

Retrospective Study

e Impact of Chronic Foot Pain Related Quality of Life: A Retrospective Case-Control Study

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Background: Chronic foot pain (CFP) is a widespread condition worldwide; however, few studies that relate CFP and foot health-related quality of life have been reported.

Objective: The aim of this study was to describe the impact of foot health and health in general in a sample of adult people with CFP compared with a control group.

Study Design: This study was designed as a retrospective case-control study.

Setting: Podiatric section of a care center.

Methods: Two hundred adults were included in the study. Patients were divided into CFP patient (n = 100) and control groups (n = 100). All of them regularly attended a private podiatric clinic to take care of their foot health. Self-reported data and medical histories for people with and without CFP were evaluated. All findings were compared with quality of life (QoL) scores based on the Foot Health Status Questionnaire, Spanish version.

Results: Adults with CFP (compared to the control group) showed reductions in QoL linked to overall health and foot health in particular and were statistically significant with respect to several domains: (1) foot pain, (2) foot function, (3) general health, and (4) physical activity. These differences were evaluated with a t-test for independent samples, and statistical significance was considered a *P* value of *P* < 0.05.

Limitations: The study was not a randomized controlled trial. Although primary outcome data were self-reported, the assessor was not blinded.

Conclusions: CFP patients, regardless of gender, recorded a negative influence on QoL-related foot health that seems to be linked with the presence of this chronic condition.

Key words: Chronic foot pain, foot specific health, health-related quality of life

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Foot problems, accompanied by pain, are a widespread worldwide condition, affecting one in 5 people over the age of 50 (1,2). Beyond the economic burden (3), foot pain has a big impact on the functional decline of people by affecting their mobility, which is accompanied by a decrease in

activity of daily living (ADL) performances (1), which eventually influences their quality of life (QoL). QoL is an important aspect of being human. Although the World Health Organization Quality of Life (WHOQOL) Group defined QoL as an "individuals' perceptions of their position in life in the context of the culture and

value systems in which they live and in relation to their goals, expectations, standards, and concerns" (4), no consensus currently exists regarding the exact meaning of QoL.

However, despite some disagreement about what the best definition is, most researchers agree that QoL is a multidimensional concept, and as such, the researcher should explore it when different areas of a patient's life, such as foot problems, are under study.

This situation is also challenging for advancing diagnostic care to assess, check, and treat patients who present with this chronic condition. Fonseca et al conducted a systematic review of people with pain who underwent interventions that showed the importance of involvement of multidisciplinary staff care in neuropathic and musculoskeletal evaluation for improving the QoL, autonomy, and reducing the economic costs of this condition for these people (5).

Thus, when the foot pain condition becomes chronic, chronic foot pain (CFP) appears, which is defined as continuous pain that lasts more than 3 months or discontinuous pain for more than 6 months. Although CFP is a condition often studied in elderly people as it is linked with mobility and balance problems, fractures, and falls (6), it is not limited to this population as healthy adults or adults with other different conditions (such as inappropriate footwear, flatfoot, arthritis, diabetes) also suffer from the disorder (7,8).

Also, this complex and multifactorial condition can be associated with changes in the plantar pressures, repeated sprains, complications putting shoes on, muscle weakness, loss of balance, alterations and deformities in the feet, and risk of falls (9-12).

Thereby, the identification of the CFP will assist in advancing personalized nursing care in matching a patient to better treatment and improving clinical outcomes in patients who present this common musculoskeletal disorder.

Finally, although research on foot pain is rapidly increasing, it is clear from the literature that no studies have sufficiently explored the relationship between CFP and QoL. Thus, the attention and follow-up in patients with foot pain is an important determinant to be taken into account while establishing preventive care and recognizing CFP as an important public health threat because of its negative impact on the individual and society (13).

Therefore, this study aimed to describe the impact of foot health and health in general in a sample of adult people with CFP when compared with a control group.

METHODS

Patients

This retrospective case-control observational study was conducted following the principles of Strengthening the Reporting of Observational Studies in Epidemiology (14) in a private podiatry health center in the city of A Coruña (Spain). Data were analyzed from January to December 2019. A non-randomized and consecutive sampling method was used to select the patients. The inclusion criteria for both cases and controls included several parameters: (1) similar anthropometric variables, (2) regular foot health check at the podiatry health center, (3) agree to participate in every stage of this research, and (4) willingness to sign the informed consent form. The specific criterion for study cases had a CFP and for controls included having no foot problems. The exclusion criteria for both groups were patients with a chronic painful disorder other than CFP, declining to sign the informed consent form, and inability to understand and agree to all the phases of this study. The final sample consisted of 200 patients, with 100 in each group.

Procedure

The research was undertaken by a specialist foot clinician with more than 20 years of expertise in the field of podiatry whose work was focused on preventing, maintaining, and restoring foot health.

The information on the age and gender of the patients was registered and included as variables of the study in addition to the anthropometrics parameters of height, weight, and body mass index (BMI). CFP was defined as a pain in the foot region with gradual onset lasting over 6 months (15). The study also included a self-administered Foot Health Status Questionnaire (FHSQ) on health-related QoL that was designed specifically for the foot (16). Although this questionnaire was originally developed to assess the results of surgical interventions in the foot, nowadays, the FHSQ is recognized as a validated test to use in different podiatric populations (17,18). The Spanish-validated FHSQ (version 1.03) was specifically used to establish the foot-specific and the general health-related QoL of our sample (19). The questionnaire consists of 3 sections: (1) the first has 13 questions to evaluate 4 foot-health related domains, including 4 for foot pain, 4 for foot function, 3 for footwear, and 2 for general foot health; (2) the second section was adapted from the Short Form-36 Health Survey (SF-36) also has 4 domains representing overall health including general health,

physical activity, social capacity, and vigor (20); and (3) the third and last section incorporates information about socio-economic variables, comorbidities, satisfaction, service utilization, and a record of medical data. The maximum score for each question is 100 points, and the minimum score is 0 points (best and worst conditions, respectively).

Ethical Considerations

The experimental protocol and procedures were approved by the institutional ethics committee of the University of A Coruña (Spain) with an application date of 08/05/2015. The study conformed to the Helsinki Declaration. Before data collection, all patients were informed about the study and signed the corresponding informed consent form.

Statistical Analysis

The software package IBM SPSS Statistics v.27.0 was used (IBM Corp., Armonk, NY). Descriptive statistics were used to characterize the sample (age, height, weight, gender, and BMI). The quantitative variables were expressed as mean ± standard deviation (SD), and the qualitative variables as absolute value and percentage. The Kolmogorov-Smirnov test was used to evaluate the normality of the sample. Between-group comparisons were made using a chi-square test to evaluate categorical variables and Student's t-test for independent samples for continuous variables. In all analyses, a P value of < 0.05 was considered statistically significant.

RESULTS

The mean age of the 200 patients selected was 33.65 (ranging from 11 to 80 years), with women accounting for 68.7% of the sample. Regarding the distribution of the patients based on CFP, 50% presented CFP, and 50% were considered controls.

Table 1 shows the characteristics of the sample, including patients with CFP and the control group based on gender and anthropo-

metric variables. Among these variables, BMI was the only one associated with CFP. CFP was not found to be related to gender, weight, or height. Women were more likely to visit a specialist foot clinician (68.50%) than men (31.50%).

On the other hand, in Table 2, no recorded statistically significant differences (P > 0.05) in the findings of the social characteristics (civil status, study level, and professional activity) of the study population, including patients with CFP and the control group, were found.

Finally, Table 3 shows the mean FHSQ scores for patients with CFP and the control group. Variables including foot pain, foot function, footwear, general foot and general health, physical activity, social capac-

Table 1. Characteristics of the sample, patients with CFP, and the control group by gender and anthropometric variables.

Parameters	Total Group (n = 200)	Case Group (n = 100)	Control Group (n = 100)	P Value
Gender				0.648
Male	63 (31.5%)	33 (52.40%)	30 (47.60%)	
Female	137 (68.5)	67 (48.60%)	70 (51.10%)	
Weight (kg)	69.04 ±14.27	71.48 ±13.02	66.59 ±15.0 8	0.121
Height (m)	1.68 ±0.08	1.67 ± 0.07	1.68 ±0.08	0.065
BMI (kg/m ²)	24.34 ± 4.45	25.48 ±4.91	23.21 ±3.6 1	0.045*

Notes: BMI, body mass index; N, number. Significant correlations are indicated in bold: *P < 0.005.

Table 2. Social characteristics of the sample, patients with CFP, and the control group.

Social Characteristics	Total group n = 200	Case Group (n = 100)	Control Group (n = 100)	P value	
Civil Status	Single	26 (13%)	16 (16%)	10 (10%)	0.322
	Divorced	28 (14%)	18 (18%)	10 (10%)	
	Widowed	36 (18%)	14 (14%)	22 (22%)	
	Couple	3 (1.5%)	2 (2 %)	1 (1%)	
	Married	107 (53.5%)	50 (50%)	57 (57%)	
Study Level	I. Primary	112 (56%)	56 (56 %)	56 (56%)	0.289
	C. Primary	44 (22%)	30 (30 %)	14 (14%)	
	Secondary	22 (11%)	6 (6 %)	16 (16 %)	
	Degree	16 (8 %)	6 (6 %)	10 (10 %)	
	S. Degree	6 (3%)	2 (2%)	4 (4%)	
Professional activity	Student	0 (0%)	0 (0%)	0 (0%)	0.340
	Freeland	10 (5 %)	6 (6 %)	4 (4%)	
	Employed	30 (15 %)	12 (12%)	18 (18%)	
	Unemployed	55 (27.5 %)	26 (26 %)	29 (29%)	
	Retired	105 (52.5%)	56 (56%)	49 (39%)	

Notes: C, complete; I, incomplete; S, superior; Frequency, percentage (%); Significant correlations are indicated in bold: *P < 0.005.

Table 3. Mean FHSQ scores of the sample, patients with CFP, and the control group.

FHSQ Domains	Total Group (n = 200)	Case Group (n = 100)	Control Group (n = 100)	P value
Foot Pain	75.01 ± 21.99	70.20 ± 26.09	79.74 ± 15.67	0.002**
Foot Function	83.56 ± 19.90	78.43 ± 23.62	88.69 ± 13.58	< 0.001**
Footwear	60.87 ± 27.05	61.91 ± 29.63	59.83 ± 26.54	0.587
General Foot Health	64.15 ± 25.43	65.05 ± 26.41	63.25 ± 24.51	0.618
General Health	67.45 ± 22.21	59.20 ± 14.95	75.70 ± 25.11	< 0.001**
Physical Activity	90.78 ± 15.41	86.27 ± 17.85	95.27 ± 10.83	< 0.001**
Social Capacity	83.94 ± 20.87	82.50 ± 22.75	85.37 ± 81.17	0.331
Vitality	61.91 ± 20.31	64.25 ± 22.35	59.56 ± 17.66	0.101

Notes: Significant correlations are indicated in bold: ** $P < 0.005$.

ity, and vitality showed a normal distribution. The CFP group was found to have statistically significant higher scores than the control group in general health and physical activity ($P < 0.005$).

DISCUSSION

The aim of this investigation was to analyze the impact of CFP on health-related QoL by comparing the results taken from the FHSQ in a case group of adults with CFP and an age, weight, and height-matched control group. Several authors have studied foot pain in different populations (1,7,21); however, as far as we know, this study is the first one performed in a Spanish adult sample with a specific chronic foot condition (CFP).

Foot health is important for the general population as it is essential for mobility and independence. Because of that, it should be kept in mind that people should keep their feet in good shape as people do with other parts of their bodies. When we do not pay enough attention to our feet, individuals can develop musculoskeletal problems related to pain (22), and they can also lose part of or all mobility, all of which can also compromise our psychological health. Patients with foot pain can show different psychological conditions, such as depression, anxiety, and neuroticism (15,23), and when both physical and psychological conditions are met, people's QoL can be seriously compromised.

In the present study, we find that patients with CFP have lower foot function and foot pain in the domains of foot health and lower general health, and lower physical activity in the domain of overall health. The negative impact on both foot and general health agrees with the study of Irving et al who showed that chronic plantar heel pain had a negative impact on

foot-specific and general health-related QoL (24). Our study also agrees with the study of Bennet et al who reported that after podiatric surgery, the foot-health related QoL improved to a similar level to the general population (17). Because QoL is a social concept that is significantly linked to loneliness, and loneliness is linked to both morbidity and mortality, people should consider loneliness when different conditions, such as foot problems, are being treated

by an advanced care nurse podiatrist or investigated by researchers.

Considering the physical activity, scores in the case group were found to be significantly lower than in the control group. It is important to understand that physical activity enhances muscle strength, gait speed, cognition (particularly executive control related-tasks), weight maintenance, mood, feelings of energy, and causes a reduction in falls, and leads to improvements in the functional abilities of the adults (25,26). In a current systematic review, the efficacy of physical activity interventions on the incidence of falls, balance, and strength was investigated, and it was found that 70% of the studies with an activity program showed a reduction in the incidence of falls, 80% showed progress in balance, and 70% reported increases in muscle strength (27). Bearing this in mind, it appears to be important to prevent the CFP so that the previously described pathologies do not develop.

Our results shed light on the value of podiatric care to prevent CFP that would help to improve the general health of the population and to adjust the amount of physical activity needed to be fit, thus improving an adult's QoL.

In addition, in light of these results, the finding from this study can be used to implement specific programs to advance nursing practices associated with this condition. In the first place, self-management strategies are necessary for leading to decreases in CHP and records of foot pain, foot function, and physical activity disabilities, QoL values, and limitations in their daily activities. In the second place, advanced nursing practices can teach the benefits of exercise and encourage patients with CHP to participate in exercise programs associated with foot health, balance, and mobility (28) and the importance of manual therapy (29). In the third

place, advanced nursing practices can actively provide information about the relationship between CHP and QoL values in addition to providing treatment recommendations to patients with this problem and their families. Last, rehabilitative nursing care may promote psychological programs and prevent such patients from needing psychological care.

Our study has several strengths and several limitations. The main limitation is the type of design. A cross-sectional study was useful for establishing causation between exposure outcomes and increasing the strength of our research. Also, only people with CFP were considered, which does not allow us to generalize our findings to other foot pain types; however, accurately, the characteristics associated with this collective type were delimited.

Also, our sample was recruited in terms of CFP, which is different when compared with other studies that recruit patients from the onset of a disease or as a secondary symptom related to another disease; this aspect provides originality to our study. Our sample was collected from a private podiatry health center specific to podiatric in the city of A Coruña, Galicia (Spain), and the use of a single clinic is a limitation as a larger sample size, and more diverse patients would have been beneficial for improving the strength of the study. Another limitation of our investigation was that CFP was only measured at baseline, which led to the bias that it was not possible to differentiate between patients who improve when going to the podiatrist from those who do not benefit as much from the treatment.

Considering that our population represents an ever-aging society, the increase in foot problems is a

reality. Preventing or curing foot complications is not only a public health problem but is also a social problem, so it seems essential to highlight the importance of foot care to prevent foot illnesses and deformities to help improve CFP and QoL.

CONCLUSIONS

CFP patients recorded a negative influence of CFP on their QoL that seems to be linked with the presence of this chronic condition regardless of gender. Detection of this foot problem should assist advanced practice nurses in improving treatment matching and provide better clinical outcomes for patients who present this foot condition. Thus, these patients and their families will need more advanced nursing care in addition to specific podiatric treatment aimed at the CFP population.

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Disclaimer

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Conflict of Interest

Each author certifies that he or she, or a member of his or her immediate family, has no commercial association (i.e., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted manuscript.

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