle\\&+\chi_7 ServiceNum+\chi_8 lnAveReport+\chi_9 lnDisclosure+\chi_{10} lnTotalGiftRate+\chi_{11} lnReviewRate+\chi_{12} Recommend\\&+\chi_{13} lnOnlinePatient+\chi_{14} Risk+\theta\end{aligned} \tag{3}$$

$$\begin{aligned}\ln OfflinePatient=&\delta_0+\delta_1 OpenYear+\delta_2 MedicalTitle+\delta_3 lnTotalPatient+\delta_4 lnHospitalLevel\_reflect+\delta_5 CityGDP+\delta_6 lnArticle\\&+\delta_7 ServiceNum+\delta_8 lnAveReport+\delta_9 lnDisclosure+\delta_{10} lnTotalGiftRate+\delta_{11} lnReviewRate+\delta_{12} Recommend\\&+\delta_{13} lnOnlinePatient+\delta_{14} Risk+\delta_{15} Risk\times MedicalTitle+\delta_{16} Risk\times lnTotalPatient\\&+\delta_{17} Risk\times lnHospitalLevel\_reflect+\delta_{18} Risk\times CityGDP+\delta_{19} Risk\times lnDisclosure+\eta\end{aligned} \tag{4}$$

where α_0, β_0, χ_0 and δ_0 are the intercepts. α_i, β_i, χ_i and δ_i are the focus parameters to be estimated. ε, μ, θ and η are the error terms.

The difference between model 3 and model 1 was that the dependent variable was replaced with patients' offline medical choice, while patients' online medical choice was added to the independent variables.
Model 2 and model 4 were added five interaction terms based on model 1 and model 3 respectively.

Results

Multiple regression analysis was performed by Stata software. Table 6 presents the results of the model estimated by conducting multiple regression analysis. We presented this equation hierarchically, first showing a model with independent variables in Column 1, and then introducing interaction terms in Column 2. The adjusted R-square values for the two regression models are 0.586 and 0.420 respectively, meaning that independent variables can explain 58.6% and 42.0% of the patients' online and offline medical choices respectively, which suggests that the models are reasonable designed with high fitting degrees and significant explanatory power.

Table 6: Parameter estimates of patients' online and offline medical choice.

VARIABLES	Patients' online medical choice (lnOnlinePatient)		Patients' offline medical choice (lnOfflinePatient)	
	Model 1	Model 2	Model 3	Model 4
MedicalTitle	-0.022*	-0.025**	0.174***	0.172***
	(-1.75)	(-1.97)	(9.48)	(9.34)
lnTotalPatient	0.138***	0.140***	0.298***	0.299***
	(17.46)	(17.69)	(23.42)	(23.45)
lnHospitalLevel_reflect	0.258***	0.248***	-0.201**	-0.201**
	(3.09)	(2.91)	(-2.02)	(-2.02)
CityGDP	0.007***	0.007***	0.038***	0.038***
	(4.13)	(4.30)	(15.54)	(15.53)
lnArticle	0.018***	0.018***	-0.046***	-0.046***
	(3.06)	(3.08)	(-6.07)	(-5.99)
ServiceNum	0.147***	0.146***	-0.098***	-0.099***
	(20.32)	(20.33)	(-8.72)	(-8.80)
lnAveReport	0.216***	0.207***	0.045***	0.040**
	(17.92)	(17.00)	(2.79)	(2.48)
lnDisclosure	-0.041***	-0.041***	0.035**	0.037**
	(-3.89)	(-3.95)	(2.32)	(2.45)
lnTotalGiftRate	-0.297***	-0.288***	-0.029	-0.041
	(-6.11)	(-5.92)	(-0.28)	(-0.40)
lnReviewRate	0.326***	0.315***	0.461***	0.448***
	(9.58)	(9.23)	(6.31)	(6.13)
Recommend	1.120***	1.126***	0.078**	0.086**
	(42.91)	(43.12)	(2.34)	(2.56)
lnOnlinePatient			0.014	0.011
			(1.23)	(1.01)
Risk	-0.040***	-0.050***	-0.063***	-0.074***
	(-2.66)	(-3.30)	(-3.00)	(-3.50)
Risk × MedicalTitle		-0.020		-0.061*
		(-0.83)		(-1.73)
Risk × lnTotalPatient		-0.047***		-0.048***
		(-6.49)		(-3.91)
Risk × lnHospitalLevel_reflect		-0.089		-0.080
		(-0.50)		(-0.39)
Risk × CityGDP		-0.003		-0.005
		(-1.02)		(-0.94)
Risk × lnArticle		0.039*		0.025
		(1.91)		(0.88)
OpenYear	Yes	Yes	Yes	Yes
Constant	-4.274***	-4.273***	-1.844***	-1.853***
	(-38.13)	(-38.17)	(-11.79)	(-11.86)
Observations	10,931	10,931	4,042	4,042
R-squared	0.587	0.588	0.423	0.426
F test	0	0	0	0
r2_a	0.586	0.587	0.420	0.422
F	594.9	502.2	109.2	93.03

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

According to model 1 in Table 6, though physician's medical title is significant under 5%, the effect is negative (β=-0.022, p<0.05), H1aa is not supported. H1ba (β=0.138, p<0.001) and H1da (β=0.007, p<0.001) are supported. Despite the coefficient of the hospital level (β=0.258, p<0.001) is significant and positive, positive coefficient indicates a negative effect due to data mapping as stated earlier; therefore, H1ca is not supported. As for patients' offline medical choice, the results provided support for hypotheses on ability trust. According to model 3 in Table 6, we found physician's medical title (β=0.174, p<0.001), patient experience (β=0.298, p<0.001), hospital level (β=-0.201, p<0.01), city economic level (β=0.038, p<0.001) significantly and positively affect patients' offline medical choice, among which the influence of physician's patient experience is the largest and the influence of city economic level is the smallest. Four proxies representing ability trust have significant positive effects on patients' offline medical choice, providing support to H1ab, H2bb, H3cb, and H4db.

In the benevolence trust dimension, the coefficients of number of shared articles (β=0.018, p<0.001), number of service types (β=0.147, p<0.001), average monthly reports after hospital visit (β=0.216, p<0.001) are positive and statistically significant. Thus, H2aa, H2ba, H2ca are supported. In terms of offline selection behaviour, the coefficients of three proxies of benevolence trust are significant under 0.1%. But the effects of number of shared articles (β=-0.046, p<0.001) and number of service types (β=-0.098, p<0.001) are negative, which are contrary to the hypotheses; therefore, H2ab and H2bb are rejected. Average monthly reports after hospital visit (β=0.045, p<0.001) is positive and H2cb is supported. Among the proxies representing benevolence trust, average monthly reports after hospital visits promotes patients' offline medical choice, while number of shared articles and number of service types have no positive effect on patients' offline medical choice.
It can be seen that ability trust has a greater positive effect on patients' offline medical choice compared with on patients' online medical choice, contrastingly, benevolence trust has a greater positive effect on patients' online medical choice compared with on patients' offline medical choice.
In the honest trust dimension, in aspect of online behaviour, the effect of information disclosure (β=-0.041, p<0.001) is negative, which is contrary to the hypothesis; therefore, H3a is rejected. Honest trust does not have a positive effect on patients' online medical choice. In aspect of offline behaviour, information disclosure (β=0.035, p<0.01) is positive and statistically significant, so H3b is supported, indicating that honest trust has a significant positive effect on patients' offline medical choice and that information disclosure can reflect physician's honest attitude, which is valued by outpatients when choosing a physician.

The trust transfer theory proposes that potential patients will borrow existing patients' trust in a physician to develop trust. For patients' online medical choice, the effect of virtual gift rate (β=-0.297, p<0.001) is negative, contrary to hypothesis, so H4aa is not supported. Analysis revealed that review rate and recommendation level have positive influence on patients' online medical choice, as evidenced by significant positive coefficients of review rate (β=0.326, p<0.001) and recommendation level (β=1.120, p<0.001). so H4ba and H4ca are supported. For patients' offline medical choice, H4ab is not supported as the coefficient of virtual gift rate is not significant. In contrast, review rate (H4bb) and recommendation level (H4cb) have positive influence on patients' offline medical choice, as evidenced by significant positive coefficients of review rate (β=0.461, p<0.001) and recommendation level (β=0.461, p<0.001).
Patients' online medical choice has no significant effect on patients' offline medical choice; therefore, H5 is not supported. Geographical restriction keeps patients from visiting the same physician in hospital after consulting online. Gap between online and offline channel leads to gap between trust in the two channels so that it is hard for established trust online to transfer between channels and form offline trust.

Hypothesis 6a, 6b, 6c, and 6d test the moderation effects of disease risk on the relationship between ability trust and patient choice. In terms of patients' online medical choice, results show that disease risk significantly and negatively moderates the relationship between physician's patient experience and patient choice (β = -0.047, p<0.001); therefore, H6ba is supported. The positive effect of physician's patient experience on patients' online medical choice is stronger under low disease risk, which indicates that patients with low-risk diseases tend more to choose physicians with high patient experience compared with patients with high-risk diseases. With respect to the other indicators of ability trust, as evidenced by the interaction terms of disease risk with the three proxies, disease risk has no significant moderating effect on physicians' medical title, hospital level, and city economic level; therefore, H6aa, H6ca, H6da are not supported. H6e tests the moderation effect of disease risk on the relationship between honest trust and patient choice. According to model 2 in Table 6, this research found a significant and negative impact of information disclosure on patient choice (β = 0.039, p<0.05), i.e., disease risk has inhibition effect on the relationship between information disclosure and patients' online medical choice, providing support to H6ea. In terms of patients' offline medical choice, disease risk has inhibition effect on the relationship between physician's medical title and medical choice and on the relationship between physician's patient experience and medical choice, as evidenced by interaction term of disease risk and physician's medical title (β=-0.061, p<0.05) and that of disease risk and physician's patient experience (β=-0.048, p<0.001); therefore H6ab and H6bb are supported. For the other indicators of ability trust dimension, the interaction terms of disease risk and city economic level and hospital level have no significant effect on patients' offline medical choice, indicating that there is no significant moderating effect of disease risk on hospital level and city economic level. H6cb and H6d b are not supported. In the dimension of honest trust, the interaction term of disease risk and physician's information disclosure also has no significant effect on patients' offline medical choice, indicating that there is no moderating effect of disease risk on information disclosure and H6eb is not supported.

According to adjusted R-square values of models, the explaining power of the model increase when interaction terms added, suggesting that disease risk indeed plays a moderating effect in both patient's online and offline medical choice. Meanwhile, the explaining power of the online model is greater than that of the offline model, suggesting that information presented online has more influence on online medical choice than offline medical choice. Online consultation is unrestricted by transportation, hence the main source of information is the doctor's information presented on the platform. By contrast, limited by their geographical location, outpatients need to take transportation factors into consideration and face more complex information sources such as hospital facilities, inpatient environment, and medical team. As a result, physicians' information presented online only accounts for a small portion of patients' considerations, resulting in less impact of presented information on offline visits than on online consultations.

Overall, 9 of the 16 hypotheses regarding patients' online medical choice are supported, and 10 of the 17 hypotheses regarding patients' offline medical choice are supported. The outcomes of hypothesis test are shown in Table 7.

Table 7: Outcomes of Hypothesis Test

Hypothesis		Relationship	Online	Offline
Ability trust	H1a	Physician's medical title→Patients' medical choice	Rejected	Supported
	H1b	Physician's patient experience→Patients' medical choice	Supported	Supported
	H1c	Hospital level→Patients' medical choice	Rejected	Supported
	H1d	City economic level→Patients' medical choice	Supported	Supported
Benevolence trust	H2a	Number of shared articles→Patients' medical choice	Supported	Rejected
	H2b	Number of provided services→Patients' medical choice	Supported	Rejected
	H2c	Average monthly number of reports after hospital visit→Patients' medical choice	Supported	Supported
Honest trust	H3	Information disclosure→Patients' medical choice	Rejected	Supported
Trust transfer	H4a	Virtual gift rate→Patients' medical choice	Rejected	Rejected
	H4b	Review rate→Patients' medical choice	Supported	Supported
	H4c	Recommendation level→Patients' medical choice	Supported	Supported
	H5	Patients' online medical choice→Patients' offline medical choice	\	Rejected
Moderating effect of disease risk	H6a	Disease risk×medical title→Patients' medical choice	Rejected	Supported
	H6b	Disease risk×Patient experience→Patients' medical choice	Supported	Supported
	H6c	Disease risk×Hospital level→Patients' medical choice	Rejected	Rejected
	H6d	Disease risk×City economic level→Patients' medical choice	Rejected	Rejected
	H6e	Disease risk×Information disclosure→Patients' medical choice	Supported	Rejected

Robustness Check

In order to check the robustness of the model, we randomly selected 50% from all the data of the online and offline samples respectively into two subsamples referring to the study by Lin (2020), and then conducted regression with the subsamples. Table 8 presents the results of the multiple linear regression model. The results are consistent with the results using the whole sample. Therefore, the results are robust.

Table 8: Parameter estimates of patients' online and offline medical choice (robust check)

VARIABLES	Patients' online medical choice (lnOnlinePatient)		Patients' offline medical choice (lnOfflinePatient)	
	Model 1	Model 2	Model 3	Model 4
MedicalTitle	-0.020	-0.025	0.162***	0.160***
	(-1.11)	(-1.37)	(6.09)	(6.03)
lnTotalPatient	0.133***	0.134***	0.304***	0.304***
	(11.77)	(11.95)	(16.81)	(16.79)
lnHospitalLevel_reflect	0.121	0.125	-0.434***	-0.432***
	(1.04)	(1.08)	(-2.78)	(-2.77)
CityGDP	0.009***	0.009***	0.039***	0.039***
	(3.72)	(3.76)	(10.85)	(10.83)
lnArticle	0.030***	0.031***	-0.046***	-0.045***
	(3.50)	(3.61)	(-4.22)	(-4.10)
ServiceNum	0.146***	0.147***	-0.108***	-0.108***
	(14.12)	(14.21)	(-6.82)	(-6.86)
lnAveReport	0.229***	0.217***	0.061***	0.057**
	(13.51)	(12.73)	(2.60)	(2.42)
lnDisclosure	-0.039***	-0.041***	0.037*	0.040*
	(-2.64)	(-2.74)	(1.77)	(1.85)
lnTotalGiftRate	-0.333***	-0.330***	0.045	0.045
	(-4.99)	(-4.96)	(0.33)	(0.33)
lnReviewRate	0.349***	0.338***	0.395***	0.386***
	(7.22)	(7.01)	(4.06)	(3.96)
Recommend	1.081***	1.087***	0.114**	0.119**
	(29.45)	(29.61)	(2.41)	(2.49)
lnOnlinePatient			0.007	0.006
			(0.43)	(0.35)

Risk	-0.074***	-0.086***	-0.057*	-0.066**
	(-3.46)	(-4.02)	(-1.89)	(-2.16)
Risk × MedicalTitle		-0.042		-0.082
		(-1.18)		(-1.56)
Risk × lnTotalPatient		-0.062***		-0.037**
		(-6.01)		(-2.08)
Risk × lnHospitalLevel_reflect		0.185		0.010
		(0.79)		(0.03)
Risk × CityGDP		-0.007		-0.003
		(-1.54)		(-0.48)
Risk × lnArticle		0.062**		0.032
		(2.18)		(0.78)
OpenYear	Yes	Yes	Yes	Yes
Constant	-4.128***	-4.114***	-1.531***	-1.559***
	(-26.82)	(-26.78)	(-6.50)	(-6.61)
Observations	5,465	5,465	2,021	2,021
R-squared	0.591	0.594	0.459	0.460
F test	0	0	0	0
r2_a	0.589	0.591	0.451	0.452
F	301.7	256.0	62.54	53.02

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

DISCUSSIONS AND IMPLICATIONS

Results and Discussions

In this paper, we investigated the influencing factors of patients' online and offline medical choice in online healthcare community and explored trust transfer from online to offline channel. First, based on the source credibility model and trust transfer theory, we crawled actual business data of *Good Doctor Online* to study the patients' medical choice in Internet medical from the perspective of trust. The research put forward hypotheses and constructed a multiple linear regression model for empirical study, which passed the multicollinearity test, correlation test and robustness check.

The regression results show that the three dimensions of the source credibility model can effectively explain the credibility of trust source and increase patients' trust, thus promote his/her medical choice.

In the dimension of ability trust, physician's medical title, patient experience, hospital level, and economic level where the hospital located all have significant positive effects on patients' offline medical choice, suggesting that these four proxies can serve as good signals of physician's ability, enhance patients' trust and thus promote patients' offline medical choice. The study of Lin (2020) verified the positive effect of physician's medical title and hospital level on patients' offline medical choice, but failed to verify the expansionary effect of city economic level on patients' offline medical choice. Patient experience and city economic level which represent ability trust have significant positive effect on patients' online medical choice. The positive effect of city economic level has been verified by Lin (2020). There is no positive effect of physician's medical title and hospital level, mainly due to the uneven distribution of physicians' medical titles and hospital levels in the online data sample.

In the dimension of benevolence trust, number of shared articles, number of online service types, and average monthly reports after hospital visits all effect on patients' online medical choice significantly and positively, which is consistent with previous studies (Hong, 2020; Lin, 2020; Zeng & Guo, 2018), indicating that if a physician take the initiative to share articles, open more service types, and provide service of report after hospital visits to more outpatients, s/he would appear more friendly and thus persuade patients to consult her/him further. Number of average monthly reports after hospital visits has a significant positive effect on patients' offline medical choice. Number of shared articles has no significant effect on patients' offline medical choice, probably because the function of office appointment is only available on mobile website page where number of shared articles is easily ignored compared with on the online website. The conclusion is inconsistent with that of Lin (2020) and Hong (2020), for changes in page design of the platform over the past two years lead to changes in indicators' ability of attracting users' attention.

Number of service types does not have a significant effect on patients' offline medical choice in this paper, probably because this proxy is less relevant to hospital visits than online consultations. However, Lin (2020) verified the positive effect of number of service types on patients' offline medical choice. In her study, only three service types were available (i.e., consultation with image, consultation through telephone and clinic appointments), hence number of service types ranged between 0 and 3. With the development of the platform in recent years, more types of services have been developed to meet users' individual needs and there have been eight service types at the time this research was completed, that is, number of service types in this study ranges between 0 and 8. Different numeric ranges of the variables lead to different findings of this paper and those of the studies carried out two years ago.

Meanwhile, the positive influence of ability trust on patients' offline medical choice is greater than on online medical choice, while the positive influence of benevolence trust on patients' online medical choice is greater than on offline medical choice.

The reason is that outpatients perceive higher disease risk and value medical skill rather than service experience when choosing a physician; while patients consulting online have higher requirements for service experience out of lack of face-to-face interaction with physicians.

There is a significant positive effect of honest trust on patients' offline medical choice in accordance with the study of Lin (2020), suggesting that patients value physician's honesty in the office appointment process. Conversely, honest trust has no significant influence on patients' online medical choice because outpatients who perceive higher disease risk have more motivation to undertake more cognitive effort to interpret the physician's profile to ensure a right decision; contrastingly, online patients are less cautious about their selection decisions and therefore place less importance on the information disclosed by the physician. This conclusion differs from existing study since different measurements of information disclosure were used. Zeng (2019) measured information disclosure by profile picture, patient experience, professional specialties and clinic information, while this paper measured information disclosure by word count of physicians' specialties and profiles.

The results also validate trust transfer theory, in which potential patients perceive trust in physicians by drawing on other patients' reviews and platform's recommendation level, forming an indirect trust relationship and promoting patients' selection intention. Review rate and recommendation level have significant positive effects on patients' online and offline medical choices, indicating that if more existing users are willing to evaluate the physician after consultation and the platform's recommendation level for the physician is higher, more potential patients will be persuaded to choose that physician, which is consistent with the findings of existing studies (e.g., Zeng, 2019). Virtual gift rate has no significant effect on patients' medical choice both online and offline, consistent with the study by Deng et al. (2019).

Trust transfer from online to offline channel is not validated in this study. Patients' online medical choice had no positive effect on patients' offline medical choice. Geographical limitation leads to gap between channels that established trust online hardly transfer between channels and form offline trust. However, Hong (2020) tested patient trust transfer from online to offline channel by multiple linear regression using total number of online consultations and offline appointments to measure patients' trust online and offline respectively and came to the conclusion that patients' online trust had a significant positive effect on patient offline trust. However, total number of online consultations and offline appointments are directly related to the opening time of physicians' homepages and whether they can serve as good indicators of patient trust is doubtful. Different variable selections in the two models lead to differences in the findings.

This paper introduced the moderating effect into the field of online healthcare to investigate the moderating effect of disease risk on the influence of ability trust and honest trust. In terms of patients' online medical choice, disease risk weakens the positive effect on relationship between physician's patient experience and patients' online medical choice. It is because patients consulted online can be divided into undiagnosed ones and diagnosed ones whose medical choice tendency differs and the proportion of undiagnosed patients in low-risk disease group is higher than in high-risk disease group. Patients with low-risk diseases tend more to choose physicians online by checking physician's information presented on the website, while patients with high-risk diseases tend more to choose physicians through report after hospital visit or by directly searching and finding physicians who they have already consulted.

There is no significant moderating effect of disease risk on the relationship between the other indicators of ability trust dimension (i.e., physician's medical title, city economic level, and hospital level) and patients' online medical choice. This is because there are two types of online patients (undiagnosed patients and diagnosed patients) and patients' receive undifferentiated information of physicians' medical titles and hospital levels. In contrast, the findings of Zeng and Guo (2018) suggested that disease risk positively moderates the effect of physician's medical title. Their study standardized medical title and academic title to obtain an indicator of physician's title, while this paper only considered medical title, leading to the difference in findings.

Disease risk also weakens the negative effect on the relationship between honest trust and patients' online medical choice. When consulting online, patients with high disease risk place more importance on their health status and are more motivated to find an honest physician. In contrast, Zeng and Guo (2018) suggested no moderating effect of disease risk on the influence of information disclosure, and the difference between findings in the two studies probably due to different measurement of the degree of disclosure.

In aspect of patients' offline medical choice, disease risk weakens the influence on the relationship between physician's medical title and patients' offline medical choice and on the relationship between physician's patient experience and patients' offline medical choice. When physician has high medical title or is experienced, selection intention of patients with low-risk disease is higher than that of patients with high-risk disease, due to the difficulty of making office appointment and limited number of hospital places. There is no significant moderating effect of disease risk on the relationship between other indicators of the ability trust dimension (i.e., city economic level and hospital level) and information disclosure which represents the honest trust dimension and patients' online medical choice. The reason is that patients in need of hospital visits consider more complex factors such as hospital facilities, inpatient environment and medical team, which reduces influence of information presented on physician's homepage and leads to less explanatory power of online information on hospital visits than on online consultations.

Theoretical Implications

The theoretical contributions of this paper are threefold.

First, there are a few scholars who have conducted studies on physician-patient trust in online healthcare communities from different areas and perspectives. However, in the physician-patient trust relationship, physicians not only play a passive role

being trusted by patients, but can also take active behaviours to win patients' trust. This paper enriches the research on physician-patient trust from the perspective of the trustee and provides feasible suggestions for physicians to enhance patients' trust. Prior studies often excessively focus on patients consulting online in healthcare, ignoring patients who make appointments through online healthcare platforms and visit in hospital. This paper takes the two types of patients (i.e., patients making online consultation and office appointment) into account, giving due attention to the growing group of offline patients in the Internet medical field.

Next, most of the studies on physician-patient trust through questionnaire survey and interviews for qualitative analysis. The research established regression models of patients' online medical choice and patients' offline medical choice respectively and crawled actual business data in the online healthcare community, of which conclusions are more objective and precise.

Finally, existing trust transfer research most concern with trust transfer between channels and focus primarily on the transfer from offline channel to online channel, and here has been very little research exploring trust transfer from online channel to offline channel. Trust transfer in the health field remains under-explored. This paper explores the trust transfer from online to offline channel, which contributes to the body of research on trust transfer in the field of Internet medical and the integration of online and offline healthcare service resources.

Practical Implications

This study has significant practical implications. Based on the results of the empirical study, feasible suggestions can be given to physicians, patients, and platform builders in online healthcare communities.

Advice for physicians

The results of the study suggest that number of articles published by physicians, number of provided service types and number of reports after hospital visits positively effect on patients' medical choice, and the positive effect on patients' online medical choice is greater than that on patients' offline medical choice. Therefore, physicians can publish more articles such as medical guide and disease related knowledge sharing in their public accounts, and provide more service types to satisfy patients' different needs. Physicians can also provide outpatients with privilege of report after hospital visits. The above actions convey the friendliness of physicians to patients and thus enhance patients' trust and optimize physician-patient interaction.

Information disclosure of physicians will promote patients' offline medical choice. Physicians can improve their personal information presented in online healthcare community, such as professional specialties and good wishes, to convey their sincerity to patients.

It is shown that patients prefer physicians with high medical competence and that disease risk moderates patients' selection behaviour. Therefore, it is recommended that physicians need to pay attention to both medical skills and disease types and risks they treat. In addition, hospital administrators should urge physicians to improve both their medical skills and service attitudes, for example, by incorporating medical skills and service attitudes into performance appraisal system.

Advice for patients

When choosing a physician, patients can evaluate the physician's medical ability by physician's medical title, patient experience and hospital level; evaluate the physician's friendliness by number of articles published by the physician, number of provided service types and number of reports after hospital visits; they can evaluate the physician's honesty by the physician's information disclosure such as profile and professional expertise to get a better understanding of the physician's actual situation. Patients can also draw on trust of existing patients in the physician according to review rate of existing patients as well as the platform's recommendation level to judge whether the physician is trustworthy.

Advice for medical platform builders

This study contributes to the design and improvement of online healthcare communities enabling the platform to provide better services to patients and physicians. First, there are various degrees of influence of different information on users' decisions, and elements are scattered on different pages. The platform builder can gather the decision information which users are concerned about and give visual priority to the key information to make it convenient for users to view, thus help patients process relevant information in a better way and save their time and energy for decision making. Next, it is found that due to geographical restrictions, patients may not be able to visit the same physician in hospital after online consultation, resulting in the trust accumulated online cannot be transferred to offline environment. Platform builders can prioritize local physicians according to the user's location, or remind the user of the physician's location when s/he is choosing a physician online, making it possible for trust to transfer between channels and hence better building physician-patient trust. Again, the results of the study show that reviews of existing patients can facilitate potential patients' choice of physicians. However, many patients are not willing to evaluate the physician after consultation. The platform can encourage users to make reviews by issuing points, establishing user ratings and giving corresponding discounts referring to e-commerce platforms to make full use of trust transfer mechanism. Last, the platform can introduce data mining and artificial intelligence technology to accurately match physicians and patients online, which can reduce users' cognitive effort of medical selection and improve its accuracy, hence avoid waste of time and energy of both physicians and patients.

Limitations and Future Research Directions

There are some limitations in the research which can be further expanded in future studies.

First, this paper used data from only one online healthcare platform, which may reduce the generalizability of the findings due to differences in platform environment and user group characteristics of different platforms. It is necessary to collect data from several platforms to conduct comparative studies.

Second, this paper only conducted a cross-sectional analysis and lacked information about how any changes to the physicians' information might affect patients' choices. Future studies could use panel data to investigate the dynamic effects of information on patients' choices.

Third, factors to consider are more complex when choosing a physician offline than online. Future study can include hardware facilities and medical team in the model to gain a better understanding of the influencing factors of outpatients' medical choice. Further, there are three modes of making appointment on *Good Doctor Online*, two of which are newly-developing. Future research could explore the differences between the emerging modes of appointment and the traditional mode, as well as the influencing factors of patients' medical choice under different modes of appointment.

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