Original Scientific Paper

PREVALENCE, FUNCTIONAL INTERFERENCE, AND COPING STRATEGIES IN ADULTS WITH CHRONIC NON-MALIGNANT PAIN: A CROSS-SECTIONAL STUDY IN CROATIA

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DOI: https://doi.org/10.65241/wh.9.2.10

For citation: Zrno U, Smrekar M, Ilic B, Filipovic B, Kriksic V, Kovacevic I. Prevalence, functional interference, and coping strategies in adults with chronic non-malignant pain: A cross-sectional study in Croatia. World of Health. 2026:2(9):73-79. https://doi.org/10.65241/wh.9.2.10

Received: 12 August 2026 Revised: 27 September 2026 Accepted: 5 October 2026

ABSTRACT

Background: Chronic non-malignant pain is a common health problem with substantial effects on daily functioning and psychosocial well-being. This study aimed to examine the prevalence and characteristics of chronic non-malignant pain in an adult Croatian sample and to assess associations between pain intensity, interference with daily activities, coping strategies, and age.

Methods: A cross-sectional online survey was conducted among 258 adults living in Croatia. Participants were recruited using snowball sampling. Chronic pain was defined as pain that had persisted or recurred for at least three months during the previous six months. Pain intensity was assessed using an 11-point Numerical Rating Scale, functional interference using a single 0-10 item, and coping strategies using the 14-item Coping Strategies Questionnaire (CSQ-14). Descriptive statistics, and Spearman's rank correlation were used.

Results: Chronic non-malignant pain was reported by 116 participants (45.0%). Among participants with chronic pain, 39.7% reported pain lasting more than five years and 38.8% experienced pain daily. Mean average pain intensity during the previous seven days was 5.08 (SD 2.00), while mean interference with daily activities was 5.37 (SD 2.24). Average pain intensity correlated positively with daily activity interference ($r = 0.567$, $P < 0.001$) and with the overall CSQ-14 score ($r = 0.327$, $P < 0.001$). Age was weakly associated with the CSQ-14 score ($r = 0.214$, $P = 0.021$). Internal consistency of the CSQ-14 was good (Cronbach's alpha = 0.824).

Conclusions: Chronic non-malignant pain was common in this non-probability adult sample and was associated with substantial interference in daily activities. The associations between pain intensity, coping, and age support assessment of both functional and psychosocial dimensions when planning chronic pain care.

Keywords: *Chronic Pain, Pain Measurement, Coping Skills, Activities of Daily Living, Adult, Croatia.*

INTRODUCTION

Chronic pain is generally defined as pain that persists or recurs for longer than three months. Unlike acute pain, which has a protective and adaptive role, chronic pain may continue beyond the expected period of healing and can become a condition in its own right (1,2). The International Association for the Study of Pain and the ICD-11 classification recognize chronic pain as a complex clinical phenomenon that may be primary or secondary and that requires assessment

beyond the underlying somatic disorder (2,3). Chronic non-malignant pain includes persistent pain not caused by cancer and may occur in musculoskeletal, inflammatory, neuropathic, and other long-term conditions (1,4).

Chronic pain is a major public health concern because of its frequency, persistence, and consequences for physical, psychological, social, and occupational functioning. Population-based evidence shows that chronic pain is common but that prevalence estimates vary considerably according to case definition, population characteristics, and study methods (5-8). A large European survey reported moderate-to-severe chronic pain in approximately one fifth of adults, while a recent systematic review of European studies found a much broader range of estimates across populations (9,10). Such variability makes it essential to interpret prevalence estimates in relation to the sampling strategy and the definition of chronic pain used in each study.

The burden of chronic pain extends beyond pain intensity. Persistent pain can interfere with mobility, work, household responsibilities, social participation, sleep, and emotional well-being. Contemporary approaches therefore conceptualize chronic pain within a biopsychosocial framework, in which biological processes interact with psychological responses, behaviour, and the social environment (4,11). Clinical and social awareness of chronic pain has also increased because persistent pain may create long-term treatment needs, reduced productivity, and substantial demand for health services (12).

Psychological and behavioural responses are particularly important because they may influence how pain is perceived and managed. Stress, threat appraisal, beliefs, mood, and learned responses can interact with pain over time (13,14). Coping strategies represent cognitive and behavioural efforts used to manage pain and its consequences. They may include distraction, activity, reinterpretation, positive self-statements, seeking support, or other responses (15-17). Their relationship with pain is not necessarily unidirectional: frequent coping may reflect effective self-management, but it may also indicate a greater need to respond to more intense or persistent pain.

Age may also influence chronic pain and coping. Older adults often have a longer history of pain and a higher burden of chronic disease, while accumulated life experience may shape responses to persistent symptoms. Previous studies have reported age-related differences in catastrophizing and coping, but the direction and clinical meaning of these differences are not uniform (18-20). This suggests that age should be interpreted as one component within a broader biopsychosocial context rather than as an isolated determinant of coping.

Data examining chronic non-malignant pain together with functional interference and coping strategies in Croatian adults are limited. Previous Croatian research has shown that chronic pain outcomes are associated with non-medical factors and that self-care experiences are important in chronic musculoskeletal pain (21,22), but population-level evidence combining prevalence, functional interference, and coping remains scarce. The primary objective of this study was therefore to determine the prevalence and characteristics of chronic non-malignant pain in an adult sample from Croatia. Secondary objectives were to examine the association between average pain intensity and interference with daily activities, the association between overall coping strategy use and average pain intensity, and the association between age and coping strategy use. We hypothesized that higher average pain intensity would be associated with greater interference with daily activities (H1), that average pain intensity would be associated with the overall CSQ-14 score (H2), and that age would be associated with the overall CSQ-14 score (H3).

METHODS

STUDY DESIGN AND PARTICIPANTS

A cross-sectional study was conducted using an anonymous online questionnaire created in Google Forms. Data were collected from 12 December to 21 December 2025. The target population comprised adults aged 18 years or older living in the Republic of Croatia, regardless of whether they had a chronic disease or chronic pain. Minors were excluded.

Participants were recruited using a non-probability snowball sampling approach. The survey link was distributed through available communication channels, including social networks and private contacts, and recipients were invited to forward the link to other adults. All participants received the same written information and questions in the same order. Logical branching within the online questionnaire directed participants who did not meet the chronic pain criterion to the end of the pain-specific section. Online questionnaire methods can facilitate rapid data collection but may also influence response patterns and the composition of the achieved sample (23).

Participation was voluntary and anonymous. Before beginning the questionnaire, participants received written information about the study purpose, anonymity, voluntary participation, and researcher contact details. Completion of the questionnaire was treated as informed consent. The survey was completed individually without the presence of the researcher and required approximately 10-15 minutes.

MEASURES

The questionnaire included sociodemographic variables (sex, age, educational level, employment status, marital/

relationship status, and place of residence) and questions on diagnosed chronic diseases. Chronic non-malignant pain was identified by asking whether, during the previous six months, the participant had experienced pain that was continuous or recurrent for at least three months. Participants who met this criterion were asked about pain duration, frequency, and anatomical location. Self-report questions are commonly used in population studies of pain, although wording and recall periods may affect prevalence estimates (24).

Pain intensity was assessed using the Numerical Rating Scale (NRS), ranging from 0 (no pain) to 10 (worst possible pain). Participants rated their worst and average pain during the previous seven days. Functional impact was assessed with a single 0-10 item asking to what extent pain interfered with everyday activities, with higher scores indicating greater interference.

Pain coping was assessed using the 14-item Coping Strategies Questionnaire (CSQ-14) available through the PhenX Toolkit (25). The instrument assesses the frequency of different cognitive and behavioural responses to pain. Each item is rated from 0 (never) to 6 (always). The mean overall score was used as an indicator of the general frequency of coping strategy use. Internal consistency was evaluated using Cronbach's alpha. Previous work on shorter CSQ formats supports examination of their measurement structure in chronic musculoskeletal pain populations (26).

STATISTICAL ANALYSIS

Categorical variables were summarized using absolute and relative frequencies, and numerical variables using means and standard deviations. Associations between pain intensity, interference, coping score, and age were examined using Spearman's rank correlation coefficient. All tests were two-sided and statistical significance was set at $P < 0.05$. P values are reported to three decimal places; values below 0.001 are reported as $P < 0.001$. Analyses were performed using SPSS version 26.0 (SPSS Inc., Chicago, IL, USA).

RESULTS

PARTICIPANT CHARACTERISTICS AND PREVALENCE OF CHRONIC PAIN

A total of 258 adults participated in the study, of whom 116 (45.0%) met the study criterion for chronic non-malignant pain (Table 1). Among participants with chronic pain, 39.7% reported pain lasting more than five years and 38.8% experienced pain daily. The most frequently reported pain locations were the lower back and joints.

Table 1. Sociodemographic and clinical characteristics of the study sample (N = 258).

Characteristic	Value
Age, years, mean (SD)	43.84 (14.18)
Age, range, years	20–88
Women, n (%)	200 (77.5)
Higher education, n (%)	147 (57.0)
Employed, n (%)	220 (85.3)
Married/cohabiting/in a relationship, n (%)	189 (73.3)
Urban residence, n (%)	180 (69.8)
Diagnosed chronic disease, n (%)	133 (51.6)
Chronic non-malignant pain, n (%)	116 (45.0)

PAIN INTENSITY, FUNCTIONAL INTERFERENCE, AND COPING

Pain intensity, interference with daily activities, and the overall CSQ-14 score are presented in Table 2. Data on worst pain during the previous seven days were available for 113 of the 116 participants with chronic pain. The CSQ-14 demonstrated good internal consistency (Cronbach's $\alpha = 0.824$). The most frequently used coping strategies were not allowing pain to interfere (mean 4.13), remaining active through work or other tasks (mean 3.98), and engaging in enjoyable activities (mean 3.76).

Table 2. Pain, interference, and coping scores among participants with chronic pain.

Measure	n	Mean	SD
Worst pain in previous 7 days (0-10)	113	6.12	1.84
Average pain in previous 7 days (0-10)	116	5.08	2.00
Interference with daily activities (0-10)	116	5.37	2.24
Overall CSQ-14 score	116	3.21	1.02

Note: Sample sizes represent the number of available responses for each measure. CSQ-14, 14-item Coping Strategies Questionnaire.

ASSOCIATIONS BETWEEN PAIN, INTERFERENCE, COPING, AND AGE

Average pain intensity was positively associated with interference with daily activities ($r = 0.567$, $P < 0.001$) and with the overall CSQ-14 score ($r = 0.327$, $P < 0.001$). Age showed a weak positive association with the overall CSQ-14 score ($r = 0.214$, $P = 0.021$). Additional correlations among the study variables are presented in Table 3.

Table 3. Spearman correlations among main study variables.

Variables	r	P value
Average pain - daily activity interference	0.567	<0.001
Overall CSQ-14 - average pain	0.327	<0.001
Overall CSQ-14 - age	0.214	0.021
Worst pain - average pain	0.668	<0.001
Worst pain - daily activity interfer ence	0.539	<0.001
Average pain - age	0.307	0.001
Daily activity interference - age	0.237	0.011

CSQ-14, 14-item Coping Strategies Questionnaire.

DISCUSSION

In this cross-sectional study, 45.0% of the 258 surveyed adults met the study criterion for chronic non-malignant pain. Among participants reporting chronic pain, more than three quarters had experienced it for at least one year, almost 40% for more than five years, and approximately two fifths experienced pain every day. Pain was not only frequent but functionally relevant: average pain intensity showed a moderate positive association with interference in everyday activities. In addition, greater average pain intensity was associated with a higher overall frequency of coping strategy use, while older age showed a weak positive association with coping.

The observed proportion of participants with chronic pain lies toward the upper end of estimates reported in international research. Population-based reviews emphasize that chronic pain prevalence varies substantially according to definitions, age structure, and other population characteristics (5). US studies have reported both high prevalence and substantial persistence of chronic pain over time (6,7), while a study across 52 countries demonstrated considerable cross-national variation and the importance of contextual factors (8). In Europe, Breivik et al. reported moderate-to-severe chronic pain in approximately 19% of adults (9), whereas a recent systematic review documented a much wider range of prevalence estimates across European adult populations (10). Accordingly, the 45.0% observed in the present study should not be interpreted as a national prevalence estimate for Croatia.

The relatively high proportion of participants with pain may partly reflect the characteristics of the achieved sample. Women constituted 77.5% of participants, more than half reported a diagnosed chronic disease, and recruitment relied on online snowball sampling. Population-based evidence has consistently linked chronic pain with demographic and health-related factors (5,10). Broader international literature also emphasizes the clinical and social relevance of adequate chronic pain care and the need to understand pain burden within the characteristics of the affected population (12). Thus, our finding is best interpreted as evidence that chronic pain was common in this particular adult sample rather than as a precise estimate for the Croatian population.

The duration and frequency findings demonstrate that the burden among respondents with pain was substantial. Almost 40% had lived with pain for more than five years and 38.8% experienced it daily. The lower back and joints were the most frequently reported pain locations, consistent with the prominent role of musculoskeletal pain in population studies (5). Previous Croatian research found that back and neck pain were associated with poorer physical and mental health-related quality of life (27). Earlier Croatian work on chronic non-malignant pain has also highlighted the contribution of non-medical factors to treatment outcomes (21), while qualitative research on self-care in chronic musculoskeletal pain has shown the importance of patient experiences, attitudes, and day-to-day management (22). Together, these findings support the view that chronic pain should be assessed as a long-term condition with functional and behavioural consequences rather than only as a symptom intensity score.

The strongest clinically relevant association in the present study was between average pain intensity and interference with everyday activities. Participants with more intense pain reported greater disruption of daily functioning (r = 0.567). This is consistent with the European survey by Breivik et al., which documented effects of chronic pain on work and everyday life (9), and with evidence linking pain to limitations in basic and instrumental activities of daily living (28). The clinical relevance of pain interference is also supported by recent research showing that social and contextual factors may shape both pain intensity and interference (29). Thus, assessment focused only on the NRS may overlook important differences in how pain affects mobility, household activities, occupational functioning, and social participation. Psychological processes, including stress responses and emotions, may also contribute to differences in how pain affects daily functioning (13,14).

The association between pain intensity and the overall CSQ-14 score requires careful interpretation. Participants with higher average pain reported more frequent use of coping strategies (r = 0.327). This does not demonstrate that coping increases pain or that the strategies used were ineffective. Instead, people with more severe pain may need to mobilize coping responses more often. Coping is context dependent, and the same response may be helpful in one situation and less effective in another (15,17). Studies of chronic pain similarly show that coping strategies relate to pain outcomes in complex ways rather than along a simple adaptive-maladaptive continuum (30,31).

The present item-level results provide useful context for this association. The most frequently endorsed responses included telling oneself not to allow pain to interfere, remaining active through work or tasks, and engaging in enjoyable activities. These patterns are compatible with active efforts to maintain function. Previous research has shown that activity patterns in chronic pain can vary between avoidance, overactivity, and more balanced approaches, with implications for disability and adaptation (32). Studies of adaptive coping have also emphasized the importance of how patients interpret their condition and integrate coping into everyday life (33). Therefore, the relatively high frequency of activity-oriented responses in this study should not automatically be labelled as beneficial; their effectiveness depends on context, pacing, symptom severity, and the individual's broader functional goals. Future studies should examine specific coping strategies alongside mood, social support, and functional outcomes, rather than relying solely on the overall CSQ-14 score (34).

Age showed a weak but statistically significant positive association with overall coping strategy use. Older participants therefore reported somewhat more frequent coping responses, but the effect size was small and should not be interpreted as evidence that older adults cope more effectively. Research on age and chronic pain is heterogeneous. Dong et al. demonstrated that catastrophizing and mood are relevant to chronic pain in older adults (18), while Keefe and Williams identified age-related differences in coping patterns among chronic pain patients (20). A recent review of successful ageing and adaptation to pain further suggests that some older adults develop strategies that help them preserve meaningful activities and psychological adaptation despite persistent symptoms (19).

In the present sample, the association between age and coping may reflect longer exposure to pain, more opportunities to develop self-management strategies, greater comorbidity, or other unmeasured factors. Because the study was cross-sectional, it cannot determine whether ageing itself changes coping or whether cohort, duration-of-pain, and health-status differences account for the observed relationship. The finding should therefore be viewed as hypothesis-generating rather than as evidence of a developmental causal process.

These results have practical implications for health professionals. A holistic approach to chronic pain management requires attention to pain intensity, function, psychological responses, self-management, social context, and patient goals (4,11,35). This is particularly relevant for nurses and other health professionals who frequently assess people with long-term conditions and can identify functional deterioration, provide education, reinforce appropriate self-management, and facilitate referral to multidisciplinary pain services. Attention to social support may also be important because social isolation and support can be associated with pain-related outcomes (29,34).

LIMITATIONS

First, snowball sampling and online recruitment produced a non-probability sample and limit generalizability to the Croatian adult population. Online questionnaire methodology may affect who participates and how complete the resulting data are (23). Second, all variables were self-reported and may be affected by recall, interpretation, and reporting bias; methodological research has shown that self-report questions require careful wording and reliability assessment when used to estimate musculoskeletal symptoms (24). Third, the cross-sectional design does not allow causal or temporal conclusions. Fourth, pain interference was assessed with a single item rather than a multidimensional validated interference instrument. Fifth, the overall CSQ-14 score reflects frequency of coping strategy use but does not by itself distinguish the effectiveness or adaptiveness of specific strategies. The broader CSQ literature also indicates that measurement structure should be considered when interpreting shorter versions of the questionnaire (26). Finally, the number of available responses varied slightly for some pain variables. Strengths include the simultaneous assessment of prevalence, pain intensity, functional interference, and coping, as well as good internal consistency of the CSQ-14 in this sample.

CONCLUSION

Chronic non-malignant pain was reported by a substantial proportion of this non-probability adult sample and was associated with meaningful interference in everyday activities. Pain intensity was related to both functional interference and overall coping strategy use, while age showed a weaker association with coping; these findings support multidimensional assessment of chronic pain that includes functional, psychological, behavioural, and social factors.

ETHICAL CONSIDERATIONS

Participation in the study was voluntary and anonymous. Before accessing the questionnaire, all participants were provided with written information about the purpose of the study, the voluntary nature of participation, anonymity, and the researcher's contact details. Informed consent was provided by voluntarily completing and submitting the questionnaire. No directly identifiable personal data were collected.

AUTHORS CONTRIBUTION

UZ contributed to study conception, data collection, statistical analysis, and manuscript drafting. VK contributed to data interpretation and manuscript revision. BF, BI, and MS contributed to data interpretation, critical revision of the manuscript, and approved the final version. IK supervised the study, contributed to the study design, methodology,

interpretation of the results, critical revision of the manuscript, and mentored the first author throughout the research process. All authors approved the submitted version of the manuscript.

FUNDING

The authors declare that no financial support was received for the research, authorship, and/or publication of this article.

CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

GENERATIVE AI STATEMENT

The authors used a generative AI tool to assist with language editing, formatting, and journal-specific manuscript preparation. All AI-assisted output was critically reviewed, revised, and verified by the authors, who take full responsibility for the final content. No AI tools were used for data collection, analysis, or interpretation.

ACKNOWLEDGMENTS

The authors sincerely thank all participants for their time and valuable contribution to this study.

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