

INFLUENCING FACTORS OF PATIENTS' CHOICE IN THE ONLINE MEDICAL MARKETS: A SYSTEMATIC REVIEW

Ansalmus Oron^{1*}, Ernawaty²

Department of Health Administration and Policy, Faculty of Public Health,
Universitas Airlangga, Surabaya, Indonesia^{1,2}

Correspondence*

Ansalmus Oron, Department of Health Administration and Policy, Faculty of
Public Health, Universitas Airlangga, Surabaya, 60286, Indonesia.

Email Korespondensi: ansalmus.oron -2023@fkm.unair.ac.id

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ABSTRACT

The telemedicine system has created a new and important way for patients to find a doctor. This research aims to identify the influencing factors of patients' choice in the online medical market using a systematic review study. Methods: Articles published in the last 5 years in Proquest, Google Scholar, and PubMed databases were systematically reviewed. Sixteen articles that met the inclusion and exclusion criteria were selected for further review. Findings regarding the influencing factors of patients' choice in the online medical were systematically synthesized. Sixteen articles explore seven main factors of patient choice in the online medical market such as physician factors, service quality, location, trust, WoM, patient perception and illness severity. Our study recommends that doctors should improve their medical skills, manners, appealing channel for health, actively publicize, increase the number of online consultations appealing channel for health, the frequency of updating the doctor's quality information and show their professional level to provide better service. The quality of online service are equally important to online doctor-patient trust and thus improve their influence.

Keywords: Online Medical Market, Patient Choice, Physician Image, Online Reputation

Background

Patient choice in healthcare is a patient's legal right to choose treatment. Patient choice is a concept introduced in the National Health Service (NHS) in England (1).. Patient choice is important because it allows them to choose and control their health and the decisions related to treatment. The freedom to make an informed decision and to choose the right

choice for the patient's needs is important to the patient's experience and recovery; both of these things are better when the patient feels confident and comfortable with where they receive care (2). For any treatment offered to patients, it is believed that giving them options will not only increase their autonomy but also better inform them about their

health conditions and the treatments available (3).

In several countries, there has been an increase in the ability of patients to make choices about their health care providers, often on the assumption that patients themselves are the best agents for such decisions (4). At the same time, national and regional health authorities have increased access to Internet-based information resources to support patients' choices (5). The assumption is that most patients will be able to choose the clinician who will provide their health care, and that the money to pay for the service should follow their choice.

The telemedicine system has created a new and important way for patients to find a doctor (6). Research shows that an increasing number of people are searching for medical and health-related information on the Internet every day (7). Wallace found that 72% of internet users have searched for health-related information online. Of these, one in five have browsed other people's comments about a particular disease or doctor (8). Consumer interest and demand for online administrative processes, information-rich internet health portals, and physician website and email access has added a new dimension to wellness and disease management (9). Assessing the quality of health care services is challenging because they are typically professional, intangible, and heterogeneous. However, the rich information from online reviews can help us understand past patients' medical experiences and perceived quality (10). Compared to offline medical care, a variety of online physician information causes a certain degree of information overload and influences patient choice (11).

The emergence of the online medical community began to change the traditional doctor-patient communication relationship, and patient selection became particularly important. Online health communities use a variety of methods to alleviate such problems of choice making and service evaluation in order to establish a trusting relationship between the doctor and the patient (12). It is generally assumed that patients have the right to make decisions about treatment, including the right to refuse treatment. This right is limited by considerations of cost-effectiveness (13)

According to McKnight, there are two main factors that influence the choice of a doctor: personal quality and online reputation (14). The reputation and experience of physicians were two important attributes to describe the ability of physicians, and had a significant impact on the decision of patients to choose appropriate physicians. Reputation refers to a comprehensive evaluation of their professional skills and service quality by patients over a period of time and experience is closely related to a person's knowledge and expertise in a specific field and represents a person's overall ability to perform duties (15,16).

Existing studies have identified that important information from online physician reviews has an impact on patient choice. Existing studies have identified several factors that influence patient choice, including patient factors, such as patient ratings (17), and physician factors, such as physician online effort (18), physician title (19), service attitudes (20), and the number of online reviews (19,21). In recent years, the information available to patients about physician quality has

been rapidly transformed by Web-based ratings from both commercial and government efforts. Little is known about how different types of Web-based ratings affect individuals' choice of physicians. The purpose of this study was to identify the influencing factors of patients' choice in the online medical.

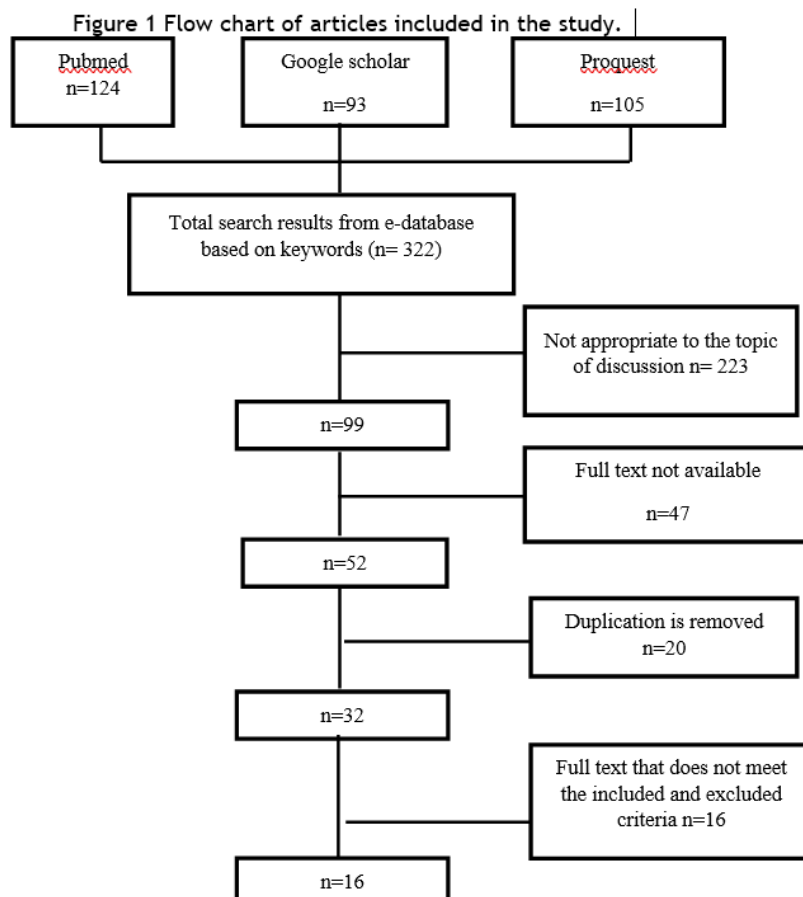
Methods

This research uses a systematic review study which was carried out by searching for articles on Proquest, Google Scholar and PubMed. Search keywords using Boolean Operators include OR/AND/NOT. The literature search terms used were "patient(s)" AND "choice" AND "online" AND "doctor(s)" OR "physician(s)". The selection of library source articles was carried out by assessing the quality and results of studies discussing the influencing factors of

patients' choice in the online medical. Inclusion criteria are original studies conducted as empirical research, articles published in the last five years 2020-2024, research published in English, full text and free access. Literature review articles, systematic reviews and meta-analyses were excluded from this study.

Quality Appraisal

The CASP Critical Appraisal of Study Quality tool is used to critically appraise studies, including the validity of the research, the accuracy of the research findings, and the usefulness of the research for practice. The quality assessment tool uses a series of questions according to the research design to assess whether the study can be used as high-quality evidence.



Data abstraction and synthesis

For each article, we extracted author(s) information, title, year of publication, data source/sample,

and findings/ conclusions (Table 1). After carrying out the screening process, the final results were 16 articles.

Table 1. Data abstraction

N o	Title, Author, year	Sample/ Data source study	Findings
1.	Physician's online image and patient's choice in the online health community (22)	40,000 physicians' images and other related information in Haodf.com	physician's beauty or physical attractiveness has no significant effect on patients' choice Smile has a positive effect on patients' choices Physician's skin status also positively affects patients' choices Physician's professional capital strengthens the effect of beauty, smile and skin status on patients' choices Beauty and skin status are the substitutes for each other, and smile and skin status are the substitutes for each other too.
2.	The Impact of Signals Transmission on Patients' Choice through E-Consultation Websites: An Econometric Analysis of Secondary Datasets (23)	4231 physicians on Healthgrades and Vitals websites	Online reputation, online effort and disease risk were positively related to patients' online physician selection The disease risk has also affected patients' e-consultation choice A high-risk disease positively moderates the relationship between online reputation and patients' e-consultation choice
3.	Understanding the influence of professional status and service feedback on patients' doctor choice in online healthcare markets (24)	418 doctors' data collected from an online healthcare market in China	the effect of a doctor's professional status and service feedback on a patient's doctor choice was substitutable patients' illness severity played a moderating role, in that the influence of professional status on a patient with high-severity illness was higher than that on a patient with low-severity illness illness severity negatively moderated the substitute relationship between professional status and service feedback on a patient's choice
4	Internal or External Word-of-Mouth (WOM), Why Do Patients Choose Doctors on Online Medical Services	4435 doctors from a leading online healthcare community in China	Both internal and external WOM had a positive impact on patients' choice of doctors; there was a significant positive interaction between internal and third-party generated WOM The position ranking of doctors

N o	Title, Author, year	Sample/ Data source study	Findings
	(OMSs) Single Platform in China? (25)		significantly enhanced the impact of internal WOM,
5	The Impact of Narrative Reviews on Patient E-doctor Choice in Online Health Communities (26)	747 doctors and 105032 reviews from WeDoctor	Clinical skills and effects, had a positive impact on patient choice service attitude and trust had a positive impact on patient choice convenience, did not show a significant effect in this study.
6	Study on the Relationships between Doctor Characteristics and Online Consultation Volume in the Online Medical Community (27)	data of doctors in Good Doctor Online	The doctor's title and city level representing the static characteristics of the doctor have a weak impact on the doctor's online consultation volume the doctor's dynamic characteristics such as the number of patient completions, the number of gifts received, and the number of published articles can have a positive impact on the doctor's online consultation volume. the comment text has no significant impact on the doctor's online consultation volume.
7	Using Telemedicine during the COVID-19 Pandemic: How Service Quality Affects Patients' Consultation (28)	2982 physicians obtained from Haodf.com.	the need fulfillment dimension variables positively affect online patient consultation the security dimension variables positively affect online patient consultation the responsiveness dimension variables positively affect online patient consultation.
8	Trust-Based Research: Influencing Factors of Patients' Medical Choice Behavior in the Online Medical Community (29)	37,341 sample data information from Platform A	the medical title of the doctors, their department's reputation, the number of gifts given to them, and the number of patients who registered with them after diagnosis, among other factors, had a significant, positive impact on the behavior of choosing doctors.
9	Distance effects and home bias in patient choice on the Internet: Evidence from an online healthcare platform in China (30)	200,000 doctors data from Haodf.com in China.	the geographic distance between doctors and patients is negatively associated with online service utilization, a strong "home bias" in which patients and doctors tend to locate in the same prefecture and in the same province.
10	Patient's behavior of selection physician in online health communities: Based	10,446 physician data	the number of types of services, number of scientific articles, and avatar in physicians' personal information all has a positive effect on patients' selection behavior.

N o	Title, Author, year	Sample/ Data source study	Findings
	on an Elaboration likelihood model (31)		Online word-of-mouth positively affected patients' selection behavior and disease risk had a moderating effect.
11	Factors that determine a Patient's willingness to physician selection in online healthcare communities: A trust theory perspective (6)	11905 physicians on <i>haodf. com</i>	physicians' quality (competence, benevolence, and integrity) and online reputation (online reviews and online rating) can significantly affect patients' selection the physician's gender can enhance the influence of online reputation on patients' selection.
12	Comparing the Impact of Online Ratings and Report Cards on Patient Choice of Cardiac Surgeon: Large Observational Study (32)	reviews for over 1 million doctors and 165,000 facilities.	a high online rating had positive and significant effects on patient utility, with limited variation in preferences across individuals, while the impact of a high report card score on patient choice was trivial and insignificant.
13	What influences patients' willingness to choose in online health consultation? An empirical study with PLS-SEM (33)	225 valid questionnaires .	physicians' ability had a significant positive influence on patients' cognitive trust in the physician physicians' integrity and benevolence had a significant positive influence on patients' affective trust in the physician cognitive and affective trust had a significant positive impact on patients' willingness to choose and there were significant positive interactions between affective and cognitive trust.
14	How do patients' perceptions and doctors' images impact patient decisions? Deconstructing online physician selection using multimodal data (34)	information on 12,890 physicians and 746,981 patient reviews from online medical platforms in China.	patients' perceptions of physicians' competence and warmth had a positive effect on decision-making physicians' age and wearing glasses enhanced the positive effect of perception on decision-making physicians' smiles weakened the positive effect of perception on decision-making.
15	Impact of a physician's prosocial behavior on the patient's choice: an empirical investigation in online health	6,204 physicians at The Good Doctor (www.Haodf.com)	a physician's prosocial behavior improves a patient's choice only when the strength of a physician's prosocial behavior is below the tipping point. the influence of a physician's prosocial behavior is heterogeneous for physicians with different online WOM and professional

No	Title, Author, year	Sample/ Data source study	Findings
	community (35)		titles.
16	The impact of doctors' facial attractiveness on users' choices in online health communities: A stereotype content and social role perspective (36)	14,897 doctors registered on a Chinese OHC.	The significant negative relationship between the facial attractiveness of doctors and the number of visits to their homepage by users This relationship only holds true for male surgeons and female internal medicine doctors, not for female surgeons or male internal medicine doctors.

RESULT

The studies explored a total of seven main factors of patient choice in the online medical market such as physician factors, service quality, location, trust, WoM, patient perception and illness severity.

Physician factors

Physician information had the greatest impact on patient choice.

The visual appeal of an online image

The doctor's headshot is the first thing a patient sees. Some studies have shown that first impressions influence consumer behavior and attitudes. An avatar in the doctor's personal information has a positive effect on the patient's choice (31). Physician's beauty or physical attractiveness has no significant effect on patients' choice. But smile and physician's skin status had a positive effect on patients' choices. Physician's professional capital strengthens the effect of beauty, smile and skin status on patients' choices, beauty and skin status are the substitutes for each other, and smile and skin status are the substitutes for each other too (22). Physicians' age and wearing glasses enhanced the

positive effect of perception on decision-making. However, physicians' smiles weakened the positive effect of perception on decision-making (34). Online visual appeal plays a critical role in engaging users, communicating information, and promoting products. Physicians can build their brand, increase their influence, and gain access to a wider range of opportunities and partners through the presentation of a compelling online presence.

Online reviews

Online reputation (online reviews and online rating) can significantly affect patients' selection (6,23). The number of patient completions, the number of gifts received, and the number of published articles can have a positive impact on the doctor's online consultation volume (Z. Chen et al., 2022). This factor is the result of each doctor's personal brand management, which reflects their comprehensive ability, reputation and integrity (Qiu et al., 2022). Therefore, doctors should actively publicize and show their professional level and constantly optimize their dynamic characteristics, increasing the number of online consultations and

improving their influence of service feedback on a patient's (Yang et al., 2021) The number of gifts given to them, had a significant, positive impact on the behavior of choosing doctors, the number of scientific articles, and avatar in physicians' personal information all has a positive effect on patients' selection behavior, while the title and personal introduction hurt patients' selection behavior (Qin et al., 2022). While according Chen, the doctor's title have a weak impact on the doctor's online consultation volume (Z. Chen et al., 2022). Moreover, the physician's gender can enhance the influence of online reputation on patients' selection. As online healthcare community becomes an increasingly appealing channel for health, the frequency of the physician's quality information updating and the quality of online service are equally important to online physician-patient trust.

Specialization

When a patient searches for information about a physician, the navigation takes the patient to the physician's home page, where the patient can view the details the physician has uploaded, such as his or her bio, work experience, and areas of specialization. The effect of a doctor's professional status on a patient's doctor choice was substitutable (Yang et al., 2021). The medical title of the doctors, their department's reputation had a significant, positive impact on the behavior of choosing doctors. Among these considerations, the number of patients registered after diagnosis had the greatest impact on the behavior of choosing doctors. This factor is the result of each doctor's personal brand management, which reflects their comprehensive ability, reputation and integrity (Qiu et al., 2022).

Number of service types

The number of types of services has a positive effect on patients' selection behavior (Qin et al., 2022). The number of patients who registered with them after diagnosis, among other factors, had a significant, positive impact on the behavior of choosing doctors. Among these considerations, the number of patients registered after diagnosis had the greatest impact on the behavior of choosing doctors (Qiu et al., 2022). The number of types of services has a positive effect on patients' selection behavior (Qin et al., 2022).

Number of patient consultation

The number of patient completions can have a positive impact on the doctor's online consultation volume (Z. Chen et al., 2022). The doctor's title and city level representing the static characteristics of the doctor have a weak impact on the doctor's online consultation volume the doctor's dynamic characteristics such as the number of patient completions, the number of gifts received, and the number of published articles can have a positive impact on the doctor's online consultation volume (27). the need fulfillment dimension variables positively affect online patient consultation the security dimension variables positively affect online patient consultation the responsiveness dimension variables positively affect online patient consultation (28)

Physician's prosocial behavior

Physician prosocial behavior refers to behaviors that meet social expectations and are beneficial to others, groups, or society. It primarily includes helping others, sharing, humility, volunteerism, cooperation, and

charitable giving. Physician's prosocial behavior refers to the behaviors that meet social expectations and are beneficial to others, groups, or society, mainly including helping others, sharing, humility, voluntary action, cooperation and charitable donations. Physician's prosocial behavior improves a patient's choice only when the strength of a physician's prosocial behavior is below the tipping point. In addition, the influence of a physician's prosocial behavior is heterogeneous for physicians with different online WOM, for physicians with higher online WOM, the effect of a physician's prosocial behaviors on a patient's choice is positive (Wang et al., 2022), online word-of-mouth positively affected patients' selection behavior and disease risk had a moderating effect (Qin et al., 2022).

Online rating

The number of gifts received can have a positive impact on the doctor's online consultation volume (Z. Chen et al., 2022). Physician rating platforms provide a new source of information for patients to use when choosing a physician. These platforms allow patients to give a general rating, provide detailed ratings on specific aspects of their experience, and write comments that are then made available to the public. A high online rating had positive and significant effects on patient utility, with limited variation in preferences across individuals. A patient's choice is affected by types of rating information; however, over the past decade, online ratings have become more influential (23,32)

Location

City level representing the static characteristics of the doctor have a weak impact on the doctor's online consultation volume (Z. Chen et al., 2022). The geographic distance between doctors and patients is negatively associated with online service utilization, though this effect is almost 40% ~ 50% weaker for online medical services than it is for offline medical services, patients and doctors tend to locate in the same prefecture and in the same province. Further analyses suggest that prior in-person visits before online consultations, the potential need for a follow-up physical visit after an online consultation, and information friction may contribute to the distance effect (Q. Chen et al., 2022)

Service quality

Quality in healthcare is a subjective, complex and multidimensional concept. Quality of service is an important factor in choosing a physician from the patient's perspective. Physicians display relevant online service quality signals to concerned patients via telemedicine platforms. This influences the patients' choice of online consultations. As a result, access to the high-quality signals of online doctors seems to be critical for patients, as they have difficulty in obtaining relevant information about the service quality of doctors due to the information asymmetry. Clinical skills and effects, had a positive impact on patient choice (Zhang et al., 2023). The need fulfillment dimension, security dimension and responsiveness dimension variables positively affect online patient consultation. Need fulfillment refers to the satisfaction of customer needs, a

reliable indicator of trust and satisfaction, patients need informational and emotional support (28). Safety means freedom from danger, risk and doubt, reflecting a good reputation and rich medical experience. Security can be a significant factor in the patient's choice of online consultation and plays a crucial role in building trust (36). Doctors with qualified and responsible information may be believed to provide a high level of service quality, influencing patients' decisions. Responsiveness refers to a service provider's ability to respond quickly to consumer requests and suggestions, and to provide support in the event of a problem. In the context of online health platforms, physician responsiveness is an essential metric that indicates consumers' (patients') impressions of the service provider's ability and willingness to respond to customers' (patients') requests (Liu et al., 2022). Physicians' quality (competence, benevolence, and integrity) can significantly affect patients' selection. As online healthcare community becomes an increasingly appealing channel for health, the frequency of the physician's quality information updating and the quality of online service are equally important to online physician-patient trust (Gong et al., 2021). Doctors are encouraged to enhance their technical competence to improve treatment effectiveness and adjust their communication methods to increase patient trust and sense of security.

Trust

Service attitude and trust had a significant positive influence on patients' choice (Zhang et al., 2023). Physicians' ability had a

significant positive influence on patients' cognitive trust in the physician; physicians' integrity and benevolence had a significant positive influence on patients' affective trust in the physician; cognitive and affective trust had a significant positive impact on patients' willingness to choose and there were significant positive interactions between affective and cognitive trust (Wan et al., 2020). The credibility theoretical model believes that trust is composed of the following three components: ability trust, benevolent trust, and integrity trust, and it also believes that these three components can explain most of the content of trust. Ability trust means that the trusted party has satisfactory professional skills and knowledge, benevolence trust refers to the fact that the trusted party is willing to provide services from the perspective of altruism, and integrity trust means that the trusted party enhances trust by providing real information (29).

Patient perception

Patients' perceptions of physicians' competence and warmth had a positive effect on decision-making. Perceptions of warmth and competence mediate the relationship between facial attractiveness and willingness to choose. Smile, physicians' age, wearing glasses and physician's skin status also positively affects patients' choices. Physicians' smiles weakened the positive effect of perception on decision-making (Bai et al., 2024). Physician's professional capital strengthens the effect of beauty, smile and skin status on patients' choices (Ouyang and Wang, 2022). The negative relationship between the facial attractiveness of doctors and the number of visits to their homepage

by users, only holds true for male surgeons and female internal medicine doctors, not for female surgeons or male internal medicine doctors (Zhang et al., 2024). These findings suggest the possible presence of gender-specialty bias in the influence of facial attractiveness on patients' decision-making.

Word-of-mouth

Word of Mouth is the verbal exchange of information between consumers without commercial intent. It plays an important role in influencing consumer choice and branding. Online WOM positively influenced patients' choice behavior, and disease risk had a moderating effect (31). Both internal and external WOM had a positive impact on patients' choice of physicians; there was a significant positive interaction between internal and external WOM. Physician position ranking significantly enhanced the impact of internal WOM, while it weakened the impact of physician recommendations on patient choice of physician (25). A physician's prosocial behavior improves a patient's choice only when the strength of a physician's prosocial behavior is below the tipping point. In addition, the influence of a physician's prosocial behavior is heterogeneous for physicians with different online WOM and professional titles. For physicians with higher online WOM, the effect of a physician's prosocial behavior on patient choice is positive, while for physicians with lower online WOM, a physician's prosocial behavior has no effect on patient choice (35).

Illness severity

Severity of illness is the strongest determinant of choice of healthcare setting. Patients do not think about access and cost, and sometimes even about quality, when they are in an emergency situation where any delay would result in serious problems or even death. Therefore, an experienced provider (in this case, a physician) plays the decisive role in a patient's choice. Disease risk was positively associated with patients' choice of doctor online. A high-risk disease positively moderates the relationship between online reputation and patients' e-consultation choice. Thus, market signals amplified the effect in the case of high-risk diseases (Shah et al., 2021). Severity of disease played a moderating role by decreasing the influence of professional status on a severely ill patient. In addition, we found that severity of illness negatively moderated the proxy relationship between professional status and service feedback on a patient's choice (Yang et al., 2021).

Patient Choice: A Conceptual Model Influencing Factors of Patient Choice in Online Medical Markets

The literature explores several influencing factors of patient choice in online medical markets within a single framework (Figure 2). This paper attempted to propose conceptual model influencing factors of patient choice in online medical markets by establishing the relationships among seven key constructs.

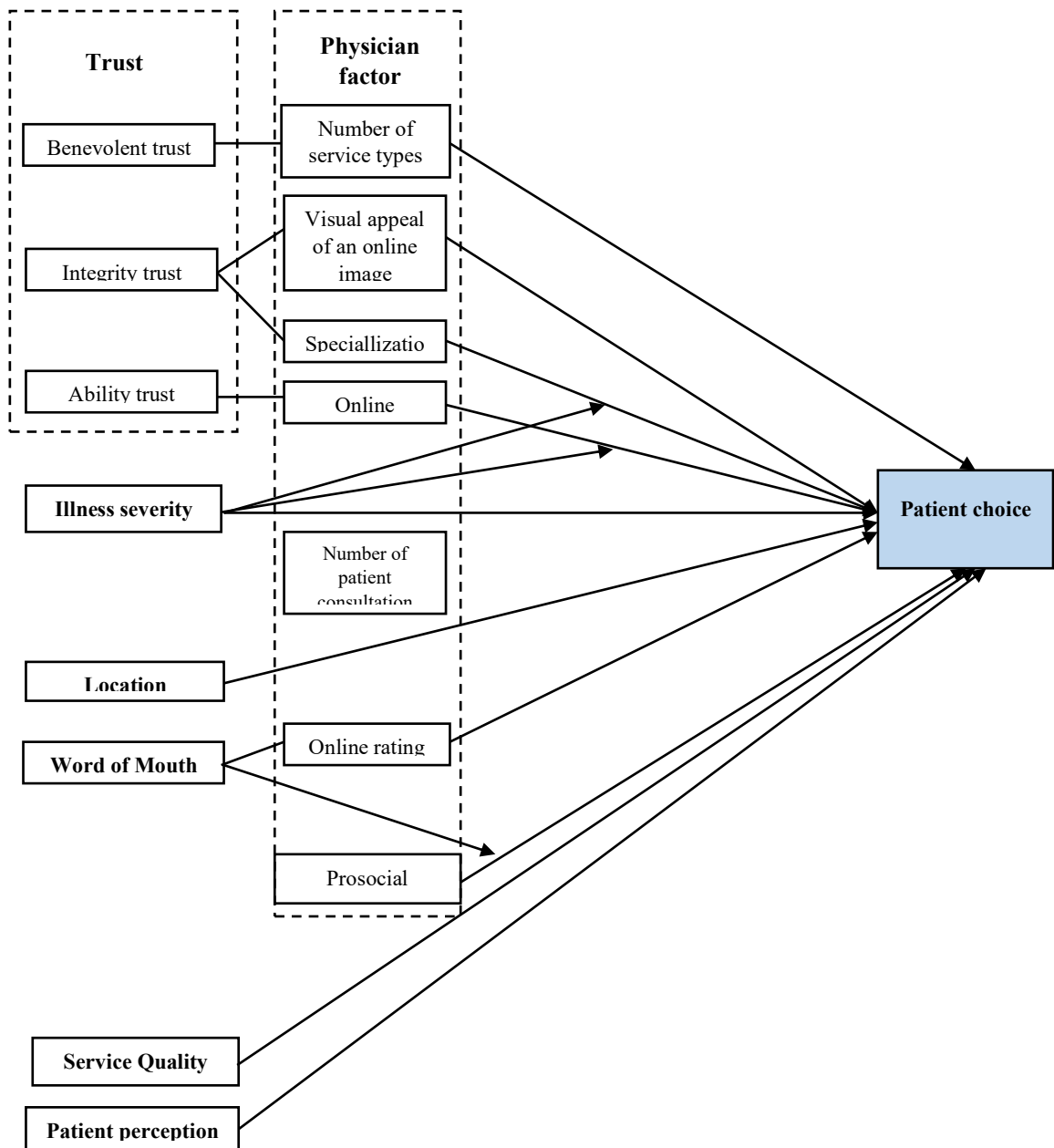


Figure 2. A conceptual model influencing factors of patient choice in online medical markets

The conceptual model shows the significant positive direct impact of physician image (including physician visual appeal/online image, online reviews, online rating, specialization, number of service types, number of patient consultants and physician's prosocial behavior on patient choice), location, service

quality, patient perception and illness severity. Trust is composed of the following three components: ability trust, benevolent trust, and integrity trust, and it also believes that these three components can explain most of the content of trust. Ability explain physicians' online review including the number of published articles, title and

introduction. Benevolence trust including the number of service type. Integrity trust explain the visual appeal of an online image (including online image, avatar in the doctor's personal information and professional fields) and specialization. Location of physicians defined the geographic distance between doctors and patients is negatively associated with online service utilization, patients and doctors tend to locate in the same prefecture and in the same province. Perceptions of warmth and competence mediate the relationship between facial attractiveness and willingness to choose. Severity of illness played a moderating role by decreasing the influence of professional status on a severely ill patient. Patients do not think about access and cost, and sometimes even about quality, when they are in an emergency situation where any delay would result in serious problems or even death. Online WoM positively influenced patients' choice behavior, and disease risk had a moderating effect, it plays an important role in influencing consumer choice and branding.

Limitation

Several limitations of our study have been identified. The

literature has been reviewed for characteristics that may be relevant to patient choice in online medical markets, and it is likely that there are other relevant factors that have not been included. These unobserved factors may not only reduce the explanatory power of the model, but may also confound the association of some of the observed factors that were included.

Conclusion

Our findings offer valuable insight into the role of several factors that influence patient choice in the online medical market. Seven main factors of patient choice in the online medical market such as physician factors, service quality, location, trust, WoM, patient perception and illness severity. Our study recommends that doctors should improve their medical skills, manners, appealing channel for health, actively publicize, increase the number of online consultations appealing channel for health, the frequency of updating the doctor's quality information and show their professional level to provide better service. The quality of online service are equally important to online doctor-patient trust and thus improve their influence.

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