JOURNAL OF
EMERGING INVESTIGATORS

Article

The effect of patient perception of physician on patient compliance

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SUMMARY

The patient-physician interaction is a crucial aspect of treatment, and patient perception of the physician can significantly impact the treatment outcome. Patient compliance is a significant factor in treatment outcomes, and past research has identified a connection between patient satisfaction and treatment adherence. However, an individual's perception of their physician does not necessarily correspond directly to satisfaction, and thus, there is a lack of literature on the direct link between perception and compliance. In this study, we examined the effect of how patients perceive their physician on their compliance with physician directions. We hypothesized that those indicating more positive perceptions of their physician would demonstrate higher compliance rates than those with more negative perceptions. The patients anonymously analyzed were those visiting local medical offices during the collection period, and each patient received a short paper survey using the multiple-choice Likert scale to query perception, compliance, and additional factors. The survey also included free-response questions to collect patients' demographic information. We calculated a weighted average incorporating individual responses and other correlating factors to provide more comprehensive results for all responses on perception or compliance. Our hypothesis was highly supported, with the data displaying a positive correlation between perception and compliance scores, indicating an association between the two. Our study's outcomes offer a myriad of applications for the healthcare system regarding treatment adherence and patient satisfaction and provide a foundation for further research to improve patient compliance and outcomes through patient perception.

INTRODUCTION

Within the dynamic healthcare landscape, treatment success is highly dependent upon patients adhering to medical regimens, which is often difficult to achieve (1). The interaction between patients and physicians plays a pivotal role, as a positive and supportive relationship can promote satisfaction and compliance while also fostering treatment-focused mindsets (2). However, even while the patient-physician relationship is positive, not all patients comply with treatment recommendations. One factor that may explain why patients do not adhere to regimens despite the benefits is patient perception. In this study, patient perception refers to a patient's view of the overall care provided by their physician and can range from very positive to very negative, depending on the patient's subjective view of a particular physician. Additionally, patient compliance, defined as how accurately the patient's actions regarding treatment correspond to physician's directions, is a complex phenomenon that can be affected by a myriad of elements, many of which vary by patient or have not been previously investigated (3). We thus sought to identify the connection between the perceived qualities of healthcare providers and the extent to which patients follow medical advice.

In this study, we asked patients of various medical offices about their perception of their physician using six 1–5 Likert scale questions. A Likert scale is a rating system that measures opinions or perceptions on a certain topic by providing respondents with a range of answer options. We also analyzed the compliance of these patients using a second series of Likert scale questions regarding several aspects of treatment adherence. Because compliance depends on many elements, we utilized several additional questions to identify the presence of economic, personal, social, and other factors. We hypothesized that individuals with more positive perceptions of their physicians would be more likely to comply with medical recommendations. The results confirmed a modest correlation between perception and compliance, as patients who viewed their physicians more favorably generally reported higher adherence to medical instructions. However, perception only accounted for a small portion of compliance variability, suggesting that other factors also play significant roles in influencing patient behavior.

RESULTS

A total of 118 patients from three Northwest Florida general clinic medical offices participated in this study. Patients predominantly visited the clinics for follow-up appointments and various diagnostic tests for cardiac, geriatric, or head and neck care. Regarding these participants' demographics, the ages ranged from 31 to 92 years old, with a mean age of 65, and the gender distribution was nearly equal, with 62 male and 56 female participants (**Table 1**). In addition, there was minimal variation in race, with the overwhelming majority of participants (approximately 85%) reporting themselves as white.

We calculated perception and compliance scores on a scale from one to five for each patient using weighted averages of survey responses. The perception score was derived from responses to questions about the physician's sociability, competence, concern, relatability, accommodation, and friendliness. We adjusted scores for competence, relatability,

https://doi.org/10.59720/24-104

Demographic characteristic	*n*	Percent
Gender		
Female	56	47.5
Male	62	52.5
Age		
31-40	4	3.4
41-50	11	9.3
51-60	21	17.8
61-70	40	33.9
71-80	31	26.3
81-90	10	8.5
91-100	1	0.8
Race		
White	101	85.6
Hispanic, Latino, or Spanish origin	2	1.7
Black or African-American	9	7.6
Asian	1	0.8
American Indian or Alaska Native	0	0.0
Middle Eastern or North African	0	0.0
Native Hawaiian or Other Pacific Islander	0	0.0
Mixed	5	4.2

Table 1: Sociodemographic characteristics of participants. Table displaying the demographic breakdown of survey participants, including gender, age, and race. Participants were collected from three Northwest Florida doctor's offices and were surveyed on demographics.

and accommodation based on external factor questions. Specifically, competence was adjusted by risk understanding to account for varying levels of patient comprehension, which could affect their perception of the physician's competence. Relatability was adjusted by condition insight, as greater insight into a patient's condition often implies a higher level of connection between the physician and the patient. The accommodation score was adjusted by economic factors, reflecting the increased need for accommodation among patients facing economic challenges.

The compliance score included responses related to medication compliance, apprehension, diet compliance, exercise compliance, smoking, and alcohol consumption. We modified the medication, diet, and exercise compliance scores based on motivation, personal factors, and economic considerations. We altered medication, diet, and exercise compliance using the economic factor question due to economic factors having a significant impact on a patient's ability to comply. The compliance score was calculated by weighing the responses to these questions at 80% of the final score, with the remaining 20% coming from motivation and personal factors, given their importance in patient compliance. The weighting choices were based on our judgment of the relative importance of these factors, considering the study's objectives and the impact of each factor on the measured outcomes.

Perception and compliance across age groups

We first assessed the relationship between age groups and their perception and compliance scores. There was a noticeable discrepancy in the age distribution among the surveyed participants, with the ages of 51 through 80 constituting the majority of patients. The distribution of perception and compliance scores was generally similar across age groups (**Figure 1**). For most age groups, the perception score was higher than the compliance score by less than 15%. Those who were 31 to 40 years of age demonstrated an average perception score that was lower than the average compliance score for the age group, though these values had a high standard deviation due to the small size of the group. In addition, there was not a statistically significant effect of age on perception (ANOVA, $p = 0.199$) or compliance (ANOVA, $p = 0.059$). Age did not play a statistically significant role in affecting patient perception and compliance.

Perception and compliance across racial groups

We then evaluated how race influenced perception and compliance scores. Although we sought a proportional representation of races among our participants, this was not achieved. The vast majority of our respondents reported their race as white, with under 15% of participants indicating they were of non-white descent. Despite this, average perception and compliance scores for each racial group displayed similar patterns, with perception scores uniformly greater than compliance scores (**Figure 2**). There was no statistically significant difference in perception (ANOVA, $p = 0.720$) or compliance scores between races (ANOVA, $p = 0.925$). Thus, race did not provide a significant effect on patient perception or compliance.

Perception and compliance across genders

Next, we compared perception and compliance scores between female and male respondents. The populations of male and female respondents were almost equal, with 62 male and 56 female patients surveyed. Males and females displayed similar scores, with an average perception score of approximately 4.4 and an average compliance score near 4.1 (**Figure 3**). There was no significant difference in perception

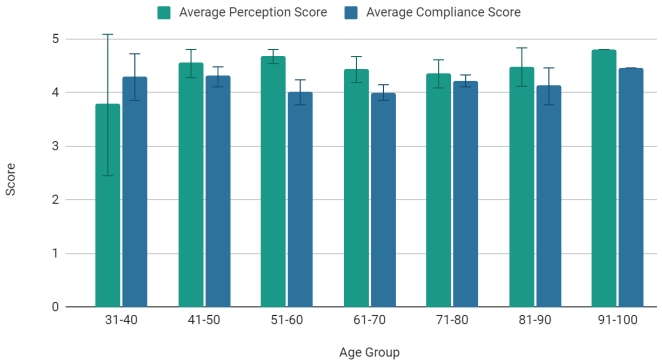

Figure 1: Perception and compliance scores across age groups. Bar graph showing average perception and compliance scores for the age groups surveyed. Error bars were calculated based on standard error of the mean. There were four participants aged 31–40, 11 aged 41–50, 21 aged 51–60, 40 aged 61–70, 31 aged 71–80, 10 aged 81–90, and one aged 91–100. Patients were surveyed on their perception of their physician, resulting compliance, and several other accompanying factors.

https://doi.org/10.59720/24-104

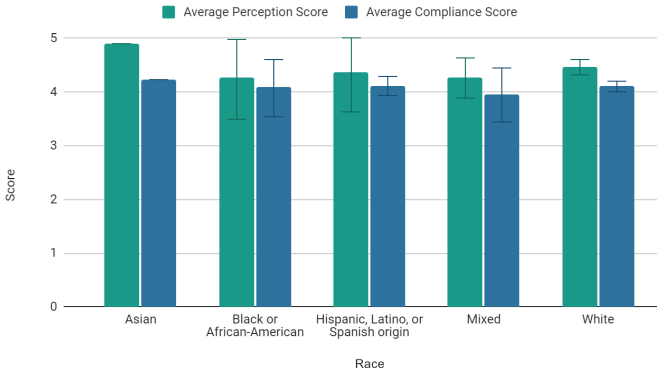

Figure 2: Perception and compliance scores across racial groups. Bar graph showing average perception and compliance scores for the races surveyed. Error bars were calculated based on standard error of the mean. There were one Asian; nine Black or African-American; two Hispanic, Latino, or Spanish; five mixed; and 101 white participants. Patients were surveyed on their perception of their physician, resulting compliance, and several other accompanying factors.

score between females and males (two sample t-test, $p = 0.786$). Additionally, there was no significant difference in compliance score between females and males (two sample t-test, $p = 0.493$). The similar scores suggested that gender had little impact on perception or compliance.

Perception and compliance comparison

Both patient perception of their physician and compliance were somewhat or very positive among all participants. We computed a Pearson correlation coefficient to assess the linear relationship between patient perception and compliance scores, finding a weak but statistically significant correlation ($p = 0.039$, $R^2 = 0.046$). The low R^2 value suggests that while the relationship was statistically significant, patient perception explained only a small part of the variability in compliance. Thus, other factors could also contribute significantly to compliance rates.

Despite this, higher perception scores tended to correspond to higher compliance scores (**Figure 4**). Over 95% of the participants reported a positive or very positive perception score equating to 3.5 or more. A similar majority, 90%, scored high or very high when asked about their compliance. Only three individuals had low or very low perception scores, though their compliance scores remained high. Additionally, there was no apparent variation in the relationship between perception and compliance based on demographic factors such as age, gender, or race.

DISCUSSION

This study explored how patient perception influences patient compliance, and the findings supported that a more positive perception correlates with a higher compliance rate. The significant limitations of this experiment included the small, homogenous sample, which contributed to the notable disparities in race and age representation and the low variation in responses. Most participants displayed both positive perceptions of their physicians and high compliance; there was minimal variability in compliance scores across participants, and the limited amount of low perception scores restricted further evaluation of a potential relationship between low perception and compliance. The scarcity of low perception scores could be attributed to multiple factors, including a potential unwillingness to complete the survey or choosing to change healthcare providers following a negative experience. Both limitations suggest that future research should target larger, more diverse populations, especially those that would contain more negative perceptions and low compliance rates, to potentially reveal more nuanced differences.

We found a modest but statistically significant correlation between perception and compliance: the R^2 value meant only 4.6% of the variability in compliance could be explained by perception scores, indicating that while there was a positive trend, other factors may also play significant roles. Multiple comparative analyses revealed minimal variation in perception and compliance scores across demographic groups, suggesting that patient perception and compliance are not significantly affected by demographics and remain consistent across different groups. It is also important to note that direct comparison of perception and compliance scores may not be methodologically sound due to variations in scoring and survey instrument design. Minor variations found during any direct comparison will thus be unlikely to have any significant implications.

Our findings contribute to the growing body of research examining patient-physician interactions by highlighting the interaction between physician traits, patient demographics, and satisfaction (4-6). While we found no significant variations in perception across demographic groups, existing research reveals important differences in patient experiences. Multiple studies have demonstrated that physician personality significantly influences patient ratings, with traits like openness and conscientiousness correlating with higher patient satisfaction (4). However, racial and ethnic disparities in patients persist, with minority patients reporting lower satisfaction ratings across multiple studies (5, 6). These may originate from multiple different factors, including potential barriers to communication, implicit biases, and differing patient expectations (5). The lower ratings among racial and ethnic minority patients suggests systemic healthcare challenges that may warrant further investigation. Future research should

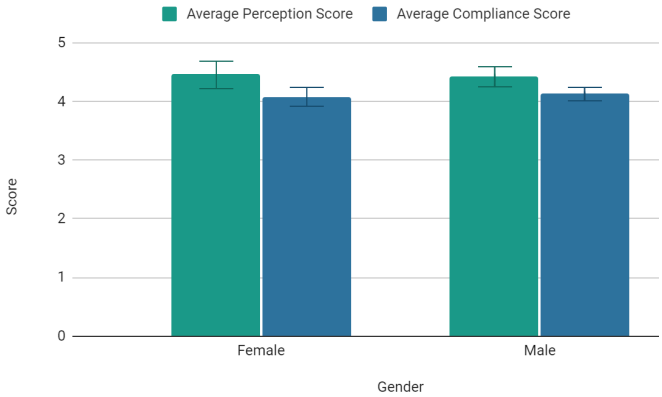

Figure 3: Perception and compliance scores across genders. Bar graph showing average perception and compliance scores for the genders surveyed. Error bars were calculated based on standard error of the mean. There were 56 female and 62 male participants. Patients were surveyed on their perception of their physician, resulting compliance, and several other accompanying factors.

https://doi.org/10.59720/24-104

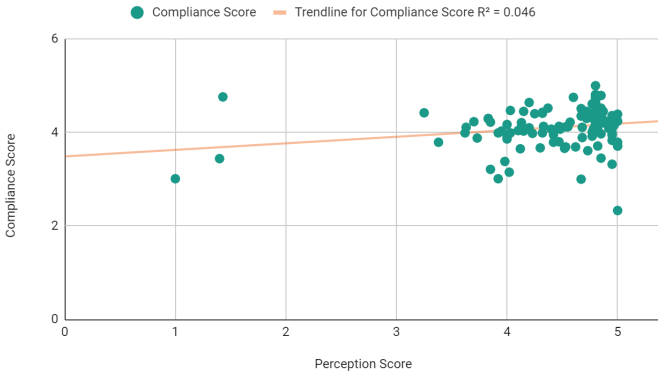

Figure 4: Correlation of patient perception and patient compliance. Scatterplot showing individual perception and compliance scores compared to one another. A line of best fit as well as the coefficient of determination R^2 are indicated. Patients were surveyed on their perception of their physician, resulting compliance, and several other accompanying factors.

focus on exploring and developing interventions that address these disparities and improve communication in healthcare settings.

The relationship between patient satisfaction and patient compliance is a critical area of healthcare research. Existing studies show the complex nature of patient adherence, emphasizing that compliance results from the interaction of patient perceptions, provider communication, and individual patient characteristics (2, 8). Patients typically evaluate compliance by weighing potential benefits against the perceived risks and constraints, including treatment side effects, time invested, and overall effort involved (8). Demographic factors also influence patient compliance, though their impact can be nuanced. Previous research identified multiple variables affecting compliance—including age, relationship status, income, race, and gender (4). However, our study suggests that individual patient-physician interactions may be more predictive of treatment adherence than demographics alone. Physician accommodation is also a particularly important factor in patient compliance. Research has indicated that patients are more likely to adhere to recommendations when they perceive their physician as accommodating and understanding (9). This highlights the important role of interpersonal dynamics and patient perception while providing medical services. While our study provided valuable initial findings, it also showed the complexity of both patient perception of their physician and patient compliance, which should be explored in the future.

Ultimately, this study addressed a gap in existing research and encourages future research on the effects an individual's perception of their physician has on their medical compliance. To ensure ease of survey completion and accurate results, we measured many, but not all, aspects of perception and compliance. Additional correlating factors could be explored in future research on a larger scale, potentially revealing a more nuanced connection between patient perception and compliance. It is especially important to explore all of the varying patient perceptions and rates of compliance with a more heterogenous sample, since in doing so, further insights for the general population could be revealed. This experiment also laid a foundation for further research to be conducted in this field, where a variety of diverse factors could be explored that may potentially affect a patient's perception and compliance. From a policy perspective, these insights may inform the development of guidelines that prioritize patient-centered care approaches. By integrating patient perception assessments into routine healthcare practices, institutions can potentially enhance patient satisfaction and treatment outcomes. Patients can better understand how their perception affects their treatment results, physicians can adopt strategies to improve patient perception, and local offices can enhance communication skills training for physicians. Understanding the impact of patient perception on compliance as part of many interacting factors could inform public health strategies aimed at improving healthcare outcomes through targeted interventions, fostering trust, and creating supportive healthcare environments.

MATERIALS AND METHODS

This study was initiated by first designing a survey to collect data while maintaining the confidentiality and anonymity of the participants (see appendix for survey questions). Although the survey was not pilot-tested or validated, the questions were based on previously tested surveys on similar topics (7). The 20-question survey, taking 15–20 minutes to complete, was divided into four sections. The first section covered demographics such as age, gender, and race. The second section assessed patients' perceptions of their physician using 5-point Likert scales to rate sociability, competence, concern, relatability, and accommodation of the physician. The third section used Likert scales to measure compliance with medication and lifestyle recommendations. The fourth

Trait	Weight		Example
Sociability	16.7%		4
Competence	80%	Total Weight: 16.7%	4
Risk Understanding	20%		3
Concern	16.7%		3
Relatability	70%	Total Weight: 16.7%	4
Condition Insight	30%		4
Accommodation	70%	Total Weight: 16.7%	3
Economic Factors	30%		3
Friendliness	16.7%		4
Final Score	**1 (Highly Negative) - 5 (Highly Positive)**		**3.63 (Somewhat Positive)**

Table 2: Perception score calculation. Table displaying weights applied to Likert scale responses when calculating a weighted average for perception values, with a score of one corresponding to a highly negative perception and five corresponding to a highly positive perception. Percentage weights are shown, with the left column of weights showing two scores that combine to a total weight. Total weights were calculated into a weighted average, and an example set of scores and their calculated average are provided for reference in the "Example" column. We administered six agreement-based 5-point Likert scales and surveyed sociability, competence, concern, relatability, accommodation, and friendliness of the physician. Risk understanding scores were weighed as 20% of the competence scores, and condition insight and economic factors were weighed as 30% of the relatability and accommodation scores due to their higher impact on the respective factors. We then averaged all six scores together with equal weights of 16.7%.

https://doi.org/10.59720/24-104

section examined external factors influencing responses, including condition knowledge, risk understanding, compliance motivation, and economic and personal factors. Three local doctor's offices were contacted for permission to use their patients as participants in the experiment, and a plan of action was coordinated with the front desk staff. All patients who visited the three offices during the four-week collection period were offered the opportunity to participate in the study. There were no specific selection criteria, and participation was voluntary, which aimed to capture a representative sample of the patient population. After data collection, completed forms were retrieved, and the data was analyzed to identify correlations between patient perception and compliance.

In the interest of consolidating data for ease of analysis, two scores were calculated for each participant using responses to all four sections of the survey. The first score measured the positivity of the patient's perception of their physician and was mainly based on the 5-point Likert scale responses to the perception section. Questions five, seven, and eight measured perceived competence, relatability, and accommodation; the score for these questions were modified using a weighted average to combine original responses and responses to questions sixteen, seventeen, and nineteen, surveying insight, risk understanding, and economic factors, respectively. The modified values were then averaged to produce a single score for perception, with a score of five corresponding to highly positive perception and a score of one corresponding to highly negative perception (**Table 2**). The equation used to calculate the perception score is as follows:

$$Perception = \frac{1}{6}(Sociability + 0.8Competence + 0.2Risk\ Understanding + Concern + 0.7Relatability + 0.3Condition\ Insight + 0.7Accommodation + 0.3Economic\ Factors + Friendliness)$$

Rather than use a full weight for certain factors, such as competence, we decreased the weights and combined them with other surveyed factors, such as risk understanding.

The second score measured participants' compliance rate, and a similar method was employed (**Table 3**). Responses to the frequency-based Likert scales were converted into a numerical value based on their indication of compliance. Questions ten, twelve, and thirteen surveyed medication, diet, and exercise compliance; these scores were modified using the score for economic factors. All of the compliance responses were then factored into a weighted average along with responses to motivation and personal factor questions. The equation used to calculate the compliance score is as follows:

$$Compliance = \frac{2}{15}(0.7Medication + Apprehension + 0.7Diet + 0.7Exercise + Smoking + Alcohol + 0.9Economic\ Factors) + \frac{1}{10}Motivation + \frac{1}{10}Personal\ Factors$$

Economic factors were weighed at 30% of the medication, diet, and exercise scores, adding up to a weight of 0.9. Motivation and personal factor scores were each 10% of the total score with the aforementioned compliance questions weighing 80% of the total score. The 2/15 proportion indicates the 1/6 used for the average multiplied by the 80% weighting. In addition, if the respondent indicated they were 81 years of age or older, the exercise question was removed entirely from the score to avoid incorrectly interpreting the responses.

Trait	Weight		Example
Medication	70%	Total Weight: 13.3%	3
Economic Factors	30%		5
Apprehension	13.3%		2
Diet	70%	Total Weight: 13.3%	5
Economic Factors	30%		5
Exercise	70%	Total Weight: 13.3%	2
Economic Factors	30%		5
Smoking	13.3%		5
Alcohol	13.3%		5
Motivation	10%		4
Personal Factors	10%		5
Final Score	**1 (Very Low) - 5 (Very High)**		**4.03 (Somewhat High)**

Table 3: Compliance score calculation. Table displaying weights applied to scores when calculating a weighted average for compliance values, with a score of one corresponding to a very low compliance and five corresponding to a very high compliance. Percentage weights are shown, with the left column of weights showing two scores that combine to a total weight. Total weights were calculated into a weighted average, and an example set of scores and their calculated average are provided for reference in the "Example" column. We administered six agreement-based 5-point Likert scales and surveyed medication, apprehension, diet, exercise, smoking, and alcohol-related compliance. Economic factor scores were weighed as 30% of the medication, diet, and exercise scores due to the extensive impact of spending and income on these factors. We then averaged all six scores together with equal weights of 13.3% for a total of 80%, then averaged them with scores on motivation and personal factors to account for changes to compliance rates. If the respondent was eighty years of age or older, the modified exercise question was not included in the average.

Following the calculation of the weighted perception and compliance scores, multiple statistical tests were performed to facilitate data interpretation. The significance level was set to $\alpha = 0.05$ and was utilized to perform the Grubbs' test to identify potential outliers in the dataset. Only one outlier was identified, which was considered an isolated case with minimal influence on the overall results. Next, the Pearson correlation coefficient was computed to assess the linear relationship between patient perception and compliance using Google Sheets, and the significance was evaluated by calculating the p-value. Additionally, several one-way ANOVA tests were conducted to examine differences in perception and compliance scores across the races and age groups, and two-sample t-tests were performed to compare perception and compliance scores between genders.

Received: April 24, 2024
Accepted: July 17, 2024
Published: March 14, 2025

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