Medication Concordance of Low-Income, Hispanic Patients at a Volunteer Clinic

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ABSTRACT

Among the Hispanic/Latino communities in the United States, medication adherence is lower than white, non-Hispanic and other minority communities. Although medication adherence has been studied extensively, little research has studied medication concordance, or patients' perceived understanding of medication specifics compared to their actual understanding. A sample of 50 Hispanic/Latino participants was taken from a volunteer, low-income clinic in St. George, UT. Overall, low concordance was seen with medication dosages and side effects.

Participant concordance with medication indications and side effects was significantly associated with provider trust, concordance with medication indication was significantly associated with taking medications as prescribed, and concordance with medication specifics was associated with participant language proficiency and preferences. These findings show a quantitative measure of patient medication concordance and its association with healthcare outcomes, reinforcing the need for increasing patient trust, educating patients on medication specifics, and addressing language barriers.

Keywords: *Medication Adherence, Hispanic or Latino, Risk Factors, Patient-Centered Care, Trust, Medication Concordance*

1. Introduction

According to National Data, there are roughly 62.1 million registered Latinos living in the United States, comprising 18.9% of the total population.[1] When compared to the health of non-Hispanic Whites, Hispanics/Latinos are at higher risk of developing obesity, lower respiratory diseases, liver disease, influenza, pneumonia, kidney disease and suicide.[2] A contributing factor to this perceived lower quality of health is suspected to be medication adherence.[3] Medication adherence refers to patients taking their medications as prescribed by their physician and following correct medication instructions (e.g., dosage, frequency).[4] Medication adherence is crucial to eradicate infection, maintain health status, and prevent worsening of disease.[3] Medication adherence of Hispanic patients in the United States is much lower than non-Hispanic whites and contributes to increased healthcare disparities.[3] Many factors contribute to lower adherence rates including demographics,[5] socio-economic status,[3] and language barriers.[6]

Medication adherence has been studied extensively in the Hispanic population. Research articles that study adherence across diseases (e.g., diabetes,[7] hypertension[3]) and risk factors (e.g., costs,[8] discrimination,[3] language barriers[9]) demonstrate the disparities of minority communities in comparison to the white, non-Hispanic population. Studying risk factors of medication adherence can identify areas for improved patient healthcare outcomes. Many risk factors, such as patient understanding[10] and confidence,[11] influence medication adherence and can be directly addressed by physicians.

Physicians often overestimate patient medication concordance[12] due to factors such as language barriers.[5] In a study on diabetes, patients with Limited English Proficiency (LEP) who were paired with language-discordant physicians were

more likely to have poor glycemic control compared to LEP patients with language-concordant physicians.[12] While pharmacists have a multidisciplinary goal in helping patients maintain adherence to medicine,[13] physicians are often the primary source of information for patients and can supplement the information provided from the pharmacist.[14] Therefore, measuring medication concordance and identifying areas for improvement, from a clinical perspective, is crucial to improving Hispanic/Latino patient care.

A study evaluating medication adherence and concordance amongst low-income Hispanic patients reported variations in participant perceived and actual comprehension of healthcare instructions, demonstrating an overestimation of comprehension in most areas.[15] Of interest, participants showed lower understanding of medication dosage and side effects. Another study demonstrated that 87% of caregivers thought it was easy to remember medication names, yet only 46% of reported names were concordant.[16] As patient understanding of medications is an integral part of medication adherence, more research is warranted to identify concordance variations in other populations. Therefore, our aim in this study is to measure the medication concordance of low-income Hispanic patients at a free clinic to further the evidence of its relation to adherence. Patients arguably have the most impactful role in medication adherence and dissonance in their ability to fully understand the specifics of their medications can have negative impacts on their adherence and healthcare outcomes.

2. Methods

Participants

Participants were recruited from the Doctor's Volunteer Clinic, a low-income clinic serving those without insurance. The clinic is located in St. George, UT, a city that is 12.5% Hispanic.[1] After completion of survey collection, medication lists were taken from the clinic's electronic health record system for comparison. Participant information was de-identified with numerical IDs before analyses began. Inclusion criteria included being Hispanic, a patient treated at the Doctor's Volunteer Clinic in St. George, UT, Spanish or English speaking, 18 years or older, taking prescribed medications, and being able to answer the questionnaire on their own (excluding interpretation, writing capabilities, or technological capacity). Exclusion criteria included being a non-Hispanic, non-patient being treated at the Doctor's Volunteer Clinic in St. George, UT, speaking a language other than Spanish or English, being younger than 18 years of age, and not taking prescribed medications. The Doctor's Volunteer Clinic in St. George, UT follows these additional criteria for its patients: patients must not have private insurance or government-provided insurance, such as Medicaid or Medicare, and patients must meet the financial guidelines of living 200% below the federal poverty level.

Survey

Data was collected through paper, electronic, and verbal survey formats. All paper and verbal data points were entered into Qualtrics for data analysis alongside the electronic entries. The survey was designed to investigate medication concordance, an understudied risk factor for medication adherence in the Hispanic population. The survey questions were created part in de novo and part by following validated and published questionnaires, including the Care Transitions Measure (CTM),[17] Trust in Physician Scale,[18] and adapted medication questions[15]. The survey was translated by advanced working proficiency and native speaking investigators into Spanish and administered in the preferred language of the participants by the same bilingual researchers. The surveys are available in English and Spanish as Supplementary materials.

Statistical Analysis

All analyses were performed on SAS STAT v.9.4. (SAS Institute Inc. Cary NC). Descriptive statistical frequencies, means and deviation were calculated for all variables using PROC FREQ or PROC MEANS. Associations for continuous variables were evaluated using Wilcoxon Rank Sum Score nonparametric tests using PROC NPAR1WAY and Spearman's correlation tests PROC CORR, non-parametric tests were used because normality assumption were not met. Statistical significance was declared at $p \leq 0.05$.

Results

Data from a total of 50 participants were collected over a period of 5 months from August to December in 2023. Twenty-eight participants (56%) were male and 22 (44%) were female (Table 1). Most were married, with a mean age of 45

years, and with a high school education. Participants were overwhelmingly of Mexican descent [34 (73.9%)] and 68.9% reported not having a primary care doctor. Nearly all participants spoke Spanish as a native language (95.8%) and more than half preferred to speak Spanish (63.6%). Self-reported English proficiency varied among participants. Spoken English proficiency was nearly identical between positive (well, very well) and negative (not well, not at all) responses [25 (51%) and 24 (49%) respectively]. Nearly the same was observed with English reading proficiency, although there were more participants that answered, "not at all". A majority of participants stated their doctor spoke their preferred language during the encounter (62%) and did not use an interpreter during the visit (56%). Twenty-eight participants (58%) did not receive any written instructions after their visit and, of those who received written instructions, 14 (70%) received instructions in their preferred language.

Table 1: Participant Demographics, Language Preferences, and Clinical Encounter Details

Category	Frequency (%) N = 50	Preferred Language	
		English	11 (25)
Sex		Spanish	28 (63.64)
Female	22 (44)	Both	5 (11.36)
Male	28 (56)	No answer	6
Marital Status		**English Speaking Proficiency**	
Married	18 (60)	Not at all	7 (14.29)
Single	12 (40)	Not well	18 (36.73)
No answer	20	Well	12 (24.49)
Highest Education Level		Very Well	12 (24.49)
K12	15 (340.09)	No answer	1
High School	22 (50)	**English Reading Proficiency**	
Higher Education	7 (15.91)	Not at all	11 (23.4)
No answer	6	Not well	12 (25.53)
Birthplace		Well	12 (25.53)
Chile	1 (2.17)	Very Well	12 (25.53)
El Salvador	2 (4.35)	No answer	3
Guatemala	5 (1.87)	**Doctor Spoke Preferred Language**	
México	34 (73.91)	Yes	31 (62)
USA	3 (6.52)	No	19 (38)
Venezuela	1 (2.17)	**Used an Interpreter for the Visit**	
No answer	4	Yes	22 (44)
Have a Primary Care Doctor		No	28 (56)
Yes	14 (31.11)	**Did you receive written instructions?**	
No	31 (68.89)	Yes	20 (41.67)
No answer	5	No	28 (58.33)
Native Language		No answer	2
English	2 (4.17)	**Were the written instructions in your preferred language?**	
Spanish	46 (95.83)	Yes	14 (70)
No answer	2	No	6 (30)
	Table continues…		

3. Self-Reported Confidence and Medication Concordance

The rating scale was converted numerically for analysis (not at all = 1, not well = 2, well = 3, very well = 4). Participant self-reported confidence was very high in all categories (Table 2). Subsequent comparison of reported versus documented medication specifics showed decreases across nearly all categories with the largest decrease in dosages and side effects. The highest variation in concordance was seen in medication name (standard deviation=0.432).

Table 2: Participant confidence and concordance of medication specifics [mean (standard deviation)]

	Name	Indication	Dosage	Frequency	Side Effects
Confidence	0.840 (0.252)	0.904 (0.186)	0.840 (0.255)	0.888 (0.21)	0.788 (0.26)
Concordance	0.681 (0.432)	0.909 (0.292)	0.301(0.405)	0.640 (0.423)	0.154 (0.349)

We analyzed medication concordance scores with participant age, self-reported trust in physician, self-reported adherence to medications, and number of medications using Spearman Correlation Coefficients (Table 3). Concordance to medication indication was significantly associated with both trust in the doctor (p<0.0001) and taking medications as prescribed (p<0.0001). Concordance with medication frequency was also significantly associated with trust in the doctor (p<0.01). Age, number of medications, medication name, medication strength, and medication frequency did not show any significant associations.

Using Wilcoxon Rank Sum Scores, we compared medication concordance data with participant data from Table 1. Participants with higher self-reported English reading proficiency had higher medication side effect concordance (Pr>ChiSq 0.046). Participants who received written instructions in their preferred language had higher concordance with medication side effects and indication (Pr>ChiSq 0.053 and Pr>ChiSq 0.025, respectively). All other analyses did not present significant association scores.

Table 3: Spearman's correlation coefficients (rho) and p values for medication concordance variables compared with participant measures variables. Statistically significant correlations are indicated by an asterisk (*).

	Patient Age	Patients reports trusting the doctor	Patient reports taking Medication as Prescribed	Number of Medications
Medication name	ρ=0.067 P=0.641	ρ=0.038 P=0.7944	ρ=0.190 P=0.1863	ρ=0.193 P=0.1786
Medication indication	ρ=-0.197 P=0.1709	ρ=0.610 P<0.0001*	ρ=0.547 P<0.0001*	ρ=0.046 P=0.7512
Medication dose strength	ρ=-0.079 P=0.5844	ρ=0.221 P=0.1236	ρ=0.081 P=0.5763	ρ=-0.005 P=0.9716
Medication usage frequency	ρ=-0.53 P=0.7147	ρ=0.250 P=0.0795	ρ=0.124 P=0.3923	ρ=0.033 P=0.8219
Medication side effects	ρ=0.157 P=0.2776	ρ=0.385 P=0.0058*	ρ=0.339 P=0.0160	ρ=0.013 P=0.9302

4. Discussion

Our research focuses on analyzing patients' perceived knowledge of medications to the actual medication information (i.e., medication concordance) as a component of Hispanic medication adherence. Previous research suggests that Hispanic patients would score low on concordance in most domains.[15] However, we find that only two categories show low concordance - dosages and side effects.

Participant concordance with medication indications and side effects is significantly associated with provider trust. The more trust the participant had with their provider, the more likely they were to identify the purpose for taking a medication and recognize side effects that may occur from taking the medications. These findings provide a qualitative assessment of medication concordance in association with a participant's trust in the healthcare system that has not yet been described in the literature, nor has it been studied in an underserved, Hispanic population. This data demonstrates the potential for improved patient medication adherence through competent and empathetic care. Healthcare professionals seeking to improve adherence should focus on the patient-physician relationship to promote outcomes.

Concordance with medication indication is also significantly associated with taking medications as prescribed. This is an expected result; participants who do not understand the reason for taking a medication may be less likely to continue taking said medication.[19] It may be that those who are struggling with medication adherence would benefit from education related to the medication's purpose. Providers might consider using teach-back methods to identify patients at risk of non-adherence and ensure adequate understanding of medications.[20]

Our data shows associations between participant language proficiency and preferences with medication specifics. Those who reported higher English reading proficiency better understood side effects. This is expected; patients often receive written instructions regarding their medications[21] and those who are better able to read these handouts would be more aware of potential medication side effects. Additionally, participants who received written instructions in their preferred language may have better understood medication side effects and indications. These findings provide evidence suggesting that participants who are less comfortable using or unable to use a language different than their preferred language may

have less comprehension of instructions they receive, regardless of the method of communication. Physicians should strive to eliminate language betters to promote better medication understanding and adherence.

These findings have clinical applications. As discussed, understanding of medication specifics is associated with trust in the healthcare provider and improved medication adherence. Healthcare providers can find ways to improve trust with their patients which may improve their understanding of side effects and the purpose for taking medications, therefore improving adherence. Additionally, patient education on medication indications may also improve adherence and patient healthcare outcomes. Finally, the effects of language barriers should be addressed by healthcare systems to improve patient medication understanding, specifically regarding side effects and indications. For those who are not proficient in reading English, Spanish-language written and/or verbal instructions should be provided to ensure adequate understanding.

Our study has limitations. The sample size is small compared to larger studies on adherence. However, for this specific population and the unique aspects of medication concordance studied, data from 50 participants is comparable to other studies.[22–24] Additionally, the data was self-reported by participants. This may over- or underestimate the confidence levels of patients; in the future, pharmacy records or other quantitative methods could be used to improve reporting.

Future studies should focus on interventions to improve medication adherence and increase patient concordance. Methods for trust-building between physicians and Hispanic patients can be studied with medication concordance to identify the most successful interventions to bridge perceived and reported understanding. Additionally, methods of patient education on medications in the physician's office, especially on side effects and indications, should be studied (e.g., defining which methods of teaching help patients to retain information regarding medications more effectively). Alternatively, researchers could collaborate with physicians and pharmacists to create novel programs to increase patient concordance in the physician's office and reinforce understanding through subsequent pharmacy education.

5. Conclusion

Medication adherence is low among Hispanic/Latino populations living in the United States and little research has studied medication concordance as a contributing factor. This study is the first we are aware of that studies medication concordance, medication adherence, and healthcare interactions among low-income, Hispanic/Latino patients. Overall, participants show lower concordance with medication dosages and side effects. First, there are significant associations between provider trust and concordance with medication indications and side effects, indicating that improved trust with patients may improve adherence and understanding. Next, concordance with medication indication was associated with taking medications as prescribed. Addressing patient misunderstanding or lack of understanding of medication indication may also improve adherence. Finally, there is an association between language proficiency and preference and understanding of medication side effects. Addressing language barriers may improve patient understanding and therefore adherence and healthcare outcomes. These findings demonstrate that the quantitative measure of medication concordance is an area of interest to explore medication adherence and is something that may be addressed to improve adherence rates for Hispanic/Latino patients in the United States.

Supplementary Materials

Supplement A: Questionnaire in English

HMC Research Questionnaire - ENGLISH
Rocky Vista University, COM; IRB #: 2022-087

What is your name?*	
What is your date of birth?*	

This information will only be used to find your chart for your visit today. All the information collected will be de-identified and your name will not appear with any of the information you provide.

Participant identifier: _____

Please answer all the following questions. If you are unsure about what a question means or how to complete a section, please ask the researcher.

What is your ethnicity?	☐ Hispanic or Latino / ☐ Not Hispanic or Latino
Where were you born?	
What is your *native* language?	
What is your *preferred* language?	
How well do you *speak* English?	☐ Not at all ☐ Not well ☐ Well ☐ Very well
How well do you *read* English?	☐ Not at all ☐ Not well ☐ Well ☐ Very well
Do you have a Primary Care doctor?	☐ Yes ☐ No

Did your doctor today speak your preferred language?	☐ Yes ☐ No
Did you use an interpreter for today's visit?	☐ Yes ☐ No
- If yes, was this interpreter a family member?	☐ Yes ☐ No
Did you receive written instructions for today's visit?	☐ Yes ☐ No
- If yes, were they in your preferred language?	☐ Yes ☐ No

Please rate your agreement with the following statements:	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. When I leave the clinic, I know the names of my medications.	☐	☐	☐	☐	☐
2. When I leave the clinic, I know the purpose for taking each of my medications.	☐	☐	☐	☐	☐
3. When I leave the clinic, I know the strength/dose of my medications.	☐	☐	☐	☐	☐
4. When I leave the clinic, I know how often to take my medications.	☐	☐	☐	☐	☐
5. When I leave the clinic, I know the possible side effects of each of my medications.	☐	☐	☐	☐	☐
6. I trusted my doctor and I will try to follow his/her advice.	☐	☐	☐	☐	☐
7. I normally take my medications as prescribed	☐	☐	☐	☐	☐
- 7a. If you do not strongly agree, what makes it difficult to take your medications as prescribed?					

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HMC Research Questionnaire - ENGLISH
Rocky Vista University, COM; IRB #: 2022-087

Are you taking any prescribed medications currently?	☐ Yes ☐ No
If yes, how many are you taking?	☐ Unsure

If you answered yes, please fill out a box for each **PRESCRIBED** medication you are taking.
DO NOT use any information **UNLESS** it was given to you at the clinic.
If you are taking more medications than you can fit on the page, please let the researcher know.

Medication #1

1. What is the name of the medication?		☐ Unsure
2. Was this medication prescribed today?	☐ Yes ☐ No	
3. Have you taken this medication before?	☐ Yes ☐ No	
- If yes, how long have you taken this for?		☐ Unsure
3. What is the medication used for?		☐ Unsure
4. What is the strength/dose of the medication?		☐ Unsure
5. How often should you take the medication?		☐ Unsure
6. How long should you take the medication?		☐ Unsure
7. What side effects can this medication cause?		☐ Unsure

Medication #2

1. What is the name of the medication?		☐ Unsure
2. Was this medication prescribed today?	☐ Yes ☐ No	
3. Have you taken this medication before?	☐ Yes ☐ No	
- If yes, how long have you taken this for?		☐ Unsure
3. What is the medication used for?		☐ Unsure
4. What is the strength/dose of the medication?		☐ Unsure
5. How often should you take the medication?		☐ Unsure
6. How long should you take the medication?		☐ Unsure
7. What side effects can this medication cause?		☐ Unsure

Medication #3

1. What is the name of the medication?		☐ Unsure
2. Was this medication prescribed today?	☐ Yes ☐ No	
3. Have you taken this medication before?	☐ Yes ☐ No	
- If yes, how long have you taken this for?		☐ Unsure
3. What is the medication used for?		☐ Unsure
4. What is the strength/dose of the medication?		☐ Unsure
5. How often should you take the medication?		☐ Unsure
6. How long should you take the medication?		☐ Unsure
7. What side effects can this medication cause?		☐ Unsure

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Supplement B: Questionnaire in Spanish

HMC Research Questionnaire - SPANISH
Rocky Vista University, COM; IRB #: 2022-087

¿Cuál es su nombre?*	
¿Cuál es su fecha de nacimiento?*	

Esta información solo se utilizará para encontrar su expediente médico de su visita de hoy. Toda la información recopilada será de forma anónima y su nombre no aparecerá.

Participant identifier: _____

Por favor, conteste las siguientes preguntas. Si no entiende una pregunta o no sabe cómo responder a una sección, pregunte al investigador.

¿Cuál es su origen etnico?	☐ Hispano o Latino / ☐ No Hispano o Latino
¿Dónde nació?	
¿Cuál es su idioma *natal*?	
¿Cuál es su idioma *preferido*?	
¿Qué tan bien *habla* el inglés?	☐ Para nada ☐ No muy bien ☐ Bien ☐ Muy bien
¿Qué tan bien *lee* el inglés?	☐ Para nada ☐ No muy bien ☐ Bien ☐ Muy bien
¿Tiene un(a) doctor(a) de atención primaria?	☐ Sí ☐ No

¿Su doctor(a) de hoy habló en su idioma preferido?	☐ Sí ☐ No
¿Usó un intérprete en la visita de hoy?	☐ Sí ☐ No
- Si es así, ¿fue un miembro de su familia?	☐ Sí ☐ No
¿Recibió instrucciones escritas en la visita de hoy?	☐ Sí ☐ No
- Si es así, ¿fueron escritas en su idioma preferido?	☐ Sí ☐ No

Por favor, margue cuanto está de acuerdo con las siguientes declaraciones:	Estoy en completo desacuerdo	No estoy de acuerdo	Estoy sin criterio	Estoy de acuerdo	Estoy en completo acuerdo
1. Al salir de la clínica, sé los nombres de mis medicamentos.	☐	☐	☐	☐	☐
2. Al salir de la clínica, sé por qué estoy tomando mis medicamentos.	☐	☐	☐	☐	☐
3. Al salir de la clínica, sé la fuerza/dosis de mis medicamentos.	☐	☐	☐	☐	☐
4. Al salir de la clínica, sé con qué frecuencia tomar mis medicamentos.	☐	☐	☐	☐	☐
5. Al salir de la clínica, yo sé los posibles efectos secundarios de mis medicamentos.	☐	☐	☐	☐	☐
6. Confié en mi doctor(a) y trataré de seguir sus consejos.	☐	☐	☐	☐	☐
7. Normalmente tomo mis medicamentos según lo prescrito.	☐	☐	☐	☐	☐
- 7a. Si no está en completo acuerdo, ¿qué es lo que le hace difícil tomar sus medicamentos según lo prescrito?					

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HMC Research Questionnaire - SPANISH
Rocky Vista University, COM; IRB #: 2022-087

¿Está tomando medicamentos recetados actualmente?	☐ Sí ☐ No
Si es así, ¿cuántos medicamentos toma?	☐ Inseguro

Si la respuesta anterior era "Sí", por favor rellene un cuadro por cada medicamento **RECETADO** que toma.
NO utilice recursos externos **A MENOS QUE** se les fueron dados por la clínica.
Avise al investigador si toma más medicamentos de lo que le permite la hoja de papel.

Medicamento #1

1. ¿Cómo se llama el medicamento?		☐ Inseguro
2. ¿Se recetó el medicamento hoy?	☐ Sí ☐ No	
3. ¿Ha tomado este medicamento antes?	☐ Sí ☐ No	
- Si es así, ¿por cuánto tiempo lo ha tomado?		☐ Inseguro
3. ¿Para qué se utiliza este medicamento?		☐ Inseguro
4. ¿Qué es la fuerza/dosis del medicamento?		☐ Inseguro
5. ¿Con qué frecuencia debe tomar este medicamento?		☐ Inseguro
6. ¿Por cuánto tiempo debe tomar este medicamento?		☐ Inseguro
7. ¿Cuáles son los posibles efectos secundarios de este medicamento?		☐ Inseguro

Medicamento #2

1. ¿Cómo se llama el medicamento?		☐ Inseguro
2. ¿Se recetó el medicamento hoy?	☐ Sí ☐ No	
3. ¿Ha tomado este medicamento antes?	☐ Sí ☐ No	
- Si es así, ¿por cuánto tiempo lo ha tomado?		☐ Inseguro
3. ¿Para qué se utiliza este medicamento?		☐ Inseguro
4. ¿Qué es la fuerza/dosis del medicamento?		☐ Inseguro
5. ¿Con qué frecuencia debe tomar este medicamento?		☐ Inseguro
6. ¿Por cuánto tiempo debe tomar este medicamento?		☐ Inseguro
7. ¿Cuáles son los posibles efectos secundarios de este medicamento?		☐ Inseguro

Medicamento #3

1. ¿Cómo se llama el medicamento?		☐ Inseguro
2. ¿Se recetó el medicamento hoy?	☐ Sí ☐ No	
3. ¿Ha tomado este medicamento antes?	☐ Sí ☐ No	
- Si es así, ¿por cuánto tiempo lo ha tomado?		☐ Inseguro
3. ¿Para qué se utiliza este medicamento?		☐ Inseguro
4. ¿Qué es la fuerza/dosis del medicamento?		☐ Inseguro
5. ¿Con qué frecuencia debe tomar este medicamento?		☐ Inseguro
6. ¿Por cuánto tiempo debe tomar este medicamento?		☐ Inseguro
7. ¿Cuáles son los posibles efectos secundarios de este medicamento?		☐ Inseguro

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