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The Effect of Physician-Patient Interaction on Patient Trust: The Mediating Role of Treatment Satisfaction

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Abstract
Purpose - This study aimed to explore the intricate dynamics within the physician-patient relationship by examining the role of treatment satisfaction as a mediator and personal control as a moderator. Specifically, the research investigated the relationship between physician-patient interaction and patient trust, with a focus on how treatment satisfaction mediates this relationship and how personal control moderates it.
Design/methodology/approach - Data were collected via self-administered questionnaires from 313 respondents who had prior experience visiting general practitioners' clinic in Karachi. Utilizing the SmartPLS statistical tool, the study tested the proposed hypotheses.
Findings - The findings underscored the significant influence of physician-patient interaction on both patient trust and treatment satisfaction. Whereas personal control had a link with physician-patient interaction and there is insignificant relationship with patient trust.
Originality/value - Moreover, the study revealed the nuanced role of personal control, shedding light on how patients' perceived control over their healthcare decisions impacts the quality of physician-patient interactions and trust levels. This research contributes valuable insights from the patients' perspective, enriching our understanding of the dynamics shaping the physician-patient relationship in the context of general practice clinics.
Key words: physician-patient interaction, patient trust, treatment satisfaction, personal control.

Introduction

The Social Exchange Theory (SET) suggests that trust and cooperation are necessary for exchange of resources with the anticipation of mutual benefits. Patients are more inclined to trust and follow their physician's advice when they believe that the care provided is of high quality. This trust can be cultivated through effective communication or interaction, respect for patient autonomy, and a collaborative approach. Trust is a fundamental cornerstone in physician–

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patient interaction and patient satisfaction with the treatment. Trust is built through recurring interactions. This theory provides understanding of how trust affects the interactions between individuals (Sobierajski et al., 2023). In case of physician-patient interaction, if patients have trust in their physician, they are more inclined to participate openly and cooperatively in conversations concerning their health issues and treatment alternatives (Wu et al., 2022). However, with the rise of transformation in healthcare system the role of patient trust and the factors that influence it need to be reconsidered, as it arises different questions. Which factors affect patient trust in healthcare organization? And how does patient trust in physician-patient interaction affect this relationship (Velsen et al., 2021). For this study, patient trust is a collection of beliefs or anticipations regarding a physician's intention (Pearson et al., 2000).

In this study patient trust in the physician's benevolence predicts approximately two-thirds of patient ratings of relationships. Patient's treatment satisfaction is derived from customer satisfaction that defines the extent to which customer expectation is met by service provider. Patient satisfaction relies on how physicians provide services in terms of care to satisfy patients' expectations. When patients' expectations are met by the physician, they feel satisfied (Wu et al., 2022; Fahim et al., 2021). Treatment satisfaction as a mediator on patient trust examines the intricate interplay between patients' satisfaction with their medical treatment and the development of trust in their healthcare providers. This investigation seeks to elucidate how patients' perceptions of the effectiveness, accessibility, and overall experience of their treatment influence their trust in physicians and healthcare institutions. By serving as a mediator, treatment satisfaction potentially shapes the formation and maintenance of trust, impacting patient adherence to medical advice, continuity of care, and overall health outcomes. Understanding this phenomenon is crucial for optimizing patient-provider relationships, enhancing patient-centered care, and fostering better healthcare outcomes. Through empirical research, this study aims to contribute valuable insights to the field of healthcare communication and patient trust.

Personal control as a moderator on the quality of physician-patient interaction explores the intricate dynamics between patients and physicians within the healthcare setting. This investigation delves into the role of personal control, examining how individuals' perceptions of control over their health and medical decisions influence the quality of their interactions with healthcare providers. By serving as a moderator, personal control potentially shapes the communication styles, decision-making processes, and overall satisfaction levels of both patients and physicians. Understanding this phenomenon holds significant implications for enhancing patient-centered care, fostering trust, and improving health outcomes. This research aims to illuminate the mechanisms through which personal control operates as a moderator in physician-patient interactions, contributing valuable insights to the field of healthcare communication and patient empowerment (Salim et al., 2023).

The phenomenon of the study on personal control as a moderator on patient trust investigates the intricate relationship between patients' sense of control over their healthcare decisions and the development of trust in their healthcare providers. This inquiry explores how individuals' perceived level of personal control moderates the influence of various factors on patient trust, such as

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communication styles, treatment outcomes, and perceived competence of healthcare professionals. By serving as a moderator, personal control potentially shapes the strength and direction of the relationship between these factors and patient trust. Understanding this phenomenon is essential for tailoring healthcare interventions and communication strategies to effectively engage patients and foster trust in healthcare settings. Through empirical investigation, this study aims to contribute valuable insights into the nuanced dynamics of patient trust and its association with personal control (Choudhury, 2023).

Problem Statement

This study centers on the investigation of personal control as a moderator and treatment satisfaction as a mediator in the context of physician-patient interaction, with a novel focus on personal control's role as a moderator. Despite extensive research on patient empowerment and treatment satisfaction separately, limited attention has been given to examining personal control's moderating effect within the physician-patient relationship. This study aims to address this gap by exploring how personal control influences the relationship between treatment satisfaction and various outcomes of physician-patient interaction. Specifically, it seeks to understand how patients' perceived level of personal control over their healthcare decisions moderates the impact of treatment satisfaction on communication quality, trust in physicians, and overall satisfaction with care. By shedding light on the moderating role of personal control in these dynamics, this research contributes to a more nuanced understanding of patient-centered care and offers insights into tailored approaches for improving healthcare delivery and patient outcomes.

Research Question

How does the quality of physician-patient interaction influence patient trust, considering treatment satisfaction as a mediating variable and personal control as a moderating variable?

Research Objective

This study investigates the moderating role of personal control on the relationship between patient trust and key outcomes of physician-patient interaction, including communication quality, trust in physicians, and overall satisfaction with care. Specifically, this study aims to elucidate how patients' perceived level of personal control over their healthcare decisions influences the strength and direction of the association between treatment satisfaction and these outcomes. By focusing on personal control as a moderator in the context of physician-patient interaction, the research seeks to provide a deeper understanding of the mechanisms underlying patient-centered care. The findings of this study will contribute to the development of tailored interventions and strategies aimed at enhancing healthcare delivery and improving patient outcomes.

Research Significance

The beneficiaries of research on patient-physician interaction as the independent variable, patient trust as the dependent variable, with personal control as the moderator and treatment satisfaction as the mediator, span various sectors of

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healthcare delivery and patient outcomes. Firstly, healthcare providers stand to gain insights into optimizing their communication strategies and fostering patient trust. Understanding how patient-physician interactions influence trust, mediated by treatment satisfaction, and moderated by personal control, can inform training programs and clinical practices tailored to enhance patient-centered care. Patients themselves benefit from improved communication and trust in their healthcare providers, leading to better adherence to medical advice, higher treatment satisfaction, and ultimately, improved health outcomes. Healthcare institutions can utilize findings from this research to implement organizational policies and practices that promote patient empowerment, satisfaction, and trust, thereby enhancing overall healthcare quality. Additionally, policymakers can leverage these insights to design healthcare policies and regulations that prioritize patient-centered care and support the implementation of evidence-based interventions aimed at optimizing patient-physician interactions. Ultimately, research in this domain has the potential to transform healthcare delivery by fostering collaborative and trusting relationships between patients and physicians, leading to better health outcomes and improved patient experiences.

Corporate beneficiaries of research on patient-physician interaction as the independent variable, patient trust as the dependent variable, with personal control as the moderator and treatment satisfaction as the mediator, extend beyond individual healthcare providers and patients to encompass healthcare organizations, insurance companies, and pharmaceutical firms. Insights gleaned from this research can inform corporate strategies aimed at enhancing patient satisfaction, trust, and loyalty. Healthcare organizations can utilize findings to refine their patient engagement initiatives, improve service delivery processes, and tailor communication protocols to foster stronger patient-physician relationships. Additionally, insurance companies may leverage research outcomes to develop innovative insurance products and coverage options that prioritize patient-centered care and promote trust between insurers and policyholders. Pharmaceutical firms can benefit by incorporating research findings into their marketing strategies, focusing on patient empowerment and satisfaction to drive brand loyalty and market share. Moreover, corporate stakeholders across the healthcare industry can use research insights to advocate for policy changes that prioritize patient-centered care and support the implementation of evidence-based practices. Ultimately, research in this area not only enhances patient outcomes but also contributes to the long-term sustainability and competitiveness of corporate entities within the healthcare ecosystem.

Literature Review

Theoretical Background - Social Exchange Theory

Homans (1958), is the pioneering figure behind the theory of social exchange, introduced a sociological framework based on rational assumptions. He described exchanges between two individuals and proposed six fundamental propositions focusing on the likelihood of specific behaviors, responses to behavioral outcomes, and choices among alternative behaviors. Homans argued that social phenomena should be analyzed in terms of individual characteristics rather than social structures. He suggested that exchange patterns are

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institutionalized and legitimized by moral codes that go beyond individual interests. According to Homans, any context can be examined by looking at the activities undertaken, the frequency of interactions between individuals, and the sentiments developed from these interactions. These sentiments include internal conditions such as affection, sympathy, antagonism, and preferences. Increased frequency of interactions tends to enhance positive sentiments among individuals (Sobierajski et al., 2023; Munawar et al., 2022). This theory gives a framework to understand how trust influences the interactions between individuals. In physician-patient interaction, if patients have trust in their physician, they are more inclined to participate openly and cooperatively in conversations concerning their health issues and treatment alternatives (Wu et al., 2022). Within healthcare, physicians contribute medical expertise, treatment, and emotional support, while patients reciprocate with trust, compliance, and sometimes financial resources. When patients assess that the benefits they receive from their physicians, such as exemplary care, effective communication, and acknowledgment of their autonomy, outweigh the associated costs and risks, their confidence in the physician typically deepens. Effective communication is particularly pivotal in nurturing trust, as it promotes transparency, comprehension, and a sense of equity in the interaction. Furthermore, an inclusive approach to decision-making, wherein patients actively participate in their treatment plans, aligns with the mutual benefit ethos of SET, thereby further fortifying trust. Ultimately, by embracing and implementing the tenets of social exchange, physicians can foster heightened patient trust, resulting in improved healthcare outcomes and heightened patient contentment. Patient trust is a collection of beliefs or anticipations regarding a physician's intention. This theory gives direction that how patient trust represents a comforting sense of assurance or dependence in the physician and their intentions. The most frequently mentioned aspects of physician behavior upon which patients are thought to establish their trust are competence, compassion, privacy and confidentiality, reliability, dependability, and communication (Pearson et al., 2000). According to this theory, a patient's treatment satisfaction is influenced by various elements such as adept communication, empathy, mutual respect, trust, and cooperation between the patient and their physician. When patients believe that their physician is competent, compassionate, attentive to their concerns, and actively involved in their care, they tend to feel more satisfied with their treatment. Social exchange theory advocates for patient-centric methodology which contributes to higher levels of patient treatment satisfaction. Patient treatment satisfaction proposed by Social Exchange Theory and is shaped by the quality physician-patient interaction, characterized by effective communication, empathy, trust, collaboration, and a patient-centered approach to care. by applying the principles of social exchange, physicians can cultivate stronger patient satisfaction with their treatment experiences, leading to improved healthcare outcomes and overall patient well-being (Wang et al., 2020) Self-regulation theory offers a comprehensive framework for understanding how individuals effectively manage their thoughts, emotions, and behaviors to accomplish desired objectives. Its connection to the personal control of patients within healthcare is significant. Personal control, at its essence, reflects individuals' confidence in their capacity to influence health outcomes through their decisions and actions. According to self-regulation theory, patients actively

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employ self-monitoring, goal-setting, and adaptive coping strategies to navigate their health journey. Those who possess a strong sense of personal control are more inclined to demonstrate self-regulating behaviors, such as adhering to treatment plans, monitoring their health status, and seeking pertinent information. Furthermore, self-regulation theory highlights the pivotal role of self-efficacy—the belief in one's ability to execute essential behaviors—in fostering motivation and dedication to health-related objectives. Patients with heightened levels of self-efficacy are more likely to undertake proactive measures to manage their health, resulting in enhanced treatment adherence and favorable health outcomes. Essentially, self-regulation theory elucidates how patients exercise control over their health by engaging in self-regulatory processes, thereby empowering them to actively engage in their healthcare journey and attain improved well-being (Scollan-Koliopoulos et al., 2011).

Patient Trust

Trust within the patient-physician relationship has only been systematically examined over the past thirty years. Trust is a complex concept influenced by numerous factors and can be categorized into two main types: interpersonal trust and social trust. Interpersonal trust involves an individual's confidence in another person's words, actions, and decisions, which is developed over time through repeated interactions where one's assumptions about another's trustworthiness are tested. Strong interpersonal trust enables patients to disclose sensitive information, accept prescribed behavioral changes, communicate openly about mental health issues, and adhere to treatment plans. On the other hand, social trust pertains to the trust an individual has in societal institutions, significantly influenced by media and general social attitudes. In healthcare, social trust refers to the confidence patients have in healthcare institutions, providing a foundation for interpersonal trust in their physicians. Effective development of both social and interpersonal trust has been shown to enhance communication and transparency between patients and physicians. Trust is crucial in the patient-physician relationship due to its direct implications on life, health, and wellbeing, often involving uncertainty and irreversible outcomes. Research indicates that a trusting relationship between patients and physicians leads to higher patient satisfaction, better treatment adherence, and improved health outcomes. Additionally, trust helps reduce the likelihood of patients leaving a physician's practice or discontinuing their health plan. Overall, trust and communication are essential for a productive and healthy doctor-patient relationship, enabling patients to better follow medical advice and treatments (Sertan et al 2023). Patients' trust in a doctor primarily stems from their satisfaction with the healthcare services they receive at the doctor's practice. This trust, along with patient satisfaction, can diminish or vanish if patients find another doctor or healthcare provider they deem more trustworthy. Consequently, it is crucial to sustain patient trust in a doctor to ensure that the hospital or clinic where the doctor practices continues to be perceived as dependable and reputable (Susilo et al 2020). Trusting relationships between physicians and patients are linked to greater information disclosure, patient adherence, satisfaction, improved health outcomes, and a reduction in lawsuits. A systematic review revealed moderate to strong correlations between trust and positive health outcomes, including patient satisfaction. The primary reason

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patients decide to file complaints against their physicians is often due to perceived poor relationships or a lack of collaborative interaction (Wu et al., 2022). Despite patients being vulnerable and reliant on healthcare providers' decisions, trust can strengthen the patient-provider relationship by fostering cooperation and privacy in treatment. Developing a patient's sense of trust can influence their healthcare utilization; a patient with trust is more likely to seek treatment early in the disease process. Conversely, a lack of trust may cause patients to delay seeking treatment until their condition worsens. Additionally, a patient's trust can impact the quality of service received, as a trusting patient is more likely to engage in their treatment and share personal information freely. This enables doctors to provide appropriate care and avoid unnecessary tests. Therefore, enhancing patient trust can reduce negative attitudes and behaviors (Durmuş & Akbolat, 2020).

Effect of Quality of Physician-Patient Interaction and Patient Trust

The doctor-patient connection is pivotal for delivering top-tier healthcare. This relationship inherently holds unequal power dynamics, largely stemming from the information gap between physicians and patients. Consequently, patient trust in their doctor emerges as a cornerstone in this partnership. Patient trust reflects the belief that physicians will furnish beneficial care and honest information, regardless of patients' ability to oversee or influence them. Fostering trust is a critical stride in nurturing high-caliber interactions and bonds between physicians and patients. Patients who lack trust may harbor suspicions about their physicians' intentions and might even exhibit hostility during their encounters. On the contrary, trustworthy doctor-patient relationships are linked with increased information sharing, patient adherence, satisfaction, improved health outcomes, and reduced legal disputes. Notably, a systematic review revealed moderate to strong connections between trust and various health indicators, including patient satisfaction. The primary reason prompting patients to lodge complaints against their physicians often revolves around perceived deficiencies in the relationship or a lack of collaborative engagement (Wu et al., 2022). Patients' overall satisfaction with their care serves as an indicator of positive relationships with their physicians. It mirrors patients' views on the effectiveness of previous medical treatments, suggesting confidence in the physician's capability to deliver high-quality care in the future. Consequently, patients' overall satisfaction influences their trust and confidence in the physician for ongoing medical care and treatment. Previous research has also demonstrated a positive correlation between higher levels of patient satisfaction and increased levels of trust in their healthcare providers (Wu et al 2022). Hence, this study proposes the below hypothesis:

H1: quality of physician-patient interaction has a significant influence on patient trust.

Treatment Satisfaction as Mediator

The satisfaction patients derive from their treatment mirrors the concept of customer satisfaction, which gauges the extent to which service providers meet customer expectations. Patient satisfaction hinges on the manner in which physicians deliver care to meet patients' needs. When physicians meet patients' expectations, the patients experience satisfaction (Wu et al., 2023).

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Patient satisfaction has emerged as a significant focus in global health policy discussions. It serves as a pivotal aspect of pay-for-performance initiatives and stands as a key predictor of the quality of care. The level of patient satisfaction is crucial for gauging patient well-being; previous studies have demonstrated a correlation between patient outcomes and satisfaction levels. Moreover, patient satisfaction has been linked to subsequent healthcare utilization, influencing patient adherence and treatment continuity. Conversely, dissatisfied patients are more likely to voice grievances or seek resolution with the institution to address cognitive dissonance and dissatisfaction with the service received. Ultimately, dissatisfaction can lead to non-adherence to treatment plans, missed appointments, and negative word-of-mouth, potentially deterring others from seeking care within the system or prompting them to seek alternative options. Assessing patient satisfaction is imperative in the ongoing efforts to hold providers accountable. Additionally, patient satisfaction surveys play a crucial role in the planning and delivery of high-quality healthcare, particularly in hospitals where patient engagement in their care is actively encouraged (Moslehpour et al., 2022). This study examines how quality of physician-patient interaction influences patients' treatment satisfaction. Thus, we postulated that:

H2: quality of physician-patient interaction has a significant influence on patients' treatment satisfaction.

Patient satisfaction with emergency care is one of the most important indicators reflecting the quality of services. Even though patient satisfaction has been considered an indicator of the quality of healthcare, the relationship between the two constructs is not clear. Several researchers have demonstrated that quality and satisfaction are distinct concepts, and they have emphasized the importance of satisfaction as a mediator, in contrast to perceived quality. Patient satisfaction plays an important mediating role, influenced by patient perception of healthcare quality, and significantly impacts patient trust. Trust is considered to be an important outcome, and has been associated with health outcomes, However, trust is distinct from satisfaction, as satisfaction looks backward while trust looks forward, and the latter has a strong emotional component. Thus, satisfaction antecedes trust have emphasized several important attributes of patient satisfaction, such as accessibility and efficacy, provider attitude, and technical competence (Abidova et al.,2021, Munawar et al., 2024). This study postulates the following hypothesis:

H3: treatment satisfaction has a significant influence on patient trust.

Moderating Effect

Personal Control as Mediator on Quality of Physician-Patient Interaction

The interaction between physicians and patients is a multifaceted clinical behavior primarily aimed at exchanging medical information to enhance understanding of clinical diagnosis, treatment, and specific diseases. The quality of communication in this interaction significantly impacts the physician-patient relationship. Traditionally, this relationship involved physicians making decisions and patients following them. Self-control perception, which involves an individual's beliefs and attitudes about their ability to care for themselves, is a crucial aspect of self-perception in health contexts. Individuals who believe they can effectively manage their health are more likely to engage in health-promoting

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behaviors and seek appropriate healthcare services when necessary. Chronic diseases, often viewed as life-threatening and stigmatized, can induce fear and negative self-perception, leading to psychological distress. Even after treatment, the burden of chronic diseases persists, with many patients feeling uncertain about their future, experiencing anxiety, loneliness, and fear of recurrence (Choudhury, 2023).

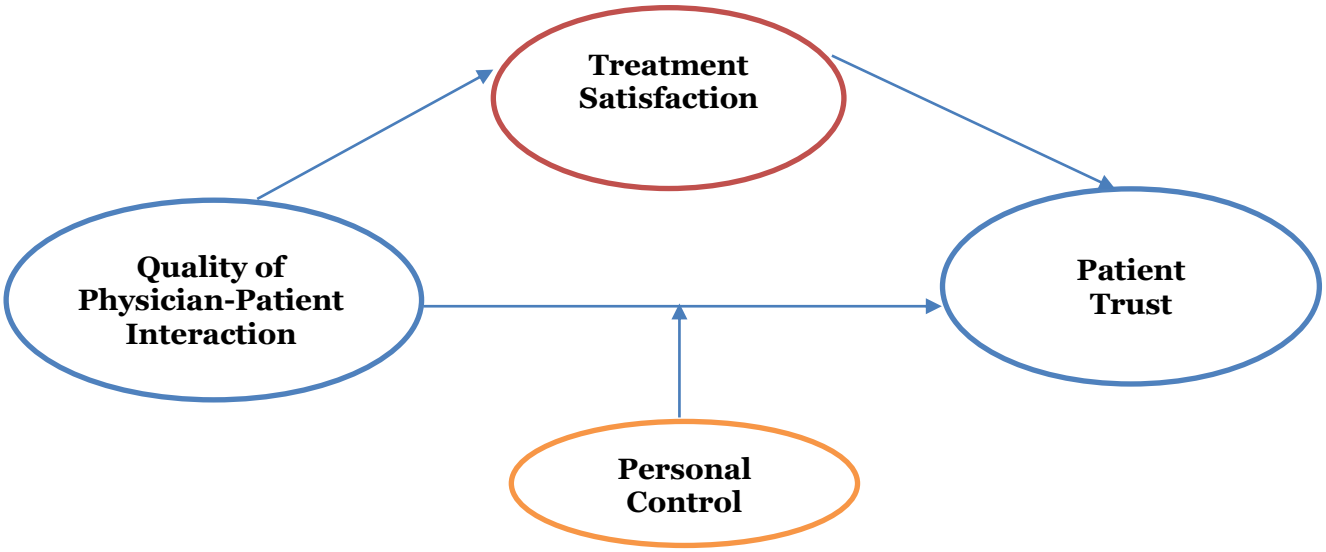
H4: personal control has a significant influence on quality of physician-patient interaction.

Personal Control as Moderator

Those patients have trust in their physician, they are more inclined to participate openly and cooperatively in conversations concerning their health issues and treatment alternatives (Wu et al., 2022). Patient trust is a collection of beliefs or anticipations regarding a physician's intention. This theory gives direction that how patient trust represents a comforting sense of assurance or dependence in the physician and their intentions. The most frequently mentioned aspects of physician behavior upon which patients are thought to establish their trust are competence, compassion, privacy and confidentiality, reliability, dependability, and communication (Pearson et al., 2000). The loyalty of physician significantly impacts the physician-patient relationship. Self-control perception, which involves an individual's beliefs and attitudes about their ability to care for themselves, is a crucial aspect of self-perception in health contexts. Individuals who believe they can effectively manage their health are more likely to engage in health-promoting behaviors and seek appropriate healthcare services when necessary. Chronic diseases, often viewed as life-threatening and stigmatized, can induce fear and negative self-perception, leading to psychological distress. Even after treatment, the burden of chronic diseases persists, with many patients feeling uncertain about their future, experiencing anxiety, loneliness, and fear of recurrence (Choudhury, 2023; Fahim et al., 2023). Therefore, we formulated the following hypothesis:

H5: personal control has a significant influence on patient trust.

3.6. Conceptual Model



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Methodology

A questionnaire was developed to meet research objectives and measure relationships among variables in the research framework by adopting items, which were previously validated from several studies. Fourteen measurement items were adapted to evaluate the quality of physician patient interaction from the study of Bieber et al. (2010). Patients' experiences comprised of one mediating variable, namely; treatment satisfaction and one moderating variable, namely; personal control. Four items for patients' treatment satisfaction were adopted from Nagpal et al. (2021) and four items for personal control were adopted from Moss-Morris et al. (2002). While the nine measurement items used for patient trust were adapted from Thom et al. (2002). The patients' response consisted of one dependent variable, namely; patient trust. A five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree) was used to obtain the respondents' responses in this study. In this research study, data was collected on-site from general practitioner clinics. The decision to collect data on-site was driven by the recognition of challenges associated with online survey distribution, particularly concerning the digital literacy of patients. Often, when surveys are circulated through online platforms, mostly patients are encounter difficulties in filling out the forms due to limited access to technology or unfamiliarity with online survey formats. By conducting the survey directly at the clinic, we aimed to ensure inclusivity and accessibility, enabling all patients, regardless of their digital literacy levels, to participate and provide valuable feedback.

This study employed the deductive approach and utilized quantitative, cross-sectional, non-experimental techniques to examine the relationships between variables. The PLS-SEM software was used to evaluate the model of this study. The partial least square method was chosen due to its suitability for the model fit without any difficulty. A step-by-step PLS analysis procedure was used to estimate the measurement model of the study. As a first step, a reflective model using PLS-SEM was used to evaluate the measurement model as per the guiding principles to estimate model results (Hair et al., 2019).

The main influences in promoting post-positivist philosophies were the works of Popper (1959), Bronowski (1950, 1956), Kuhn (1970), Hanson (1958). Post-positivism provides a valuable lens through which to examine the intricacies of physician-patient interaction and the development of patient trust within healthcare settings. This theoretical framework acknowledges the inherent subjectivity in human experiences and the limitations of strictly objective approaches. In the relationship between physician-patient interaction and patient trust, post-positivism encourages to explore the multifaceted nature of these dynamics, considering factors such as cultural context, power dynamics, and individual perspectives. By embracing a diversity of research methods, including both quantitative and qualitative approaches, it allows to delve deeper into the complexities of trust formation and communication between physicians and patients. Moreover, post-positivism promotes critical reflection on the assumptions and biases inherent in research, leading to more nuanced understandings of trust-building processes in healthcare. Ultimately, by adopting a post-positivist perspective, it contribute to the development of pragmatic solutions aimed at enhancing patient trust and improving the overall quality of healthcare delivery (Clark, 1998).

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The philosophical ideas introduced by Charles Sanders Peirce (1839-1914) are helpful for researchers in understanding the application of quantitative methods specific to the foundational concepts of deduction, abduction and induction. The deduction approach is employed in research on physician-patient interaction and patient trust due to its structured and systematic nature, which aligns well with the complexity of healthcare dynamics. This method begins with a general theory or hypothesis, derived from existing knowledge or theoretical frameworks, and then seeks to test and validate these propositions through empirical observation and data analysis. In the context of studying physician-patient interaction and trust, deduction allows to formulate specific hypotheses about the factors influencing trust formation, communication patterns, and the efficacy of interventions within healthcare settings. Moreover, the deductive approach facilitates the development of generalizable insights and theoretical frameworks. Overall, the deduction approach offers a rigorous and structured framework for investigating the complex interplay of factors influencing physician-patient interaction and patient trust, contributing to a deeper understanding of these critical aspects of healthcare delivery (Hillen et al., 2012).

Quantitative and causal explanatory research design is employed in studies investigating the effects of physician-patient interaction on patient trust due to their ability to establish causal relationships and provide precise measurements. These designs utilize rigorous methodologies to systematically examine the impact of specific variables, such as communication styles, empathy, and rapport-building techniques, on patient trust outcomes. By collecting quantitative data through questionnaires, the strength and direction of relationships between these variables and patient trust levels are quantified. Additionally, causal explanatory research designs allow to identify potential confounding factors and control for them statistically, thereby enhancing the internal validity of the findings. This approach enables us to draw causal inferences about the effects of physician-patient interaction on patient trust, providing valuable insights for healthcare practitioners and policymakers. Furthermore, the use of quantitative methods facilitates the generalizability of findings across diverse patient populations and healthcare contexts, enhancing the applicability of research findings to real-world practice. In summary, quantitative and causal explanatory research designs offer a robust framework for investigating the complex dynamics of physician-patient interaction and their implications for patient trust, contributing to the advancement of evidence-based healthcare communication strategies and patient-centered care initiatives (Peng et al., 2019).

Non-probability sample distribution is used in this study due to its practicality and feasibility in accessing specific populations of interest. In the context of studying physician-patient interaction and trust, non-probability sampling methods, such as purposive sampling, enable us to recruit participants who have direct experience with healthcare services and can provide valuable insights into their perceptions and experiences. By employing non-probability sample distribution, it can enhance the relevance and applicability of the findings to real-world healthcare settings, informing the development of patient-centered care strategies and communication interventions aimed at fostering trust and improving patient outcomes (Ommen et al., 2011).

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Sampling Technique

The purposive sampling technique is applied in this study to check the effects of physician-patient interaction on patient trust due to its ability to target specific groups or individuals who possess relevant characteristics or experiences. In studies focused on healthcare communication and trust-building, it's good to capture the perspectives of individuals who have direct experience with medical consultations and interactions with healthcare providers. Purposive sampling allows us to intentionally select participants who represent a diverse range of backgrounds, medical conditions, and healthcare settings, ensuring that the sample encompasses a breadth of experiences and viewpoints relevant to the research objective. By strategically selecting participants based on predetermined criteria, such as age, gender, ethnicity, or medical history, we gathered in-depth qualitative data that illuminate the nuances of physician-patient interaction and trust dynamics. Additionally, purposive sampling enables us to explore variations in communication styles, patient preferences, and trust-building strategies across different demographic groups and healthcare contexts. In summary, the purposive sampling technique enhances the depth and richness of data collected in this study on relationship between physician-patient interaction and patient trust, facilitating a more comprehensive understanding of these critical aspects of healthcare delivery (Murray et al., 2015).

Sample Size

The sample size for this study is 317 respondents those are patients. As suggested by "Kline's Rule of Thumb" (2016). To ensure an adequate sample size relative to the complexity of the model being tested. In structural equation modeling (SEM) and confirmatory factor analysis (CFA), each observed variable (item) typically represents one parameter to be estimated in the model. Multiplying the number of observed variables by 10 is a general guideline to ensure a sufficiently large sample size relative to the number of estimated parameters, reducing the risk of estimation problems and providing more stable and reliable results (Memon et al.,2020).

Statistical Analysis

The PLS-SEM software was used to evaluate the model of this study. The partial least square method was chosen due to its suitability for the model fit without any difficulty. A step-by-step PLS analysis procedure was used to estimate the measurement model of the study. As a first step, a reflective model using PLS-SEM was used to evaluate the measurement model as per the guiding principles to estimate model results (Hair et al., 2019).The SmartPLS technique is used to check the effects of physician-patient interaction on patient trust due to its suitability for analyzing complex structural equation models (SEMs) and causal relationships among latent variables. In studies investigating healthcare communication and trust-building processes, researchers often aim to examine the underlying constructs and pathways that contribute to patient trust, such as communication quality, empathy, satisfaction, and perceived competence of healthcare providers. SmartPLS provides a user-friendly platform for conducting partial least squares (PLS) path modeling, which is particularly advantageous when dealing with small or non-normal samples, as commonly encountered in healthcare research. This technique allows to assess both the measurement

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model (validity and reliability of constructs) and the structural model (relationships among constructs) simultaneously, providing insights into the direct and indirect effects of physician-patient interaction on patient trust. Moreover, SmartPLS offers robustness against multicollinearity and measurement errors, making it well-suited for analyzing complex models with interrelated variables. By leveraging the SmartPLS technique, researchers can gain a deeper understanding of the mechanisms underlying physician-patient interaction and patient trust, informing the development of targeted interventions and communication strategies aimed at improving patient outcomes and healthcare quality (Hair et al., 2019).

Measures

In this study we have taken four variables. The independent variable; quality of physician-patient interaction and dependent variable; patient trust. While treatment satisfaction was used as mediator and personal control as moderator of the study. Independent variable i.e, quality of physician–patient interaction is measured by using five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree) was used to obtain the respondents' responses. Fourteen items of quality of physician-patient interaction have been adopted tom in this study Bieber et al. (2010). Dependent variable i.e, patient trust is measured by using five-point Likert scale from 1 (not at all) to 5 (completely) was used to obtain the respondents' responses in this study. Nine items from the study of Thom et al. (2002) have been adopted to measure the construct of patient trust. Mediator i.e, treatment satisfaction is measured by using five-point Likert scale from 1 (very dissatisfied) to 5 (very satisfied) was used to obtain the respondents' responses in this study. Four items were adopted from the study of Nagpal et al. (2022) to measure the construct of treatment satisfaction. Moderator i.e, personal control is measured by using five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree) was used to obtain the respondents' responses in this study. Four items were adopted from Moss et al. (2022) to measure the construct of personal control.

Results

Respondent Demographic Profile

The respondent's demographic information shows that most of the respondents (53%) were male; female respondents were about (47%) of the sample. The age of the majority is under the age of 40. The marital status data indicates that singles form the largest group, followed by married individuals. There's a smaller number of divorced individuals and widow in the sample (Table 1).

Table 1: Respondents' Demographic Profile

Variable	Category	Frequency

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Age	20-30	47
	31-40	85
	41-50	115
	51-60	45
	More than 60	21
Gender	Male	165
	Female	148
Marital Status	Single	49
	Married	223
	Divorced	11
	Widow	29
	Others	1

Univariate Descriptive Analysis

Table 2 shows the results of the univariate descriptive analysis. The results indicated that the score of each measuring item of the variables was within the acceptable skewness and kurtosis ranges, which indicated normality.

Table 2: Univariate Normality

Name	Mean	Standard deviation	Excess kurtosis	Skewness
PPI1	3.728	1.144	0.133	-1.008
PPI2	3.639	1.304	-0.742	-0.732
PPI3	3.93	1.067	0.914	-1.206
PPI4	3.182	1.475	-1.455	-0.227
PPI5	3.952	0.999	0.923	-1.16
PPI6	3.824	1.174	-0.299	-0.881
PPI7	3.185	1.462	-1.45	-0.201
PPI8	3.796	1.187	0.017	-0.969
PPI9	3.534	1.335	-0.837	-0.655
PPI10	3.613	1.376	-0.776	-0.76
PPI11	3.684	1.289	-0.653	-0.762
PPI12	3.371	1.473	-1.295	-0.435
PPI13	4.013	1.054	0.779	-1.176
PPI14	3.591	1.384	-0.939	-0.662
PT1	3.958	1.076	1.212	-1.293
PT2	3.457	1.421	-1.381	-0.325
PT3	3.885	1.175	-0.283	-0.892
PT4	3.565	1.406	-1.029	-0.609
PT5	3.591	1.368	-0.927	-0.64

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PT6	3.147	1.576	-1.537	-0.239
PT7	3.46	1.373	-0.99	-0.564
PT8	3.684	1.316	-0.937	-0.636
PT9	3.425	1.435	-1.166	-0.494
TS1	3.93	1.153	0.2	-1.08
TS2	3.773	1.263	-0.788	-0.714
TS3	3.62	1.384	-0.913	-0.682
TS4	3.275	1.575	-1.509	-0.313
PC1	3.693	1.267	-0.4	-0.856
PC2	3.76	1.327	-0.676	-0.814
PC3	3.93	1.178	0.229	-1.100
PC4	4.022	1.154	0.462	-1.197
PPI	51.042	12.517	-0.325	-0.407
PT	32.173	8.806	-0.774	-0.186
TS	14.597	4.278	-0.928	-0.364
PC	15.406	4.267	0.191	-0.999

Multivariate Skewness and Kurtosis

Table 3 shows that the output includes Mardia's multivariate skewness and kurtosis, which are measures of the overall skewness and kurtosis of the multivariate data: Mardia's Multivariate Skewness: 238.4486 with a p-value of 0.000, indicating a significant departure from normality in terms of skewness. Mardia's Multivariate Kurtosis: 1435.1952 with a p-value of 0.000, also indicating a significant departure from normality in terms of kurtosis.

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Table 3: Mardia's test (Multivariate Normality)

		p-value
Skewness	238.4486	0.000
Kurtosis	1435.1952	0.000

Measurement Model

For the examination of indicator loadings, factor loadings above 0.708 are recommended. In our study, the factor loadings (FL) ranged from 0.6 to 0.897 pointing out that these constructs have more than 50% explanatory power; which provides an acceptable range for reliability (Hair et al., 2019). The findings of the measurement model reveal that composite reliability (CR). The CR values ranged from 0.875 to 0.931 (Table 4) which met the criterion of good reliability since the threshold is from 0.70 and 0.90 (Hair et al., 2019). Composite reliability values are above 0.9 for all constructs, indicating excellent internal consistency among the indicators measuring each construct. The convergent validity was measured for the constructs; where average variance extracted (AVE) was applied to evaluate convergent validity (CV) (Hair et al., 2019). According to Fornell and Larcker (1981), the cut-off value for AVE should be above 0.50. Here, AVE values ranged from 0.494 to 0.744 (Table 4.4) illustrating that the underlying factors of the model had more than 50% explanatory power over the variance of its items. Convergent validity values vary, with Personal Control at 0.744 and Physician-Patient Interaction at 0.494, suggesting that indicators for Personal Control are more consistent in measuring the same construct compared to those for Physician-Patient Interaction.

Overall results suggest that the measurement model is reliable, with most constructs showing strong outer loadings and composite reliability. However, the convergent validity indicates that some constructs may be measured more consistently than others.

Table 4: Indicator Reliability, Composite Reliability, and Convergent Validity

Construct	**Indicator**	**Outer loadings**	**Composite Reliability**	**Convergent Validity**
Personal Control (PC)	PC1 <- PC	0.897	0.921	0.744
	PC2 <- PC	0.865		
	PC3 <- PC	0.856		
	PC4 <- PC	0.832		
Physician-Patient Interaction (PPI)	PPI1 <- PPI	0.711	0.931	0.494
	PPI10 <- PPI	0.704		
	PPI11 <- PPI	0.755		
	PPI12 <- PPI	0.736		
	PPI13 <- PPI	0.600		
	PPI14 <- PPI	0.729		
	PPI2 <- PPI	0.755		
	PPI3 <- PPI	0.578		
	PPI4 <- PPI	0.724		
	PPI5 <- PPI	0.594		
	PPI6 <- PPI	0.708		
	PPI7 <- PPI	0.741		

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	PPI8 <- PPI	0.705		
	PPI9 <- PPI	0.763		
Patient Trust (PT)	PT1 <- PT	0.669	0.908	0.523
	PT2 <- PT	0.774		
	PT3 <- PT	0.649		
	PT4 <- PT	0.773		
	PT5 <- PT	0.732		
	PT6 <- PT	0.718		
	PT7 <- PT	0.731		
	PT8 <- PT	0.747		
	PT9 <- PT	0.706		
Treatment Satisfaction (TS)	TS1 <- TS	0.834	0.875	0.638
	TS2 <- TS	0.829		
	TS3 <- TS	0.830		
	TS4 <- TS	0.692		

Measurement Model

Discriminant Validity

Table 5 shows the measurement model analysis by applying Heterotrait-monotrait (HTMT) ratio the discriminant validity was assessed. The values indicate that each construct shares more variance with its indicators than with other constructs. Overall, the model suggests that the constructs are well-defined and exhibit good discriminant validity.

Table 4.5

	PC	PPI	PT
Patient-Physician Interaction (PPI)	0.301		
Patient Trust (PC)	0.303	0.857	
Treatment Satisfaction (TS)	0.288	0.730	0.830

Hypotheses Testing

Table 6 shows the structural model analysis. The hypotheses test results were obtained by running bootstrapping with the setting of, 10000 subsamples to evaluate the structural model along with the hypotheses one by one. The standardized path coefficients obtained from bootstrapping show that physician-patient interaction had a significant positive relationship with patient trust (0.547; $p < 0.01$), lending support to H1. On the contrary, the path coefficients from physician-patient interaction to treatment satisfaction (0.639; $p < 0.01$) was positive and significant; hence, H2 is supported. The path coefficients from treatment satisfaction to patient trust (0.347 $p < 0.01$) had a significant relationship. Therefore, the treatment satisfaction has a significant and positive influence on patients' trust, thus, H3 is accepted. Based on the report of mediating effects in Table 4.6, the findings revealed that treatment satisfaction mediates the effect of physician-patient interaction on patient trust. The standardized path coefficient of personal control had a link with physician-patient interaction and there is insignificant relationship with patient trust (-0.017 $p > 0.01$) hence, H5 is not accepted. Thus, H1, H2, H3 and H4 are accepted. The table suggests that physician-patient interaction has a significant

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direct effect on patient trust and a significant mediating effect through treatment satisfaction. Personal control does not appear to have a significant direct effect on patient trust, nor does it significantly moderate the relationship between physician-patient interaction and patient trust.

Table 6: Hypotheses Testing

	Beta Coefficient	**Sample mean (M)**	**Standard Error**	**T statistics**	**P values**	**LCI**	**UCI**
Direct Effect							
*PPI -> PT	0.547	0.553	0.062	8.785	0.000	0.443	0.648
Moderating Effect							
*PC x PPI -> PT	-0.017	-0.015	0.041	0.409	0.341	-0.086	0.048
Mediating Effect							
*PPI -> TS -> PT	0.222	0.218	0.038	5.910	0.000	0.161	0.284

*Personal Control (PC), Patient-Physician Interaction (PPI), Patient Trust (PC), Treatment Satisfaction (TS)

Importance Performance Metrics

Table 7 shows that treatment satisfaction's impact on patient trust is moderately important, its performance is quite high with an importance score of 0.347 and a performance score of 67.584, this suggests that that current efforts in this area are effective. The impact of physician-patient interaction on treatment satisfaction has a high importance score of 0.639, but the performance score isn't provided. Given the high importance, it's crucial to ensure that physician-patient interaction influence on treatment satisfaction is performing well. The relationship of physician-patient interaction and patient trust has the highest importance score of 0.769 with a performance score of 66.354, indicating that it's very crucial and performing reasonably well, but there might be room for improvement.

The impact of personal control on patient trust has a low importance score of 0.044, it has the highest performance score of 70.56. This indicates that while personal control direct impact on patient trust might not be critical, it's performing exceptionally well. In summary, the importance performance analysis results suggest focusing on improving the performance of highly important factors, particularly where the performance scores are lower.

Table 7: Importance-Performance Matrix

	Importance	Performance
*TS -> PT	0.347	67.584

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*PPI -> TS	0.639	
*PPI -> PT	0.769	66.354
*PC x PPI -> PT	-0.017	
*PC -> PT	0.044	70.560

*Personal Control (PC), Patient-Physician Interaction (PPI), Patient Trust (PC), Treatment Satisfaction (TS)

Effect Size (f^2)

Personal control on patient trust, the effect size is 0.005, which indicates a very weak relationship or effect from Personal control to patient trust. Physician-patient interaction on patient trust, the effect size is 0.537, suggesting a moderate to strong relationship or effect from physician-patient interaction to patient trust. Physician-patient interaction to treatment satisfaction with an effect size of 0.689, this indicates a strong relationship or effect from physician-patient interaction to treatment satisfaction. Treatment satisfaction on patient trust with effect size is 0.223, which points to a weak to moderate relationship or effect from treatment satisfaction to patient trust. In summary, the strongest effect is observed between physician-patient interaction and treatment satisfaction, followed by physician-patient interaction and patient trust. The effect between treatment satisfaction and patient trust is weaker, and the relationship between personal control and patient trust is very weak.

Table 8: Effect size

	f-square
*PC -> PT	0.005
*PPI -> PT	0.537
*PPI -> TS	0.689
*TS -> PT	0.223

*Personal Control (PC), Patient-Physician Interaction (PPI), Patient Trust (PC), Treatment Satisfaction (TS)

Discussion

The constructs for physician and patient interaction consist of four variables (physician-patient interaction, patient trust, treatment satisfaction and personal control). In terms of a causal relationship between physician and patient. The PLS algorithm found no significant correlations between physician-patient interaction and patient trust. In addition, the findings also identified that physician-patient interaction and patient trust are mediated by the effect of treatment satisfaction. Their study demonstrated that quality of physician-patient interaction was a significant factor in patient trust, suggestive of a change toward hedonic appreciation in a traditionally utilitarian service environment setting, particularly healthcare. These sensorial factors further have consequential impacts on the patients' treatment satisfaction, especially when they encounter some sort of discomfort that impairs their personal control. The evaluation of patient trust relies heavily on physician-patient interactions. Hence, it does not come as a surprise that physician-patient communication positively affects patients' trust. The findings highlight the significance of

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friendly and comfortable communication; for instance, the capability to convey friendliness and a sense of caring by the healthcare provider as well as the internal physician toward patients. The findings of the study point to the links between physician-patient interaction and patient trust. These outcomes are aligned with prior studies. The physician-patient relationship is an important component of high-quality care. Trustful physician-patient relationships are associated with high disclosure of information, patient adherence and satisfaction, better health outcomes, and fewer lawsuits.

Conclusion

The constructs of physician-patient interaction, patient trust, treatment satisfaction, and personal control are crucial variables in understanding the dynamics of healthcare relationships. Although the PLS algorithm found no direct significant correlations between personal control and patient trust. The study underscores the importance of high-quality physician-patient interactions as a significant factor in building patient trust, indicating a shift towards valuing hedonic elements in healthcare environments. These interactions are particularly impactful on treatment satisfaction, especially when patients experience discomfort that affects their sense of personal control. Effective physician-patient communication, characterized by friendliness and genuine care, is vital for fostering trust. Trustful relationships between physicians and patients lead to greater information disclosure, adherence to treatment plans, higher satisfaction, better health outcomes, and reduced litigation. These findings align with previous research, reaffirming the essential role of the physician-patient relationship in delivering high-quality healthcare.

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