

Introduction

- **Social determinants of health** (SDoH) are non-medical factors related to a person’s specific conditions related to how they were born, grow, work, live and age and are feature that influence health outcomes.¹
- Examples of SDoH include a persons’ own experience with **income and social protection, education, employment, working life conditions, food insecurity, housing, stress levels, childhood development, social support, and access to care.**
- Inter-individual perception of pain is an important characteristic that may contribute to the expectations and outcomes of patients.
- It is unclear how a persons’ own SDoH measures are related to pain outcomes.

- **OBJECTIVE:** To understand better how these various components of SDoH may be correlated with reported pain

Methods

- This was a retrospective observational study, in which all patients with available survey data related to SDoH were analyzed from the All of Us Research Program database.²
- Survey results related to SDoH were provided from ~500,000 patients. This survey elicited numerous questions related to patient-specific experiences with various SDoH components. In addition, patients reported their average pain score experienced daily over the last 7 days (based on the Numeric Rating Scale [NRS]).
- Responses were provided on a Likert scale (1 – 5), binary responses (yes or no), numeric scale (1-15), or categorical.
- To measure association of each question using Likert scale with pain scores, the Spearman’s rank correlation co. efficient was calculated. To measure association of each question not using Likert scale, linear regression was performed, and the R-squared metric was reported. A P-value <0.001 was considered statistically significant and a correlation value ≥0.2 was considered clinically significant.
- Multivariable analysis controlled for age, sex, BMI, chronic pain, and opioid use disorder

Results

The objective of this study was to **measure correlation of various patient-reported SDoH measures with reported daily pain scores** using a national database, All of Us Research Program, which provides data from diverse patient populations across the United States.

Top 10 Questions Correlated with Increasing Pain Scores

Question	Correlation
Within the past 12 months, were you worried whether your food would run out before you got money to buy more?	0.246
Within the past 12 months, were you worried whether the food you had bought just didn't last and you didn't have money to get more?	0.238
In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0.212
In the last month, how often have you been upset because of something that happened unexpectedly?	0.198
In the last month, how often have you found that you could not cope with all the things that you had to do?	0.197
In the last month, how often have you felt that you were unable to control the important things in your life?	0.194
How often do you feel like a doctor or nurse is not listening to what you were saying. when you go to a doctor's office or other health care provider?	0.186
How often are you treated with less courtesy than other people when you go to a doctor's office or other health care provider?	0.184
In the last month, how often have you felt nervous and "stressed"?	0.183
How often are you treated with less respect than other people when you go to a doctor's office or other health care provider?	0.182

Top 10 Questions Correlated with Decreasing Pain Scores

Question	Correlation
How often do you have someone to take you to the doctor if you need it?	-0.141
How often do you have someone to love and make you feel wanted?	-0.143
How often do you have someone to turn to for suggestions about how to deal with a personal problem?	-0.150
How often do you have someone who understands your problems?	-0.156
How often do you have someone to have a good time with?	-0.159
How often do you fell that you can find companionship when you want it?	-0.159
In the last month, how often have you been able to control irritations in your life?	-0.160
In the last month, how often have you felt confident about your ability to handle your personal problems?	-0.168
In the last month, how often have you felt that you were on top of things?	-0.204
In the last month, how often have you felt that things were going your way?	-0.208

- There were **n=183,650 patients** included in the analysis.
- The median [quartiles] NRS pain scores were 2 [1, 2.75].
- The survey questions with highest positive correlation with pain scores (i.e. higher agreement with survey question associated with higher pain scores) included: “Within the past 12 months, were you worried whether your food would run out before you got money to buy more?” (r = 0.24, P<0.001) and 'In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?' (r = 0.21, P<0.001).
- The survey questions with highest negative correlation with pain scores (i.e. higher agreement with survey question associated with lower pain scores) included ““In the last month, how often have you felt that things were going your way?’ (r = -0.21, P <0.001) and 'In the last month, how often have you felt that you were on top of things?' (r = -0.20, P <0.001).
- A multivariable linear regression was performed in which all question results were modeled to predict pain scores. The adjusted R-squared value was 0.25 (P<0.001).

Discussion

- Questions related to food insecurity and stress levels were found to be mostly correlated with pain scores.
 - Higher concerns for food insecurity were correlated with higher pain scores in daily life.
 - Lower concerns with daily stress level were correlated with lower pain scores in daily life.
- This highlights the importance of understanding SDoH and how it may correlate with patient outcomes, specifically with pain outcomes.

References

1. Wind K, Poland B, HakemZadeh F, Jackson S, Tomlinson G, Jadad A. Using self-reported health as a social determinants of health outcome: a scoping review of reviews. Health Promot Int. 2023 Dec 1;38(6)
2. U.S. Department of Health & Human Services. National Institutes of Health All of Us Research Program. Accessed December 21, 2023. <https://allofus.nih.gov/>