

Attitudes toward cannabidiol use among Bulgarian patients with neurodegenerative diseases and chronic pain

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Abstract

Background: Cannabidiol (CBD) has gained increasing scientific and clinical attention because of its potential therapeutic effects in chronic pain, anxiety, and neurodegenerative disorders. Patients with neurodegenerative diseases frequently experience persistent pain, emotional distress, and reduced quality of life, leading to growing interest in complementary therapeutic approaches, such as CBD products.

Aim: The aim of the present study was to evaluate the awareness, attitudes, and willingness to use CBD products among Bulgarian patients with neurodegenerative diseases and chronic pain.

Materials and methods: A cross-sectional survey study was conducted among 55 adult patients experiencing chronic pain, including individuals diagnosed with Parkinson's disease, Alzheimer's disease, Huntington's disease, and multiple sclerosis. Data were collected using a structured questionnaire assessing demographic characteristics, awareness of CBD products, pain intensity, anxiety levels, and willingness to use CBD products. Statistical analyses included descriptive statistics, the Mann–Whitney *U* test, Fisher's exact test, Pearson's chi-square test, and Spearman correlation analysis.

Results: Most participants (61.8%) reported prior awareness of CBD products, while 85.5% expressed willingness to use CBD if recommended by a healthcare professional. Significant associations were identified between CBD awareness and willingness to use CBD products, as well as between awareness and previous CBD use. Participants informed about CBD reported higher levels of chronic pain and anxiety compared with uninformed respondents. A moderate positive correlation was observed between pain intensity and anxiety levels. Patients with neurodegenerative diseases demonstrated higher anxiety levels compared with respondents without neurodegenerative conditions.

Conclusion: Bulgarian patients with chronic pain and neurodegenerative diseases demonstrate substantial interest in CBD products as complementary therapeutic agents. However, insufficient patient awareness and limited medical guidance remain important barriers to the safe therapeutic integration of CBD products.

Keywords

anxiety, Bulgaria, cannabidiol, CBD, chronic pain, neurodegenerative diseases, patient attitudes

Introduction

Cannabidiol (CBD), a non-psychoactive phytocannabinoid derived from *Cannabis sativa*, has attracted substantial scientific and clinical interest in recent years because of its potential therapeutic applications in chronic pain, anxiety, epilepsy, and neurodegenerative disorders (Mechoulam et al. 2007; Mouhamed et al. 2018). Unlike Δ^9 -tetrahydrocannabinol (THC), CBD does not induce psychotropic effects and demonstrates a comparatively favorable safety profile, which has contributed to its increasing popularity among patients seeking complementary therapeutic approaches. Experimental and clinical evidence suggests that CBD exerts anti-inflammatory, antioxidant, anxiolytic, anticonvulsant, and analgesic effects through modulation of the endocannabinoid system and multiple receptor pathways (Millar et al. 2020; Ożarowski et al. 2021).

Neurodegenerative diseases, including Parkinson's disease, Alzheimer's disease, Huntington's disease, and multiple sclerosis, represent a major global health burden due to their progressive nature, chronic disability, and substantial impact on quality of life. These disorders are frequently associated with persistent pain, sleep disturbances, anxiety, depression, motor dysfunction, and reduced social functioning (Feigin et al. 2019). Chronic pain itself is increasingly recognized as a multidimensional condition involving both physical and psychological components, often contributing to emotional distress and functional impairment (Treede et al. 2019). Anxiety symptoms are particularly common among patients with neurodegenerative disorders and are associated with worsened disease burden, impaired daily functioning, and reduced treatment satisfaction (Koychev et al. 2020).

The therapeutic potential of cannabinoids in neurological disorders has become an important area of contemporary research. Preclinical studies indicate that CBD may demonstrate neuroprotective properties through attenuation of oxidative stress, neuroinflammation, excitotoxicity, and mitochondrial dysfunction (Crippa et al. 2018; Ożarowski et al. 2021). Cannabinoid-based therapies have also shown promising effects in the management of neuropathic pain, spasticity, anxiety, and sleep disorders associated with neurodegenerative diseases (Stasiłowicz et al. 2021). Experimental evidence suggests potential benefits of CBD in Parkinson's disease, Huntington's disease, and multiple sclerosis, particularly regarding symptom control and improvement of patient-reported quality of life (Lassres-Becker et al. 2005; Sagredo et al. 2007; García et al. 2011; Valdeolivas et al. 2012).

Despite the growing interest in CBD, currently available clinical evidence remains heterogeneous and limited by the relatively small number of large-scale randomized controlled trials. Existing systematic reviews indicate that cannabinoids may provide modest benefits in chronic neuropathic pain and multiple sclerosis-related symptoms; however, uncertainties remain regarding long-term safety, optimal dosing strategies, drug interactions, and standardized therapeutic protocols (Whiting et al. 2015;

Häuser et al. 2018). Furthermore, public perceptions regarding CBD products frequently exceed the strength of currently available scientific evidence, increasing the importance of adequate patient education and professional medical guidance.

In recent years, CBD-containing products have become increasingly accessible in many European countries, including Bulgaria, through pharmacies, online platforms, and specialized commercial outlets. Nevertheless, both healthcare professionals and patients frequently encounter uncertainty regarding the legal status, therapeutic efficacy, safety profile, and appropriate use of CBD products. This issue is particularly relevant for patients with chronic neurological conditions, who often seek additional therapeutic options because of insufficient symptom control with conventional treatment.

Understanding patient attitudes toward CBD use is important for several reasons. Patient perceptions may significantly influence treatment adherence, self-medication practices, and expectations regarding therapeutic outcomes. In addition, identifying the factors associated with willingness to use CBD products may help healthcare professionals provide more effective counseling and risk communication strategies. Evaluation of patient awareness and concerns may further contribute to the development of evidence-based educational and clinical approaches regarding cannabinoid-based therapies.

Therefore, the aim of the present study was to evaluate the awareness, attitudes, and willingness to use CBD products among Bulgarian patients with neurodegenerative diseases and chronic pain, as well as to analyze the relationship between symptom severity, anxiety levels, and perceptions regarding CBD use.

Materials and methods

Study design and participants

A cross-sectional descriptive survey study was conducted between May 2025 and September 2025 among Bulgarian adult patients experiencing chronic pain associated with neurodegenerative diseases or other chronic conditions. The study aimed to evaluate patient awareness, attitudes, and willingness to use CBD products for symptom management.

A total of 55 participants were included in the study using a targeted convenience sampling approach. Eligible participants were adults aged 18 years or older who reported chronic pain persisting for more than 3 months. Patients diagnosed with neurodegenerative disorders, including Parkinson's disease, Alzheimer's disease, Huntington's disease, and multiple sclerosis, were included in the neurodegenerative disease subgroup.

For comparative analysis, respondents were divided into two analytical groups:

1. Patients with neurodegenerative diseases ($n = 18$; 32.7%);

2. Patients with chronic pain without diagnosed neurodegenerative disease ($n = 37$; 67.3%).

Participants who were unable to complete the questionnaire independently or who provided incomplete survey responses were excluded from the analysis.

Data collection instrument

Data were collected using a structured anonymous questionnaire specifically designed for the purposes of the present study. The questionnaire included items related to:

- Demographic characteristics (age, sex, and education level);
- Clinical characteristics;
- Intensity of chronic pain;
- Anxiety levels;
- Awareness of CBD products;
- Previous experience with cannabidiol;
- Willingness to use CBD products;
- Preferred pharmaceutical dosage forms;
- Perceived benefits and barriers associated with CBD use.

The questionnaire consisted primarily of closed-ended questions and rating scales. Before data collection, the survey instrument was reviewed for clarity and comprehensibility.

Assessment of pain and anxiety

Pain intensity was evaluated using a visual analog scale (VAS) ranging from 0 to 10, where 0 indicated “no pain” and 10 indicated “unbearable pain.”

Anxiety symptoms were assessed using a five-point self-reported scale ranging from 0 to 5, with higher scores indicating greater levels of daily anxiety and associated emotional distress.

Statistical analysis

Statistical analysis was performed using IBM SPSS Statistics software version 22. Descriptive statistics were applied to summarize demographic and clinical characteristics of the study population. Continuous variables were presented as mean $\pm$ standard deviation (SD), while categorical variables were expressed as frequencies and percentages.

Because of the relatively small sample size and non-normal distribution of several variables, non-parametric statistical methods were applied. Differences between independent groups were analyzed using the Mann–Whitney U test and Wilcoxon test where appropriate. Associations between categorical variables were evaluated using Pearson’s chi-square test and Fisher’s exact test. Correlations between pain intensity and anxiety levels were assessed using Spearman’s rank correlation coefficient (ρ).

A p -value < 0.05 was considered statistically significant.

Ethical considerations

Participation in the study was voluntary and anonymous. All participants provided informed consent before inclusion in the survey. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki concerning research involving human participants.

Results

Demographic and clinical characteristics

A total of 55 participants were included in the study, of whom 36 (65.5%) were female and 19 (34.5%) were male.

The majority of respondents were aged between 46 and 65 years, corresponding to the typical epidemiological profile of chronic pain and neurodegenerative disorders.

Most participants demonstrated a relatively high educational level, with 74.5% possessing higher education qualifications and 52.7% holding a master’s degree.

Based on self-reported diagnoses, respondents were divided into two analytical groups:

- Patients with neurodegenerative diseases ($n = 18$; 32.7%);
- Patients with chronic pain without neurodegenerative disease ($n = 37$; 67.3%).

The neurodegenerative disease subgroup included patients diagnosed with Parkinson’s disease, Alzheimer’s disease, Huntington’s disease, and multiple sclerosis. Clinical characteristics of the study population are presented in Table 1.

Table 1. Clinical characteristics of the study population.

Characteristic	n (%)
Neurodegenerative disease	18 (32.7)
Chronic pain without neurodegenerative disease	37 (67.3)
Regular analgesic use	49 (89.1)

Pain intensity and anxiety levels

Most participants reported substantial symptom burden associated with chronic pain. A total of 89.1% of respondents stated that they regularly used analgesic medications for symptom control.

The mean anxiety score among participants was 3.36 ± 1.14 on the five-point anxiety scale, indicating moderate to high levels of emotional distress within the study population.

Correlation analysis demonstrated a statistically significant positive association between pain intensity and anxiety levels. Spearman’s rank correlation analysis revealed a moderate positive correlation between the two variables ($\rho = 0.449$; $p < 0.001$), indicating that higher levels of chronic pain were associated with increased anxiety symptoms (Fig. 1).

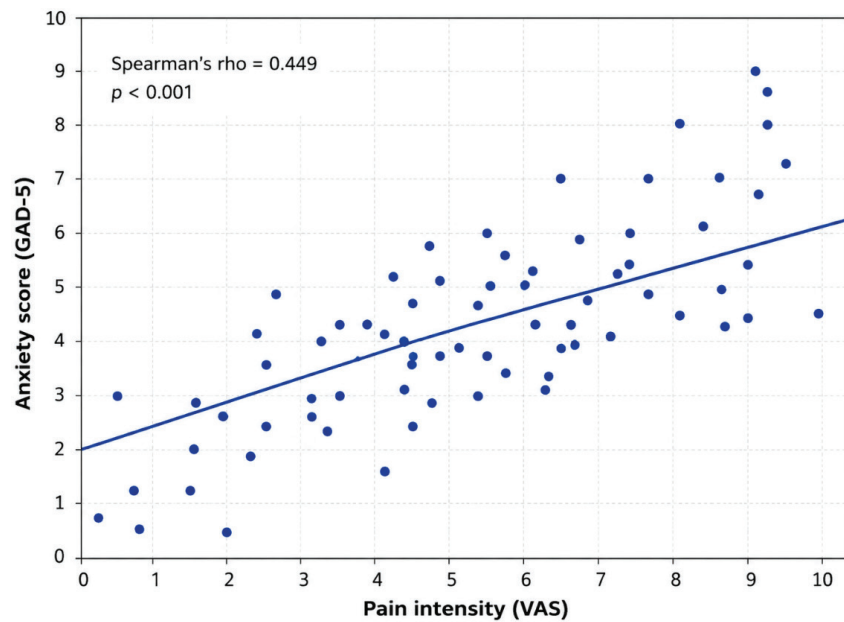


Figure 1. Relationship between pain intensity (VAS score) and anxiety levels among study participants, demonstrating a moderate positive correlation (Spearman's $\rho = 0.449$, $p < 0.001$).

Awareness and attitudes toward cannabidiol products

Most respondents (61.8%) reported prior awareness of CBD products. However, only 14.5% considered themselves fully informed regarding the therapeutic effects, safety profile, and appropriate use of CBD.

A high degree of openness toward cannabinoid-based therapies was observed. Overall, 85.5% of participants reported willingness to use CBD products if recommended by a healthcare professional.

Statistical analysis demonstrated a significant association between prior awareness of CBD and willingness to use CBD products ($p = 0.001$). In addition, respondents familiar with CBD were significantly more likely to report previous experience with CBD products compared with uninformed participants ($p < 0.001$).

Participants informed about CBD also demonstrated significantly higher reported levels of chronic pain and anxiety compared with respondents who were not familiar with CBD products ($p < 0.01$). Table 2 shows patient awareness and attitudes towards CBD products.

Table 2. Awareness and attitudes toward CBD products.

Variable	n (%)
Prior awareness of CBD products	34 (61.8)
Fully informed about CBD products	8 (14.5)
Willingness to use CBD if recommended by a healthcare professional	47 (85.5)

Preferred pharmaceutical dosage forms

Among the different pharmaceutical forms of CBD products, oral dosage forms demonstrated the highest patient preference.

Comparative analysis according to diagnosis

Comparative analysis between patients with neurodegenerative diseases and respondents with chronic pain without neurodegenerative disorders identified several statistically significant differences.

Patients with neurodegenerative diseases demonstrated significantly higher anxiety levels compared with participants without neurodegenerative conditions ($p < 0.05$). Within the neurodegenerative subgroup, the primary motivations for considering CBD therapy were the expectation of slowing disease progression, improving sleep quality, and reducing anxiety symptoms. In contrast, respondents without neurodegenerative disorders primarily associated CBD use with direct pain relief.

Barriers to cannabidiol use

Several important barriers influencing patient attitudes toward CBD products were identified.

The most commonly reported concern was the lack of adequate medical guidance and professional consultation regarding dosing, safety, and potential drug interactions. Many participants expressed uncertainty regarding the appropriate therapeutic use of CBD products.

Fear of adverse effects also represented a significant barrier, despite the non-psychoactive nature of CBD. Some respondents continued to associate CBD with the psychotropic effects traditionally linked to cannabis use.

Economic factors additionally influenced patient attitudes. The relatively high cost of high-quality CBD products was identified as an important limitation for long-term use, particularly among older participants older than 65 years of age. Fig. 2 shows the main barriers to CBD use among the study participants.

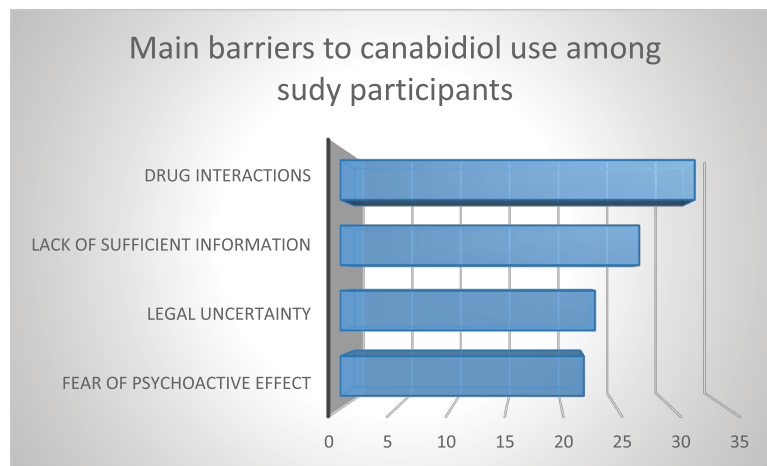


Figure 2. Main barriers to CBD use among study participants. Lack of sufficient information and concerns regarding potential drug interactions were the most frequently reported barriers, followed by legal uncertainty and fear of psychoactive effects.

Discussion

The findings of the present study demonstrate substantial patient interest in CBD products among Bulgarian individuals experiencing chronic pain and neurodegenerative disorders. The observed high willingness to use CBD products, particularly when recommended by a healthcare professional, reflects the growing international tendency toward complementary and alternative therapeutic approaches in chronic neurological conditions (Häuser et al. 2018; Mouhamed et al. 2018). The results additionally suggest that patient attitudes toward CBD are strongly influenced by symptom burden, especially pain intensity and anxiety levels.

One of the most important findings of the study was the statistically significant positive correlation between chronic pain intensity and anxiety levels ($\rho = 0.449$; $p < 0.001$). This observation is consistent with existing evidence demonstrating the bidirectional relationship between chronic pain and psychological distress (Treede et al. 2019; Koychev et al. 2020). Chronic pain is increasingly recognized not only as a sensory experience but also as a complex biopsychosocial condition associated with impaired emotional regulation, sleep disturbances, reduced physical functioning, and diminished quality of life. In patients with neurodegenerative diseases, these effects may become even more pronounced because of progressive disability and uncertainty regarding disease progression.

The significantly higher anxiety levels identified among patients with neurodegenerative disorders in the present study are also supported by previous research. Anxiety symptoms are frequently reported in Parkinson's disease, multiple sclerosis, and Alzheimer's disease and are associated with poorer treatment outcomes and increased caregiver burden (Crippa et al. 2018; Feigin et al. 2019). This may partially explain the increased interest in CBD products among symptomatic patients seeking additional relief beyond conventional pharmacotherapy.

The high degree of willingness to use CBD observed in the present study (85.5%) is comparable to findings from recent international studies investigating patient perceptions regarding medical cannabis and CBD products (Kvamme et al.

2021; Schlag et al. 2023). Many participants perceived CBD as a potentially safer and more “natural” alternative compared with conventional analgesics or anxiolytic medications. Such perceptions are likely influenced by increasing public exposure to information regarding cannabinoid-based therapies through media platforms, social networks, and commercial advertising. However, the growing popularity of CBD products often exceeds the strength of currently available clinical evidence, creating a risk of unrealistic therapeutic expectations and unsupervised self-medication.

The present findings additionally demonstrated that participants informed about CBD products reported significantly higher pain and anxiety levels compared with uninformed respondents. This observation suggests that patients experiencing greater symptom severity may be more actively searching for alternative therapeutic options. Similar patterns have been described in previous studies showing that patients with refractory chronic pain or inadequate symptom control are more likely to explore cannabinoid-based interventions (Whiting et al. 2015; Häuser et al. 2018). Consequently, interest in CBD may reflect dissatisfaction with conventional treatment effectiveness rather than solely sociocultural attitudes toward cannabis-derived products.

Another important finding concerns the relatively low level of detailed knowledge regarding CBD despite the high general awareness among participants. Although most respondents had heard about CBD products, only a small proportion considered themselves adequately informed regarding dosing, safety, adverse reactions, and potential drug interactions. This discrepancy between willingness to use CBD and insufficient medical knowledge has also been reported in studies involving both patients and healthcare professionals (Mouhamed et al. 2018; Schlag et al. 2023). The findings highlight the existence of a substantial informational gap that may contribute to inappropriate self-administration and increased safety risks.

The identified barriers to CBD use in the present study are similarly consistent with international evidence. Participants frequently reported uncertainty regarding appropriate dosing strategies, concerns about adverse effects, and insufficient professional medical guidance.

Although CBD lacks the psychoactive properties associated with Δ^9 -tetrahydrocannabinol (THC), many respondents continued to associate CBD with the psychotropic effects traditionally linked to cannabis use. This indicates persistent social stigma and limited differentiation between medical CBD and recreational cannabis products.

Economic limitations additionally emerged as an important barrier, particularly among older participants. The high cost of standardized and high-quality CBD products may restrict long-term therapeutic adherence and contribute to inequalities in access to cannabinoid-based supportive therapies. Similar concerns regarding affordability and product standardization have been described in European studies evaluating patient access to cannabinoid-containing medicinal products (Schlag et al. 2023).

The preference for oral pharmaceutical forms observed in the present study is also clinically relevant. Capsules and tablets were preferred over oils and topical formulations, possibly because oral dosage forms resemble conventional pharmacotherapy and may therefore be perceived as more medically acceptable and easier to administer. This observation may have implications for future pharmaceutical development and patient-centered formulation design involving cannabinoid-based therapies.

From a clinical perspective, the findings emphasize the increasingly important role of healthcare professionals in guiding patients regarding the safe and evidence-based use of CBD products. Physicians and pharmacists remain the most trusted sources of therapeutic information despite the widespread availability of online resources. Previous studies have demonstrated that healthcare professionals frequently report insufficient education and uncertainty regarding cannabinoid pharmacology, indications, dosing, and safety monitoring (Mouhamed et al. 2018). Consequently, improving professional education regarding the endocannabinoid system and cannabinoid-based therapies may represent an important step toward safer clinical integration of CBD products.

Several limitations of the present study should be acknowledged. First, the relatively small sample size limits the generalizability of the findings to the broader Bulgarian population. Second, the cross-sectional design does not allow conclusions regarding causal relationships between symptom severity and attitudes toward CBD use. Third, the study relied on self-reported patient data, which may introduce recall bias and subjective interpretation of symptoms and experiences. Nevertheless, the study provides important preliminary insights into patient perceptions regarding CBD products within a relatively underexplored population in Bulgaria.

Future research should include larger multicenter studies and longitudinal analyses evaluating the long-term effectiveness, safety, and patient-reported outcomes associated with CBD use in neurodegenerative disorders and chronic pain management. Further investigation is also needed regarding healthcare professional preparedness, regulatory policies, and evidence-based clinical guidelines for cannabinoid-based therapies.

Conclusion

The present study highlights substantial interest in CBD products among Bulgarian patients with chronic pain and neurodegenerative diseases. Higher levels of pain and anxiety were associated with greater willingness to use CBD, suggesting that patients with insufficient symptom control are more likely to seek complementary therapeutic options.

Despite the high level of interest in CBD products, limited patient awareness and insufficient medical guidance remain significant barriers to their safe therapeutic use. The findings highlight the need for improved healthcare professional education and the development of evidence-based clinical recommendations regarding CBD use in chronic neurological conditions.

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Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statements

The authors declared that no clinical trials were used in the present study.

The authors declared that no experiments on humans or human tissues were performed for the present study.

Informed consent from the humans, donors or donors' representatives: Scientific Ethics Committee – Medical University of Plovdiv.

The authors declared that no experiments on animals were performed for the present study.

The authors declared that no commercially available immortalised human and animal cell lines were used in the present study.

Artificial Intelligence (AI) use

The authors accept full responsibility for the content of the manuscript, including the disclosure of any use of AI.

Regarding the use of AI in the preparation of this manuscript, the authors declare the following: GPT.

Used for: Figures, tables and charts.

AI was used to generate the histogram scale in Figure 1.

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Author contributions

TG conceptualized the study, performed the analysis, and drafted the manuscript; TG and AM contributed to the curation and analysis of the data. TG and NB contributed to the methodology and revision of the manuscript; AM supervised the study. All authors contributed to the interpretation of the results and approved the final manuscript.

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Data availability

All of the data that support the findings of this study are available in the main text or Supplementary Information.

Supplementary material 1

Survey study data

Authors: Tanya Gesheva, Nedyalka Boycheva, Gergana Todorova, Anna Mihaylova

Data type: xlsx

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