



## RESEARCH ARTICLE

## Exploring the Impact of Medical Science Articles by Physicians on Their Online Consultation Volume in Online Health Community: The Mediating Role of Paid Feedback

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ARTICLE INFO	ABSTRACT
Received: Jul 16, 2024	<p>In recent years, the development of information technology triggered the emergence and blossom of online health community (OHC). Online economic returns are important motivation for physicians to participate in community activities, which contributes to the continuous prosperity of OHC. The current research on physicians' online returns was primarily based on objective data from patients' perspective. However, few studies have explored how doctors can initiatively make online efforts to improve their online performance. This study examined the impact of medical science articles posted by physicians on their online consultation volume. Further, this study tried to explain this influential mechanism by introducing the mediating role of paid feedback. Data of 995 hepatitis B physicians was collected from a leading online health community in China. Research model was proposed and ordinary least square (OLS) model was used to test research hypotheses. The empirical results verified that medical science articles posted by physicians positively impact their online consultation volume, and paid feedback played partially mediating role in the relationship between medical science article by physicians and their online consultation volume. This study contributes to the literature on factors influencing physicians' online returns and encourages physicians to initially make online efforts to increase their income. This study also guides patients to choose physicians and provide implications for platform managers to design the layout of website.</p>
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### INTRODUCTION

With the development of information technology, online health community (OHC), as an important channel for patients to communicate with physicians to obtain treatment and related medical information, has made rapid progress (Yang and Zhang, 2019). The emergence of OHC breaks limits of time and place when patients seek medical treatment, which helps save time and travel costs. In addition, patients can enjoy better medical resources than before by consulting physicians from advanced hospitals in developed cities in OHC at any time. Therefore, OHC helps alleviate uneven distribution of medical resources.

In online health community, physicians play a significant role in the success of online health communities (OHCs) (Li *et al.*, 2020). Online economic returns are important motivation for

physicians to participate in community activities, which contributes to the continuous prosperity of OHC. Therefore, numerous studies have been done on exploring factors that can improve physicians' online performance. The current research on physicians' performance was primarily based on objective data from patients' perspective, such as physicians' professional titles (Yang *et al.*, 2020), online ratings (Wei and Hsu, 2022), eWOM (Pal *et al.*, 2023; Aderibigbe *et al.*, 2024), online reviews (Li *et al.*, 2023), etc. However, few studies have explored how doctors can take initiatives and make online efforts to improve their online performance.

Physicians not only provide paid services like online consultation by text, telephone or video, but they can also perform prosocial behavior, such as sharing medical science articles and videos, diagnosing patients on live for free. It takes physicians personal time and energy to post medical science articles, which helps patients learn about their professional skills, service attitudes, willingness to help patients. According to signaling theory, patients are more inclined to consult those physicians. Following this line, this study is interested in exploring the role of medical science articles post by physicians on their online performance.

Another perspective ignored by current OHC literature is the underling influential mechanism of the effect of medical science articles on their online performance. Wang *et al.* (2022) investigated the heterogeneity of physicians with high/low WOM/title would influence patients interpret physicians' publishing medical science articles. Liu *et al.* (2022) investigated the impact of popular science articles on their performance from the physicians' perspective in terms of surface and content features. However, they ignored the role of paid feedback in the relationship between physician-posted medical science articles and their performance. When patients interpret physicians' online effort from the medical science articles, they can send virtual gifts to show their gratitude. On the other hand, the reliability of paid service feedback makes the number of virtual gifts a strong signal for other patients to make consultation decision, raising the possibility of being selected. Following this line, it is reasonable to infer that the paid feedback plays a mediating role between medical science articles and their online performance.

In conclusion, the goal of this study is to examine how the physician-posted medical science articles would impact their online performance, and whether paid feedback would mediate the relationship between medical science articles and online performance.

## **2. Theoretical Background and Hypotheses**

### **2.1 Online Health Community**

Online health community (OHC) is physician-patient interaction platform in the telemedicine era. Physicians provide online medical services in OHC. Patients can search information about hospitals and physicians, make outpatient appointment online, and consult physicians through text and pictures, telephone, or video. What's more, OHC also provides feedback approach for patients, such as electronic voting, virtual gifts and online reviews, which reduces the information asymmetry between physicians and patients, facilitates patients to select the right physician from the large amount of information, and effectively urges physicians to improve their professional level and service attitudes.

The main participants of OHC are physicians, patients and platforms. According to the main participants, OHCs can be divided into three types, namely, the physician-physician interaction mode, the patient-patient interaction mode and the physician-patient interaction mode. The main participants of the physician-physician interaction mode are medical workers and researchers, such as Medscape, Practice Fusion, Dingxiang Garden (Li *et al.*, 2023; Ashaari *et al.*, 2023), where physicians can exchange professional knowledge, search literature and improve professional level. Patient-patient interaction mode involves patients with similar disease, such as Patients Like Me, Slow Friends, where patients share their medical experience and obtain emotional support. The main

function of the physician-patient interaction mode is that physicians provide patients with online medical service, such as Zoc Doc, YiXinLi, Good Physician Online, Chunyu Physician, Wephysician, Ali Health and so forth (Zhou et al., 2020; Jadoon et al., 2024). This paper focuses on physician-patient interaction websites.

In recent years, the government has promoted the participation in deploying new information technologies like 5G, big data, and artificial intelligence in healthcare, leading to rapid growth in China's internet healthcare market. According to the 2024 China Internet Healthcare Industry Market Prospect Forecast Research Report by the China Business Industry Research Institute, the market size reached 309.9 billion yuan in 2022, a 39% increase from the previous year.

## 2.2 Signaling theory

Spence (2002) introduced signaling theory for the first time by examining information asymmetry in the labor market, which helps us understand people's behavior when they lack information about commodity quality or service capability. Signaling theory includes three components: signal, signaler, and receiver, as well as three stages: signaling stage, processing stage and feedback stage.

Signaling theory has been widely used in various management fields, including organizational and strategic management, human resource management and marketing management. In the context of OHC, patients often lack professional medical knowledge, placing them at a disadvantage. This theory suggests that physicians can provide signals to patients, reducing information asymmetry and increasing their likelihood of being chosen by patients.

In OHC, physicians write medical science articles to help patients understand their disease and treatment plan. Similar to typical knowledge sharing behavior in online information sharing platform, publishing medical science articles in OHC would reduce information asymmetry between physicians and patients. In addition, this behavior conveys information about physicians' professional expertise and willingness to help patients (Wang *et al.*, 2022). Therefore, we consider the writing free articles as a positive signal.

## 2.3 Reciprocity theory

The theory of social exchange elaborates on the social behavior of resource exchange between two individuals in the process of interaction (Emerson, 1976). Reciprocity theory, first proposed in the field of knowledge sharing, is an important part of social exchange theory (Wu *et al.*, 2006). It initially refers to the motivation of people who master knowledge to share information only when they would get corresponding returns from the recipient (Kankanhalli *et al.*, 2005). According to Wu *et al.* (2006), reciprocity theory is defined as a set of socially accepted trading rules in which one party provides resources to the other and obliges the other to return the favor. The reciprocity principle is the internal cause of continuous communication between people since people will always repay each other owing to the nature of mutual indebtedness within the principle (Chen and Hung, 2010). According to reciprocity theory, though prosocial behavior is altruistic and can cause loss, it will also bring benefits, which may be immediate or sometimes delayed.

Drawing on the above knowledge, writing free articles is a typical activity that follows reciprocity theory in the context of OHC. Physicians sacrifice personal rest time and energy to share health articles, which cannot bring immediate returns. When patients select physicians in OHC, it is difficult to make consulting decision due to the huge amount of information online and limited health literacy. At this time, patients can learn the physicians' professional expertise and service attitudes. Without doubt, patients would like to choose physicians who have published medical science articles frequently to consult. Thus, physicians are belatedly awarded financial and reputation returns. Based on signaling theory and reciprocity theory, we proposed the following hypothesis:

H1: The number of medical science articles posted by physicians positively impact their online volume.

## 2.4 Gift theory

Gift exchange plays a vital role in social interactions. Gift theory, which involves the norm of reciprocity and explains why gift givers frequently receive return gifts, provides a suitable theoretical basis for this study (Peng *et al.*, 2020). Gifts can be divided into affective and instrumental gifts based on different motives. Affective and instrumental gifts are defined as having “emotional expression” and “utilitarian purpose,” respectively. Patients buy virtual gifts mainly to show gratitude to physicians. Peng et al (2020) investigated the impact of gift giving on physicians’ service quality by analyzing the dynamic physician-patient interaction processes. Jing et al (2019) explored the effect of monetary incentives on physician prosocial behavior.

In the context of OHC, when patients learn useful information from physician-posted medical science articles, they can give small monetary gifts, typically worth about 10 Chinese Yuan (approximately \$1.50), to physicians as an expression of gratitude (Zhang *et al.*, 2018). For example, on Haodf.com, one of the largest platforms in China, more than 2 million patients have given approximately 4.1 million virtual gifts to physicians as of June 2021 (Zhao *et al.*, 2020). This online gift-giving feature is a modern iteration of an age-old custom in China. Under this circumstance, the virtual gifts belong to emotional gifts. Based on the analysis, we propose the following hypothesis:

H2: The number of physician-posted medical science articles positively impact the number of virtual gifts from patients.

On the other hand, paid feedback can improve the reliability of service feedback and reduce the proportion of false information because it increases the cost for feedback providers. Consequently, paid feedback is a strong signal that would be captured by patients (Yang and Zhang, 2019), increasing the possibility of being chosen. Based on signaling theory and gift theory, we proposed the following hypothesis:

H3: The number of virtual gifts positively impact physicians’ online consultation volume.

Combined with H1, H2 and H3, we propose the following hypotheses:

H4: The number of virtual gifts plays a mediating role in the relationship between the number of medical science articles by physicians and their online consultation volume.

Based on the analysis above, we present the conceptual model for this study, as is shown in Figure 1.

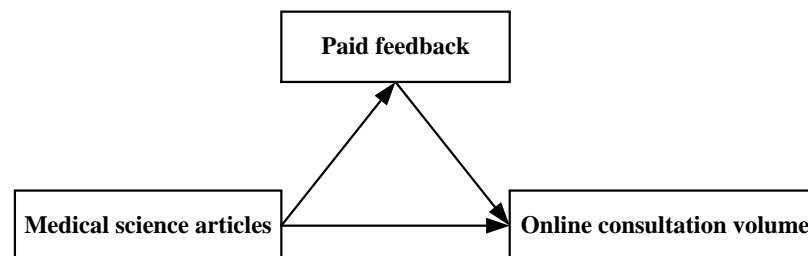


Figure 1 Conceptual model

## 3. DATA AND METHODOLOGY

### 3.1. Data description

The research context of this thesis was Haodf.com, a leading online health community in China. Established in 2006, Haodf.com has attracted about 910,000 physicians from more than 10,000

hospitals in large cities by July 2023. Among them, 280,000 doctors registered on the platform with their real names to provide online medical services directly to patients. In addition, doctors from Grade III Class A hospitals account for 73 percent, indicating a high authority for medical services. As of July 2023, Haodf.com has served more than 84 million patients. It has been widely trusted by doctors and patients.

A java-based web crawler was developed to collect data of hepatitis B physicians on Haodf.com. Excel and Stata 16 were used to clean the data. Finally, we collected data including 995 physicians.

### 3.2 Measurement

#### 3.2.1 Dependent variable.

The dependent variable is online consultation volume (*ConVol*), measured by the total number of patients who have consulted the physician (Ouyang and Wang, 2022; Wang *et al.*, 2022; Xing *et al.*, 2019).

#### 3.2.2 Independent variable

The independent variable is the number of medical science articles (*ArtNum*).

#### 3.2.3 Mediating variables.

The mediating variable is paid feedback, measured by the number of virtual gifts from patients (*Gift*).

#### 3.2.4 Control variables

For the control variables, the hospital level (*HosLev*) is measured by the level of hospital physician works in (1 represents Grade III Class A hospital; 0 otherwise). Professional title (*Title*) is measured by the physician's professional title (1 represents chief physician; 0 otherwise). Online rating (*Rating*) is measured by the score generated automatically by system (the value ranges from 0 to 5). Offline appointment service (*Off*) is measured whether the physician provide outpatient appointment service (1 represents providing; 0 otherwise). Consultation price (*Price*) is measured by written consultation price. Total access volume (*Access*) is measured by the number of visits to personal homepage. These variables have been verified to have impact on patients' choice. Therefore, they should be controlled to eliminate cumulative effects.

### 3.3 Empirical model

We used ordinary least square (OLS) to test our hypotheses. To address the issue of large variances and the problem of the zero values, we use the form of logarithms of (variable+1) (Li *et al.*, 2019). We developed the following formulas to estimate the main effect and mediating effect (Wen and Ye, 2014).

$$\ln ConVol = \alpha_0 + \alpha_1 \ln ArtNum + \alpha_2 C + \varepsilon_1 \quad (1)$$

$$\ln Gift = \beta_0 + \beta_1 \ln ArtNum + \beta_2 C + \varepsilon_2 \quad (2)$$

$$\ln ConVol = \gamma_0 + \gamma_1 \ln ArtNum + \gamma_2 \ln Gift + \gamma_3 C + \varepsilon_3 \quad (3)$$

where,  $\alpha$ ,  $\beta$  and  $\gamma$  parameters are the coefficients to be estimated.  $\varepsilon_1$ ,  $\varepsilon_2$  and  $\varepsilon_3$  are the error terms.  $C$  stands for control variables.

## 4 ANALYSIS AND RESULTS

### 4.1. Descriptive statistical analysis

Stata 16 was used to analyze the data. Table 2 offers the results descriptive statistics for all the variables involved in this study. As can be seen from the information of hepatitis B physicians, the maximum value of consultation volume is 44192, while the mean value is only about 1816, and the

standard deviation is about 3862, indicating that the degree of dispersion is large, and the data presents a left-skewed distribution. This also reflects that physicians' online consultation volume varies widely, while most physicians have great room to improve their online income. As independent variable, the average number of medical science articles is much lower than the maximum value, indicating that the individual effort of physicians varies greatly. The number of physicians who have enabled offline appointment service accounts for only 44.1%, meaning that more than half of them do not provide this service. The average value of professional title and hospital level are as high as 0.687 and 0.970 respectively, indicating that the majority of physicians registered in Haodf.com are of high quality.

**Table2 Descriptive statistics**

Variable	N	mean	sd	min	max
ConVol	995	1816.222	3861.982	0	44192
ArtNum	995	26.310	137.709	0	3576
HosLev	990	0.970	0.172	0	1
Off	992	0.441	0.497	0	1
Title	991	0.687	0.464	0	1
Rating	995	3.662	0.354	3.2	5.0
Price	955	41.004	61.971	0	900
Access	995	1556374	4981933	703	84659799
Gift	995	136.580	367.666	0	3683

#### 4.2. Correlation Analysis

We conducted correlation analysis for the key variables to test for the presence of multicollinearity between the variables.

**Table3 Correlations matrix**

variable	ConVol	ArtNum	HosLev	Off	Title	Rating	Price	Access	Gift
ConVol	1								
ArtNum	0.305	1							
HosLev	-0.055	-0.016	1						
Off	0.225	0.048	0.006	1					
Title	0.087	0.004	-0.007	-0.031	1				
Rating	0.553	0.150	0.005	0.346	0.110	1			
Price	0.329	0.095	0.030	0.231	0.069	0.331	1		
Access	0.770	0.409	-0.008	0.100	0.086	0.308	0.248	1	
Gift	0.800	0.419	0.006	0.186	0.052	0.557	0.319	0.722	1

The largest value in the correlations matrix is 0.800. Variance inflation factor (VIF) is a measure of the severity of multicollinearity in a multiple linear regression model. It represents the ratio of the variance of the estimated regression coefficients to the variance of the regression coefficients between the independent variables that are not linearly correlated (Slinker *et al.*, 1985). To verify whether there is multicollinearity issue in this thesis, Variance Inflation Factor (VIF) statistics were calculated by Stata 16. The results of VIF test are shown in Table 4.

**Table 4 VIF test**

Variable	VIF	1/VIF
Gift	2.99	0.334741

Access	2.23	0.448688
Rating	1.7	0.58703
ArtNum	1.26	0.79338
Title	1.19	0.841751
Off	1.16	0.858867
Price	1.03	0.972301
HosLev	1	0.998375
Mean VIF	1.57	

The variance inflation factor (VIF) statistic for each variable is not greater than 10. According to the standard suggested by Hair *et al.* (1995), there is no significant multicollinearity among the variables (Deng *et al.*, 2019).

### 4.3. Regression Results

This study employed OLS regression to estimate the data and the hierarchical linear regression results are shown in Table 5. Model 1 only includes control variables. The results reveal that enabling offline appointment, online rating, consultation price and access volume all have a significant positive impact on physicians' consultation volume. In general, the high price of items has significant negative impact on consumers' desire to purchase in the marketing field. While in the context of OHC, patients often use price as a signal of service quality when facing uncertainty before making decisions. Since the service quality of physicians can influence patients' health and even life, they are willing to pay higher prices for physicians who are able to reduce their perceived risk and induce trust (Wu and Lu, 2018).

Model 2 adds the explanatory variable compared to model 1. The regression results show that there is a significant positive impact of medical science articles by physicians on their online consultation volume,  $\beta = 0.629$ ,  $p < 0.01$ , and H1 is verified. The more medical science articles physicians publish, the greater online consultation volume they will obtain.

Model 3 changes the explained variable to the number of virtual gifts. The results show that a significant positive impact of medical science articles on physicians' online consultation volume,  $\beta=0.526$ ,  $p<0.01$ , and H2 is validated. The more medical science articles physicians publish, the more virtual gifts they will receive from patients.

Model 4 adds the number of virtual gifts as an explanatory variable to model 2, and the results show a significant positive impact of virtual gifts on physicians' online consultation volume,  $\beta=0.982$ ,  $p<0.01$ , and H3 is validated. The more virtual gifts physicians receive, the greater online consultation volume they will obtain. What's more, the impact of medical science articles on physicians' online consultation volume is also significant,  $\beta=0.112$ ,  $p<0.01$ . Following the guidance of Wen and Ye (2014), combined with the results of model 2 and model 3, we can conclude that the number of virtual gifts plays a partially mediating role in the relationship between medical science articles by physicians and their online consultation volume, supporting H4.

**Table 5 Regression Results**

	(1)	(2)	(3)	(4)
Variable	lnConVol	lnConVol	lnGift	lnConVol
HosLev	-0.967***	-0.674**	-0.359	-0.322*

	(-2.837)	(-2.248)	(-1.496)	(-1.732)
Off	1.243***	0.930***	0.643***	0.298***
	(9.587)	(8.054)	(6.955)	(4.078)
Title	0.043	-0.052	-0.207**	0.152**
	(0.328)	(-0.454)	(-2.267)	(2.144)
Rating	2.061***	1.341***	1.720***	-0.348***
	(10.768)	(7.729)	(12.381)	(-3.010)
Price	0.004***	0.003***	0.003***	0.000
	(3.798)	(3.198)	(3.802)	(0.335)
Access	0.000***	0.000***	0.000***	-0.000
	(8.868)	(4.775)	(6.880)	(-1.004)
lnArtNum		0.629***	0.526***	0.112***
		(16.680)	(17.430)	(4.180)
lnGift				0.982***
				(38.903)
_cons	-1.796**	-0.173	-4.160***	3.912***
	(-2.395)	(-0.260)	(-7.803)	(9.211)
N	943	943	943	943
r <sup>2</sup>	0.402	0.539	0.614	0.824
r <sup>2</sup> <sub>a</sub>	0.398	0.535	0.611	0.823

*t* statistics in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 5 Robustness test

To enhance the reliability of the findings, this study conducted three different methods to verify whether consistent conclusions could be drawn.

### 5.1 Replacement of regression model with Poisson regression

In Poisson regression, the dependent variable should be a non-negative counting variable (Hu *et al.*, 2021). Therefore, we replaced the dependent variable *lnConVol* with its original form *ConVol*. The results in table 6 are consistent with that of OLS regression.

**Table 6 Robustness check using Poisson regression**

	(1)	(2)	(3)
variable	ConVol	Gift	ConVol
HosLev	-0.432***	0.123***	-0.464***
	(-125.129)	(7.411)	(-134.315)
Off	0.279***	0.199***	0.062***
	(161.475)	(31.576)	(36.335)
Title	0.018***	-0.207***	0.143***
	(9.765)	(-31.239)	(77.671)
Rating	0.909***	1.258***	0.025***
	(555.190)	(220.159)	(13.732)
Price	0.001***	0.002***	0.000***
	(165.742)	(60.358)	(16.019)
Access	0.000***	0.000***	0.000***
	(525.705)	(149.752)	(149.140)



lnArtNum	0.297***	0.337***	0.031***
	(606.143)	(185.670)	(56.804)
lnGift			0.675***
			(896.033)
_cons	3.361***	-1.133***	4.547***
	(489.616)	(-42.302)	(674.479)
N	943	943	943

*t* statistics in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 5.2 Replacement of measurement indicator for control variable

We replaced the control variable consultation price (Price) with the telephone consultation price (TPrice). The results in table 7 are consistent with our main results, indicating the robustness of our findings.

**Table 7 Robustness checking using alternative measurement indicator**

	(1)	(2)	(3)
variable	lnConVol	lnGift	lnConVol
HosLev	-0.281	-0.090	-0.211
	(-1.093)	(-0.348)	(-1.325)
Off	0.418***	0.364***	0.133**
	(4.235)	(3.670)	(2.160)
Title	0.242**	-0.071	0.298***
	(2.439)	(-0.709)	(4.852)
Rating	1.208***	1.615***	-0.057
	(8.784)	(11.690)	(-0.612)
TPrice	0.015***	0.014***	0.004
	(3.891)	(3.662)	(1.618)
Access	0.000***	0.000***	0.000
	(5.501)	(6.000)	(1.230)
lnArtNum	0.442***	0.463***	0.079***
	(13.330)	(13.897)	(3.418)
lnGift			0.784***
			(33.055)
_cons	0.806	-3.604***	3.630***
	(1.501)	(-6.687)	(10.605)
N	681	681	681
r <sup>2</sup>	0.548	0.588	0.828
r <sup>2</sup> <sub>a</sub>	0.543	0.584	0.826

*t* statistics in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 6 DISCUSSION

### 6.1 Key Findings

This study investigated the effect of medical science articles posted by physicians on their online consultation volume. The empirical results reveals that the number of physician-posted medical

science articles positively affects their online consultation volume. The credence feature of medical service results in serious information asymmetry (Dulleck and Kerschbamer, 2006). In general, physicians mainly concentrate on their own field to write medical science articles about the same topic, which delivers positive signal about their professional expertise. It reduces information asymmetry to a great extent and increases perceived trust of patients on physicians. Thus, patients are inclined to choose physicians who publish more medical science articles.

Additionally, this study examined the mediating role of paid feedback in the relationship between medical science articles posted by physician and their online consultation volume. In online health community, physicians spend time and energy to write medical science articles which is not work-related (Li *et al.*, 2020), which shows their service attitude and great willingness to help patients. Patients who interpret the information conveyed in the signal would be motivated to buy virtual gifts to show gratitude. On the other hand, paid feedback, as a strong signal showing that the physicians with more virtual gifts are more professional and have good service attitude towards, would increase the possibility of being selected of physicians. Based on gift theory and our empirical results, paid feedback plays a partially mediating role in the relationship between medical science articles and physicians' online consultation volume.

## **6.2. Research Contribution**

### **6.2.1. Theoretical Implications**

This study provides theoretical contributions mainly in the following aspects. First, this study enriches the literature in online health community field. Second, this study contributes to the study on factors impact physicians' online consultation volume. It verified medical science articles posted by physicians can positively influence their online consultation volume. At last, this study proposes a new perspective to explain the influential mechanism of medical science articles on physicians' online consultation volume. It empirically tested that paid feedback partially mediates the relationship between medical science articles and physicians' online consultation volume, providing a new perspective to understand the influential mechanism.

### **6.2.2. Practical Implications**

The findings of this study have practical implications for all three parties, physicians, patients, and platforms in online health community.

This study provides important implications for physicians, apart from performing paid online consultation that is work-related, they should spare time to publish medical science articles that is not work-related to show their professional expertise and service attitude. Our study guides physicians on how to make online efforts initiatively.

This study also has realistic implications for patients. According to the findings of the study, the number of virtual gifts would positively impact the number of medical science articles by physicians. The medical science articles can help patients learn about the physician's professional skills and service attitudes, understand their disease and treatment plan. Therefore, they are suggested to send virtual gifts to motive physicians to make effort to engage in information sharing activity.

This study also has implications for platform managers in online health community. In this circumstance, the type of gift would change from affective gifts to instrumental gifts. The platform should encourage physicians to spare more time and energy to write medical science articles, which can not only improve patients' health literacy level, but also increase personal online performance. Besides, platform managers should design the module of popular science column as one of the most important parts of online health community, and then put the gift-giving button in a more apparent position to encourage patients to buy virtual gift. This will help improve physicians' online returns and further help the platform prosper sustainably.

### 6.3. Limitations

There are some limitations in this study. First, we only focus on the quantity of medical science articles, while ignored the quality of the articles, which may play important role in measuring how hard the physicians work online. In the future, we can use the number of likes or reading volume of the articles to investigate the impact of the quality of medical science articles on physicians' online volume. Second, we only collect a cross-section data for empirical analysis. According to reciprocity theory, the medical science articles may have lagged effect on physicians' online consultation volume. We plan to collect several stages of cross-section data and integrate to panel data, aiming to examine the robustness of our findings under the lagged effect.

## 7 CONCLUSION

Guided by signaling theory, reciprocity theory and gift theory, this study investigated the impact of medical science articles posted by physicians on their online consultation volume in online health community. Additionally, this study tried to explain the influential mechanism by exploring the mediating role of paid feedback. Then the conceptual framework was developed and stata 16 was used to test hypotheses using real data from Haodf.com. The empirical results verified that physician-posted medical science articles positively impacts their online consultation volume, and paid feedback partially mediates the relationship between physicians' free articles and their online consultation volume. Our findings are important for all the participants in online health community. Physicians are suggested to make efforts to publish medical science articles in order to improve their online income. Platform manager should design the layout to make full use of popular science column module. However, this study also has some limitations. In the future, we will introduce the quality of medical science articles by physicians to test the robustness of our findings using panel data.

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