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Pain Measurement in the National Social Life, Health, and Aging Project: Presence, Intensity, and Location

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Objectives. To describe the rationale for the pain presence, location, and intensity measures in the National Social Life, Health and Aging Project (NSHAP).

Method. Responses to the pain presence, location (pain map), and intensity (verbal descriptor scale) items were analyzed by gender and age (62–69, 70–79, and 80–91). Pain intensity was dichotomized (none to mild vs moderate or higher) and compared by demographics, physical function, mood, and self-rated health. All analyses used Wald tests to compare sample means.

Results. Participants completed the pain presence (n = 2,430/2,799), location (n = 2,558/2,799), and intensity (n = 2,589/2,799) items. Pain items varied by gender with women reporting more head, arm, hip/buttock, leg, and foot pain compared to men, ($p < .05$) at each individual site. Women also reported more intense pain compared to men—2.13 versus 1.94, respectively ($p < .05$). Pain items demonstrated remarkable similarity among age cohorts. Health indicators were significant and in the expected direction ($p < .001$). An increase in comorbidity, ADL and IADL dependence, worse self-rated health, and more depressive symptoms were each significantly more common among participants who reported moderate or greater pain compared to none to mild pain.

Discussion. Pain presence, location, and intensity measures were successfully integrated into NSHAP Wave 2 and exhibit construct and external validity.

Key Words: Location—Measurement—Older adult—Pain.

THE perception of pain is a universal experience and alerts us to internal and external threats to our integrity (Woolf, American College of Physicians, & American Physiological Society, 2004). Acute pain generally represents a noxious stimulus produced by injury and/or disease, is limited in its duration, and serves a protective function. In contrast, persistent (e.g., chronic) pain lasts beyond the usual course of an acute process, injury, or chronic pathological process and lacks a meaningful biologic function (Woolf et al., 2004). Persistent pain can last for months or years and manifest symptoms intermittently or continuously (AGS Panel on Persistent Pain in Older Persons, 2002; Thielke et al., 2012). The discomfort and suffering associated with persistent pain substantially impacts the well-being and health of older adults including poorer physical, psychological, and social outcomes compared to older adults without pain (AGS Panel on Persistent Pain in Older Persons, 2002; Blyth et al., 2008; Buchman et al., 2010; Gibson & Lussier, 2012; Reitsma, Tranmer, Buchanan, & Vandenkerkhof, 2011; Scudds & Ostbye, 2001; Shega, Dale, et al., 2012; D. Weiner, Peterson, & Keefe, 1998).

The elucidation of reliable and valid reports of a patient's pain experience is paramount in order to better delineate the relationships between persistent pain and health in older adults. This can be obtained from several sources including self-report, proxy report, and an assessment of pain behaviors, of which self-report is considered the gold standard (AGS Panel on Persistent Pain in Older Persons, 2002; K. Herr, 2011; K. Herr, Spratt, Garand, & Li, 2007; K. A. Herr, Spratt, Mobily, & Richardson, 2004). Multidimensional pain measures, such as the Brief Pain Inventory and McGill Pain Questionnaire (Atkinson et al., 2011; Caraceni et al., 2002; Melzack, 1975), provide a comprehensive assessment of a person's pain experience including pain descriptors, exacerbating and relieving factors, impact of analgesia, and an extensive inventory of pain-related interference with physical and psychological functioning. However, the time needed to complete these instruments and the specificity of the questions to pain-related impairment usually limits the use of these measures to studies whose primary objective focuses on pain-related outcomes.

Unidimensional pain measures (e.g., pain intensity) provide an alternative approach to capturing a person's pain experience. These measures benefit from minimal respondent burden, a rapid administration time, and strong psychometric properties. Unidimensional measures include the numeric rating scale (NRS) (e.g., 0 to 10-point scale), visual analogue scale (VAS) (e.g., continuous line anchored by two end-points), and the verbal descriptor scale (VDS)

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(e.g., verbal terms express the level of pain). The response to these scales can then be used to determine the proportion of participants with pain, its intensity, and the relationship between pain and other health-related conditions, such as depressive symptoms or physical health. Unfortunately, unidimensional pain scales do not permit an evaluation of other important pain-related characteristics captured by multidimensional scales.

In response to the burgeoning evidence surrounding the relationship between pain and physical, psychological, and social health among community-dwelling older adults, the National Social Life, Health, and Aging Project (NSHAP) incorporated a pain assessment. Pain measurement in Wave 1 focused on pain presence in the lower extremity. Wave 2 incorporated a more comprehensive pain assessment including its presence, location, and intensity. In this article, we describe the rationale for selecting the pain measures for NSHAP Wave 2, derive information regarding its internal and external validity, and provide recommendations for measure use as an outcome or covariate for NSHAP-related research.

Method

Overview

NSHAP is a nationally representative, longitudinal survey designed to investigate the complex interplay of social, biological, emotional, and environmental factors that come with aging. Persistent pain represents a common experience among older adults with a theoretical as well as empirical role in aging trajectories (Blyth et al., 2008; Shega, Dale, et al., 2012). Despite this, epidemiologic studies of aging frequently overlook pain assessment or select measures not adequately validated in older persons. Moreover, studies that incorporate a pain measure maintain noteworthy limitations, including an assessment of pain presence but not intensity, measurement in one wave but not others, and/or failure to assess pain uniformly across multiple waves (Scudds & Ostbye, 2001; Thielke et al., 2012). As a result, the longitudinal relationship of pain with health at the population level remains poorly understood.

In Wave 1, pain presence was assessed in the lower extremity while walking (see Table 1).

In Wave 2, investigators sought to integrate a more robust pain measure in order to address the shortcomings of previous studies as described above, and to better understand the relationship of pain with health. Given the time and space constraints within NSHAP, investigators elected to incorporate a brief, yet scientifically rigorous assessment of persistent pain, including its presence, location, and intensity. A literature review was conducted along with input from pain and aging experts (J. W. S. and W. D.) to establish optimal measures.

Data are publicly available (NSHAP Wave 1: Waite, Linda J., Edward O. Laumann, Wendy Levinson, Stacy Tessler Lindau, and Colm A. O'Muircheartaigh. National Social Life, Health, and Aging Project (NSHAP): Wave 1. ICPSR20541-v6. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2014-04-30. doi:10.3886/ICPSR20541.v6. NSHAP Wave 2: Waite, Linda J., Kathleen Cagney, William Dale, Elbert Huang, Edward O. Laumann, Martha K. McClintock, Colm A. O'Muircheartaigh, L. Phillip Schumm, and Benjamin Cornwell. National Social Life, Health, and Aging Project (NSHAP): Wave 2 and Partner Data Collection. ICPSR34921-v1. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2014-04-29. doi:10.3886/ICPSR34921.v1.).

Measures

The stem portion of the questions assessing pain presence, location, and intensity helps differentiate whether pain reports represent acute or persistent pain (see Table 1). This is particularly important as acute pain represents a normal biologic response and serves an important physiologic function, whereas persistent pain lasts beyond its signal value and is considered to lack a meaningful purpose (Woolf et al., 2004). Pain represents a continuum with cut point between acute, subacute, and persistent being somewhat arbitrary. Persistent pain generally lasts for weeks to months from which we selected a threshold of 4 weeks

Table 1. NSHAP Pain Measures

	Question	Response options	Response rate (%)	*N*
Wave 1				
Pain walking	During the past 12 months have you had pain, aching, or cramps in your calves, thighs or buttocks that occurred while walking but improved with rest?	No, yes	82.26	2,472
Wave 2				
Pain presence	In the past 4 weeks, have you had any pain?	No, yes	86.82	2,430
Pain location	On the diagram below, please circle the area where you have felt the most pain in the past 4 weeks	45 locations specified on human body diagram	91.39	2,558
Pain intensity	Please check the box next to the phrase that best describes the level of pain in the past 4 weeks	The most intense pain imaginable, extreme pain, severe pain, moderate pain, mild pain, slight pain, no pain	92.50	2,589

Note. NSHAP = National Social Life, Health, and Aging Project.

duration representing persistent pain (Scudds & Ostbye, 2001; Turk & Okifuji, 2001). While 4-week duration was used in NSHAP Wave 2 to capture persistent pain, we cannot exclude the possibility that these reports may signify acute or subacute pain.

Ascertainment of pain location is important as it adds another dimension to the epidemiology of pain in older adults, facilitates treatment choices (e.g., medical management with pharmacologic therapy, physical and/or occupational therapy, and/or assist devices), and can be utilized to better capture pain-related functional impairment (D. Weiner et al., 1998). The pain map, as depicted in Figure 1, adapted from Margolis et al., has undergone rigorous reliability and validity testing in older populations (Margolis, Chibnall, & Tait, 1988; D. Weiner et al., 1998). As such, it is widely recognized as the pain location measure of choice in older adults with and without cognitive impairment. The front and back of a body is divided into 45 areas and respondents circle painful locations. These numbered body areas correspond to 1 of 12 body locations, as described in Figure 1. In Wave 2, we asked participants to indicate where they have felt the most pain in the past 4 weeks (see Table 1). Over half of Wave 2 respondents indicated more than one painful location.

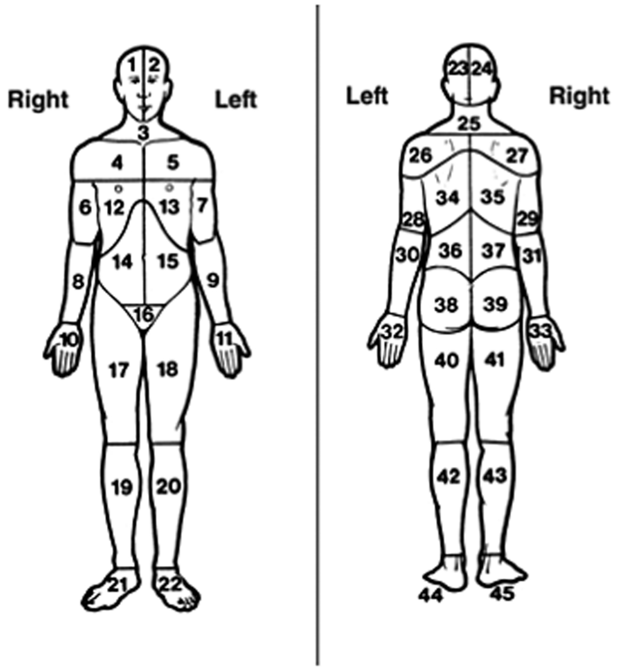

Figure 1. Pain location.

The VDS was selected as the pain intensity measure based upon the findings of several landmark studies examining the psychometric properties of unidimensional pain measures in older populations (K. Herr, 2011; K. Herr et al., 2007; K. A. Herr et al., 2004). Older adults routinely choose the VDS (compared to the NRS and VAS) as the most preferred unidimensional pain intensity measure (K. Herr et al., 2007; K. A. Herr et al., 2004; Peters, Patijn, & Lamé, 2007). Also, the VDS demonstrated the highest completion rates when directly compared to other unidimensional measures (K. Herr et al., 2007; K. A. Herr et al., 2004). Lastly, the VDS exhibits superior reliability and validity compared to other unidimensional measures in older adults from different ethnicities and range of cognitive abilities (K. Herr, 2002; Li, Herr, & Chen, 2009; Taylor, Harris, Epps, & Herr, 2005). Table 1 displays the stem and response categories for the VDS incorporated into Wave 2.

We recommend the pain descriptors be recoded into the following numeric format: 0 = no pain, 1 = slight pain, 2 = mild pain, 3 = moderate pain, 4 = severe pain, 5 = extreme pain, and 6 = the most intense pain imaginable. In this format, verbal pain descriptors can be readily translated into numeric values to facilitate data analysis with pain as a predictor or outcome (Scudds & Ostbye, 2001; Shega, Andrew, et al., 2012). Also, the pain intensity measure can be dichotomized at the moderate intensity level and greater (e.g., no pain, slight pain, mild pain vs moderate pain, severe pain, extreme pain, and the most intense pain imaginable) to better ascertain clinically relevant pain (Collins, Moore, & McQuay, 1997; Shega, Andrew, et al., 2012; D. K. Weiner et al., 2003).

The data collection process in NSHAP included three components: (a) an in-home face-to-face interview; (b) a collection of biomeasures; and (c) a leave-behind self-administered questionnaire. The pain questions for Wave 1 and 2 were assessed in the leave-behind self-administered questionnaire. Pain presence with walking in Wave 1 was completed by 82.3% of respondents. Among Wave 2 sample respondents, 2,949 of 3,337 completed and returned the leave-behind questionnaire of which 2,799 were age eligible for the current analysis. The pain questions were asked in the order and format displayed in Table 1. Pain presence

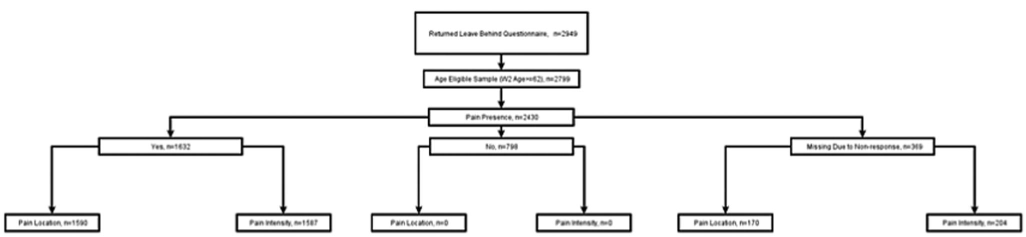

Figure 2. Respondent completion rates by item in order of presentation.

was followed by location, and intensity with response rates of 86.8%, 91.4%, and 92.5%, respectively. A portion of respondents did not answer the pain presence question ($n = 396$), but subsequently answered the location ($n = 170$) and intensity ($n = 204$) items as reflected by the larger sample size for these later groups. See Figure 2 for a flow diagram displaying participant response to pain-related items based upon response to the pain presence question. These respondents were coded as "missing" for analyses of the pain presence item in this article. However, researchers may consider recoding the skipped pain presence responses as "yes" or "no" based upon the responses to the subsequent pain location or intensity measures. Investigators should establish their analytic approach a priori depending upon the research question. Also, participants who reported no pain in the past 4 weeks on the pain presence question were directed to skip the subsequent two questions on pain location and intensity. These participants ($n = 798$) were subsequently identified as "missing legitimately" for the latter 2 questions and coded as a "no pain" response.

Statistical Analysis

In order to generate an inter-wave robustness test of pain responses, we ran Pearson's correlations between the similar, but not identical, measures capturing walking pain at Wave 1 and pain location at Wave 2, limiting the analysis to Wave 1 returning respondents. Of note, a series of questions also evaluated sex-related lower extremity pain at Wave 1; however, these items were not examined in this analysis since they are more appropriately intended for use with the NSHAP sexual measures. Eleven out of the 12 body locations assessed in Wave 2 demonstrated significant associations with Wave 1 walking pain (data not presented). Walking pain at Wave 1 was positively correlated with all lower body extremity pain sites at Wave 2-hip/buttock ($\rho = .11$, $p < .001$), genital ($\rho = .08$, $p < .01$), leg ($\rho = .19$, $p < .001$), and foot pain ($\rho = .15$, $p < .001$).

Summary statistics were generated for walking pain, pain presence, location, and intensity. Sample means by gender and age (Table 2) were compared using Wald tests. In order to examine mean differences among the three age categories, the pain measures were regressed on age, followed by the Wald tests. Pain intensity reports were dichotomized (no to mild pain vs moderate pain or greater) among Wave 2 respondents and compared by demographic characteristics along with physical and mental health status (Table 3). The analytic sample was first compared to the nonrespondent group, as a portion of respondents neglected to answer the pain items which varied by age (75.4 and 72.1, $p < .01$) and female gender (60.2 and 51.7, $p = .06$), item nonresponse and response, respectively.

Results

Mean pain presence, location, and intensity by gender and age are presented in Table 2. In general, women reported more pain by location and intense pain than men. Among women who completed the pain location measure, leg (40.2%), back (25.5%), foot (19.7%), and hip/buttock (19.7%) were the most common painful

Table 2. Wave 1 and 2 Pain Measures, by Gender and Age[a]

	Overall Mean (*SE*)	Women	Men	Sig test[b]	Age ≤69	Age 70–79	Age ≥80	Sig test[b]
Wave 1	*n* = 2,472	*n* = 1,285	*n* = 11,187		*n* = 1,350	*n* = 820	*n* = 302	
Pain walking[c]	38.5 (1.5)	40.1 (2.1)	36.8 (1.7)	.139	37.8 (1.9)	38.6 (2.2)	43.0 (3.5)	.346
Wave 2	*n* = 2,430	*n* = 1,272	*n* = 1,158		*n* = 969	*n* = 961	*n* = 500	
Pain presence[c]	66.90 (1.3)	69.4 (1.6)	64.2 (2.2)	.074	67.4 (2.2)	65.5 (1.9)	68.5 (2.9)	.567
Pain location[c]	*n* = 2,558	*n* = 1,344	*n* = 1,214		*n* = 1,007	*n* = 1,007	*n* = 544	
Head	5.7 (0.5)	7.2 (0.7)	4.2 (0.7)	.005	5.4 (0.7)	4.6 (0.7)	8.8 (1.7)	.006
Neck	11.5 (0.8)	11.6 (0.9)	11.3 (1.3)	.862	11.7 (1.2)	11.8 (1.3)	10.3 (1.6)	.773
Shoulder	18.2 (0.9)	18.7 (1.3)	17.6 (1.5)	.639	18.9 (1.6)	16.3 (1.4)	20.1 (2.3)	.234
Arm	10.5 (0.8)	12.5 (1.1)	8.3 (1.3)	.022	12.2 (1.6)	9.0 (1.1)	9.0 (1.6)	.244
Hand	12.5 (1.0)	14.1 (1.6)	10.7 (1.0)	.072	11.5 (1.2)	13.6 (1.6)	12.8 (1.9)	.538
Chest	3.1 (0.5)	3.0 (0.7)	3.2 (0.6)	.816	2.6 (0.8)	2.1 (0.4)	6.2 (1.5)	.003
Abdomen	8.5 (0.6)	8.7 (1.0)	8.3 (0.8)	.770	24.0 (2.4)	23.1 (1.6)	26.7 (2.2)	.379
Back	24.2 (1.4)	25.5 (1.5)	22.7 (1.9)	.197	8.1 (1.2)	9.6 (1.6)	7.2 (1.5)	.593
Hip/buttock	15.8 (1.0)	19.7 (1.3)	11.5 (1.3)	<.001	15.3 (1.4)	16.2 (1.4)	16.0 (2.2)	.879
Genital	2.4 (0.4)	2.7 (0.7)	2.1 (0.4)	.443	2.0 (0.4)	3.5 (0.9)	1.2 (0.4)	.052
Leg	35.7 (1.2)	40.2 (1.7)	30.9 (1.9)	.001	34.4 (2.3)	35.8 (2.1)	38.9 (2.8)	.432
Foot	17.6 (1.1)	19.7 (1.4)	15.3 (1.5)	.038	19.4 (2.0)	16.6 (1.9)	15.1 (1.6)	.300
	n = 2,589	*n* = 1,352	*n* = 1,237		*n* = 1,020	*n* = 1,015	*n* = 554	
Pain intensity[d]	2.04 (0.046)	2.13 (0.048)	1.94 (0.076)	.036	2.03 (0.084)	1.98 (0.057)	2.14 (0.102)	.254

Notes. SE = standard error.
[a]Estimates weighted to account for probability of selection and differential nonresponse. Design-based standard errors in parentheses.
[b]*p* Value for Wald test.
[c]Percent. Totals do not add up to 100% as respondents could indicate more than one painful location.
[d]Estimates and standard errors reported by unit change.

Table 3. Wave 2 Sample Characteristics by Pain Intensity[a]

	None to mild (n = 1,300)	Moderate or greater (n = 1,289)	Sig test[b]
Demographic			
Age	72.06 (0.308)	72.06 (0.387)	.991
Gender (female)[c]	48.2 (2.0)	55.2 (1.9)	.018
High school grad[c]	87.5 (1.4)	82.3 (1.9)	.009
Non-hisp white[c]	83.4 (1.8)	83.3 (1.7)	.937
Non-hisp black[c]	7.5 (1.2)	7.0 (1.0)	.675
Hispanic/Latino[c]	6.6 (1.5)	6.8 (1.3)	.828
Other race/ethnicity[c]	2.5 (0.6)	2.9 (0.6)	.631
Widowed[c]	20.5 (1.7)	20.9 (1.6)	.869
Health			
Comorbidity (0–13)[d]	2.06 (0.063)	2.88 (0.088)	<.001
ADLs (0–9)[e]	0.73 (0.052)	1.69 (0.082)	<.001
IADLs (0–6)[f]	0.30 (0.025)	0.76 (0.058)	<.001
Self-reported health (0–5)[g]	3.55 (0.049)	3.00 (0.045)	<.001
Depressive symptoms (0–22)[h]	3.28 (0.156)	4.99 (0.166)	<.001

Notes. [a]Estimates weighted to account for probability of selection and differential nonresponse. Design-based standard errors in parentheses.
[b]*p* Value for Wald test.
[c]Percent.
[d]Myocardial infarction, congestive heart failure, heart problem, heart attack, high blood pressure, COPD/asthma, emphysema, arthritis, osteoporosis, diabetes, skin cancer, other cancer, metastatic cancer.
[e]Difficulty walking across a room, walking a block, dressing, bathing, eating, getting in/out of bed, using the toilet, driving during day,driving at night.
[f]Difficulty preparing meals, taking medication, managing money, grocery shopping, doing light housework, using the telephone.
[g]1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent.
[h]CES-D 11; could not get going, felt disliked, felt sad, people unfriendly, lonely, trouble sleeping, everything was an effort, felt depressed, not feel like eating, enjoyed life, felt happy.

sites. Among men who completed the pain location measure, leg (30.9%), back (22.7%), shoulder (17.6%), and foot (15.3%) were the most frequently reported painful locations. In addition, women described more head, arm, hip/buttock, leg, and foot pain compared to men, ($p < .05$) at each individual site. Women reported more intense pain compared to men—1.94 versus 2.13, respectively ($p < .05$).

Next, Table 2 compares mean pain reports of presence, location, and intensity according to age cohorts specified at 62–69, 70–79, and 80 and above. The results demonstrate that although there were some qualitative differences in pain presence, location, and intensity, only a few reached statistical significance. Older respondents reported more head pain and chest pain, but less genital pain than younger respondents ($p < .05$).

Pain reports categorized as no to mild versus moderate or greater among Wave 2 respondents by demographic characteristics along with physical and mental health factors are displayed in Table 3. Women were more likely to report moderate or greater rather than none to mild pain, 55.2% versus 48.2%, respectively ($p < .05$). High school graduates reported lower rates of moderate or greater compared to none to mild pain, 82.3% versus 87.5%, respectively ($p < .01$). All of the health indicators were significant and in the expected direction ($p < .001$). An increase in comorbidity, ADL and IADL disability, poorer self-reported health, and more depressive symptoms were each significantly more common in participants who reported moderate or greater pain compared to none to mild pain.

Discussion

Pain presence, location, and intensity questions were successfully incorporated into NSHAP Wave 2 with acceptable response rates for a leave-behind questionnaire. Participants who reported walking pain at Wave 1 were more likely to report lower extremity pain (e.g., hip/buttocks, genital, leg, and feet pain) at Wave 2. Pain was commonly reported as 49.8% of the sample endorsed moderate or greater pain in the past 4 weeks. Moreover, moderate or greater pain was associated with worse health, including increasing comorbidity, ADL and IADL disability, poorer self-reported health, and additional depressive symptoms compared to persons who reported none to mild pain.

Among age eligible Wave 2 participants, over half indicated pain in more than one body area. Based upon question wording and respondent reporting, we recommend investigators interpret the pain location measure as marked areas corresponding to painful locations. However, we do not believe these areas necessarily represent locations of the most intense pain, nor can one infer an absence of markings indicating no painful locations. The convergent and predictive validity of the pain location measure is supported by the correlation of respondents reporting pain in the lower extremity in Wave 1 and an increased likelihood of circling painful areas in the lower extremity in Wave 2. Moreover, respondents indicated lower extremity pain (e.g., leg, back, and foot) was more common than other locations such as head, upper extremity, and chest, as has been demonstrated in other older adult samples, supporting the measures' external validity (D. Weiner et al., 1998).

The proportion of respondents who report "any pain" and "moderate or greater pain" resemble findings from other community-dwelling, older adult, population-based samples, conducted in the US, Canada, and Europe (Donald & Foy, 2004; Gibson & Lussier, 2012; Hadjistavropoulos et al., 2007; Jakobsson, Klevsgård, Westergren, & Hallberg, 2003; Reitsma et al., 2011; Smith et al., 2010). The proportion of older adults who report pain varies from 30% to 80%, depending upon the study. Variations in pain report may stem from sample characteristics including participant location (e.g., community-dwelling, assisted living facility, and/or nursing home) along with patient specific factors such as comorbidity and the presence of cognitive impairment, as well as characteristics of the pain measure itself. The fact that the prevalence of pain in our sample mirrors that of other studies further substantiates the external validity of the pain presence and intensity measures incorporated into NSHAP Wave 2. Importantly, item nonresponse did vary by gender and age. Therefore, researchers interested in the relationship of pain with these variables should consider an adjustment for differential nonresponse to minimize bias.

The construct validity of the NSHAP pain intensity measure is further supported by the association of moderate and greater pain with poorer health. Pain intensity demonstrates the predictive relationship of pain with physical, psychological, and overall health among older adults (Eggermont, Penninx, Jones, & Leveille, 2012; Leveille et al., 2009; Parmelee, Harralson, McPherron, DeCoster, & Schumacher, 2012; Scudds et al., 2001; Shega, Andrew, et al., 2012; Shega, Dale, et al., 2012; D. K. Weiner et al., 2003). We generated the NSHAP measure based on the criterion of previous research that utilized verbal descriptor scales, and these results meet expectations for an older sample (K. Herr, 2002, 2010, 2011; K. Herr et al., 2007). Table 3 presents evidence for concurrent validity since moderate or greater pain was associated with additional physical disability and depressive symptoms as well as poorer self-reported health compared to those with no or mild pain. Moderate or greater pain was also associated with additional comorbid conditions, many of which are associated with persistent pain, such as arthritis, diabetes, and osteoporosis. These results can be used as guidelines by analysts who wish to distinguish between the health of at least two sub-samples of respondents by self-reported pain intensity. While the above findings argue the "4 week" time-frame in the stem of the pain item represents persistent pain, such report may also represent other designations on the pain continuum including acute or subacute pain, thereby limiting generalizability.

We recommend that investigators interested in pain as an outcome dichotomize the intensity measure at the moderate intensity level and greater (e.g., no pain, slight pain, mild pain vs moderate pain, severe pain, extreme pain, and the most intense pain imaginable). This represents "clinically relevant pain" or pain associated with physical, psychological, and social health (Collins et al., 1997; Shega, Dale, et al., 2012; D. K. Weiner et al., 2003). When pain is used as a predictor, investigators may elect to use either the pain intensity measure at the cutoff of moderate intensity or higher or the pain presence measure (yes or no). It is important to note that the verbal descriptor levels maintain ordinal and not interval properties. That is, the increase in physical, psychological, and social impairment between pain levels (e.g., mild to moderate vs moderate to severe) is not equivalent.

In conclusion, we were able to successfully incorporate a pain presence, location, and intensity measure into NSHAP Wave 2. The robustness of the variables is supported by a high completion rate of pain items by respondents along with evidence of external validity. Researchers can utilize the pain measures as a predictor or outcome and as a continuous or dichotomous variable depending upon the research question. NSHAP investigators hope and encourage researchers to use these measures to further our understanding of the relationship between pain and health, particularly social health.

Key Points

- NSHAP Wave 2 introduced pain presence, location and intensity measures with response rates that resembled previous North American and European studies.
- The congruent and predictive validity of pain location items was supported by significant correlations between Wave 1 walking pain and Wave 2 lower extremity pain.
- More than half of the sample reported moderate or greater pain, confirming past research. We recommend designating moderate pain as a threshold for users investigating the correlates of pain intensity.
- Gender was a key predictor of anatomic location and intensity of pain, whereas age was associated with a few painful locations.

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