Original article

The impact of medication use on symptom burden in older patients with multiple medical morbidities

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ABSTRACT

Background: On average, older adults have more medical morbidities and consume a greater number of prescribed medications than their younger counterparts. However, the independent impact of greater medication use on symptom burden is not clear.

Objective: To determine to what extent there is: (1) an association between medical morbidity and symptom burden; and/or (2) an association between medication use and symptom burden.

Materials and methods: We performed a cross-sectional study, including one-on-one surveys of patients and medical record reviews, at a Veterans' Affairs primary care clinic in Connecticut, involving 159 community-dwelling males age >65 years, who were seen at routine appointments during the 5-month study period. The most commonly reported symptoms associated with adverse drug events were considered, and severity of symptoms was reported according to a Likert scale. Symptom burden was calculated as the sum of "severe and very severe" symptoms across all symptom categories. Linear regression and Chi-square analyses were performed to assess the bivariate associations between symptom burden and medications and between symptom burden and medical morbidities.

Results: On average, participants had 2.6 ± 1.4 medical morbidities, were prescribed 7.9 ± 2.8 medications, and reported 0.70 ± 1.2 severe or very severe symptoms. Linear regression analysis demonstrated a direct association between medical morbidities and symptom burden (slope = 0.38, $r^2 = 0.17$, $p < 0.0001$) and a weaker association between medication use and symptom burden (slope = 0.11, $r^2 = 0.06$, $p = 0.002$). When considered in a multiple regression model, medical morbidity continued to be a significant predictor of symptom burden ($p < 0.0001$), but the number of medications was no longer predictive ($p = 0.52$).

Conclusion: Medical morbidity contributes significantly to symptom burden, and use of additional medications does not allay or contribute to this effect.

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1. Introduction

Quality of Life (QOL) is a health outcome that is valued by many older adults.[1] In fact, a recent study demonstrated that only 25% of older patients rated "being kept alive" as more important than other goals of care, including symptom reduction and pain reduction. QOL, as a health outcome, can be most broadly defined as a multidimensional concept that refers to an individual's overall life satisfaction and total well-being.[2] More specifically, the Center for Health Promotion at the University of Toronto has divided the QOL outcome into three broad domains: well-being (including physical, psychological, and spiritual components), belonging (including physical, social, and community components), and becoming (including growth, practical, and leisure components).[3]

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Though numerous social, psychological, and physical factors collectively influence QOL in older individuals, symptom burden is one contributing factor that has consistently been shown to negatively impact QOL scores.[4–9] A symptom can be conceptualized as multidimensional in nature with components that include frequency, severity, and distress.[10] The resultant effect of these dimensions across all symptoms experienced by the patient can be referred to as symptom burden. Symptom burden is an entity which encompasses both the severity of the symptoms and the patient's perception of the impact of all of his/her symptoms. Because symptom burden significantly influences QOL, it is important to find ways to reduce symptom burden in the older adult population.

It has been suggested that medical morbidities in older patients are largely responsible for the occurrence of symptoms, many of which are managed through the use of pharmacotherapy.[11] Although one of the objectives of pharmacotherapy is to alleviate symptoms, considerable evidence has demonstrated that increased medication use also results in higher rates of adverse drug reactions (ADRs).[12] Though these events are often considered to be secondary side effects, studies indicate that older patients regard these adverse events to be as important as the beneficial effects of medication.[1,4] Consequently, it is not clear whether older adults who take multiple medications achieve net improvement or detriment in symptom burden with each additional medication, or whether there is a threshold at which medication use becomes more harmful than beneficial in the reduction of symptom burden. Given the elevated rates of both medical morbidities and medication use by older patients, it is clinically relevant to explore the impact that each independently has on symptom burden.

Prior studies assessing the impact of medical morbidities on symptom burden among community-dwelling individuals are limited in number, but they have consistently demonstrated a direct relationship.[8] However, only one of these studies controlled for the number of prescribed medications as a confounder, and this study was limited to patients who had recently started dialysis.[13] There are even fewer published studies exploring the association between medication use and symptom burden, and the results of these studies are conflicting. A study of older Native Americans demonstrated an inverse relationship between medication use and health-related QOL (HRQOL),[14] although this study did not control for several medical morbidities. Another study demonstrated a linear relationship between number of medications and two specific clinical manifestations – weight loss and impaired balance[15] – after adjusting for comorbidities. By contrast, a survey of a rural elderly population demonstrated no association between medication use and QOL scores.[16]

For an older population that may value the relief of symptom burden as much as survival or disease prevention, it is important to establish the impact that both diseases and the medications used to treat these diseases have on symptom burden. The primary objectives of this study were to determine the independent associations between medical morbidities and symptom burden and between medication use and symptom burden in an older community-dwelling population.

2. Materials and methods

2.1. Study design

A cross-sectional study based on patient surveys and review of electronic medical records.

2.2. Participants

Participants in this study were enrolled between August 2007 and December 2007. Participants were eligible for the study if they were ≥65 years of age, enrolled in a primary care clinic in the VA Connecticut Healthcare System, and able to provide written informed consent in English. Exclusion criteria were: (1) residence at a long term care facility at the time of data collection; and (2) inability to complete the patient interview. A total of 170 participants who met eligibility criteria for the parent study were approached at regular outpatient appointments; 166 (98%) agreed to participate and provided informed consent. Seven of the participants (4%) were female, and they were subsequently excluded from the analysis, as the study was unlikely to be powered to yield statistically significant information regarding gender. Primary data was collected for 159 participants through one-on-one patient interviews conducted by trained research assistants in the clinical office setting and through review of electronic medical records. The Institutional Review Board of the VA Connecticut Healthcare System approved the study.

2.3. Symptom assessment

On the date of a participant's office visit, symptom occurrence and severity were evaluated through a patient-directed questionnaire and subsequent electronic chart review conducted by a blinded researcher. Participants were asked if they regularly experienced 18 symptoms (difficulty sleeping, change in mood, depression, nausea, diarrhea, constipation, decreased appetite, dizziness, imbalance, headache, fatigue, confusion, muscular aches, rash, falls, weight loss, urinary incontinence, and difficulty thinking) without providing a definition or description of any symptoms. The symptoms selected focused on the cardiovascular, gastrointestinal, and nervous systems and encompass the most common adverse drug effects experienced by older adults as reported in prior studies.[12,17–20] For all symptoms experienced regularly, participants were asked to rate "how bothersome" they found the symptom to be on a Likert scale from zero to four, where zero was "not at all" and four was "severely".

A review of patient charts up to 1 year prior to the interview, including outpatient clinic notes, Emergency Department notes, discharge summaries, and telephone notes, was conducted to assess for any additional symptom documentation by health care providers. If a symptom was noted by a clinician in the medical record, the researcher searched for further evidence that a clinician linked this symptom to a medication(s). If a symptom-medication relationship was noted, evidence for a medication change related to the symptom was further documented.

Symptom data was modified for this study to facilitate data analysis. Five symptoms (urinary incontinence, falls, diarrhea, rash, and weight loss) were excluded, because strictly defined they represented objective clinical signs, rather than symptoms. One symptom (headache) was excluded due to the low rate of patients reporting at any severity level (<15%). Clinically similar symptoms were combined into related symptom groups, as it was not clear that patients were able to accurately differentiate these symptoms from one another. Related symptom groups included change in mood and depression, difficulty thinking and confusion, dizziness and imbalance, and nausea and decreased appetite. The final analysis included eight symptoms/symptom groups, including change in mood/depression, difficulty thinking/confusion, dizziness/imbalance, nausea/decreased appetite, fatigue, constipation, aches and pains, and difficulty sleeping.

To obtain a measure of overall symptom burden for each participant, a composite variable was created, indicating the total number of severe or very severe (three or four on the Likert scale, respectively) symptoms experienced across the eight symptom groups. We considered symptoms with a bothersome rating >2 to be clinically significant, because it was thought that patients who