Predictors of Unrelieved Symptoms in Individuals with Chronic Conditions: The Relevance of the All of Us Research Program Survey Data to Interdisciplinary Care

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Background

- Over half of all adults living in the United States are diagnosed with a chronic condition
- These individuals are at higher risk of having unrelieved symptoms that may negatively impact daily life
- All of Us Research Program offers a unique opportunity to study symptoms and predictors of symptoms in adults diagnosed with one or more chronic conditions

Objectives

- To identify symptom phenotypes of patients diagnosed with one or more common chronic conditions, specifically cancer, chronic obstructive pulmonary disease (COPD), heart failure, and/or type 2 diabetes mellitus
- To understand the demographic, healthcare access and utilization, and health-related factors that predict membership in symptomatic phenotypes

Methods

- Conducted a retrospective, cross-sectional analysis using participant responses to All of Us Research Program survey questions
- Performed analyses on All of Us data release version 4.0 within the secure Researcher Workbench using R
- Identified adult (≥18 years of age) participants diagnosed with cancer, COPD, heart failure, and/or diabetes based on ICD and SNOMED condition codes and complete responses to symptom-related survey questions
- Performed hierarchical clustering to generate symptom phenotypes of fatigue, emotional distress, and pain
- Used multinomial regression to determine if demographic, healthcare access and utilization, and health-related variables (Figure 1) predict symptom phenotype

Results

- Participants (N=14,127; Figure 2) were approximately 63 years of age and primarily women, White/non-Hispanic, married, highly educated, not employed, and insured
- Time between earliest condition start date and response to symptom surveys: median=3.6 years (min=0, Q1=1.82, Q3=7.48, max=36.98)
- Four phenotypes, one asymptomatic or mildly symptomatic (n=9,961) and three highly symptomatic, characterized by all severe symptoms (n=618), severe pain (n=2,576), and severe emotional distress (n=972), were identified (Figure 3)
- The percentage of participants that belong to the all severe symptoms phenotype increased with the number of chronic conditions
- Most notably, foregoing or delaying medical care (OR=1.30-1.68, 95%CI=1.10-2.16, p<0.001-0.002) and rating mental health as poor (OR=3.64-39.79, 95%CI=2.10-69.24, all p<0.001) or fair (OR=1.89-6.44, 95%CI=1.60-8.33, all p<0.001) increased the odds of belonging to a highly symptomatic phenotype

Conclusions

- Consistent with previous research, foregoing or delaying medical care was a key factor in unmet health care needs, increasing the likelihood of belonging to a phenotype characterized by severe, unrelieved symptoms
- Found that participants who rated their mental health as poor or fair had higher odds of belonging to a symptomatic phenotype compared to those who rated their mental health as good
- While poor mental health may be related to emotional distress, relationships were not limited to the severe emotional distress phenotype
- These findings support a growing body of literature that suggests a complex, bidirectional relationship between psychological and physical symptoms in chronic conditions
- Mental health interventions, such as telehealth to expand access, should be explored as methods of symptom management

All of Us Research Program data offer a unique opportunity to study symptoms in individuals diagnosed with one or more chronic conditions and inform targeted interventions to mitigate symptom burden