


Factors Associated With Perceived Worsened Physical Health Among Older Adults Who Are Newly Enrolled Long-term Services and Supports Recipients

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Abstract

Limited information exists on the perceived health of older adults new to receiving long-term services and supports (LTSS) compared with the year prior, posing challenges to the anticipation of health care need and optimization of wellness efforts for this growing population. In response, we sought to identify differences in perceived worsened physical health across three LTSS types (nursing home, assisted living, and home and community-based services) along with health-related quality of life (HRQoL) characteristics associated with older adults' ratings of perceived worsened physical health at the start of receiving LTSS. Enrolled LTSS recipients completed a single interview assessing their HRQoL. Bivariate and multivariable logistic regression analyses were performed to determine associations in LTSS types and HRQoL characteristics with perceived worsened physical health among older adults (≥ 60 years old) since 1 year prior to study enrollment. Among the 467 LTSS recipients, perceived physical health was rated as worse than the previous year by 36%. Bivariate analyses revealed no differences in perceived worsened physical health across LTSS types. In adjusted analyses, religiousness/spirituality and better mental and general health perception had a decreased odds of being associated with perceived worsened physical health ($P < .05$). Participants with major changes in their health in the past 6 months were more likely to report perceived worsened physical health ($P < .001$). Findings provide information that may be used to target efforts to enhance perceived physical health and improve quality of life among LTSS enrollees.

Keywords

aging, self-rated health, long-term care, health related quality of life, cross-sectional secondary analysis

What do we already know about this topic?

Perceived health ratings and their associated factors and outcomes have been reported among older adults entering and leaving acute care settings and those residing in the community; there is little information, however, on the perceived health among older adults new to receiving long-term services and supports (LTSS) in general along with potential differences specific to LTSS organizational types (ie, nursing home, assisted living, and home and community-based services).

How does your research contribute to the field?

Our findings provide important information for policy makers, LTSS administrators, clinicians, caregivers, and other LTSS team members as it suggests the need to prioritize significant health changes, religious preferences, emotional status (ie, mental health), and general health (ie, self-rated health) of newly enrolled older adults to LTSS.

What are your research's implications toward theory, practice, or policy?

This information may inform care planning initiated by health care professionals across LTSS types and health promotion programs.

Background and Objectives

Healthy aging across the life span has become a national priority as the life expectancy for people in the United States continues to increase.¹ Approximately 50 million US residents have at least met the retirement age of 65, a growth of 40%

over a 16-year span (2000–2016).² Furthermore, this age group is projected to make up one-fifth of the US population by the year 2030.³ Accompanying this demographic shift is a rise in acute and chronic illnesses along with mobility limitations that threaten the number of healthy years lived in older adult age.⁴ As a result, the need for care from long-term services and



supports ([LTSS] organizations, specifically nursing home [NH], assisted living [AL], and home & community-based service [HCBS]) use will also rise sharply.⁵ This shift calls for increased attention on wellness efforts to enable more independent and active years in aging older adults despite illness, functional deficits, or care experiences.

A number of measures can be assessed and modified to optimize wellness, functional status, and other health outcomes during the life span. These measures, however, must take into account the holistic health of individuals. According to the World Health Organization,⁶ holistic health is “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” Therefore, objective measures such as blood pressure, x-rays, and laboratory results may only provide information on the present disease state of individuals. On the contrary, subjective measures such as perceived health may provide psychosocial information for an individual, a sense of well-being, and how one might respond and adapt to acute and chronic illness.⁷ For example, despite physical and functional impairments, one group of older adults receiving HCBS noted that getting older is typically associated with “withering away”; however, the ability to remain active and communicate with others by accessing services made things “better” for them.⁸

Perceived Health and Its Impact

An individual’s perceived health status has been deemed a good and, in some instances, better indicator of health status than objective measures of health.^{9,10} Perceived health takes into account the sensory state of suffering and healing along with physical and psychological dimensions of health not ascertained in a medical diagnosis alone.¹¹ Positive perceptions of health have the potential to limit the impact of illness on functional limitations and quality of life,¹¹ and influence behaviors that may lead to decreased frailty, increased treatment adherence, and improved self-management of chronic conditions.¹² This subjective inquiry has been linked to objective measures of health-related quality of life (HRQoL) such as health and functional status, clinicians’ ratings of individuals’ health, patient prognosis, depressive symptoms, inflammatory markers, and survival.¹³⁻¹⁷ Moreover, perceptions of health are an important determinant of perceived need for health care and other health-related services.^{16,18}

Perceived health ratings and their associated factors and outcomes have been reported among older adults entering and

leaving acute care settings and those residing in the community.^{17,19-22} There is little information, however, on the perceived health among older adults new to receiving LTSS in general along with potential differences specific to LTSS organizational types (ie, NH, AL, and HCBS). In particular, assessments of their perceptions since the year prior to the start of LTSS and what may be driving these perceptions are poorly understood.²³ Because individuals are transitioning in service need as a result of a shift in care needs (eg, illness, functional deficits), it is important to understand how this shift affects their current perception of health. When considering admission to LTSS, the intensity of care needed can vary across LTSS type along with how the use of that care is decided upon.^{24,25} For example, those in AL are found to have increased involvement in decision making and planning to enroll in these services while NH recipients are found to have less involvement.²⁴ As such, decisions to enroll in LTSS have been for reasons beyond changes in health in which exploring associations with perceived worsened health at the time of LTSS admission can bring about information outside of what may be deemed to be the obvious.²⁵ Anticipation of health care needs and prioritization of wellness efforts for older adults newly enrolled to LTSS are important for optimizing quality of life, yet, challenging without reliable and valid measures that capture perceived health.

While perceived health consists of multiple elements—mental, social, and physical health—we chose to focus on perceived physical health because it is commonly assessed in both research and clinical settings.²⁶ Based on the premise that individuals who require LTSS services would perceive their physical health as worse than the year prior, we sought to explore what HRQoL factors (ie, individual and environmental characteristics, functional and emotional status, overall quality of life, and social support) are predictive of perceived worsened physical health compared with those that rate their health as improving or remaining the same. This study was designed to examine these HRQoL factors associated with perceived worsened physical health (since the year prior) among older adults newly enrolled in the following types of LTSS: NH, AL, HCBS.

Research Design and Methods

Design

This was a cross-sectional secondary analysis of data generated during initial interviews conducted by trained research

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assistants with older adults who had just begun to receive LTSS. All participants in the parent study, “Health Related Quality of Life: Elders in Long-term Care” (NIA/NINR grant number R01AG025524; PI: Mary D. Naylor), were enrolled between 2006 and 2010. The purpose of the parent study was to understand how changes in HRQoL influence the care and outcomes of older adult recipients of LTSS.

Conceptual Framework

The parent study was guided by an adaptation of the Wilson & Cleary HRQoL conceptual model.^{11,27} The original HRQoL model includes aspects of quality of life that impact domains of health such as function, emotional well-being, and physical health. Zubritsky and colleagues²⁷ adaptation to the original model provided additional domains influencing HRQoL among older adults receiving LTSS to include both environment²⁸ and cognitive impairment factors.²⁹ This multidimensional conceptual framework accounts for the unique characteristics of older adults receiving LTSS and guided the selection of predictor variables in this study.

Sample

The parent study consisted of a convenience sample of 470 older adults from NH, AL, and HCBS organizations that were purposefully sampled from the Pennsylvania, New Jersey, and New York metropolitan areas. Participants consisted of older adults ≥ 60 years of age who were new to receiving LTSS (within 60 days of start of services) and did not have prior experiences with NHs, ALs, or HCBSs. Older adults were excluded if they were terminally ill (< 6 months to live and/or enrolled in hospice per medical record), were assessed with a score of < 12 on the Mini-Mental State Examination (MMSE)²⁶ indicating severe cognitive impairment, expected to be discharged from the LTSS program in less than 3 months and/or had an active untreated psychiatric disorder (eg, active hallucinations).

Potentially eligible older adults were provided information on the study and screened for eligibility criteria by a representative within the LTSS program. Those meeting eligibility criteria and agreeing to receive further information were then visited by a research staff member with the exception of participants receiving services from the Visiting Nursing Services of New York (VNSNY). For participants receiving services from VNSNY, all aspects of data collection including consents/assents and interviews were completed by their team of researchers and de-identified data sent to our research team. Each eligible older adult with a MMSE score ≥ 23 (indicating no cognitive impairment to very mild cognitive impairment) across settings and services provided written informed consent. For eligible LTSS recipients with MMSE scores indicating mild to moderate cognitive impairment (12-22), participants provided assent with written informed consent being obtained from their legally authorized representatives.

These procedures and the overall study were reviewed and approved by three Institutional Review Boards (University of Pennsylvania-805326, Philadelphia Veterans Administration Medical Center-01033, and the Visiting Nurse Services of New York-E07-001). Further details regarding these methods have been reported previously.³⁰

Data Collection

Baseline data were collected through in-person interviews conducted by trained research assistants. Interviews lasted up to 1.5 hours with voluntary breaks and were conducted either in the home (HCBS enrollees) or a private place in the NH or AL. Participants were given the option to complete the interview over 2 sessions. Within 60 days of enrollment of LTSS, participants completed a single survey consisting of multiple HRQoL domains. Sociodemographic information was also collected, including race, ethnicity, sex, age, education, and marital status. All data were entered into data collection forms which were scanned into TeleForm and reviewed by trained research assistants overseen by a doctorally prepared research coordinator for data entry quality.

Main Outcome

Perceived physical health was the main outcome of interest. Enrollees provided ratings of their overall perceived physical health as compared with the prior year on a 3-point Likert scale. Participants were asked, “Is your physical health now better, about the same, or worse than it was one year ago?” This variable was dichotomized to compare perceived worsened physical health (1) to ratings of better or about the same (0) to assess perceived decline in physical health. This particular dichotomy was created because of our interest in what might contribute to older adults perceiving that their health had worsened after entry into LTSS, thus providing necessary information to stakeholders to improve on what may be a detriment to older adult health.

Predictor Variables

Individual characteristics. Race (dichotomized as white and non-white), age (continuous), and years of education of participants (continuous) were all collected. Marital status consisted of a series of 5 questions soliciting whether the participant was single, married, separated, divorced, or widowed. Religiousness/spirituality was a continuous variable rated on a 4-point scale ranging from 1 (not at all religious/spiritual) to 4 (very religious/spiritual). The participant was first prep’d with the following statement, “Next, I’d like to ask you a few questions about your religious or spiritual beliefs and practices.” To assess religiousness/spirituality, they were then asked, “How religious or spiritual would you say you are?” Total number of chronic conditions were identified via chart reviews and made up a continuous variable.

Sensory deficits (eg, use of hearing aids, glasses) and ambulation deficits (eg, use of supportive devices such as walker, cane, wheelchair, etc) also were captured (yes/no for each). Finally, each participant was asked whether they had experienced the loss (or death) of a spouse/loved one/friend/pet in the last 6 months (yes to any loss = 1) or any major change in health status in the last 6 months such as a new diagnosis or recent major health problem.

Measures of HRQoL. Several measures were used to assess the common HRQoL domains in the conceptual framework: quality of life, social support, cognitive status, emotional status, symptom status, functional status, and general health perception.²⁷ An overall rating of quality of life was captured using a 5-point scale ranging from 1 (poor) to 5 (excellent).³¹ The Medical Outcome Survey Social Support Scale subscales were used to assess social support: tangible, emotional/informational, and social interaction.³² Each scale consists of a 5-point Likert scale summary score ranging from 1 (none of the time) to 5 (all of the time). The cognitive status of participants was measured using the MMSE scale.³³ Higher scores indicate less cognitive impairment (range: 0-30; normal to little impairment: 24-30, mild impairment: 20-23, moderate impairment: 12-19). Emotional status was measured with two standardized assessments. The Geriatric Depression Scale (GDS) assessed the presence of depressive symptoms (score range: 0-15). GDS scores ≥ 5 are an indicator of depressive symptoms that warrant further evaluation, scores 10 and higher are indicative of major depression.³⁴ The Medical Outcomes Survey Short Form (12-item) Mental Composite Score (SF-12 MCS) captured overall mental health status on a scale from 0 to 100, with higher scores indicating better overall mental health.³⁵ Symptom status, specifically pain, was measured using a single item from the Symptom Bothers Scale³⁶ which inquired about bothersome pain in the last week (no; yes, but not bothered; yes, bothered a little; or yes, bothered a great deal) and was dichotomized as presence or absence of pain. Basic activities of daily living related to functional status were assessed using Katz and Akpom's³⁷ original 6-item scale, assessing deficits in bathing, dressing, toileting, feeding, transferring, and incontinence care (score: 0-6, higher scores fewer functional deficits). For participants with a score of < 24 on the MMSE, the activity of daily living questions were completed by a proxy (eg, caregiver, certified nursing assistant, home health aide). Self-rated general health perception was captured using the SF-12 Physical Composite Score (PCS). Similar to the SF-12 MCS, this composite score ranged from 0 to 100 with higher scores indicating better perceived general health.³⁸ More details to the scales used along with a summary table of the scales can be found elsewhere.³⁰

Characteristics of the environment. We evaluated where the services were being provided with the LTSS variable. LTSS type was a categorical variable that described NH, AL, and

HCBS use. Physical environment was assessed with three investigator-developed questions about private space, control over room temperature, and control over the lighting in rooms (input on developing the environment variable was provided by a subject matter expert). Each item was measured continuously on a 4-point scale ranging from 1 (strongly agree) to 4 (strongly disagree).

Data Analysis

Descriptive statistics for each variable were computed and bivariate analyses were performed to determine associations in LTSS types and HRQoL characteristics by perceived physical health since the year prior. F-tests and chi-square tests were used for continuous and categorical variables, respectively.

Multivariable binomial logistic regression models were fitted with the robust estimate of variance for the probability of the dichotomized perceived physical health rating being "worse" (vs. "better and about the same") than the year prior. The initial model was built by using all predictors associated with the outcome at a P value of $< .20$.^{39,40} Excluding variables based on the bivariate associations helps to identify potential predictors of the outcome as a preprocessing step. A backward elimination procedure was then used to remove the predictor with the highest P value at each step until those remaining in the final multivariable model demonstrated significance at $P < .05$. We chose this procedure for the following reasons: from the unadjusted models, this process allows for filtering out the variables that cannot contribute to explaining the variation of the outcome. This process also reduces the potential multicollinearity problem which might appear in the multivariable model. Subsequently, the backward elimination process was used to find the best set of predictors.

All data were analyzed using SAS 9.4 statistical software. The results from the final model are reported and presented in odds ratios and 95% confidence intervals and/or P values.

Results

Descriptive Analysis

A total of 470 older adults participated in this study across the three LTSS types. Complete data for the outcome of interest, perceived physical health, were available for 467 (99%) participants (NH, $n = 157$; AL, $n = 155$; HCBS, $n = 155$). In determining factors associated with perceived worsened physical health compared with the year prior, participants did not differ in age, education, sex, race, or marital status. Compared with the year prior to LTSS enrollment, 36% of participants rated their health as worse ($n = 168$) and 64% rated their health about the same or better ($n = 299$). In relation to those who perceived their health as about the

same or better than 1 year ago, those who perceived their health as worse than 1 year ago were less religious/spiritual ($P = .03$) and had lower quality of life ($P < .001$), lower overall mental health (lower SF-12 MCS scores; $P < .0001$), and lower general health perception (lower SF-12 PCS scores, $P < .0001$). Lower cognitive deficits (higher MMSE score; $P < .001$) and higher numbers of depressive symptoms ($P < .001$) along with an increased likelihood of reporting at least one major health change in the past 6 months such as a new diagnosis or recent major health problem ($P < .0001$) and pain in the past week ($P < .001$) were also significant factors among participants who rated their perceived physical health as worse than 1 year ago in comparison with those who rated their health as about the same or better. Descriptive bivariate analyses by perceptions of physical health are shown in Table 1.

Multivariable Analysis

Multivariable logistic regression model results for perceived worsened physical health since the year prior are presented in Table 2. Participants who were more religious/spiritual (higher religiousness/spirituality scores; odds ratio [OR] = 0.71; 95% confidence interval [CI]: 0.55-0.92; $P = .01$) and had better overall mental health (higher SF-12 MCS scores; OR = 0.95; 95% CI: 0.93-0.97; $P < .0001$) and better general health perception (higher SF-12 PCS scores; OR = 0.93; 95% CI: 0.91-0.96; $P < .0001$) had fewer odds of perceiving their physical health as worse than a year prior to LTSS enrollment compared with their counterparts with lower scores. Alternatively, participants with a major change in their health in the past 6 months, such as a new diagnosis or recent major health problem, had a 2.67-fold increased odds of having perceived worsened physical health than a year prior to LTSS enrollment (95% CI: 1.71-4.15; $P < .0001$). Our interpretation of findings from the initial model that included variables with P values $\leq .20$ in the bivariate analyses did not change significantly from the interpretation of the final model produced by backwards selection.

Discussion

To our knowledge, this is the first study to examine newly enrolled LTSS older adults' perceptions of their physical health across three LTSS organizational types along with the impact HRQoL domains have on perceived worsened physical health since the prior year. The use of the HRQoL conceptual framework to guide variable selection allowed us to include domains of health that are influential to perceived physical health.¹¹ Interestingly, more than one third of participants perceived their physical health as worse than the prior year. These findings compare to data from the 2016 National Health Interview Survey which show that 22% of older adults in the general 65-year-old and over population rate their overall health as poor or fair.⁴¹ Significant

predictors of perceived worsened physical health in our study were major changes in health in the past 6 months such as a new diagnosis or recent major health problem, lower levels of religiousness/spirituality, and decreased overall mental health and general health perception. Previous research has focused on one LTSS type and/or queried older adults about their general health perceptions compared with other persons of similar age not utilizing LTSS.^{17,18,42} However, in our study, the LTSS user was able to provide perspective in what might be influencing their reporting of worsened perceived physical health since the prior 12 months. By examining these factors in a wide array of LTSS settings, we can potentially target interventions aimed to provide the best care to older adults that is based on their perceived health.

Nearly 40% of our study sample had a major change in health (ie, new diagnosis or recent major health problem) in the 6 months prior to the start of LTSS and greater than half of these participants rated their physical health as worse than the previous year. This recent health change associated with perceptions of worsened physical health may have largely driven the transition to receiving LTSS among the participants in this study. In older age, those 65 and over are commonly predisposed to burdensome health events including stroke, heart attack, cancer, influenza, and pneumonia, as well as chronic obstructive pulmonary disease and heart failure exacerbations.^{43,44} While medical management of these conditions is necessary, the ability to cope with such changes also has been found to be critical for an optimum health outcome.^{5,45} Clinicians working in LTSS can identify newly enrolled older adults who have recently experienced a major change in health and provide them with the knowledge, support, and training to adjust to their recent health changes. Such support may in turn optimize daily functioning, management of disease, and future outlook on health for the older adult.⁴⁶ Importantly, the expectation and/or assumption should not be that with physical decline prior to or during one's stay in a LTSS setting, one's subjective health and well-being must follow, nor will it not improve. In past research, older adults have looked to LTSS as a means to "live again" and maintain an active lifestyle despite physical and functional decline.⁸

Participants who were more religious or spiritual were less likely to report their physical health as worse than the prior year compared with those who were less religious or spiritual. Religiousness and spirituality can be critical to how one responds to disease, life changes, isolation, and suffering. In the work of Idler (1987), opportunities to engage in religious and spirituality activities were associated with lowering levels of functional disability and depressive symptomatology. These findings are situated in the context in which social networks and social support for health needs may be unevenly dispersed within the LTSS setting, but ensuring access to or involvement in religious activities may help fill these foreseeable voids.⁴⁷ Moreover, religious and spiritual measures have been regarded as important predictors to

Table 1. Characteristics of Newly Enrolled Long-term Services and Supports Recipients by Reports of Worse and Better or About the Same Perceived Physical Health Compared With the Year Prior.

Characteristic	All LTSS users (n = 467) Mean ± SD or n (%)	Worse (n = 168)	Better or about the same (n = 299)	P value
Individual characteristics				
Age, y	80.96 ± 8.66	80.80 ± 9.23	81.05 ± 8.33	.77
Education, y	11.88 ± 4.43	11.93 ± 4.33	11.86 ± 4.50	.85
Gender (female)	332 (71.1%)	120 (71.4%)	212 (70.9%)	.90
Race: White (vs nonwhite)	237 (51.1%)	87 (51.8%)	150 (50.7%)	.82
Marital status				
Single (never married)	50 (10.7%)	17 (10.1%)	33 (11.1%)	.91
Married	93 (20.0%)	37 (22.0%)	56 (18.8%)	
Widowed	242 (51.9%)	85 (50.6%)	157 (52.7%)	
Divorced	56 (12.0%)	19 (11.3%)	37 (12.4%)	
Separated	25 (5.4%)	10 (6.0%)	15 (5.0%)	
Religiousness/spirituality	2.97 ± 0.84	2.86 ± 0.90	3.04 ± 0.79	.03
No. of chronic conditions	8.63 ± 3.96	8.49 ± 3.82	8.70 ± 4.04	.59
Assistive equipment				
Use of sensory aids (glasses or hearing aids)	322 (69.4%)	125 (74.9%)	197 (66.3%)	.06
Use of ambulation aids	364 (77.9%)	136 (81.0%)	228 (76.3%)	.24
Significant changes in the past 6 months				
Death of spouse, loved one, friend, roommate	184 (39.5%)	72 (42.9%)	112 (37.6%)	.26
Major changes in health ^a	175 (38.0%)	95 (56.9%)	80 (27.3%)	<.0001
Health-Related Quality of Life Domains				
Overall quality of life rating	2.97 ± 1.07	2.70 ± 1.11	3.12 ± 1.02	<.001
Medical Outcomes Survey: Social Support				
Tangible	2.97 ± 0.95	2.94 ± 0.93	2.98 ± 0.96	.66
Emotional or informational	2.72 ± 1.01	2.62 ± 1.03	2.77 ± 1.00	.13
Positive social interaction	2.46 ± 1.13	2.30 ± 1.16	2.54 ± 1.11	.03
Cognitive status				
Mini-Mental State Examination Score	23.94 ± 4.29	24.90 ± 4.00	23.39 ± 4.35	<.001
Emotional status				
Geriatric Depression Scale	4.54 ± 3.39	5.36 ± 3.46	4.08 ± 3.27	<.001
SF-12 Mental Composite Score	49.01 ± 10.54	46.15 ± 11.48	50.62 ± 9.62	<.0001
Functional status				
Basic Activities of Daily Living	4.28 ± 1.89	4.10 ± 1.92	4.38 ± 1.86	.14
General health perception				
SF-12 Physical Composite Score	37.37 ± 10.89	32.70 ± 9.62	40.00 ± 10.70	<.0001
Characteristics of the environment				
Physical environment				
Enough private space	1.82 ± 0.78	1.87 ± 0.83	1.79 ± 0.76	.29
Control over lights	1.98 ± 0.82	2.01 ± 0.88	1.96 ± 0.79	.51
Easy access to bath items	1.75 ± 0.67	1.76 ± 0.68	1.74 ± 0.66	.81
LTSS				
Assisted living	155 (33.2%)	60 (35.7%)	95 (31.8%)	.31
Home and community-based services	155 (33.2%)	59 (35.1%)	96 (32.1%)	
Nursing home	157 (33.6%)	49 (29.2%)	108 (36.1%)	
Symptom Status—Pain Scale				
Presence of pain	243 (52.7%)	106 (63.5%)	137 (46.6%)	<.001

Note. LTSS = long-term Services and Supports; SF = short form.

^aMajor changes in health include new diagnosis or recent major health problem.

future LTSS use as well as improved perceived health and actual health in other studies.^{48,49} Some studies explore measures of religiousness/spirituality with church attendance⁵⁰

and frequency in engaging with practices such as bible reading and prayer⁵⁰ or as a global rating or single item as we have done.⁵¹ Providing opportunities, resources, and/or space

Table 2. Multivariable Logistic Regression Models Predicting Worse Perceived Physical Health Compared With the Year Prior for Older Adults Receiving Long-term Services and Supports (n = 467).

Characteristic	PE	OR (95% CI)	P
Religiousness/spirituality	-0.34	0.71 (0.55-0.92)	.01
Significant changes in the past 6 months			
Major change in health yes vs no ^a	0.98	2.67 (1.71-4.15)	<.0001
Emotional status			
SF-12 Mental Composite Score	-0.05	0.95 (0.93-0.97)	<.0001
General health perception			
SF-12 Physical Composite Score	-0.07	0.93 (0.91-0.96)	<.0001

Note. PE = parameter estimate; OR = odds ratio; CI = confidence interval; SF = short form.

^aMajor changes in health include new diagnosis or recent major health problem.

for older adults to observe religious and spiritual practices may positively support their religious and spiritual needs and psychological well-being^{52,53} especially for men who are less likely to seek support for medical, psychosocial, and physical needs.⁴⁷ Specifically, nonorganized religious programs; attendance at religious services, private prayer, religious radio, television, and/or reading the bible or other religious literature have been found to be associated with a decreased length of time in LTSS use, increased survival, and better health outcomes.^{47,54-57} Our findings are also reflective of responses from those living in institutionalized settings such as NHs whereas prior research focused more on exploring these concepts in noninstitutionalized settings.⁴⁷ Future research assessing changes over time in perceived physical health and religiousness/spirituality among institutionalized and in noninstitutionalized LTSS recipients is needed.

We additionally found that higher SF-12 composite scores of overall mental and general health were associated with a decreased likelihood of perceived worsened physical health reporting. Consistent with previous reports, these findings reiterate the importance of treating the whole individual and addressing both the mental and general well-being of the older adult as these factors impact each other.⁵⁸ This is especially important for overall mental health as depressive symptoms, while typically underreported and under diagnosed among older adult populations⁵⁸ were not associated with perceived worsened physical health after controlling for several other HRQoL domains. Moreover, untreated mental health illness is associated with poor physical health outcomes (ie, disability, illness, and decreased quality of life).⁵⁹ Provision of psychological support has been found to correlate with better self-rated health and fewer symptoms indicative of poor mental health.⁶⁰ Focus on engaging the older adult in stimulating activities and exercise, providing age-friendly services and settings, promoting healthy lifestyle behaviors, and identifying mental disorders early may prove beneficial in preventing mental and physical health decline or supporting improved overall mental and physical health.^{58,59}

At the start of services, other domains originating from the HRQoL framework such as social interaction, number of

chronic conditions, pain, and depressive symptoms were not found to be significant predictors of perceived worsened physical health when performing adjusted analyses in our study. These measures, however, have been found to be associated with perceived health in other research in which older adults have compared themselves to others of similar age.^{61,62} In addition, despite known differences in characteristics and services offered between LTSS types, in our bivariate analyses we found no difference in our outcome based on LTSS type. It is possible that changes in perceived physical health may not be specific to LTSS type. Future research with LTSS recipients examining their perceptions of health and well-being over time can help to provide greater understanding of how their perceived health changes based on time spent receiving LTSS.

Implications

Our findings provide important information for policy makers, LTSS administrators, clinicians, caregivers, and other LTSS team members and suggest the need to prioritize significant health changes, religious preferences, and emotional (ie, mental) and general well-being of newly enrolled older adults to LTSS. Critically, it is necessary to recognize objective physical health as different from perceived health. Two different concepts are being measured and how to best treat the perceived health has rose in its importance and priority level in recent years. This new focus has emerged as a result of providers restricting their efforts to providing care based on what we think the resident wants or what the medical diagnosis says and often failing to incorporate the resident into their own goals of care and how they perceive their health. By examining new enrollees to LTSS, our findings reflect the most accurate information related to changes in perceived health while it is still fresh in the LTSS recipients' memory. Findings from this study may inform care planning initiated by health care professionals across LTSS types and health promotion programs. Initiatives, such as the Older Americans Act Reauthorization Act of 2016,⁶³ have already begun to emphasize the need for health promotion and disease

prevention programs in LTSS and require that these programs be evidence-based. This bill additionally grants states' funding for supportive services that include chronic care self-management which is critical to supporting older adults experiencing changes in health. Moreover, changing the culture around nursing home care delivery so that it is more person-centered and less institutionalized-based has been supported by the Affordable Care Act, Centers for Medicare and Medicaid Services, and The Administration for Community Living Long-term Care Ombudsman Program.⁶⁴⁻⁶⁶

Leveraging such existing state and federal support to address factors associated with perceived worsened physical health found in this study may positively change the care provided to older adults and how their care is prioritized in these settings. LTSS recipients rating their physical health as worse than 1-year prior may especially benefit from targeted interventions and enhanced support aimed to improve or maintain their HRQoL.

Limitations

This study has several notable limitations. First, while the parent study was powered to detect differences in several HRQoL outcomes over time, this study is a secondary data analysis of the parent data. Next, while 60% of the sample were considered cognitively intact, 40% did have mild to moderate cognitive deficits which may have impaired their ability to recognize or recall changes in the prior 12 months. In addition, while cognitive status (MMSE score) was not statistically significant, a sensitivity analysis by subset (MMSE \geq 24 vs MMSE $<$ 24) was reviewed. The effect sizes of the estimates for those with MMSE scores $<$ 24 were similar for 2 out of the 4 factors (overall mental and general health scores). It is possible that the variations seen in religion/spirituality and changes in physical health may be due to recall errors for those with cognitive impairment. Findings for the cognitively intact group were similar to the final model. Nonetheless, those with mild to moderate cognitive impairment are commonly excluded as participants in research, but remain an important group to capture and understand.⁶⁷ In addition, because of the cross-sectional nature of the data, causal inferences cannot be made. However, older adults were asked to reflect on their physical health at the time of the survey compared with the year before which does allow us to make inferences about their perceived physical health upon entering LTSS. In addition, because spirituality alone holds several other confounding implications (personality, social environment, life experiences, etc) which unless studied, results and conclusions may not have the desired specificity. Next, a minor limitation is that we were unable to assess the severity of disease as the count of chronic conditions may not have varied when the underlying disease worsened. Last, one might expect the prevalence of worsening health to be substantially higher than what was found in our study. Important to consider is

that actual physical decline versus perceived physical decline may differ and not directly align as two different concepts are being measured. Also, older adults enter LTSS for reasons outside of physical decline, including changes in informal support, loss of a loved one, desire for more social connectedness, preferences, and limited ability to manage everyday home maintenance.²⁴ Nonetheless, the convenience nature of the sample does limit the generalizability of our findings and we are unable to examine the presence or absence of sample bias.

Conclusion

In conclusion, as the older adult population continues to grow, the number of individuals requiring LTSS will also increase substantially. This will require a better understanding of how best to optimize health and delay decline for these groups. Our findings align with national priorities of optimizing the physical, mental, and emotional well-being of older adults.⁶⁸ Moreover, we have provided insight into specific factors—namely recent health changes, religious preferences, and overall mental and general health—that may be addressed to lessen poor perceptions of physical health among older adults newly enrolled to LTSS.

Author's Note

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