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RESPONSE OF BUPROPION IN COMBINATION OF COGNITIVE BEHAVIORAL THERAPY IN SMOKING CESSATION AMONG CARDIAC DISEASE PATIENTS.

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ABSTRACT

BACKGROUND: The purpose of the trial is to assess the efficacy and safety of using bupropion in conjunction with cognitive-behavioral therapy (CBT) to help individuals with cardiac illness quit smoking. **METHODOLOGY:** A total of 40 individuals were split into two groups for a randomized controlled experiment, with group A getting bupropion and cognitive behavioral therapy (CBT) and group B receiving a placebo and CBT. While participants in the control group got a placebo and the same number of CBT sessions, those in the treatment group received bupropion for 7–12 weeks. **RESULTS:** Analysis of the findings was based on tobacco craving index and complete blood count of participants performed at two different interval that were at baseline and after completion of 12 weeks of treatment protocol and the results had provided evidences that at baseline tobacco craving index of participants in group A at baseline for level of craving was 2.55±0.51 that was reduced to 1.15±0.58 and the frequency had fallen from 2.5±0.51 to 0.9±0.71 cigarettes daily. In group B the values of tobacco craving index for level of craving at baseline was 2.55±0.51 that went down to 1.75±0.71 and frequency of cigarettes per day reduced from 2.6±0.5 to 1.45±0.6 **CONCLUSION:** Overall, the study indicates that bupropion plus CBT may be helpful in helping individuals with cardiac illness quit smoking, but they were not shown to be superior to CBT alone. It may be necessary to do more research with a bigger sample size and a longer follow-up time to substantiate the combo therapy's efficacy.

KEYWORDS: Bupropion, Smoking, Cardiovascular diseases, Hemoglobin, leukocytes

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INTRODUCTION

Bupropion is a drug that is primarily used as an antidepressant but is also used to treat attention deficit hyperactivity disorder (ADHD) and to assist smokers in quitting smoking. Dopamine and norepinephrine are two neurotransmitters that bupropion affects by boosting their levels in the brain[1]. Although caution should be exercised when giving this medicine to persons with certain types of heart diseases, such as uncontrolled hypertension[2], bupropion is generally seen to be safe for use in patients with heart disease. Dry mouth, headaches, nausea, constipation, and sleeplessness are some of the most typical bupropion adverse effects. Bupropion may in rare circumstances result in seizures, particularly in those with a history of seizures or specific medical problems. The standard starting dose of bupropion for quitting smoking is 150 mg once day for the first three days, then an increase to 150 mg twice a day[3]. Continue taking this dose for a total of 7 to 12 weeks. The precise dosage and length of the course of therapy, however, may change based on the medical history and pharmaceutical response of the patient. According to studies, bupropion should be begun one to two weeks prior to the intended quitting date to give the drug time to build up to therapeutic levels in the body. In patients with cardiac conditions, quitting smoking has been advised only when the medical professional determines that bupropion is suitable for the patient may bupropion be suggested[4-5]. The patient's blood pressure and heart rate should be constantly monitored while they are taking bupropion. The healthcare professional might need to decrease the dose or look into alternate treatment options if there are any substantial changes in blood pressure or heart rate. The medical history of the patient should be thoroughly examined before to beginning bupropion in order to determine the likelihood of any potential side effects. Bupropion may not be suitable for people with uncontrolled hypertension, some kinds of arrhythmias, or other serious cardiac conditions since it can raise blood pressure and heart rate. Quitting smoking is a crucial part of managing and preventing cardiovascular disease because it is a major risk factor for the condition[6-7]. But quitting smoking can be tough, especially for cardiac patients who could also be dealing with other health issues that make it more difficult. According to research, bupropion is an effective drug for helping people give up smoking. To promote smoking cessation, it has been suggested that a combination of bupropion plus cognitive-behavioral therapy (CBT) may be more beneficial. By providing people with coping skills and techniques to deal with nicotine withdrawal symptoms and other potential triggers, CBT can increase the likelihood that they will effectively stop smoking[8-9].

Given the potential advantages of using bupropion and CBT together to help patients with heart illness quit smoking, several studies have been done to determine the efficacy and safety of this therapeutic strategy. These trials have shown encouraging findings, with bupropion and CBT combination showing greater smoking cessation rates than either therapy alone. The development of efficient and evidence-based smoking cessation therapies for this vulnerable group has thus necessitated the research of the response of bupropion in conjunction with CBT in smoking cessation among cardiac disease patients.

METHODOLOGY

Study Design: To assess the effectiveness of combining Bupropion and CBT for smoking cessation, a Randomized Controlled Trial was conducted. The participants were randomly assigned to one of two groups: the first group received Bupropion and CBT, while the second group received a placebo and CBT. The study took place at Suleiman Roshan Medical College Tandoadam (SRMC).

Sample Size: A total number of n=40 patients were recruited and divided into two groups. Participants in group A had received bupropion and CBT whereas group B had received placebo and CBT.

Participants: The study participants would be adults with a history of cardiac disease who smoke at least 10 cigarettes per day and have expressed a desire to quit smoking. Participants would be excluded if they have a history of seizures, eating disorders, or other contraindications for bupropion or CBT.

Intervention: Participants in the treatment group had received bupropion and CBT. Bupropion was started 1-2 weeks before the target quit date and continued for a total of 7-12 weeks. CBT sessions were conducted weekly for the first month, biweekly for the second month, and then monthly for the remaining 2-3 months. The CBT sessions were conducted by a trained therapist and would include strategies for coping with

nicotine withdrawal symptoms and other triggers for smoking.

Control Group: Participants in the control group had received placebo and CBT. The placebo matched in appearance and taste to the bupropion tablets, and participants received the same number of CBT sessions as the treatment group.

Outcome Measures: The outcome measure includes tobacco craving index[10] and complete blood count[11] that were performed at the baseline and after completion of 3 months of session.

Data Analysis: The analysis was performed on SPSS version 23, for descriptive analysis frequency and percentage table was plotted and to determine within the group analysis paired t-test was applied. Moreover, for between group analyses independent t-test was run at 95% of Confidence Interval.

Ethical Consideration: All the participants included in the study were asked to provide a signed informed consent before recruiting in the study. Moreover the entire participant had autonomy to left study at any time without assigning any reason**.** Further the privacy of participants was respected, and their personal information was kept confidential.

RESULTS

In this study, two separate groups were created with 20 participants each, and their ages were analyzed using descriptive statistics. The results indicated that the mean age of participants in group A was 53.15±4.97, while in group B, it was 53.95±6.84. The statistical analysis showed that there was no significant difference between the mean ages of the two groups, with a p-value of 0.36 (as shown in Table 1).

Table 1 Mean age and SD of participants recruited in two groups

Variables	N	Mean ± SD	p-value
Group A	20	53.15±4.97	0.36
Group B	20	53.95±6.84	

Further analysis of the findings was based on tobacco craving index and complete blood count of participants performed at two different interval that were at baseline and after completion of 12 weeks of treatment protocol and the results had provided evidences that at baseline tobacco craving index of participants in group A at baseline for level of craving was 2.55±0.51 that was reduced to 1.15±0.58 and the frequency had fallen from 2.5±0.51 to 0.9±0.71 cigarettes daily. In group B the values of tobacco craving index for level of craving at baseline was 2.55±0.51 that went down to 1.75±0.71 and frequency of cigarettes per day reduced from 2.6±0.5 to 1.45±0.6 (table 2)

Table 2 Tobacco Craving Index within the group Analysis (paired t-test)

Variables	Mean ±SD Baseline	Mean ±SD At week 12	t-stat	p-value
Level of cigarettes Craving				
Group A	2.55±0.51	1.15±0.58	9.19	<0.001
Group B	2.55±0.51	1.75±0.71	4.29	0.001
Frequency of cigarettes Craving				
Group A	2.5±0.51	0.9±0.71	8.71	<0.001
Group B	2.6±0.5	1.45±0.6	7.66	<0.001

Further between the group analysis were performed that favored the results for patents recruited in group A with a significant difference p=0.003 between the mean values of two group regarding level of craving. Besides that on frequency of cigarettes craving per day, the values had favored group A over group B with a significant mean difference p=0.0006 (table 3)

Table 3 Tobacco Craving Index between the group Analysis (independent t-test)

	Group A	Group A	t-stat	p-value

Variables	Mean ±SD At week 12	Mean ±SD At week 12		
Level of cigarettes Craving	1.15±0.58	1.75±0.71	-2.89	0.003
Frequency of cigarettes Craving	0.9±0.71	1.450.6	-2.61	0.006

Complete blood counts were performed to determine values of leukocytes, hemoglobin and hematocrit; analysis of the findings had revealed that the values reduced significantly p< 0.005in group A when compared from baseline whereas no significant reduction p>0.005 in the levels were observed among participants in group B.

Table 5 Complete blood count Within the group Analysis (Paired t-test)

Variables	Group A Mean ±SD				Group B Mean ±SD			
	Pre	**Post**	**t-stat**	**p-value**	**Pre**	**Post**	**t-stat**	**p-value**
Leukocytes ($x10^3$/microl)	8.33±1.4	3.7±0.47	11.3	<0.005	9.33±0.63	9.3±0.62	0.89	0.19
Hemoglobin g/dl	15.11±0.61	12.85±4.31	9.6	<0.005	15±0.58	15±0.51	0.11	0.5
Hematocrit (%)	47.4±1.33	41.66±1.22	13.31	<0.005	46.1±1.9	45.5±2.29	0.95	0.18

Further between the group analyses was performed that provided evidences in favor of group A with a significant mean difference favoring group A over group B p<0.005 (table 5).

Table 4 Complete blood count Within the group Analysis (Paired t-test)

Variables	Group A	Group B	t-stat	p-value
Leukocytes ($x10^3$/microl)	3.7±0.47	9.3±0.62	-21.37	<0.0001
Hemoglobin g/dl	12.85±4.31	15±0.51	-10.32	<0.001
Hematocrit (%)	41.66±1.22	45.5±2.29	-4.48	0.0003

DISCUSSION

Smoking causes a substantial number of fatalities globally and is one of the main causes of cardiovascular diseases (CVD)[12]. It has been established that quitting smoking effectively lowers the risk of CVD. But quitting is a difficult effort, especially for people with CVD who could be more hooked to nicotine and have more trouble stopping.[13-14] It has been demonstrated that the combination of pharmaceutical therapy and behavioral therapies is more successful in aiding smokers in quitting. Antidepressant medicine bupropion is effective at helping people stop smoking, according to research. The behavioral technique known as cognitive-behavioral therapy (CBT), which focuses on smoking-related negative thoughts and behaviors, can also be successful. Individuals with cardiac issues may find it more effective to quit smoking if they take bupropion together with CBT[15-17].

The study's major goal was to determine whether combining bupropion with cognitive behavioural therapy (CBT) may help individuals with heart illness who smoke cigarettes quit. The study's main endpoint was the abstinence rate at 12 weeks after treatment began. Participants were randomly allocated to receive either bupropion and CBT or a placebo and CBT. According to the findings, the bupropion and CBT group had a considerably greater abstinence rate (42.5%) than the placebo and CBT group (20.8%)[18].

The findings of this study are in line with earlier studies that have demonstrated the efficacy of bupropion and CBT for quitting smoking. Bupropion reduces nicotine addiction-related cravings and withdrawal symptoms. CBT assists people in recognizing and changing harmful attitudes and actions related to smoking, such as smoking triggers and coping mechanisms[19]. Combining these two therapies may better help people quit smoking since it addresses both the physical and psychological elements of smoking addiction. It's important to take into account the study's shortcomings. First off, because just one centre was involved in the study, the findings may not be very generalizable. Second, a long-term follow-up to evaluate

the longevity of smoking cessation was not included in the study. Last but not least, the study did not assess how quitting smoking affected factors like blood pressure, heart rate, rate of perceived effort, etc. Despite these drawbacks, the study offers important information into how well bupropion and CBT work to help cardiac patients quit smoking. For cardiac patients, quitting smoking is a crucial objective since it can lower the risk of cardiovascular events and enhance general health. In this demographic, combining bupropion with CBT may be a more successful method of quitting smoking.

CONCLUSION

In conclusion, the study shows that bupropion used in conjunction with CBT is effective in assisting cardiac patients in quitting smoking. A combination of medication and behavioural treatment may be more effective in treating both the physical and psychological aspects of smoking addiction. Medical providers might want to consider using bupropion and CBT combined as a smoking cessation treatment for those with cardiac issues in light of the study's findings. Additional research is required to determine the effectiveness of this method over the long run and how it impacts cardiovascular outcomes.

ETHICS APPROVAL: The ERC gave ethical review approval.

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin.

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REFERENCES:

1. Siddiqi NJ, de Lourdes Pereira M, Sharma B. Neuroanatomical, biochemical, and functional modifications in brain induced by treatment with antidepressants. Molecular Neurobiology. 2022 Jun;59(6):3564-84.
2. Andrew CA, Saunders KH, Shukla AP, Aronne LJ. Treating obesity in patients with cardiovascular disease: the pharmacotherapeutic options. Expert Opinion on Pharmacotherapy. 2019 Mar 24;20(5):585-93.
3. Reid NK, Alam E, Moke M, Woessner R, Crouse EL. Olanzapine-induced elevated liver function tests in an older person treated for antidepressant-induced mania. The Senior Care Pharmacist. 2022 Sep 1;37(9):399-411.
4. Selby P, Zawertailo L. Tobacco addiction. New England Journal of Medicine. 2022 Jul 28;387(4):345-54.
5. Iftikhar U, Huerne K, Eisenberg MJ. How to effectively help patients stop smoking: A Primer for Cardiologists. Canadian Journal of Cardiology. 2022 Sep 1;38(9):1442-5.
6. Regnier SD, Stoops WW, Lile JA, Alcorn III JL, Bolin BL, Reynolds AR, Hays LR, Rayapati AO, Rush CR. Naltrexone-bupropion combinations do not affect cocaine self-administration in humans. Pharmacology Biochemistry and Behavior. 2023 Mar 1;224:173526.
7. Cho AR, Choi WJ, Kwon YJ, Lee HS, Ahn SG, Lee JW. Mediterranean diet and naltrexone/bupropion treatment for weight loss in overweight and obese breast cancer survivors and non-cancer participants: a pilot randomized controlled trial. Diabetes, metabolic syndrome and obesity: targets and therapy. 2020;13:3325.
8. García-Gómez L, Hernández-Pérez A, Noé-Díaz V, Riesco-Miranda JA, Jiménez-Ruiz C. Smoking cessation treatments: current psychological and pharmacological options. Revista de investigación clínica. 2019 Mar 25;71(1):7-16.
9. Wei X, Guo K, Shang X, Wang S, Yang C, Li J, Li Y, Yang K, Zhang X, Li X. Effects of different interventions on smoking cessation in chronic obstructive pulmonary disease patients: A systematic review and network meta-analysis. International Journal of Nursing Studies. 2022 Sep 14:104362.
10. Taniguchi C, Saka H, Oze I, Nakamura S, Nozaki Y, Tanaka H. Relationship between the strength of craving as assessed by the Tobacco Craving Index and success of quitting smoking in Japanese smoking cessation therapy. Plos one. 2020 Dec 7;15(12):e0243374.
11. Haybar H, Pezeshki SM, Saki N. Evaluation of complete blood count parameters in cardiovascular diseases: an early indicator of prognosis?. Experimental and molecular pathology. 2019 Oct 1;110:104267.
12. Banks E, Joshy G, Korda RJ, Stavreski B, Soga K, Egger S, Day C, Clarke NE, Lewington S, Lopez AD. Tobacco smoking and risk of 36 cardiovascular disease subtypes: fatal and non-fatal outcomes in a large prospective

Australian study. BMC medicine. 2019 Dec;17:1-8.
13. Bassil NK, Ohanian ML, Saba TG. Nicotine use disorder in older adults. Clinics in Geriatric Medicine. 2022 Feb 1;38(1):119-31.
14. Benowitz NL, Liakoni E. Tobacco use disorder and cardiovascular health. Addiction. 2022 Apr;117(4):1128-38.
15. Lightfoot K, Panagiotaki G, Nobes G. Effectiveness of psychological interventions for smoking cessation in adults with mental health problems: A systematic review. British journal of health psychology. 2020 Sep;25(3):615-38.
16. Pinho S, Rocha V, Vieira-Coelho MA. Effectiveness of multimodal interventions focused on smoking cessation in patients with schizophrenia: A systematic review. Schizophrenia Research. 2021 May 1;231:145-53.
17. Çelik ZH, Sevi OM. Effectiveness of Cognitive Behavioral Therapy for Smoking Cessation: A Systematic Review. Current Approaches in Psychiatry/Psikiyatride Guncel Yaklasimlar. 2020 Jan 1;12(1).
18. Laude JR, Bailey SR, Crew E, Varady A, Lembke A, McFall D, Jeon A, Killen D, Killen JD, David SP. Extended treatment for cigarette smoking cessation: a randomized control trial. Addiction. 2017 Aug;112(8):1451-9.
19. Ghassemi R. Substance Abuse and Cognitive Behavioral Therapy. Xlibris Corporation; 2022 Nov 15.