



Diabetes Treatment Satisfaction on Hospital Outcome through Patient Empowerment

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Abstract

This study examines the relationship between Patient Satisfaction with Diabetes Treatment and Hospital Reputation, with Patient Empowerment and Well-being acting as mediators. Additionally, this study includes Lifestyle as the moderating component. This quantitative, cross-sectional study employs a survey methodology using a structured questionnaire of respondents selected by quota sampling. A total of 160 respondents were obtained from two private hospitals. Data was analyzed using Partial Least Square-Structural Equation Modelling (PLS-SEM). Diabetes Treatment Satisfaction is assessed as a higher-order construct (HOC) consisting of dimensions of Patient Empowerment as a lower-order construct (LOC). The three LOCs are Patient Control, Patient Participation, and Patient Support. This study employs a disjoint two-step methodology. The research findings indicate a strong and positive relationship between Diabetes Treatment Satisfaction and Hospital Reputation mediated by Patient Empowerment and Patient well-being. The indirect effect is statistically significant (p -value < 0.05, CI 95%). The analysis also reveals a strong relation between Patient Well Being and Hospital Reputation ($\beta=0.842$, $f^2=2.427$). However, the Lifestyle variable did not substantially relate to the relationship between Diabetes Treatment Satisfaction and Patient well-being. This study model has been empirically validated to provide sufficient explanatory and predictive capacities for assessing hospital reputation.

Introduction

A recent study conducted by The Lancet indicates that the global prevalence of diabetes is projected to affect over 1.31 million individuals by the year 2050 (Lancet, 2023). This discovery highlighted the worldwide consequences of diabetes, resulting in changes to quality of life, death rates, and additional health issues (Sun *et al.*, 2021). The occurrence of diabetes in Indonesia has been consistently rising. The World Health Organization's report revealed that Indonesia ranks in the top 10 countries with the highest prevalence of diabetes, affecting a staggering 8.5 million individuals (WHO, 2022). Therefore, it is imperative to implement a more holistic approach to treating diabetes patients, focusing on enhancing

private hospitals' role in empowering patients.

The healthcare providers mirror the substantial transformation taking place over the years. 4 This fosters an intricate and ever-changing perspective in the healthcare sector, particularly in patient empowerment. Patient empowerment aims to provide patients with information, assistance, and self-assurance, enabling them to engage and collaborate actively in health-related decisions (Mogueo & Defo, 2022). The deployment of this context in patient care within the healthcare business significantly relates to the quality of life and life expectancy of individuals, as well as enhances the quality of medical care and patient satisfaction (Stampe *et al.*, 2021). Patient empowerment is continuously growing, with healthcare providers and patients

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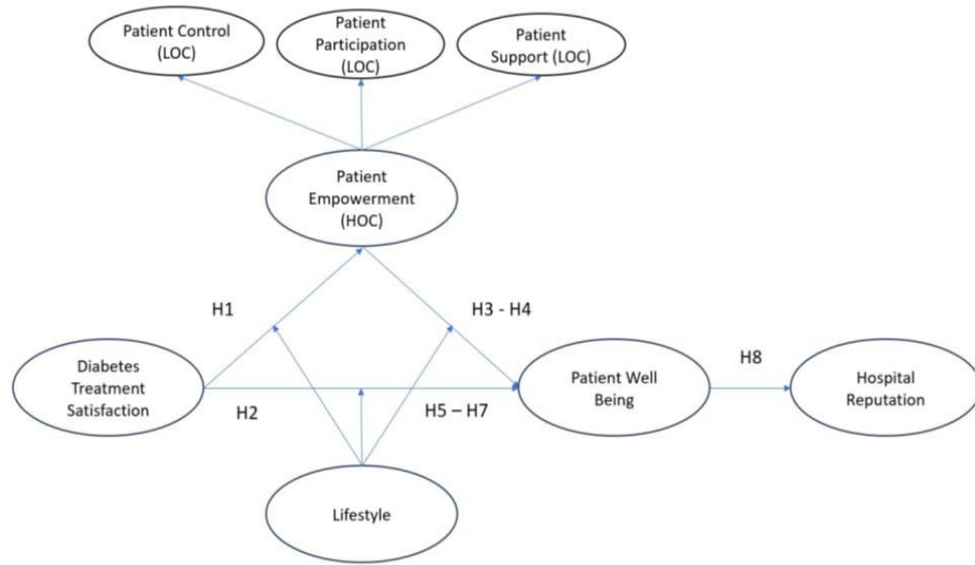


FIGURE 1. Conceptual Framework

playing a role in its advancement. A study conducted by Weisbeck, Lind, and Ginn (2019) demonstrated that patient empowerment significantly contributed to the successful continuation of long-term therapy, enhancing the overall therapeutic outcome, including the survival rate. Empowerment improves patients' autonomy and participation in decision-making and healthcare, particularly in chronic conditions. Individuals diagnosed with chronic diseases often experience significant concerns regarding the numerous uncertainties they meet and the limitations imposed on their daily activities as a result of their health condition.

This uncertainty may be accompanied by a sense of helplessness and a feeling of impotence that arises from the disruption of the physical, psychological, and social components of the patient's existence. According to research conducted by Stepanian *et al.* (2023), patient empowerment is crucial for enhancing the ability of individuals with chronic diseases to take charge of their health. Implementing patient empowerment in care delivery is anticipated to yield several favorable results for the organization, including enhancing the quality of treatment delivery, boosting patient satisfaction, and promoting patient involvement in decision-making (Gregg *et al.*, 2019). Diabetes patient care entails a systematic approach prioritizing regular and patient-focused therapy, which necessitates continuous

communication and collaboration between the patient and the healthcare team (Garcimartín *et al.*, 2020). One common approach to assess a hospital's reputation among patients is to use patient satisfaction surveys that measure service quality (Verweij *et al.*, 2022). Attaining patient satisfaction is vital in diabetes therapy as it can improve self-efficacy, medication adherence, and long-term glycemic control (Hickmann *et al.*, 2022).

Previous studies contend that patient empowerment, self-management education, and lifestyle modification are pivotal in managing diabetes mellitus (Navarro Martínez *et al.*, 2021). Another recent study stated that patient empowerment aims to enhance patients' understanding, abilities, and self-assurance in handling their healthcare (Acuña Mora, Sparud-Lundin, Fernlund, *et al.*, 2022; Acuña Mora, Sparud-Lundin, Moons, *et al.*, 2022). Patient involvement positively affects patient loyalty, and this effect is partly mediated by patient satisfaction. In addition, patient loyalty in primary care is a significant measure of care quality and well-being (Yeo *et al.*, 2021). This study investigates the relationship between patient empowerment, patient satisfaction, and patient well-being and their perception of the hospital, eventually affecting its reputation. This research seeks to better comprehend the interaction and connection between these factors concerning the patient's experience. This

insight will contribute to improving diabetes care and enhancing hospitals' reputation as great healthcare providers. This research can also provide a foundation for developing more effective strategies to strengthen healthcare in collaboration with the private sector.

Within the conceptual framework, patient empowerment and welfare mediate the relationship between diabetes treatment satisfaction and hospital reputation. Patient empowerment encompasses three distinct dimensions: patient control, patient involvement, and patient support. Similarly, the way of life influences the connection between satisfaction with diabetes treatment and patient empowerment and health.

Materials and Method

The quantitative survey was conducted cross-sectionally in 2024 at two private hospitals in Manado, Indonesia. Both are accredited hospitals with an internal medicine outpatient department facilitated by more than 200 beds and services specifically integrated for diabetic patients, making them ideal study subjects. For this study, the Research Committee Ethic of Pelita Harapan University has granted ethical approval (No: 023/M/EC-Nov/XI/2023). All eligible participants voluntarily completed the questionnaire. The targeted population of this study were diabetic type II patients without terminal complications, such as multi-organ failure or patients needing dialysis. Respondents were taken purposively based on several criteria. Inclusion criteria are chronic patients diagnosed with diabetes; respondents must be fully aware and awake, willing to collaborate when completing the questionnaire, and have previous experience meeting and communicating with the doctors. The study was carried out from October to November of 2023. The sample size was calculated using G*power (version 3.1.9.4) with a significance of 0.05, an effect size of 0.15, and a power of 0.90 (Sarstedt *et al.*, 2022). The minimal sample size was determined to be 116 respondents. According to the recommendations for analysis, Partial Least Square-Structural Equation Modeling (PLS-SEM) was used. However, the inverse square root method is recommended based on the reference for the minimum sample size for

research using PLS-SEM. If the power cannot be determined, the minimum sample required is at least 160 respondents. This quantity fulfilled the requirements for the minimal sample requirement. For data analysis, 160 questionnaires were considered eligible.

This research instrument uses a structured questionnaire with closed questions. A 1–5 Likert scale was used to quantify these study variables, and the question items were taken from earlier studies from Sekaran and Bougie (2020). Diabetes treatment satisfaction was adapted from (Saisho, 2018). Hospital reputation was adapted from Satir (2006). Patient wellbeing and patient empowerment were adapted from Law, Steinwender and Leclair (1998) and Robyn, Jillian and Lester (2015), respectively. Lastly, the lifestyle variable was adapted from a study by (Glendinning *et al.*, 1995). A professional linguist translated this questionnaire from English to Indonesian and assessed it by an expert panel of three academics to ensure validity. After receiving input from the expert panel, improvements were made to the question sentences so that respondents could better understand them. SmartPLS® version 4.1.0.2 was used for the PLS-SEM analysis, as it offered a bootstrapping menu for significance testing. This approach was chosen for its ability to test complex models in explanatory survey research. The primary models used in PLS-SEM were the measurement model (outer model) and the structural model (inner model) (Bougie & Sekaran, 2020). The reliability and validity of the connections between the indicators and constructs were evaluated using the measurement model. The structural model was used to assess the critical association between each component in the study model (Sarstedt *et al.*, 2022; Shmueli *et al.*, 2019).

Result and Discussion

A total of 160 respondents who fulfilled the study's requirements were included in the research. According to their demographic profile, most respondents (52.8%) were female. According to the age group, most of the participants were in the age range of 46 to 60 years. Most patients had their recent visit to the internal medicine outpatient department within the last 1 – 3 years. More than half of the patients only consumed oral anti-diabetics treatment, and most of the respondents also showed

TABLE 1. Respondents Characteristic

Demographic variables	Category	Sample (n)	Percentage (%)
Gender	Male	76	47.5
	Female	84	52.5
Age	17–25 years old	1	0.6
	26–36 years old	2	1.3
	37–45 years old	14	8.8
	46–60 years old	143	89.4
Weight	40–50 kg	15	9.4
	51–60 kg	48	30
	61–70 kg	53	33.1
	> 70 kg	44	27.5
Education	Elementary	0	0
	Junior high	24	15
	Senior high	88	55
	University	48	30
Recent visit to internal medicine outpatient	1–6 months	38	23.8
	6 months–1 year	21	13.1
	1–3 years	59	36.9
	3–5 years	42	26.3
Anti-diabetic medication used	Oral	109	68.1
	Insulin	40	25
	Combination	11	6.9
Diabetes-related complications	Yes	20	12.5
	No	140	87.5
Health insurance	Public insurance	160	100
	Private insurance	0	0
	Others	0	0

no diabetes-related complications. This data shows that most patients in this study have achieved reasonable glycemic control with oral medications. All of the respondents in the present study received treatment with public insurance. The demographic profile (Table 1) displays the characteristics of the research participants.

The Heterotrait-Monotrait (HT/MT) ratio determined the discriminant validity test. Given that every indicator in the research model had been adequately discriminated against to allow the assessment of each construct, it was determined that all the constructs in this study's validity test had values less than 0.9 (Table 2) (Henseler *et al.*, 2015; Sarstedt *et al.*, 2022). R² determined the structural model's explanatory strength, while Q²_{predict}

assessed its predictive relevance. The standard method bias (CMB) caused by errors or biases in the measurement process was previously evaluated using the inner variance inflation factor (VIF). The results of this investigation suggest that there is no standard method bias in this model, as all constructs have an inner VIF value between 3 and 5 (Shmueli *et al.*, 2019).

The results of this study model indicate that the HR and PWB variable R² were classified as having moderate to vital predictive accuracy at 0.708 and 0.683, respectively. Subsequently, variable PE was found to have weak predictive accuracy with an R² value of 0.386. These findings indicate that this model has adequate explanatory power. PLS_{predict} was deployed

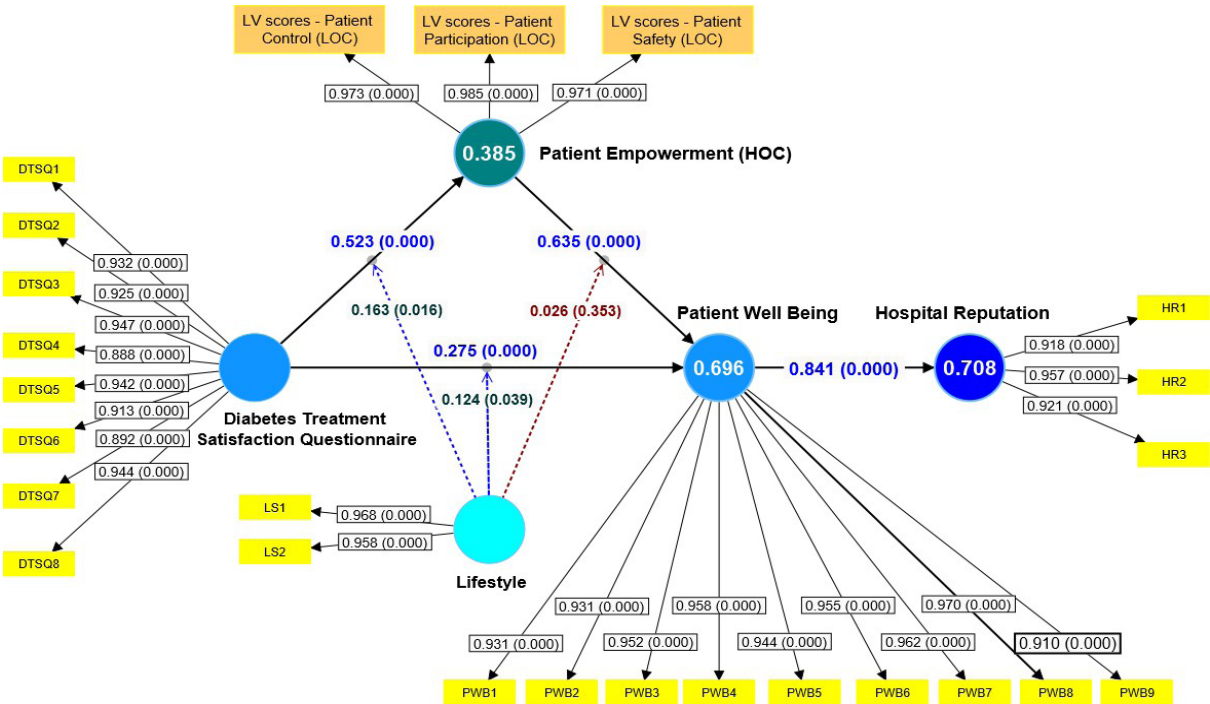


FIGURE 2. PLS-SEM Structural Model

TABLE 2. Heterotrait-Monotrait Ratio (HTMT) – Matrix

First Stage							
	DTSQ	HR	PP	PC	PS	PWB	
DTSQ	1						
HR	0.780	1					
PC	0.612		1				
PP	0.568		0.964	1			
PS	0.533		0.920		1		
PWB	0.550		0.670		0.702	1	
Second Stage							
	DTSQ	HR	LS	PE	LS x DTSQ		LS x PE
DTSQ	1						
HR	0.780	1					
LS	0.322	0.186	1				
PE	0.588	0.646		1			
PWB	0.550	0.878		0.681	1		
LS x DTSQ	0.131	0.446		0.092	1		
LS x PE	0.122	0.121		0.249	0.661	1	

to assess the model's overall prediction ability. The cross-validated predictive ability test (CVPAT) was a better method for evaluating a model's predictive performance (Hair *et al.*, 2019). The average indicator (IA) and PLS-

SEM are compared in the research findings. The linear model thus displays a negative value compared to IA, indicating a smaller error value in PLS-SEM. In contrast, a positive value for LM suggests that the model has adequate

TABLE 3. Cross-Validated Predictive Ability Test

Variable	PLS-SEM Vs. Indicator Average (IA)		PLS-SEM Vs. Linear Model (LM)	
	Average Loss Difference	P-Value	Average Loss Difference	P-Value
HR	-0.916	0.000	0.361	0.000
PE	-0.503	0.000	0.767	0.000
PWB	-0.701	0.000	0.865	0.000
Overall	-0.578	0.000	0.758	0.000

TABLE 4. Hypotheses Test Result

Hypotheses	P-values	Confidence Interval		Result	f ²
		5.0%	95.0%		
DTSQ → PE	0.523	0.000	0.462	0.591	H y p o t h e s i s 0.380 supported
DTSQ → HR	0.275	0.000	0.181	0.371	H y p o t h e s i s 0.152 supported
PE → PWB	0.635	0.000	0.551	0.717	H y p o t h e s i s 0.780 supported

predictive power (Shmueli *et al.*, 2019). The results of CVPAT are shown in Table 3.

Based on the bootstrapping feature hypothesis testing findings (Table 4), seven hypotheses were accepted with $p < 0.05$ and confidence intervals (CI) of 5% and 95% in the hypothesized direction. H7, on the other hand, was not supported since they needed to match the importance requirements. This implies that lifestyle has no significant effect as a moderating factor between patient empowerment and patient wellbeing, meaning patients' perceptions regarding their daily health-related habits must be elevated to increase their awareness.

All variables with direct routes to PE, PWB, and HR exhibit significant effect sizes. The paths from DTSQ to PE, PE to PWB, and PWB to HR all have a significant effect size. Notably, the path from PWB to HR has the most significant effect size, with a f^2 value of 2.247. This demonstrates a robust relationship between PWB and HR, suggesting that PWB substantially influences HR. However, the impact of LS x DTSQ on PE is deemed moderate, as indicated by an f^2 value of 0.017, which suggests that the effect of LS and DTSQ on PE is relatively minor compared to other variables. The relationship between LS x PE and PWB was determined to have a negligible effect size, as indicated by a f^2 value of 0.001. This suggests no meaningful association or influence

of LS x PE on PWB. Thus, the available evidence does not support the claim that the interplay between these variables adequately explains the heterogeneity of PE and PWB. These results suggest that the model demonstrates a satisfactory effect size.

This study aims to empirically examine the research model within the specific context of diabetes treatment satisfaction. Diabetes mellitus is a complex metabolic condition defined by elevated blood sugar levels caused by either insufficient insulin production, impaired insulin function, or a combination of both. The persistent high blood sugar levels in diabetes are linked to unique long-term issues affecting small blood vessels. Therefore, providing high-quality treatment for diabetic patients requires an intricate delivery of care, focusing on patient centricity. A meticulous approach is oriented around the needs and preferences of the individual patient (Punthakee *et al.*, 2018). More research needs to be done on the relationship between psychological empowerment and hospital reputation in Indonesia. This research is expected to provide a valuable contribution to the field of hospital management, especially in the context of quality of diabetes treatment satisfaction, patient empowerment, patient well-being, and the hospital's reputation.

According to the data analysis, it is evident that seven of the eight paths examined

have a substantial relation that aligns with the hypothesis. A significant discovery from this study is that patient well-being can mediate other variables effectively, with a coefficient value of 0.842. This is followed by the relation of patient empowerment to patient wellbeing, with a coefficient of 0.620. In addition, the indirect relation analysis revealed that the most influential path was from patient empowerment to hospital reputation, mediated by patient wellbeing, with a coefficient value of 0.522. However, the path from PE to PWB mediated by LS is found to be not supported. This might be related to various exogenous and endogenous reasons that could affect an individual's lifestyle. Generally, the idea of health determinants includes the social, economic, and physical environment and additionally the person's characteristics and behavior (Hillger, 2008). In some contexts, patient empowerment may not always be positively related to patient well-being. This follows a research by Brown (Brown *et al.*, 2023), which provides an example that too much control and responsibility given to patients without adequate support can cause excessive stress, thus hurting their well-being. Research by McMaughan (McMaughan *et al.*, 2020) also suggests that in cases where the patient's lifestyle is unhealthy, the negative impact of patient empowerment may be amplified. A poor lifestyle can place an additional burden on patients who feel empowered, as they may feel more pressure to manage their health without adequate support. Apart from that, there are also other factors such as social support, quality of treatment, or the patient's basic health condition which may have more influence on the patient's well-being and empowerment than their lifestyle (Lee *et al.*, 2022).

This finding is consistent with prior research conducted by (Bailo *et al.*, 2019) and (Yeh *et al.*, 2018), demonstrating that empowering patients with chronic diseases has various beneficial effects. These effects include higher patient satisfaction with their care, improved adherence to treatment self-management, and better clinical outcomes. However, this study offers novel insight that PE should mediate the relationship between DTSQ and behavior intention. As patients

are the ones who start and create behavioral change, the possibility of manipulating or imposing values is reduced. Essentially, patient education is to empower patients to reorient themselves independently. The findings of this study align with the proposition put forth by (Lin *et al.*, 2020) that behavioral intention serves as a crucial mediator between patient empowerment and behavioral intention, which in turn directly impacts diabetes self-care behaviors. Patient's well-being in healthcare can be seen as a service experience that resembles a process that involves their notions of well-being and a requirement for assistance in dealing with the decline in their health (Ryynänen, 2023). The findings of this study are consistent with the research conducted by (Ramos-Vera *et al.*, 2022), which concluded that patient well-being plays a crucial role as a mediator in the link between satisfaction with medical care and physical health. Prior research has also demonstrated a relationship between satisfaction with healthcare services and overall health conditions (Paul *et al.*, 2016). Placing patients' well-being as a top priority is crucial in ensuring high-quality healthcare. This can be accomplished by providing personnel with effective, culturally adaptable, and competent training to promote healthy lifestyle choices among patients, followed by a thorough evaluation (Ramos-Vera *et al.*, 2022).

The study's findings indicate that hospital administration should prioritize enhancing patient empowerment, particularly among individuals with chronic illnesses such as DMT2. Patient empowerment is becoming one of the determinants in DMT2 patients as the population at risk. Research has shown that patient empowerment is linked to favorable health results, such as the ability to control one's health, belief in one's abilities, cost efficiency, and overall quality of life (Ahmed *et al.*, 2023). Private healthcare facilities, in particular, can benefit from patient empowerment by enhancing patient happiness, improving health outcomes, and promoting improved communication. Patients actively involved in their healthcare are more likely to follow their treatment programs, resulting in lower costs and improved efficiency. These activities reinforce relationships, cultivate trust, and augment the

hospital's reputation, ultimately attracting a more extensive patient base and enhancing the overall quality of care. Enhanced educational initiatives, psychological support programs, psychosocial interventions, and intense counseling can enhance performance and yield favorable patient outcomes. It is essential to examine general tactics such as improving communication, increasing accessibility to educational services, and implementing complication-prevention programs. Ongoing assessment is necessary to guarantee continual enhancement in the calibers of healthcare solutions.

Especially in the healthcare industry, the relationship between private hospitals and the government has been increasingly important, particularly in enhancing the quality of care for chronic patients. As the demand for healthcare services continues to grow, the role of private hospitals as governmental partners in the delivery of high-quality care has become more prominent. One key factor that significantly impacts this partnership is the level of treatment satisfaction experienced by patients. Patient satisfaction with their treatment is a crucial determinant of healthcare facilities' overall quality of care. Improved service quality, leading to patient satisfaction and positive behavioral intentions, can help hospitals build long-term relationships with their patients and adhere to the therapy. Additionally, patient experiences and satisfaction levels can offer valuable insights into the willingness of diabetic patients to get involved and thereby be more actively engaged in adhering to their treatment regimens. A crucial example is when patients complain about their illness, they will be more open to communicating their symptoms with their doctors. This research also noted a few limitations: first, this study was only conducted in one city. Therefore, the study's findings only apply to this particular demographic and cannot be directly applied to populations of diabetes patients at other hospitals or in different regions. Patient characteristics can differ between hospitals and geographical areas, which could relate to the study's external validity. Second, self-reporting bias may have resulted from the online questionnaires used for data collection. Potential data distortion

may arise from patients' propensity to give answers interpreted as more socially acceptable or expected than they are. As a result, care should be taken while analyzing the data to prevent drawing sweeping judgments.

Conclusion

This study illustrates that the Diabetes Treatment Satisfaction Questionnaire (DTSQ) is valuable for evaluating the quality of care provided to diabetic patients, particularly in private hospitals. The long-term outcome of patient well-being significantly predicts the hospital's reputation, highlighting its relevance. The DTSQ instrument can effectively assess treatment satisfaction, its relationship with patient empowerment, and the relationship between patient empowerment and patient wellbeing. If both the empowerment of patients and their well-being increase, it will ultimately improve the hospital's overall performance. The findings of this study provide a fresh perspective on the need to consider and combine these two factors to deliver care for diabetes patients effectively. This study also found that private hospitals are crucial in managing diabetes within the community.

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