Effect of Doctor–Patient Interaction on Value Cocreation: Mediating Effect of Trust

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Abstract

Background: Research on the effect of the doctor–patient interaction on value cocreation is limited; the established model can provide practical implications for hospital management. **Aim:** Was to investigate whether trust has a mediating effect on the relationship between doctor–patient interaction and value cocreation. **Methods:** We applied a cross-sectional design and selected 617 doctors practicing Western medicine in Hualien County, Taiwan, as the study participants. From September to December 2017, structured questionnaires were distributed, and 152 valid responses were returned (return rate, 24.64%). **Results:** Doctor–patient interaction had a significant positive effect on value cocreation ($\beta=0.548$, $p<0.001$). Trust was a crucial factor in that it had a significant mediating role in the effect of doctor–patient interaction on value cocreation ($\beta=0.417$, $p<0.001$). **Conclusion:** Enabling patients and medical service providers to adequately understand information related to the input and output processes of medical services and encouraging them to collaborate for value cocreation can engender a comprehensive disease diagnosis and treatment system; such a system can improve the quality of medical services.

Keywords: Doctor–patient interaction; Trust; Value cocreation

Introduction

The doctor–patient relationship refers to the interpersonal interaction between a doctor and a patient [1], and it is a multidimensional social relationship [2]. This interaction differs considerably between Eastern and Western cultures. In the conventional care model, treatment methods are mostly determined by the medical personnel. Most patients either passively accept the treatment decision or seek a second opinion; they rarely have interactive discussions with their doctors. By contrast, patients currently play an active role in the maintenance and improvement of their health. The relationship between health care providers and patients is no longer authoritarian but rather involves shared rights and responsibilities [3,4]. Davis et al. [5] proposed a vision of patient-centered care in 2020; this vision emphasizes that hospitals should place more emphasis on the rights of patients, involvement of patients in the treatment process, provision of adequate medical information, coordination of medical teams, and comprehensiveness of care. Additionally, medical service providers should provide follow-up of patients through subsequent hospital revisits and provide education through public health and medical information dissemination. This should be the development direction of medical care, which can create a close doctor–patient interactions and a high-quality medical care environment [6].

The word "trust" is widely used in various domains of knowledge, and it is a crucial construct for investigating the management of the relationships between doctors and patients [7,8]. Trust is a major factor affecting the relationship between care providers and care receivers [9]. Trust can be divided into two dimensions: credibility and benevolence. Credibility refers to the perceived intention and ability of people to make promises to one another. Benevolence refers to a person's inherent willingness to sacrifice his or her own interest to maintain his or her partner's benefit. Medical services are highly professional. Most patients cannot identify the quality of medical services, and their trust on doctors becomes their critical basis for quality evaluation [10-12]. The relationship between doctors and patients in medical services is a mutual trust relationship established thorough continual service encounters. If the medical personnel hope the patients will continue to seek their support or will recommend them to others, then they must establish a favorable relationship with the patients on the basis of their medical professions to increase their level of trust [9,13]. Studies have suggested that a higher trust level between doctors and patients usually leads to a higher quality of life and more favorable health outcomes [14-16]. This is primarily because a patient who trusts his or her doctor demonstrates great adherence to the doctor's orders [17-19].

Several scholars have emphasized the cocreation and interaction aspects of value creation [20-23]. Value creation can only be achieved through cooperation from both parties and their investment in various production resources [23,24]. Accordingly, value cocreation relies on not only the efforts of medical professionals but also the cooperation and efforts of individuals (patients and their family members). Currently, consumers (patients or medical service recipients) can actively

participate in decision-making processes and are no longer passive receivers of medical services. [25,26]. That is, both parties participate in value cocreation [27].

Overall, although a reasonable amount of research has been conducted on doctor–patient interaction in Taiwan, research on the effect of the doctor–patient interaction on value cocreation is limited. Therefore, the objective of this study is to establish a model to examine the effect of doctor–patient interaction on value cocreation.

Materials and Methods

Participants

In total, 617 doctors in Hualien County, Taiwan, participated in this study. We distributed structured questionnaires to the doctors, and 152 valid responses were returned (return rate, 24.64%).

Research tools

We applied the questionnaire method and collected data through structured questionnaires. The questionnaire was designed by considering the study objective. The content of the questionnaire was organized into two parts. The first part entailed collecting the participants' demographics, such as their gender, age, education level, religious belief, years of practice, and amount of medical service provided (e.g., average number of patients examined or average number of inpatients examined per month). The second part involved a scale measuring doctor–patient interaction, trust, and value cocreation. Participants' agreement with the questionnaire items was measured using a 5-point Likert scale with anchors ranging from 5 (*strongly agree*) to 1 (*strongly disagree*). The Cronbachs' α values for interaction, trust, and value cocreation were 0.961, 0.934, and 0.978, respectively. Regarding the overall reliability of empirical data obtained using the questionnaire, the Cronbach's α value was 0.968, indicating a relatively high degree of reliability for the data (Table 1).

Construct	Mean	SD	Cronbach's α
Interaction	4.053	0.483	0.961
Trust	4.098	0.515	0.934
Value co-creation	4.053	0.483	0.978

Table 1: Validity and average variable extracted.

Concerning validity testing, we conducted an expert validity test to measure content validity. We invited five experts and scholars to evaluate the validity of- and provide recommendations for the questionnaire. The questionnaire was modified according to their recommendations. Specifically, we clarified ambiguously defined questionnaire items to ensure the questionnaire's comprehensiveness. After the expert validity test, we calculated the content validity index (CVI) of the questionnaire. The average CVI value was 0.971, indicating our questionnaire to have favourable validity.

Statistical analysis

We used SPSS version 22.0 to analyze the data obtained after questionnaire distribution. Statistical analysis methods included reliability analysis, descriptive statistical analysis, correlation analysis, and regression analysis. We filtered invalid responses and analyzed valid responses, and then we utilized the appropriate statistical analysis method according to aforementioned study design. To avoid the problem of multicollinearity, we standardized the independent and mediating variables before data analysis.

Ethical approval

The study protocol was reviewed and approved by the Institutional Review Board of School of Show Chwan Memorial Hospital for review and approval (IRB 1031108)

Results

Descriptive statistics for each variable

Descriptive statistics revealed that the average value for interaction, as well as that for value cocreation, was 4.053 (SD=0.483). Moreover, the average value for trust was 4.098 (SD=0.515), which was the highest.

Sample representativeness analysis

The study sample comprised participants who provided valid responses. Among the participants, those working in internal medicine departments constituted the highest proportion (55.92%) of the sample. In addition, for age, participants aged 41–50 years constituted 38.16% of the sample. Regarding education level, participants with a master's degree constituted the highest proportion (65.79%) of the study sample. Furthermore, concerning religious belief, participants citing Buddhism and Taoism as their religion accounted for the highest proportion (53.95%) of the sample, followed by those citing Christianity and Catholicism (26.3%). Regarding gender, the sample comprised a higher proportion of female participants (55.92%). Moreover, 38.16% of the participants had 11–20 years of experience. Concerning the number of inpatients treated each month, 36.84% of the participants reported treating 11–30 patients, on average. Finally, concerning the number of outpatients treated per outpatient session, 46.05% of the participants reported treating 21–40 patients, on average.

The mentioned participant characteristics were compared using a chi-squared test according to age (p=0.433), education level (p=0.313), religious belief (p=0.110), gender (p<0.001), years of practice (p=0.140), average number of inpatients treated per month (p=0.309), and number of outpatients treated per session (p=0.907). Table 2 presents the results in detail.

Mediating effect of trust on value cocreation

In the control variables in the present study, we tested causal models involving independent, mediating, and dependent variables. To minimize problems engendered by multicollinearity, we developed a standardized coefficient and incorporated it into the regression equation. The details are provided as follows.

	Surgical medicine	%	Internal medicine	%	Total	%	X^2
Age							0.433
<40 Years	15	9.9	27	17.8	42	27.6	
41-50Years	27	17.8	31	20.4	58	38.2	
>51Years	25	16.4	27	17.8	52	34.2	
Education level							0.313
College	21	13.8	31	20.4	52	34.2	
Graduate school	46	30.3	54	35.5	100	65.8	
Religious belief							0.110
No	18	11.8	12	7.9	30	19.7	
Buddhism and Taoism	31	20.4	51	33.6	82	54	
Christianity and Catholicism	18	11.8	22	14.5	40	26.3	
Gender							0.001
Male	6	3.9	61	40.1	67	44	
Female	27	17.8	58	38.2	85	56	
Years of experience							0.140
<5 Years	11	7.2	14	9.2	25	16.4	
6-10 Years	10	6.6	25	16.4	35	23	
11-20 Years	31	20.4	27	17.8	58	38.2	
>21 Years	15	9.9	19	12.5	34	22.4	
Number of inpatients treated each month							0.309
<10	25	16.4	22	14.5	47	30.9	
11-30	23	15.1	33	21.7	56	36.8	
>31	19	12.5	30	19.7	49	32.2	
Number of outpatients treated per outpatient							0.907
<20	21	13.8	27	17.8	48	31.6	
21-40	32	21.1	38	25.0	70	46.1	
>40	14	9.2	20	13.2	34	22.4	

Table 2: Baseline characteristics (n=152).

To test the mediating effect of trust, we used the method proposed by Baron and Kenney [28] and conducted a regression analysis of independent (trust) and dependent (value cocreation) variables. According to the regression model (Table 3), interaction, the independent variable, had a significant positive effect on trust, the mediating variable (β=0.702, p<0.001). Moreover, according to Model 2, interaction, the independent variable, had a significant positive effect on value cocreation, the dependent variable (β=0.548, p<0.001). As revealed by Model 3, we assessed the mediating effect of trust on the relationship between doctor–patient interaction and value cocreation and determined the effect to be positive and significant (β=0.417, p<0.001). Finally, when trust was added to Model 4, doctor–patient relationship had no significant effect on value cocreation (β=0.063, p=0.6545), but trust still affected value cocreation (β=0.504, p<0.001), and this effect was positive and significant. The finding is consistent with the conditions of mediating effect proposed by Baron and Kenny [28]. When we compare the regression coefficients, the regression

coefficient of interaction was nearly zero, and the variable had not significant effect on value cocreation. This shows that trust has a complete mediating effect on the relationship between doctor–patient interaction and value cocreation.

Therefore, trust is a crucial influencing factor and mediating variable in doctor–patient interaction and value cocreation. Table 3 presents the results in detail.

Measure	Regression model							
	Independent variable							
	Trust		Value co-creation					
	Model 1		Model 2		Model 3		Model 4	
	Betavalues	tvalues	Betavalues	tvalues	Betavalues	tvalues	Betavalues	tvalues
Interaction	0.702	12.059***	0.548	8.028***	—	—	0.063	0.654
Trust	—	—	—	—	0.417	5.611***	0.504	5.251***
R^2	0.492		0.301		0.173		0.303	
Adj. R^2	0.489		0.296		0.168		0.293	
F values	145.418		64.451		31.483		32.316	
P values	<0.001		<0.001		<0.001		<0.001	
Note: ***p<0.01, **p<0.05, *p<0.1								

Table 3: Mediating effect of trust on value cocreation.

Discussion

The purpose of this study was to test whether trust is a mediating variable in the effect of doctor–patient interaction on value cocreation. The implications of and conclusions made on the basis of the study findings are provided as follows.

The study findings suggest that interaction had a significant positive effect on value cocreation. The concept underlying value cocreation is that it is achieved only when two parties collaborate closely [29,30]. As the saying goes, "Without interaction, none of the parties can move". Both parties should be able to reach a shared understanding gradually in order to achieve value cocreation within a reasonable time. Therefore, the process of value cocreation is similar to a chemical reaction; interaction is required to catalyse innovation and engender unexpected new values.

Our findings are consistent with those of Prahalad and Ramaswamy [31]. They proposed that value is created through interaction between businesses and consumers. Consumers can choose their role in this interaction process, and their choices give them different feelings and experiences. In the context of the current study, interaction provides patients with opportunities and channels to express their conditions to their doctors by using the language they are familiar with; subsequently, doctors should provide feedback to patients regarding medical information [32,33]. Because of the inseparability of medical processes, in which service and consumption occur simultaneously, a high level of interaction exists between patients and doctors. In most situations, patients must participate in service processes, and this thus engenders interactions between patients and medical service providers, which is favorable for value cocreation.

This study also provides evidence for the mediating effect of trust on doctor–patient relationship. Trust improves the interactions between doctors and patients. This increases patients' participation in treatment decision-making processes,

enabling the patients to determine the most appropriate treatment method through discussions with the doctors. Previous studies have reported that when a patient's trust in a doctor is higher, the patient's health outcomes are more favorable [34-37]. In other words, when the doctor–patient relationship is stronger, the effects of value cocreation are more favorable.

Study Limitations

Because of time, human resource, and material resource constraints, we selected doctors in only a single area for data collection. Therefore, the findings of this study may not be generalizable to doctors in other parts of Taiwan. Moreover, our data collection was limited to practitioners of Western medicine. Hence, the results may not be generalizable to all doctors.

Conclusion

In Taiwanese society, the relationship between doctors and patients is influenced by the increasing adoption of Western health care systems in Taiwan. However, advances in medicine have engendered numerous treatment and diagnostic instruments and techniques, and the systematization and commercialization of medical treatment have increased the distance between doctors and patients. Enabling patients and medical service providers to adequately understand information related to the input and output processes of medical services and encouraging them to collaborate for value cocreation can engender a comprehensive disease diagnosis and treatment system; such a system can improve the quality of medical services.

Recommendation

Future studies should conduct a nationwide survey to verify whether the results of the current study are applicable to other parts of Taiwan.

Acknowledgments

Author Contributions

Yu-Hua Yan initiated the research, collected data, conducted the analysis and wrote the manuscript. Chih-Ming Kung and Yu-Li Lan contributed to the design of the study, provided critical reviews of the manuscript and contributed to interpretation of the results.

Competing interests

None declared.

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