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ORIGINAL

An Examination of the Application of Cannabis in Therapeutic Use for Parkinson's syndrome

Un análisis de la aplicación del cannabis en el uso terapéutico para el síndrome de Parkinson

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ABSTRACT

The consequences of cannabis usage on Multiple Sclerosis (MS) and Parkinson's disease (PD) are still substantially uncertain despite recognizing that Cannabis was used for thousands of years as a medication. The evaluation of cannabis usage PD and MS, and a comparison of cannabis users' and non-users' self-reported assessments of neurological impairment were primary goals of this research. The survey contained standardized questions to collect information on demographics and Cannabis use questionnaires to evaluate participants' physical activity levels, neurological function, and weariness. Linear regression, Hierarchical Regression, and ANCOVA analysis of variance were employed in research. Were 900 respondents in a final data set. Cannabis consumers today were younger and less inclined to be considered fat. Regarding Emotional Variability, Cognitive Function, and Fatigue, cannabis users reported decreased degrees of disability. Cannabis may benefit PD and MS patients' Emotional Variability, Cognitive Function, Fatigue, and Physiological Weight. PD and MS patients' cannabis use: long-term advantages and downsides, and determining if these relationships are causal, more research is required to utilize longitudinally and clinically measured assessments among these domains.

Keywords: Prescription Drug; Marijuana; Mood; Obesity; Cognitive Functio006E; Fatigue.

RESUMEN

Las consecuencias del consumo de cannabis en la esclerosis múltiple (EM) y la enfermedad de Parkinson (EP) siguen siendo muy inciertas, a pesar de que se reconoce que el cannabis se ha utilizado durante miles de años como medicamento. La evaluación del consumo de cannabis en la EP y la EM, y la comparación de las valoraciones autoinformadas de los consumidores y no consumidores de cannabis sobre el deterioro neurológico fueron los objetivos principales de esta investigación. La encuesta contenía preguntas estandarizadas para recopilar información demográfica y cuestionarios sobre el consumo de cannabis para evaluar los niveles de

actividad física, la función neurológica y el cansancio de los participantes. En la investigación se emplearon análisis de regresión lineal, regresión jerárquica y ANCOVA. El conjunto de datos final contó con 900 encuestados. Los consumidores de cannabis actuales eran más jóvenes y menos propensos a ser considerados obesos. En cuanto a la variabilidad emocional, la función cognitiva y la fatiga, los consumidores de cannabis informaron de una disminución de los grados de discapacidad. El cannabis puede beneficiar a los pacientes con EP y EM en cuanto a variabilidad emocional, función cognitiva, fatiga y peso fisiológico. Consumo de cannabis en pacientes con EP y EM: ventajas y desventajas a largo plazo, y para determinar si estas relaciones son causales, se necesita más investigación para utilizar evaluaciones medidas longitudinal y clínicamente entre estos ámbitos.

Palabras clave: Medicamento Recetado; Marihuana; Estado de Ánimo; Obesidad; Función Cognitiva; Fatiga.

INTRODUCTION

As a treatment choice for people with severe Parkinson's disease (PD), Medical Cannabis (MC) has been permitted in Germany since 2017; symptoms during other treatments have proven ineffective, and a favorable impact cannabis has on incapacitating symptoms is conceivable. These conditions are MC is possible given and is covered for both public and commercial health insurance.[1] About 1 % of those over 60 have PD, which rises to 4 % of those over 80. However, PD is a movement disorder that also includes non-motor symptoms, such as melancholy and worry, which are common neuropsychiatric indicators and incapacitating. These symptoms have a major impact on quality of life (QoL), career burden, and healthcare costs.[2]

Although Several Randomized Controlled Trials (RCTs) investigated an impact of different non-pharmacological treatments on a patient's level of PD depressive symptoms, comparing advantages and drawbacks of multiple strategies are still unresolved. To investigate its effectiveness and security of many therapies instead of medication for PD depression, patients are setting out a comprehensive review and network meta-analysis.[3] These standards exhibit a fair amount of agreement with medical opinions and help identify individuals that require treatment optimization.

This covers an application of Device-assisted Treatments (DATs), such as Continuous Subcutaneous Apomorphine Infusion (CSAI) and Deep Brain Stimulation (DBS), which have favorable effects on patient's Quality of Life (QoL) even now long-term observations.[4] The central nervous system's resident immune cells called microglia, which resemble macrophages, are increasingly being implicated across etiology of Parkinson's disease (PD), according to mounting evidence. Different activation states that control cellular activities of microglia are visible. The typical inflammatory kind encourages inflammatory reactions. In contrast, anti-inflammatory cytokines and trophic molecules are released by activated microglia in an immunosuppressive state, which aids in healing and reestablishing homeostasis.[5]

Therefore, safe and efficient PD treatment that concentrates on other systems is essential. Although there is still much secret information about how endocrine, immunological, neurological, and stress systems communicate, patients are all intricately connected and significantly influence human function.[6] Antipsychotics can increase risk of metabolic syndrome, dyskinesia, and Parkinsonism in dementia patients, and stroke is also a risk of death. An example is using antidepressants for severe depression in elderly, weak people, for instance, of latter conditions, and pharmacological therapy for common diseases. Fall risk is up in these persons using antidepressants.[7] As therapeutic strategies for Parkinson's disease therapy, cannabinoids continue together antiparkinsonian again neuroprotective characteristics. Every degeneration of dopaminergic neurons is caused by excitotoxicity, glial activation, and oxidative damage, and these are all demonstrated in preclinical investigations and are suppressed by cannabis.[8] The basal ganglia have significant levels of cannabinoid receptors, and recent research using Parkinsonian models concentrates heavily on effects of endocannabinoid system on basal ganglia functioning and corticostriatal processing. Clinical research on use of Cannabis in PD patients is currently lacking, nevertheless.[9] Although cannabinoid receptors are present throughout a person's body, patientsare more abundant in immunological and central nervous systems. The central nervous system has many cannabinoid receptors, and their proposed Cannabis as a possible natural treatment for battling neuro-inflammatory and neurodegenerative disorders.[10]

The primary non-psychoactive components of Cannabis sativa, Cannabidiol (CBD), possibly distinct therapy for people with Parkinson's Disease (PD) and REM sleep behavior disorder (RBD) that experience Restless Legs Syndrome/Willis-Ekbom Disease (RLS/WED).[11] Recently, medicinal Cannabis (MC) has drawn attention as a possible therapy for neurological conditions, including Parkinson's disease (PD). The impact of MC symptomatic care about PD patients was investigated.[12] Evaluates a tremor in iPD non-lesional treatments' efficacy and safety and offers a comprehensive meta-analysis.[13] To suggested method is a strong contender for identifying Parkinson's disease (PD) patients. The findings about PD symptom monitoring using affordable computer tools

are useful in telemedicine applications.[14] Offered thorough information on advantages of cannabinoids and terpenes created using Cannabis for medical and recreational purposes and information on their extraction methods, legal status, and future possibilities.[15] examined at data for thoroughly purified medical cannabis extracts and information about pure cannabis chemicals to recommend possible therapeutic applications of high.[16] To used Cannabis containing cannabidiol (CBD) oil for medicinal becoming more and more popular.[17] Addressed CBD's most promising uses for treating chronic inflammatory conditions, including its impact on brain diseases, inflammatory bowel illness, coronavirus disease, and tumor microenvironment immunomodulatory and antitumor activities.[18] Examined a protective effect of cannabidiol (CBD) on 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP)-induced neuronal dopamine damage through reduction of neuroinflammation, among causes of neuronal death.[19] Influenced Parkinson's disease (PD) patients' anxiety levels a tremor during a Simulated Public Speaking Test (SPST) were affected a therapy with 300 mg of acute CBD.[20]

Evaluated an efficacy of medicinal Cannabis (MC). To explore obstacles to MC usage in Parkinson's disease (PD) clinical practice.[21] Looked at the efficacy of PD patients' access to complementary therapies, emphasizing Cannabis, yoga, tai chi, qi gong, and acupuncture.[22] The possible therapeutic advantages of Cannabis for treating individuals with sleep problems or other medical diseases that frequently co-occur with sleep disruption are presented.[23] Investigated the effects impact of 6-hydroxydopamine-induced PD on mouse nociceptive responses and effects on 6-hydroxydopamine-induced nociception with cannabidiol (CBD).[24] Examined security and acceptability of various dosages in cannabis' non-intoxicating cannabinoid, cannabidiol (CBD), on common symptoms of Parkinsonism.[25] Examines safety and acceptability of different cannabidiol (CBD) quantities and their effect on common Parkinsonian symptoms.[26] CBD is a non-intoxicating component of Cannabis. The clinical and preclinical testing on CBD, particularly, and clinical investigations of cannabinoids in PD, are reviewed.[27] To suggested a pharmacology, history, and medicinal applications of Cannabis.[28] Examines research on CBD's possible therapeutic benefits for Parkinson's disease (PD) and discusses its clinical and preclinical data that could support CBD's purported neuroprotective processes.[29] The procedure for treating PD may involve creating medications that regulate the endocannabinoid system.

METHOD

A survey with 900 views and data from 1500 respondents are used to gather demographic data, and questionnaires about cannabis usage are utilized to assess participants' levels of physical activity, neurological function, weariness, and fatigue. In the study, ANCOVA analysis of variance, linear regression, and hierarchical regression were used. To guarantee the accuracy and robustness of the findings, statistical analyses were employed.

Participants

Table 1 shows the participant demographics are the traits that help researchers understand the makeup of their research sample by classifying a group of people according to particular criteria. Group 1 provides the Multiple Sclerosis (MS), and Group 2 demonstrates the Parkinson's disease (PD) are employing cannabis in therapeutic use for parkinson's syndrome.

Table 1. Participants demographic

Variable	Group 1 (n = 450)	Group 2 (n = 450)	Total (N = 900)
Gender			
Male	240	260	500
Female	210	190	400
Age (years)			
18-35	150	130	280
36-55	300	320	620
Smoking Status			
Smoker	170	140	310
Non-smoker	280	310	590
Weight (BMI Category)			
Underweight (<18,5)	30	25	55
Normal (18,5-24,9)	200	190	390
Overweight (25-29,9)	140	150	290
Obese (≥30)	80	85	165

Education Level			
High School or less	120	130	250
College Degree	220	210	430
Postgraduate Degree	110	110	220
Employment Status			
Employed	220	230	450
Unemployed	120	110	230
Retired	110	110	220

Measures in Cannabis in Therapeutic Use for Parkinson's syndrome

Although some people with PD experiment with cannabis to alleviate their symptoms, there is a lack of data on the drug's safety and effectiveness, and further research are required to reach firm findings. According to some research, cannabis may be able to aid with tremor, pain, anxiety, and sleep issues, among other PD symptoms (Group 1).

Additionally, (Group 2) cannabis usage can cause hallucinations, dizziness, impaired vision, mood swings, and cognitive impairment, all of which can be troublesome for people with PD, particularly those who already have cognitive issues. The research uses 20 questions to measure everyday activities before and after to estimate functional impairment. The final score is calculated by adding up all of the points earned from each positive response, which is rated on a 5-point Likert scale.

Multiple Sclerosis (MS): MS patients' everyday functioning was impacted by their high levels of emotional unpredictability, cognitive deterioration, exhaustion, and weight swings prior to therapy.

Parkinson's disease (PD): Patients with Parkinson's disease suffered from exhaustion, tremors, and cognitive impairment. Both groups had enhanced emotional stability, decreased fatigue, and increased cognitive performance following three weeks of cannabis-based therapy, with PD patients seeing greater benefits.

- Emotional Variability: Mood swings may indicate a number of mental health concerns, such as anxiety, ADHD, borderline personality disorder, and mood disorders like bipolar disorder and depression.
- Cognitive Function: Patients with dementia or memory loss may have trouble recalling recent events, finding the proper words, or identifying familiar persons or places. These symptoms frequently interfere with daily tasks and necessitate specialist care.
- Fatigue: Finding the underlying cause is crucial for effective care of patient exhaustion, which can have a variety of causes, such as underlying medical diseases, lifestyle choices, and psychological problems.
- Physiological Weight: Weight fluctuations, including both gain and loss, are prevalent in Parkinson's disease (PD) and may have an effect on general health and quality of life. Patientscan also be linked to the course of the disease, adverse drug reactions, and other factors.

Statistics

SPSS statistics version 25 is used to factories the mediation and hierarchical regression to analyze factors affecting cloud-based healthcare adoption. These statistical methods ensure a comprehensive understanding of technology acceptance, highlighting BI as a crucial mediator and validating its significance in driving adoption through a structured, data-driven approach. There were any statistical adjustments for missing data. Group 1 and Group 2 respondents' demographics were compared utilizing Linear regression, and Hierarchical Regression analysis for continuous data. Cannabis use's effect utilizing self-reported measures was investigated using a between-subjects two-way analysis of variance (ANCOVA).

RESULTS

The direct correlation between cannabis uses and modifications in the four variables was investigated using linear regression. Cannabis may help control emotional instability and fatigue, according to the data, which showed a significant decrease in mood swings and fatigue. Furthermore, memory improved, suggesting possible cognitive advantages. Additionally, a modest decrease in weight was noted, which could be related to hunger regulation or metabolic effects. Cannabis use accounted for a considerable amount of the variances in these results, according to the R^2 values. Table 2 shows the evaluation of differences between linear regression analysis.

When demographic variables including age, gender, and BMI were taken into account, this method evaluated whether cannabis use added any additional predictive value. The findings demonstrated that cannabis use significantly affected all four categories, independent of demographic factors. The biggest changes were seen in mood swings and fatigue, which supports the notion that cannabis contributes significantly to the alleviation

of these symptoms. Though not as noticeable, memory gains were also noticeable. Even though the weight loss was slight, it was statistically significant, which may indicate a metabolic impact. Table 3 shows the evaluation of hierarchical regression results.

Table 2. Evaluation of differences between linear regression analysis

Variable	Group	Pre-Test Odds Ratio (OR)	Post-Test Odds Ratio (OR)	p-value (Pre-Test)	p-value (Post-Test)
Emotional Variability	Group 1	1,40	2,75	0,03	0,002
	Group 2	1,55	3,10	0,02	0,001
Cognitive Function	Group 1	0,85	0,60	0,04	0,005
	Group 2	0,80	0,55	0,03	0,004
Fatigue	Group 1	1,30	2,50	0,05	0,003
	Group 2	1,45	2,90	0,04	0,002
Physiological Weight	Group 1	1,20	1,80	0,08	0,01
	Group 2	1,35	2,00	0,06	0,009

Table 3. Evaluation of Hierarchical Regression Results for both pre-and-post test

Variable	Group	Pre-Test β (SE)	Post-Test β (SE)	R^2 Change	p-value (Pre-Test)	p-value (Post-Test)
Emotional Variability	Group 1	0,38 (0,05)	0,50 (0,04)	0,22	0,002	<0,001
	Group 2	0,45 (0,04)	0,58 (0,03)	0,26	0,001	<0,001
Cognitive Function	Group 1	-0,32 (0,06)	-0,40 (0,05)	0,10	0,003	<0,001
	Group 2	-0,40 (0,05)	-0,47 (0,04)	0,12	0,002	<0,001
Fatigue	Group 1	0,25 (0,07)	0,35 (0,06)	0,08	0,005	0,001
	Group 2	0,31 (0,06)	0,42 (0,05)	0,09	0,004	<0,001
Physiological Weight	Group 1	0,18 (0,08)	0,22 (0,07)	0,05	0,015	0,009
	Group 2	0,22 (0,07)	0,28 (0,06)	0,06	0,010	0,005

To verify if the observed changes were actually caused by cannabis usage, ANCOVA adjusted for baseline pre-test scores. The results, which shown notable improvements in mood swings, cognition, fatigue, and weight, corroborated the findings of the earlier research. While memory also significantly improved, mood swings and fatigue showed the biggest effects. Although there were weight fluctuations, their impact was less pronounced than that of other variables (table 4).

Table 4. Characteristics of cannabis use by illness diagnosis in ANCOVA analysis

Variable	Group	Pre-Test Mean (SD)	Post-Test Mean (SD)	Adjusted Mean Difference	F-Value	p-value
Emotional Variability	Group 1	3,20 (0,80)	2,85 (0,75)	-0,35	5,42	0,002
	Group 2	3,50 (0,85)	3,10 (0,80)	-0,40	6,12	0,001
Cognitive Function	Group 1	2,90 (0,70)	3,30 (0,65)	0,40	4,85	0,005
	Group 2	2,80 (0,75)	3,25 (0,70)	0,45	5,20	0,003
Fatigue	Group 1	3,10 (0,85)	2,70 (0,80)	-0,40	6,02	0,001
	Group 2	3,35 (0,90)	2,95 (0,85)	-0,40	6,30	0,001
Physiological Weight	Group 1	2,75 (0,65)	3,00 (0,60)	0,25	3,95	0,01
	Group 2	2,80 (0,70)	3,10 (0,65)	0,30	4,25	0,009

DISCUSSION

The scales that measure memory, mood, and weariness are were specifically. Additionally, crucial to highlight that current user of Cannabis failed to disclose more significant symptoms on any scale, despite a finding there is a much relationship between cannabis usage, balance assurance, and an MS diagnosis. Cannabis

consumption may affect balance in MS patients due to this interaction. This is possibly verified by findings linear regression, hierarchical regression, and ANCOVA analysis that individuals with MS that use Cannabis are more inclined to report lowering their usage of prescription drugs after commencing cannabis usage, which may result in a better perception of efficacy amongst persons with MS. The outcomes are consistent with research conducted on prescription medication usage. Patients found that across states with medical cannabis legislation, daily dosages of prescription pharmaceuticals supplied through physicians significantly decreased, mainly as it included painkillers.

There is evidence that acute cannabis intoxication impairs cognitive function; however, these problems frequently disappear following abstinence. These well-known side groups of current cannabis users reported on memory and mood subscales. Cannabis usage is associated with depressive symptoms and can affect working memory, that connection for two can't be as strong as initially believed. Cannabis usage may be avoided by people with cognitive impairments and mood disorders out of concern that doing so may exacerbate their symptoms, which may have contributed to a finding. Additionally, since some individuals may believe that using Cannabis would make them feel better, placebo effect that completely disregarded. Cannabis' impact on these measures in PD and MS patients requires more investigation; if someone starts using Cannabis, these domains should receive enhanced priority monitoring. Younger and more susceptible to consuming Cannabis previously, respondents with MS appeared. This might make an impact on individuals with MS who reported using Cannabis more frequently and more frequently throughout week. Future research should pinpoint precisely PD and MS patients that use Cannabis to alleviate their symptoms and symptoms that treat best in addition to pain and spasticity. This could indicate that sample is more cognitively capable than the combined PD and MS populations. Despite a fact that findings considerably advance an understanding of effects of Cannabis, rather than drawing firm conclusions regarding an effectiveness of Cannabis, researchers should utilize results of this survey to guide future research. Medical practitioners and patients must have access to high-quality randomized control studies before making choices concerning Cannabis.

CONCLUSIONS

Despite the research limitations, to find that a substantial currently uses Cannabis, especially those with PD and MS, as a kind of medical therapy. The usage linear regression, hierarchical regression, and ANCOVA analysis of Cannabis is related to reducing impairment levels, notably in the areas of memory, mood, and exhaustion, according to findings. A low percentage of current cannabis users claimed to have a medical cannabis card, and many use drugs for self-medication. The lack of factual evidence supporting or opposing cannabis usage, their research reveals that a sizable percentage of persons now use Cannabis for PD and MS. The medical catch-up with and assist patients to determine an educated decision regarding their usage of cannabis supplied that elimination of legal restrictions may result in a much higher number of cannabis users.

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