



# Comparing Two Scales: FPS-R and NRS for Pain Measurement in Elderly Bedridden Population of Hamadan-Iran

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## Abstract

**Background:** Pain is a common complaint of the elderly and it is important to evaluate pain intensity carefully in aged people. There are different self-report scales for pain evaluation in elderly individuals, however, only a few studies have compared these scales. This study was conducted to compare 2 regular pain scales: FPS-R and NRS in the elderly population.

**Methods:** In this cross sectional study, we evaluated 2 different pain assessment tools. A total of 120 bedridden patients, who were older than 65 years, and were admitted in governmental hospitals in Hamadan-Iran were studied during 3 months (May-July 2016). For evaluating pain, we used the FPS-R (faces pain scale-revised) and NRS (numerical rating scale). All participants' information were gathered in a checklist and analyzed using the SPSS 16 software.

**Results:** All patients had some degree of pain that started from 1 month to over 6 months ago, among them, 115 (96%) had persistent pain. The mean pain intensity in the participants was similar with both scales. There was a strong correlation between the 2 scales when using the Pearson correlation method ( $r = 0.735$ ,  $P < 0.001$ ). The age group analysis showed a significant difference in different age subgroups, therefore, the 75 - 85 year old age group had the highest and  $> 85$  years old had the lowest pain intensity (7.07 vs. 5.36, respectively using NRS,  $PV = 0.014$ )

**Conclusions:** Pain has a remarkable prevalence in bedridden patients in Hamadan. Both scales: the FPS-R and NRS scales had a strong correlation for measuring pain intensity in the elderly patient population, however, simplicity of the FPS-R scale for use with the older adults, makes it an appropriate pain scale in clinical practice. Future studies need to evaluate a suitable management pain for older adults.

**Keywords:** Pain, FPS-R, NRS, Aged, Hospitalization, Iran

## 1. Background

Pain is a common complaint of the elderly. As the number of individuals older than 65 years continues to rise, frailty and chronic diseases associated with pain would likely increase (1). Therefore, primary care physicians would face a significant challenge in pain management in older adults. The elderly are more likely to have arthritis, bone and joint disorders, cancer, as well as other chronic disorders associated with pain (2). Pain is the important problem between 25% and 50% of community-dwelling elderly (3). Prevalence of pain in geriatric nursing home residents is even higher, which is estimated to be between 45% and 80% (4). The elderly are often untreated or undertreated for pain. Barriers for effective management include challenges to proper assessment of pain, underreporting by patients, atypical manifestations of pain in the

elderly, misconceptions about tolerance, and addiction to opioids in elderly (1). Consequences of under treatment for pain in the elderly population are depression, anxiety, social isolation, cognitive impairment, immobility, sleep disturbances, and losses in the quality of life (5, 6). Pain plays a key role in the mental health of older adults (7). Reasons that physicians usually indicate inadequate pain control might include lack of training, inappropriate pain assessment, and reluctance to prescribe opioids (3). As is the case in many developing countries, the elderly population in Iran is significantly growing and is predicted to have more than 26 million seniors (over 60 years old) in Iran by 2050 (8). The elderly (65 years and older) represent more than 7% of Iran's population now (9) and is estimated to be more than 10% and 21% in 2025 and 2050, respectively (10, 11). For convenient management of pain in elderly patients, it is necessary to use appropriate pain as-

assessment methods. There are different self-report scales for pain evaluation in elderly individuals, among them FPS-R (faces pain scale-revised) and NRS (numerical rating scale) are 2 useful pain assessment tools. Both these scales score the sensation of pain on a widely accepted 0-to-10 metric, which the FPS-R is accompanied with different sad to happy faces according to level of pain in a person.

FPS-R is widely used for pain assessment in children, however, due to simplicity of implementation, this instrument is frequently used for pain assessment in older adults in clinical practices as well.

Despite the widespread use of these scales for pain measurements in geriatrics, only a few studies have compared them. Considering the above facts, this study was conducted to compare 2 scales: FPS-R and NRS in the bed-ridden elderly population of Hamadan, Iran.

## 2. Methods

In this cross-sectional study, all 120 elder bed-ridden patients, who were older than 65 years, were studied during 3 months (May-July 2016) by using a convenient sampling. Patients were selected from the internal wards of Shahid Beheshti hospital, which is the referral center for internal medical disorders in Hamadan. For measuring pain frequency and intensity in each patient, we used FPS-R (faces pain scale-revised) and NRS (numerical rating scale) as self-report scales.

Although both these measures are scored from 0 to 10 (0 indicating no pain and 10 is the worst experienced pain), NRS contains both even and odd numbers and FPS-R has only even numbers as a scoring scale.

We used trained nurses for patient interviews. Questions such as how much pain did they have at the moment and if they had any pain, how long did it take to feel better were asked. Nurses also helped them express their pain intensity by choosing the right number (NRS) or the right picture (FPS-R), which indicated the best for their pain condition according to the above scales. The inclusion criteria for this study included being over 65 years as well as getting verbal consent. Severely ill patients and those who could not estimate their pain intensity for different reasons (like severe dementia) were excluded from the study. We defined persistent pain as pain that lasts for a prolonged period (usually more than 3 - 6 months (12)). All participants' information were gathered in a checklist and then analyzed using SPSS software (version 16.0, SPSS, Chicago, IL). Normality was evaluated by Kolmogorov-Smirnov. ANOVA, Chi-square, t-test, and Pearson correlation was used to evaluate the relationship between the 2 scale's correlations. The Ethics Committee of Hamedan University of Medical Sciences approved

the ethical considerations of the present study under No Ref:p.16.35.320.

## 3. Results

Totally, 120 patients older than 65 years entered the study. The most frequent diagnoses in these patients were hypertension (55%), COPD (Chronic Obstructive Pulmonary Disease) (20%), malignant neoplasms (10%), and diabetes mellitus (7.5%). In total, 78 (65%) participants were male and 42 (35%) were female. Mean  $\pm$  (SD) age was  $74.9 \pm (6.8)$ , which did not have significant difference in men and women ( $74.98 \pm (6.8)$  in men and  $75 \pm (6.9)$  in women, respectively). All patients (100%) had some degree of pain, which started from 1 month to more than 6 months ago. Among them, 115 (96%) had a persistent pain that started more than 3 months ago. Pain frequency and intensity in the study population, according to FPS-R and NRS scales, is shown in Table 1. There was a strong correlation between the 2 scales using Pearson correlation method ( $r = 0.735$ ,  $P < 0.001$ ). Analysis of pain intensity in terms of gender did not show any statistically significant difference between men and women (Table 2). The age group analysis in participants showed a higher pain intensity in the 75 - 85 year old group compared to other age groups with both FPS-R and NRS scales, which was statistically significant (Table 2).

Post hoc analysis indicated that 2 age groups (75 - 85-year-old and > 85-year-old) had statistically significant different pain intensities (Table 2).

## 4. Discussion

Pain is a common problem in the elderly population and our results showed that all of the hospitalized, bed-ridden patients in Hamadan, had pain problems. Furthermore, pain intensity in most participants was higher than the median (score 5 or higher according to table 1), which is higher than other studies. Results of a study done on elderly hospitalized patients, in Italy, which applied NRS, showed that pain the prevalence was 63% in the study population (13). Most of the elderly population in our study (96%) had a persistent pain that started more than 3 months ago. Results of 2 different studies showed persistent (i.e. chronic) pain affecting more than 50% of older individuals living in a community setting and more than 80% of nursing home residents (14, 15). Results of another study in Tehran, Iran indicated that 72.8% of the elderly residents in 2 private nursing homes reported some degree of pain at the time of study and 66.7% reported persistent pain (5). In addition, in a cross-sectional study in Japan, the prevalence of pain among 9 healthcare facilities was 47.2%

**Table 1.** Pain Frequency and Intensity in the Study Population Based on NRS and FPS-R Scales<sup>a</sup>

Level of Pain <sup>b</sup>	NRS			FPS-R		
	N	%	N Cumulative	N	%	N Cumulative
3	3	2.5	2.5			
4	11	9.2	11.7	24	20	20
5 (Moderate pain)	21	17.5	29.2			
6	24	20	49.2	45	37.5	57.5
7	13	10.8	60			
8	25	20.8	80.8	36	30	87.5
9	18	15	95.8			
10 (Worst pain)	5	4.2	100	15	12.5	100
Mean pain intensity ( $\pm$ SD)			6.5 ( $\pm$ 1.8)			6.7 ( $\pm$ 1.88)
Total	120	100		120	100	

<sup>a</sup>No items were found at level 0, 1, 2 so these levels were not listed in this table.

<sup>b</sup>NRS contains both even and odds numbers, but FPS-R has only even numbers.

**Table 2.** Comparison of Mean Pain Intensity in Different Sex Groups and Different Age Groups of the Participants<sup>a</sup>

Variable		FPS-R	NRS
Sex	Male	6.53 $\pm$ 1.84	6.56 $\pm$ 1.81
	Female	7.00 $\pm$ 1.93	6.97 $\pm$ 1.77
P value		0.20	0.23
Age, y <sup>b</sup>	65 - 74 a	6.44 $\pm$ 1.55	6.62 $\pm$ 1.78
	75 - 84 b	7.00 $\pm$ 1.65 c	7.07 $\pm$ 1.79 c
	$\geq$ 85 c	5.44 $\pm$ 1.02	5.36 $\pm$ 1.28
P value		0.04	0.014

<sup>a</sup>Values are expressed as mean  $\pm$  SD.

<sup>b</sup>In post hoc analysis (tukey) significant difference was between b\*c (FPS-R: P = 0.04, NRS: P = 0.014).

and between self reported pain reasons, mental health issues had the greatest portion (OR: 9.18, 95%CI 1.27 - 66.52) (16). Measuring pain intensity using the FPS-R scale showed that most participants (80%) had moderate to severe pain, which means they assigned the score of 6 or more to their pain severity. Results of a study on elderly adults, from 6 nursing homes in Hong Kong, that used a geriatric pain assessment scale, showed a pain intensity of 4.51 on a 10-point scale, which was lower than our results (17). A recent study of elderly people that resided in the community setting in Brazil showed that 52.8% of the elderly population suffered from chronic pain; among them 54.6% reported highest or the worst possible pain intensity (18).

In our study, the pain intensity measured by the NRS scale showed similar results, therefore, 106 (88.3%) patients

rated a pain intensity of 5 or more (moderate to worst pain). These self-rating pain scales are suitable for measuring pain in the elderly. In different studies, their effectiveness in assessment of pain intensity in the elderly has been proved (19-21). Results of present study showed a strong correlation ( $r = 0.735$ ,  $P < 0.001$ ) between the 2 scales using the Pearson correlation method, which is very similar to results of the Kim EJ et al. study in Korea. Like our study, they showed a strong correlation ( $r = .73$ ,  $P < .001$ ) between the FPS and the NRS in older adults in Korea (21).

In another study, validity and reliability of these scales have been shown in traditional and electrical usages (22). Comparing pain intensity in women and men did not show a significant difference and the results were the same with FPS-R and NRS scales. However, other studies indicated that the pain intensity in women was higher than men (23, 24). In a study done in California, older women, with a low income, who were insufficiently active during their leisure time, had higher prevalence of chronic pain (25). In some investigations, the role of ethnicity in pain intensity is being considered in older adults (this can be a new subject in pain topics) (26).

Finally, analyzing pain intensity in different age groups using ANOVA showed that pain intensity was highest in the 75 - 85 year old age group and the lowest in the individuals who were older than 85 years. Most clinical studies suggest a relative decrease in intensity of pain symptoms associated with different disorders in adults of advanced age (27).

#### 4.1. Conclusions

Pain has a remarkable prevalence in bed-ridden patients in Hamadan, Iran; therefore, it is necessary to evaluate each elderly hospitalized patient regarding pain using appropriate pain assessment methods. Two different scales used in this study (FPS-R and NRS) showed a strong correlation to assess pain in the study population, among them, FPS-R seems to be more convenient to administer, especially in cognitive disorders, and requires no equipment except for the photocopied faces. Evaluating pain intensity in the study population showed that most participants had moderate to severe pain, which emphasizes the necessity for appropriate treatment in the geriatric population.

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#### Footnote

**Disclosure:** We declare that there is no conflict of interests regarding this manuscript.

#### References

- Cavalieri TA. Management of pain in older adults. *J Am Osteopath Assoc*. 2005;**105**(3 Suppl 1):S12-7. [PubMed: 18154193].
- A. G. S. Panel on Persistent Pain in Older Persons . The management of persistent pain in older persons. *J Am Geriatr Soc*. 2002;**50**(6 Suppl):S205-24. [PubMed: 12067390].
- Galluzzi KE. Managing neuropathic pain. *J Am Osteopath Assoc*. 2007;**107**(10 Suppl 6):ES39-48. [PubMed: 17986677].
- Ferrell BA, Ferrell BR, Osterweil D. Pain in the nursing home. *J Am Geriatr Soc*. 1990;**38**(4):409-14. [PubMed: 2109765].
- Asghari A, Ghaderi N, Ashory A. The prevalence of pain among residents of nursing homes and the impact of pain on their mood and quality of life. *Arch Iran Med*. 2006;**9**(4):368-73. [PubMed: 17061612].
- Cavalieri TA. Pain management in the elderly. *J Am Osteopath Assoc*. 2002;**102**(9):481-5. [PubMed: 12361180].
- Rashedi V, Asadi-Lari M, Foroughan M, Delbari A, Fadayevatan R. Mental Health and Pain in Older Adults: Findings from Urban HEART-2. *Community Ment Health J*. 2017;**53**(6):719-24. doi: 10.1007/s10597-017-0082-2. [PubMed: 28124258].
- Sheykhi MT. General review of the sociological challenges and prospects of population in Iran-A sociological study of quality of life. *J Soc Sci*. 2006;**12**:21-32.
- Statistic Center of Iran . *National Census Report, 2006*. Tehran; 2011.
- Tajvar M, Arab M, Montazeri A. Determinants of health-related quality of life in elderly in Tehran, Iran. *BMC Public Health*. 2008;**8**:323. doi: 10.1186/1471-2458-8-323. [PubMed: 18808675].
- United Nation. *World Population Ageing: 1950-2050, Countries of area: Islamic Republic of Iran*. 2015. Available from: <http://www.un.org/esa/population/publications/worldageing19502050/pdf/113iran.pdf>.
- American Geriatrics Society Panel on the Pharmacological Management of Persistent Pain in Older P. Pharmacological management of persistent pain in older persons. *Pain Med*. 2009;**10**(6):1062-83. doi: 10.1111/j.1526-4637.2009.00699.x. [PubMed: 19744205].
- Fabbian F, De Giorgi A, Pala M, Mallozzi Menegatti A, Gallerani M, Manfredini R. Pain prevalence and management in an internal medicine setting in Italy. *Pain Res Treat*. 2014;**2014**.
- Helme RD, Gibson SJ. The epidemiology of pain in elderly people. *Clin Geriatr Med*. 2001;**17**(3):417-31. v. [PubMed: 11459713].
- Rosenthal RA, Kavic SM. Assessment and management of the geriatric patient. *Crit Care Med*. 2004;**32**(4 Suppl):S92-105. [PubMed: 15064668].
- Takai Y, Yamamoto-Mitani N, Ko A. Prevalence of and factors related to pain among elderly Japanese residents in long-term healthcare facilities. *Geriatr Gerontol Int*. 2014;**14**(2):481-9. doi: 10.1111/ggi.12094. [PubMed: 23682821].
- Tse M, Leung R, Ho S. Pain and psychological well-being of older persons living in nursing homes: an exploratory study in planning patient-centred intervention. *J Adv Nurs*. 2012;**68**(2):312-21. doi: 10.1111/j.1365-2648.2011.05738.x. [PubMed: 21679226].
- Pereira LV, de Vasconcelos PP, Souza LA, Pereira Gde A, Nakatani AY, Bachion MM. Prevalence and intensity of chronic pain and self-perceived health among elderly people: a population-based study. *Rev Lat Am Enfermagem*. 2014;**22**(4):662-9. [PubMed: 25296151].
- Herr KA, Garand L. Assessment and measurement of pain in older adults. *Clin Geriatr Med*. 2001;**17**(3):457-78. vi. [PubMed: 11459715].
- Herr KA, Mobily PR, Kohout FJ, Wagenaar D. Evaluation of the Faces Pain Scale for use with the elderly. *Clin J Pain*. 1998;**14**(1):29-38. [PubMed: 9535311].
- Kim EJ, Buschmann MT. Reliability and validity of the Faces Pain Scale with older adults. *Int J Nurs Stud*. 2006;**43**(4):447-56. doi: 10.1016/j.ijnurstu.2006.01.001. [PubMed: 16510146].
- de la Vega R, Roset R, Castarlenas E, Sanchez-Rodriguez E, Sole E, Miro J. Development and testing of painometer: a smart-phone app to assess pain intensity. *J Pain*. 2014;**15**(10):1001-7. doi: 10.1016/j.jpain.2014.04.009. [PubMed: 24854065].
- Arnstein P, Herr K. *Bonica's management of pain*. In: Fishman S, Ballantyne J, Rathmell J, editors. Philadelphia: Lippincott, Williams & Wilkins; 2010. Pain in the older person.
- Miskulin DC, Abebe KZ, Chapman AB, Perrone RD, Steinman TI, Torres VE, et al. Health-related quality of life in patients with autosomal dominant polycystic kidney disease and CKD stages 1-4: a cross-sectional study. *Am J Kidney Dis*. 2014;**63**(2):214-26. doi: 10.1053/j.ajkd.2013.08.017. [PubMed: 24183837].
- dos Santos FA, de Souza JB, Antes DL, d'Orsi E. Prevalence of chronic pain and its association with the sociodemographic situation and physical activity in leisure of elderly in Florianopolis, Santa Catarina: population-based study. *Rev Bras Epidemiol*. 2015;**18**(1):234-47. doi: 10.1590/1980-5497201500010018. [PubMed: 25651024].
- Park J, Engstrom G, Tappen R, Ouslander J. Health-Related Quality of Life and Pain Intensity Among Ethnically Diverse Community-Dwelling Older Adults. *Pain Manag Nurs*. 2015;**16**(5):733-42. doi: 10.1016/j.pmn.2015.04.002. [PubMed: 26206611].
- Gibson SJ, Helme RD. Age-related differences in pain perception and report. *Clin Geriatr Med*. 2001;**17**(3):433-56. v-vi. [PubMed: 11459714].