The utility of the Faces Pain Scale in the assessment of shoulder pain in Turkish stroke patients: its relation with quality of life and psychologic status

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This study was planned to investigate the utility of the vertical Faces Pain Scale (FPS) in the assessment of pain in stroke patients using the shoulder pain model and to assess its utility in the Turkish patient population. The secondary aim was to analyze the association of FPS with the quality of life and depression in the study population. Thirty stroke patients (group I) and 30 controls (group II), all suffering from shoulder pain were included in the study. The patients with subacute shoulder pain and with no other known diseases and impairments were recruited as a control group. Shoulder pain was evaluated by the commonly used pain scales including the Visual Analogue Scale, Likert Pain Scale and 0–10 Numerical Rating Scale besides FPS. Depression was screened using Beck Depression Inventory (BDI) and quality of life was evaluated using Short Form-36 (SF-36). FPS showed good correlations with the other pain scales in both the groups (r=0.950–0.972 and 0.674–0.926, respectively). In group I, there were significant correlations between FPS and physical functioning, pain and emotional role subscales of SF-36 (r= −0.432, 0.707 and −0.461, respectively). Although there was a low correlation between the FPS and BDI scores, it was not statistically significant. In group II, FPS showed significant correlations with the BDI scores and all subscales of SF-36 except social functioning and vitality (r= −0.679 to 0.848). FPS had a high degree of convergent validity and can be used in the assessment of shoulder pain in stroke patients. It may be a good alternative for pain assessment especially in patients with speech disorders and illiterate patients. ***International Journal of Rehabilitation Research*** **33:363–367 © 2010 Wolters Kluwer Health | Lippincott Williams & Wilkins.**

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Introduction

Accurate assessment of pain is very important for successful pain relief in clinical practice. Pain is a subjective experience and influenced by personal and sociocultural characteristics of an individual. In contrast, an accurate pain assessment is dependent on using the most appropriate pain scale for the existing condition. What is more, assessment of pain is difficult in stroke patients as concomitant cognitive, speech and affective impairments may complicate the assessment in this group of patients (Eechaute *et al.*, 2007). In addition, education level of the patients may affect the use and understanding of the pain scales (McAuliffe *et al.*, 2009). In Turkey, 16% of the population above 6 years of age is illiterate (World Development Report 2000/2001, 2001). Furthermore, our observations in our daily clinical practice show that less educated patients have more difficulty in defining their pain intensity using numeric scales, and pain levels reported with numeric scales are not always correlated with the patients' clinical status. Low literacy and educational level may be a hidden barrier for the precise assessment of pain with these scales in the Turkish population.

The Faces Pain Scale (FPS) was first developed for children and further found to be an appropriate tool for the assessment of pain in patients with cerebral palsy, young children, mature adults and the elderly (Bieri *et al.*, 1990; Stuppy, 1998; Hunter *et al.*, 2000; Boldingh *et al.*, 2004; Kim and Buschmann, 2006). The reliability and validity of this scale was reported to be good in patients with stroke and dementia in whom mild or moderate cognitive impairments existed in both the groups (Pautex *et al.*, 2005; Kim and Buschmann, 2006; Benaim *et al.*, 2007). Several versions of this scale such as 6, 7, 9 or 11 faces are being used (Kim and Buschmann, 2006; Benaim *et al.*, 2007; Silva and Thuler, 2008). In addition, a vertical version can be used in patients with visuospatial neglect (Benaim *et al.*, 2007). The FPS is an easy tool as it does not require reading or writing, yet it is suitable for illiterate patients as well (Jaywant and Pai, 2003; Kim and Buschmann, 2006).

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To our knowledge, there are no studies evaluating the utilization of FPS in the Turkish population. Thus, this study was planned to investigate the utility of vertical FPS in the assessment of pain in stroke patients. As shoulder pain is the most common pain-related complication in stroke patients (Aras *et al.*, 2004; Dromerick *et al.*, 2006, 2008; Chae *et al.*, 2007; Sackley *et al.*, 2008), it was chosen as the pain model to test FPS. It is known that the prevalence of depressive symptoms in patients with chronic pain is reported to be higher than in healthy individuals, and diseases with chronic pain have a negative impact on the patients' quality of life (Fishbain *et al.*, 1996; Pagano *et al.*, 2004). Thus, the secondary aim of the study was to analyze the association of FPS with the quality of life and depression in these patients.

Methods

Patients

This study was conducted in the rehabilitation unit of a university hospital. Thirty consecutive patients (14 female, 16 male) with a mean age of 64.23 ± 9.42 years, diagnosed as first-ever stroke patients (WHO MONICA Project Principal Investigators, 1988) admitted to the inpatient rehabilitation unit and suffering from shoulder pain (group I), were recruited to the study between January and May 2009. Exclusion criteria were being under the age of 18, having musculoskeletal impairments and painful conditions other than shoulder pain, having any shoulder pathology before stroke, existence of cognitive deficits including sensory aphasia that hampered in filling the questionnaires used in the study. Thirty patients (18 female, 12 male) with a mean age of 51.5 ± 11.5 years with subacute shoulder pain and no other known diseases and impairments were recruited as a second group (group II). Equivalent exclusion criteria were applied to the control group as well. Group II was planned to be a control group to test whether there was any difference in the utility of FPS between the stroke group and the second group that had no impairment in cognition. The study was approved by the Ethics Committee of the Ufuk University Faculty of Medicine and all the patients gave informed consent.

The sociodemographic (age, sex, education) and clinical characteristics (disease duration, etiology, haemiplegic side for the stroke group, localization of shoulder pain) of the patients in both the groups were recorded. The demographic characteristics of the patient groups are displayed in Table 1.

Stroke patients had a complete neurological evaluation and all the patients had a complete musculoskeletal examination. In both groups, special attention was given to perform a detailed shoulder examination to include the patients with pain due to the shoulder pathology only.

Table 1 The characteristics of the patients in both groups

	Group I (*n*, %)	Group II (*n*, %)	*P*
Age, year (mean ± SD)	64.23 ± 9.42	51.5 ± 11.45	0.000*
Sex			0.30
Female	14 (46.7)	18 (60)	
Male	16 (53.3)	12 (40)	
Education duration (year)			0.112
Illiterate	3 (10)	3 (10)	
5	15 (50)	7 (23.3)	
8	3 (10)	1 (3.3)	
11	4 (13.3)	9 (30)	
More than 11	5 (16.7)	10 (33.3)	
Duration of shoulder pain (month) (mean ± SD)	5.9 ± 3.08	7.23 ± 10.75	0.034*
Etiology			
Ischaemic	25 (83.3)		
Haemorrhagic	5 (16.7)		
Haemiplegic side			
Right	9 (30)		
Left	21 (70)		

*$P < 0.05$.

Assessment of pain

All patients were asked to rate their shoulder pain using FPS. FPS is a seven-item horizontal scale that defines the patients' feelings due to pain with seven facial expressions. The first face represents 'no pain' and the seventh face represents 'the worst possible pain,' and the patients are asked to mark the face that expresses their level of pain (Kim and Buschmann, 2006; Benaim *et al.*, 2007). Face figures are scored between 0 and 6, the least score representing 'no pain'.

Shoulder pain was also assessed by the most commonly used pain scales such as the Visual Analogue Scale (VAS), Likert Pain Scale (LPS) and 0–10 Numerical Rating Scale (NRS) to test convergent validity and make comparisons.

The Visual Analogue Scale is a horizontal 10 cm line (0 cm: no pain; 10 cm: severe pain). The patients are asked to mark along the line that expresses their pain intensity (Wewers and Lowe, 1990).

LPS is a five-point (0–4) scale in which zero represents 'no pain' and four represents 'insufferable pain'. The patients are asked to point out the number that displays their pain level (Likert, 1932).

NRS is an 11-item horizontal scale with numbers 0 to 10, which represent 'no pain' and 'the worst possible pain,' respectively. The patients are instructed to mark the number that describes their current pain intensity (McCaffery and Beebe, 1993).

Assessment of depression

The Beck Depression Inventory (BDI) was used to screen the existing level of depression in the patients. The BDI is a 21-item measure screening current symptoms of depression (Beck *et al.*, 1961). The validity and reliability of the Turkish version was reported by Hisli (1989).

Assessment of quality of life

The quality of life was evaluated with the Short Form-36 (SF-36) questionnaire. The SF-36 is composed of 36 items and eight subgroups of physical functioning, physical role, bodily pain, emotional role, general health, vitality, social functioning and mental health (Brazier *et al.*, 1992; Puhan *et al.*, 2008). The Turkish version of SF-36 was also found to be reliable and valid (Kocyigit *et al.*, 1999).

Statistical analysis

Statistical analyses were performed by using the SPSS 11.5 statistical package (Chicago, Illinois, USA). The mean ± SD or median (minimum–maximum) values were given as descriptive statistics. The chi-square test and Mann–Whitney *U*-test were used for comparing the two groups. The Spearman correlation test was used for correlations among the scales. The correlation of pain with depression levels and quality of life was also assessed using the Spearman correlation. *P* less than 0.05 was accepted as statistically significant.

Results

The patients were younger and the mean duration of shoulder pain was longer in group II. There were no statistically significant differences between the groups regarding sex and education level ($P > 0.05$).

All the patients in both the groups had no difficulty in understanding and completing the four pain scales.

The descriptive statistics of the scales for the two groups are given in Table 2. Pain scores of the patients in group II were slightly higher than the stroke group, but no statistically significant differences were observed between the groups in terms of the pain scores ($P > 0.05$).

FPS showed good correlations with the other pain scales in both the groups ($r = 0.950$–0.972 and 0.674–0.926, respectively) (Table 3). Thus, FPS had a high degree of convergent validity.

The SF-36 and BDI scores of the two groups are shown in Table 2. The physical functioning, bodily pain, emotional role, vitality and mental health subscales of SF-36 were found to be higher whereas the BDI scores were found to be lower in group II, and statistically significant differences were found in the physical functioning, emotional role and social functioning subscales of the SF-36 and BDI scores ($P < 0.05$).

In group I, there were significant correlations between FPS and physical functioning, pain and emotional role subscales of SF-36 ($r = -0.432$, 0.707 and -0.461, respectively). Although there was a low correlation between the FPS and BDI scores, it was not statistically significant. In group II, FPS showed significant correlations with the BDI scores and all the subscales of SF-36 except social functioning and vitality ($r = -0.679$ to 0.848). The correlations coefficients and their significance are given in Table 3.

Table 2 The median values of pain severity, SF-36 and BDI scores of the groups

	Group I [median (minimum–maximum)]	Group II [median (minimum–maximum)]	*P*
FPS	3 (1–6)	4 (1–6)	0.167
VAS	5.2 (1–9.5)	5 (1–9)	0.734
Likert Pain Scale	2 (1–4)	2 (1–4)	0.267
Numerical Rating Scale	5 (1–10)	6.5 (1–10)	0.571
SF-36 physical functioning	0 (0–33.3)	51.7 (16.7–66.7)	0.000***
SF-36 physical role	0 (0–50)	0 (0–50)	0.646
SF-36 bodily pain	45.5 (18.2–72.7)	45.5 (9.1–63.6)	0.492
SF-36 emotional role	0 (0–50)	50 (0–50)	0.021*
SF-36 general health	44 (28–52)	44 (28–56)	0.302
SF-36 vitality	33.3 (25–50)	37.5 (16.7–50)	0.153
SF-36 social functioning	40 (30–60)	40 (20–50)	0.002**
SF-36 mental health	36.7 (23.3–50)	40 (20–50)	0.091
BDI	26 (1–47)	16.5 (6–36)	0.002**

BDI, Beck Depression Inventory; FPS, Faces Pain Scale; SF-36, Short Form-36; VAS, Visual Analogue Scale.
*$P<0.05$.
**$P<0.01$.
***$P<0.001$.

Table 3 The correlations between the Faces Pain Scale and Visual Analogue Scale, Likert Pain Scale, Numerical Rating Scale, Short Form-36 and Beck Depression Inventory of the groups

	Correlations with FPS	
	Group I *r*	Group II *r*
VAS	0.950**	0.674**
Likert Pain Scale	0.972**	0.926**
Numerical Rating Scale	0.957**	0.895**
SF-36 physical functioning	−0.432*	−0.679**
SF-36 physical role	−0.049	−0.613**
SF-36 bodily pain	0.707**	0.848**
SF-36 emotional role	−0.461**	−0.499**
SF-36 general health	−0.152	0.409*
SF-36 vitality	0.128	−0.051
SF-36 social functioning	0.167	0.031
SF-36 mental health	−0.217	−0.322*
BDI	0.295	0.482**

BDI, Beck Depression Inventory; FPS, Faces Pain Scale; SF-36, Short Form 36; VAS, Visual Analogue Scale.
*$P<0.05$.
**$P<0.01$.

Discussion

Results of this study indicated that the FPS is a reliable tool in assessing somatic pain in patients with stroke and in a nonstroke group. The scale also showed significant correlations with other commonly used pain scales supporting convergent validity of the FPS. Furthermore, significant correlations were found between FPS and some of the subscales of SF-36 including physical functioning, pain and emotional role.

The FPS was used in different groups of patients from children to the elderly with dementia (Bieri *et al.*, 1990; Stuppy, 1998; Hunter *et al.*, 2000; Jaywant and Pai, 2003; Boldingh *et al.*, 2004; Pautex *et al.*, 2005; Kim and Buschmann, 2006; Benaim *et al.*, 2007; Silva and Thuler, 2008). Herr *et al.* (2007) indicated failures in completing some of the pain scales. Pautex *et al.* (2005) also reported poor comprehension of the FPS in the elderly demented patients because of the lack of standardized instructions on applying the scale and because of the existing dementia (Pautex *et al.*, 2005). In this study, all the patients completed the four pain scales successfully and had no difficulty in understanding the scales including the illiterate patients. However, it should be reminded that patients with cognitive impairments were excluded in this study.

It is reported that, when using the faces scales, affective distress may interfere with the rating of pain severity (Chambers and Craig, 1998; Hicks *et al.*, 2001). However, none of the faces of the FPS used in this study had drawings that recall emotions, such as tears or smiling, and this is an advantage in distinguishing pain severity from mood status (Stuppy, 1998; Hicks *et al.*, 2001).

Pain, being a subjective symptom, is not always easy to assess and it is important to use an easy but valid tool. There are many studies showing the validity and utility of FPS (Bieri *et al.*, 1990; Stuppy, 1998; Hunter *et al.*, 2000; Boldingh *et al.*, 2004; Pautex *et al.*, 2005; Kim and Buschmann, 2006; Benaim *et al.*, 2007). Stuppy (1998) investigated the validity of FPS in mature adult patients and reported strong relationships between the FPS and Pain Intensity Number Scale, VAS and Verbal Descriptor Scale. Kim and Buschmann (Kim and Buschmann, 2006) compared the 0–10 version of FPS (with 11 faces which requires no mathematical translation to complete the 0–10 scale) with the 0–10 NRS and VAS and also reported good correlations among the three scales in older adult patients. In a study of Pautex *et al.* (2005), strong correlations among the verbal rating scale, horizontal VAS, vertical VAS and FPS were found in the elderly patients with dementia. Pautex *et al.* (2006) evaluated the efficacy of the verbal rating scale, horizontal VAS and FPS in another group of patients with severe dementia and found moderate–strong correlations among the three scales (Pautex *et al.*, 2006). Results of these studies are similar with this study as FPS showed significant correlations with the other three pain scales; namely VAS, LPS and NRS in two different patient populations having the similar musculoskeletal pain model. The FPS was used in different patient groups with painful conditions in various studies (Jaywant and Pai, 2003; Rodriguez *et al.*, 2004; Fadaizadeh *et al.*, 2009). In all these studies, significant correlations were detected between FPS and the other pain scales (Jaywant and Pai, 2003; Rodriguez *et al.*, 2004; Herr *et al.*, 2007; Fadaizadeh *et al.*, 2009). Herr *et al.* (2007) evaluated pain levels in 97 patients with chronic arthritic pain and FPS was found to be valid as well.

Haemiplegic shoulder pain is a chronic pain condition and consequences of this situation are anxiety, depression, decreased quality of life, sleep problems and extended length of stay in the hospital. The relationship between chronic musculoskeletal pain and impaired quality of life has been reported in various studies (Widar *et al.*, 2004; Laursen *et al.*, 2005; Taylor, 2005; Chae *et al.*, 2007; Yildiz *et al.*, 2009). Chae *et al.* (2007) showed an association between poststroke shoulder pain and poor quality of life. Widar *et al.* (2004) also reported a similar association in a group of patients with long-term pain after stroke. In a study, a significant correlation was detected between pain severity and impaired quality of life in patients with knee osteoarthritis (Yildiz *et al.*, 2009) and equivalent results were reported in Laursen's study (Laursen *et al.*, 2005) in which pain severity was assessed using the VAS in both. In this study, FPS was found to be significantly correlated with a few components of life quality in the stroke patients and with most of the components in the controls with shoulder pain except vitality and social functioning. The difference in the two groups might be because of the fact that, in the stroke group, there are other factors and impairments effecting the quality of life as much as shoulder pain. Nevertheless, it can be concluded that there is a relationship between FPS and the quality of life as it was shown for VAS earlier.

The association between chronic pain and depression has been known and the existence of psychologic deteriorations affect the severity and treatment of pain adversely. Significant correlation was detected between the complex regional pain syndrome and the presence of depression in haemiplegic patients (Kocabas *et al.*, 2007). Celikel and Saatcioglu (2003) evaluated depressive symptoms in patients with chronic pain assessed by VAS and found a moderate correlation between pain severity and depression. In this study, no significant correlation was found between the FPS and BDI scores in the stroke patients, although a low significant correlation was detected in the controls. In the control group, disease duration was longer and the pain scores were slightly higher whereas the mean age and BDI scores were lower as compared with the stroke group. This bias may be the reason of these differences in both the groups.

There are several limitations of this study. First, patients' preferences of the pain assessment scales were not evaluated. In some studies, FPS was reported to be the second preference in the older adult patients and in patients with communication problems (Rodriguez *et al.*, 2004; Herr *et al.*, 2007). The combination of NRS and FPS was preferred in the illiterate patients (Jaywant and Pai, 2003). Second, the reliability of the FPS in the left and right hemispheric stroke patients was not evaluated.

Third, on account of the sample size, a subgroup analysis was not performed; for example, the utility of FPS in stroke patients with neglect or different levels of cognitive impairments was simply assessed by a Mini-Mental State Examination in our rehabilitation setting. In the next step, investigating the efficacy of the FPS in detecting change by treatment of painful conditions would be a good aim.

The FPS can be used for assessing pain in patients suffering from shoulder pain with or without stroke. The scale may be a good alternative for pain assessment especially in patients with speech disorders and illiterate patients because it is easy to use, understandable and there is no need for writing and reading.

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