Effect of Cognitive Behavioral Therapy on The Behavior of Patients with Cardiovascular Disease: A Systematic Review

Efecto de la Terapia Cognitivo Conductual en el Comportamiento de Pacientes con Enfermedad Cardiovascular: Una revisión sistemática

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SUMMARY

Background: Cardiovascular disease (CVD) has been known to be one of the most common causes of death in the community. One of the factors that affect the condition of patients with cardiovascular disease is unhealthy behavior. Cognitive-behavioral Therapy (CBT) is a therapy to improve patient behavior from bad to better behavior. This study aims to synthesize various research results on the effect of Cognitive-Behavioural Therapy (CBT) on the behavior of patients with cardiovascular disease.

Materials and Methods: Systematic review. A literature search was carried out on international journal databases, namely Scopus, Science Direct, and PubMed, from 2016 to 2021. The synthesized articles were those that met the PICOS inclusion criteria, namely Population = people with cardiovascular disease. Intervention = cognitive behavioral therapy. Comparison = usual care. Outcome = healthy behavior, study design: trial. The keywords used in the search were “Cognitive Behavioral Therapy” AND “cardiovascular”.

Result: There are 416 articles found in the search. Articles were identified and screened resulting in seven articles that met the inclusion criteria. The results of this study found that the effects of cognitive behavioral therapy on cardiovascular disease patients were able to overcome insomnia or rest and sleep disorders, overcome anxiety, stress, and symptoms of depression, improve lifestyle and healthy living behaviors such as physical activity, and reduce smoking habits, and a healthy diet, improved coping skills and pain control, and improved mental health and quality of life of patients with cardiovascular disease. The average duration of therapy was 7.95 or about 8 weeks.

Conclusion: CBT is effective in improving various healthy behaviors in patients with cardiovascular disease. However, pharmacological therapy or treatment regimens remain the main ones supported by CBT to produce a better impact on the health of CVD patients.

Keywords: Cognitive-Behavioural Therapy, CBT, Cardiovascular Disease

RESUMEN

Antecedentes: Se sabe que la enfermedad cardiovascular (ECV) es una de las causas más comunes de muerte en la comunidad. Uno de los factores que afectan la condición de los pacientes con enfermedades cardiovasculares es el comportamiento poco saludable. La Terapia Cognitivo-Conductual (TCC) es una terapia para mejorar el comportamiento del paciente de mal a mejor comportamiento. Este estudio tiene como objetivo sintetizar varios resultados de investigación sobre el efecto de la Terapia Cognitivo-
Conductual (TCC) en el comportamiento de los pacientes con enfermedad cardiovascular.

**Materiales y Métodos:** Revisión sistemática. Se realizó una búsqueda bibliográfica en bases de datos de revistas internacionales, a saber, Scopus, Science Direct y PubMed, de 2016 a 2021. Los artículos sintetizados fueron aquellos que cumplieron con los criterios de inclusión de PICOS, a saber, Población = personas con enfermedad cardiovascular. Intervención = terapia cognitiva conductual. Comparación = atención habitual. Resultado = comportamiento saludable, diseño del estudio: ensayo. Las palabras clave utilizadas en la búsqueda fueron “Terapia cognitiva conductual” Y “cardiovascular”. Resultado: Hay 416 artículos encontrados en la búsqueda. Los artículos fueron identificados y examinados dando como resultado siete artículos que cumplían con los criterios de inclusión. Los resultados de este estudio encontraron que los efectos de la terapia cognitiva conductual en pacientes con enfermedades cardiovasculares fueron capaces de superar el insomnio o los trastornos del sueño y del sueño, superar la ansiedad, el estrés y los síntomas de depresión, mejorar el estilo de vida y los comportamientos de vida saludable, como la actividad física, y reducir los hábitos de fumar, y una dieta saludable, mejores habilidades de afrontamiento y control del dolor, y mejor salud mental y calidad de vida de los pacientes con enfermedades cardiovasculares. La duración media de la terapia fue de 7.95 o unas 8 semanas.

**Conclusión:** La TCC es efectiva para mejorar varios comportamientos saludables en pacientes con enfermedades cardiovasculares. Sin embargo, la terapia farmacológica o los regímenes de tratamiento siguen siendo los principales apoyados por la TCC para producir un mejor impacto en la salud de los pacientes con ECV.

**Palabras clave:** Terapia cognitivo-conductual, TCC, enfermedad cardiovascular.
Search strategy

The literature search was conducted on three international journal databases, namely Scopus, Science Direct, and PubMed. The literature search was conducted using the keywords “Cognitive Behavioral Therapy” and “Cardiovascular”.

Eligibility Criteria

Eligibility criteria for articles used in this study are publications in 2016-2021 that meet the inclusion criteria of the PICOS framework, namely Population: cardiovascular disease patients, Intervention: Cognitive Behavioral Therapy, Comparison: Usual care, Outcome: Healthy behavior, and Study Design: Randomized Controlled Trial, Pre-Post Study, Quasi Experiment.

Study selection

The search results have obtained four hundred and sixteen literature or articles in the database used. Articles were removed from duplicates and filtered by title to 409, filtered by abstract to 27, and full text filtered to 7 (Figure 1).

Risk of bias

Assessment of article quality and risk of bias was carried out independently by the research team using the Critical Appraisal Joanna Briggs Institute (JBI) (7).

Figure 1. PRISMA flow diagram of the article selection process (8).
Data extraction

Predefined articles were extracted based on the researcher, year, country, research design, types of cardiovascular disease, research sample, patient’s condition or behavior, forms of CBT intervention in the treatment group, action duration, the form of treatment in the control group, and research result on the effect of cognitive behavioral therapy on the behavior of patients with cardiovascular disease.

RESULTS

Characteristic study

All seven articles that have been synthesized are original research with a randomized controlled trial study design, 6 articles, and 1 article with a pre-post-trial study design. The total of all cardiovascular disease patients who were found to be involved in this study was 765 people. as many as 399 people (52.15 %) became the intervention group in CBT therapy and 366 people (47.8 %) became the control group. Most of the patients, namely 522 people (68.2 %) were male and 243 people (31.8 %) were female. Types of cardiovascular disease experienced by patients are angina pectoris, myocardial infarction, heart failure, atrial fibrillation, arrhythmia, coronary heart disease, cardio-metabolic syndrome (CMS), coronary artery bypass, and aortic or mitral valves replacement. The patient’s unhealthy condition or behavior is insomnia, anxiety, depressive symptoms, stress, somatic anxiety, vital fatigue, unhealthy lifestyle; smoking, diet, physical activity, and depression on postoperative pain control (Table 1).

Outcomes

The results of this study found various impacts of CBT in patients with cardiovascular disease was to be able to overcome insomnia or rest and sleep disorders, treat anxiety, stress, and depressive symptoms, improve lifestyle and healthy living behaviors such as physical activity, smoking reduction, and healthy diet improved coping skills and pain control, and improved mental health and quality of life of patients. Based on the results of the synthesis of articles, it was found that the average duration of cognitive behavioral therapy actions given was 7.95 or about 8 weeks (Table 1).

DISCUSSION

The results indicate that many positive effects are obtained when cognitive behavioral therapy is given to patients with various conditions or behaviors due to suffering from cardiovascular disease. Insomnia is a sleep disorder condition that begins with an attempt to start sleeping, maintain sleep, wake up too early, or experience poor sleep (15,16). Insomnia has been found to have a significant association with cardiovascular events and mortality (15-17). The high incidence of cardiovascular diseases associated with insomnia is stroke, myocardial infarction (MI), and coronary heart disease (15,18,19). Patients who experience insomnia and have difficulty initiating sleep have a high risk of death from cardiovascular disease. This condition occurs because insomnia increases anxiety, stress, and interferes with mental health which worsens cardiovascular disease (20). CBT has been shown not only to be effective in reducing insomnia symptoms, but also to have a positive effect over time in improving the functional health, psychological well-being, and quality of life of patients (21,22). CBT also holds promise as an effective insomnia treatment for reducing morbidity in patients with cardiovascular disease (23).

Anxiety, stress, and depression are psychological problems that greatly affect the health of patients with cardiovascular disease (24). Psychological and cognitive responses to stress play a role in triggering heart disease, risk of death, and the need for rehabilitation (25-27). Depression is prospectively associated with the development of atherosclerosis in individuals with no history of cardiovascular disease, but in someone with heart disease, depression conditions will worsen and increase the risk of death and heart deterioration 2-fold after myocardial infarction or heart failure and after heart surgery (28). Depression that occurs in patients with cardiovascular disease is generally a result of an impaired adjustment of patients to...
Table 1: Summary of findings on the effect of Cognitive Behavioral Therapy on the behavior of patients with cardiovascular disease (n=7)

<table>
<thead>
<tr>
<th>No</th>
<th>Researcher, Year</th>
<th>Country</th>
<th>Research design</th>
<th>Types of cardiovascular disease</th>
<th>Sample</th>
<th>Patient's condition or behavior</th>
<th>Forms of CBT</th>
<th>Action duration</th>
<th>Form of treatment in the control group</th>
<th>Research result</th>
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<tbody>
<tr>
<td>1</td>
<td>Siebmann et al. 2021 (2)</td>
<td>Sweden</td>
<td>a randomized controlled trial</td>
<td>Angina, myocardial infarction, heart failure, atrial fibrillation and atrial flutter, and arrhythmias</td>
<td>48 patients</td>
<td>Insomnia</td>
<td>Cognitive behavioral therapy (CBT) is internet-based in the form of modules</td>
<td>9 weeks</td>
<td>No intervention; waiting for the opportunity to receive intervention after the eight-week waiting period ends.</td>
<td>The intervention has a good treatment effect on insomnia problems in CVD patients during the treatment and follow-up period</td>
</tr>
<tr>
<td>2</td>
<td>Schneider et al. 2020 (9)</td>
<td>Canada</td>
<td>a randomized controlled trial</td>
<td>Myocardial infarction or unstable angina</td>
<td>53 patients</td>
<td>Anxiety and depressive symptoms</td>
<td>Cognitive behavioral therapy (CBT) internet-based in the form of a Heart Wellbeing Course</td>
<td>8 weeks</td>
<td>Decreased patient general anxiety, depression, distress, cardiac anxiety, and increased physical activity behavior, mental health, and improved quality of life</td>
<td>Continued in page S483 …</td>
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<tr>
<td>3</td>
<td>Heenan et al., Canada 2020(10)</td>
<td>Pre-post trial study</td>
<td>Myocardial infarction, arrhythmia</td>
<td>47 patients, 25 men (53.2%), and 22 women (45.8%), average age 62 years</td>
<td>Insomnia, anxiety, and depression</td>
<td>Cognitive behavioral therapy (CBT) in the form of the Heart Healthy Sleeping Group (HHSG)</td>
<td>No control group</td>
<td>Improved sleep duration, maintenance, efficiency, latency, and sleep quality, and decreased symptoms of anxiety and depression</td>
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<tr>
<td>4</td>
<td>Johansson et al., Sweden 2020(11)</td>
<td>A randomized controlled trial</td>
<td>Myocardial infarction, angina, atrial fibrillation, heart failure</td>
<td>144 patients, 89 men (61.8%), 55 women (38.2%), average age 63 years.</td>
<td>Depression</td>
<td>Cognitive behavioral therapy (CBT) is internet-based in the form of modules</td>
<td>Online discussion</td>
<td>Decreased depressive symptoms and increased physical activity</td>
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</tbody>
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Continued in page S484 ...
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<th>Forms of CBT Intervention in the Treatment Group</th>
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<tr>
<td>5</td>
<td>Norlund et al. 2017(12), Sweden</td>
<td>a randomized controlled trial</td>
<td>Coronary heart disease</td>
<td>362 patients (277 men (76.5%), and 85 women (23.5%), average age of 61.5 years)</td>
<td>Stress, somatic anxiety, vital behavioral exhaustion, therapy with face-to-face meetings</td>
<td>0 and 11 months, the average intervention was 26 days or about 3.7 weeks</td>
<td>Usual care</td>
<td>CBT has a moderately positive effect on somatic anxiety</td>
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<td>192 people in the intervention group, 170 people in the control group</td>
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<td>6</td>
<td>Zhang et al. 2016(13), Republic of China</td>
<td>randomized controlled trial</td>
<td>Cardio-metabolic syndrome</td>
<td>58 patients (Male 25 (43.1%), female 33 (56.9%), average age 48.6 years)</td>
<td>Lifestyle; smoking, diet, lack of physical activity</td>
<td>12 weeks with workshop activities 2 days a week</td>
<td>Usual information via weekly text messages about CMS standard care</td>
<td>Improvement of physical and mental health conditions due to lifestyle changes; smoking reduction, healthy diet, and good physical activity</td>
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<td>28 people in the intervention group, 30 people in the control group</td>
<td>Patient-centered Cognitive behavioral therapy (PC-CBT) in the form of workshops equipped with modules</td>
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the latest health conditions that are not realized will worsen their health conditions (29,30). Depression is significantly associated with an increased risk of cardiovascular disease morbidity and should therefore be screened and treated (31). CBT is a therapy that has a high intensity in overcoming the psychological problems of patients with cardiovascular disease (24,32). CBT is an effective treatment for reducing depression and anxiety in patients with cardiovascular diseases such as heart failure and coronary heart disease (33).

A healthy lifestyle can substantially reduce the burden of cardiovascular disease (34). Regular physical activity, a healthy diet, an ideal body weight, and not smoking have been shown to significantly reduce the risk of cardiovascular disease (35). Unhealthy behavior or lifestyle predicts a higher risk of being the cause of death in all cases of death in cardiovascular disease patients, namely myocardial infarction and stroke, regardless of genetic risk (36). CBT can improve a person's behavior or healthy lifestyle such as nutritional intake, exercise, and weight control (37). The CBT intervention also increased commitment and adherence to regular physical exercise in sports (38) and commitment to quitting smoking (39).

Pain can increase or worsen the risk of cardiovascular disease condition. Patients who report pain may indicate a significant heart disease problem (40). CBT has a significant relationship with the patient's ability to empathize and control pain (41). Quality of life is a strong and independent predictor of all causes of death and hospitalization for cardiovascular disease patients, namely heart failure, both mild and severe (5,42). CBT is a reliable psychological therapy for improving the quality of life of patients with cardiovascular disease (9,14).

Cognitive-behavioral therapy (CBT) is a combination of behavioral and cognitive therapy that focuses mostly on working with patients. CBT is generally a directive approach to psychotherapy that helps patients to challenge their troubled thoughts to become new and better thoughts (43). In this study, various CBT approaches were found to be given to patients with cardiovascular disease, namely face-to-face CBT and internet-based CBT. Whatever approach

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<tbody>
<tr>
<td>7</td>
<td>Doering et al., 2016(14)</td>
<td>United States of America</td>
<td>Case control study</td>
<td>Coronary artery bypass, aortic or mitral valve replacement, a combination of both</td>
<td>53 patients (Male 44%, Female 9%, average age 66 years)</td>
<td>Depression, postoperative pain control</td>
<td>Eight sessions in one hour nurse and patient meetings</td>
<td>Usual care</td>
<td>Decreased depressive symptoms, improved coping skills, and improved pain control after cardiac surgery.</td>
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is taken, whether face-to-face or via the internet, CBT in patients with cardiovascular disease must require modules to produce a better impact. Some important topics in the module that are good for CBT intervention in cardiovascular patients are having an introduction, the subject of living with cardiac disease, sleep, heart disease and sleep problems, stimulus control, sleep restriction, thoughts that contribute to sleeping badly, stress related to heart disease that can contribute to sleep problems, and completion (2). In CBT to improve a healthy lifestyle for patients with cardiovascular disease, the module topics can include breaking the ice, interacting with each other deeply, talking about health, lifestyle, methods in psychological adjustment, and patient-centered, viable lifestyle change program (13). In CBT for dealing with stress, subjects may include health education, self-monitoring, skills training, cognitive restructuring, and spiritual development (12). The results of this study also found that the average duration of CBT that can be given to patients with cardiovascular disease is 7.95 or about 8 weeks. Although CBT has many significant positive effects on several behaviors that can worsen the condition of patients with cardiovascular disease, adjustment of psychosocial interventions and pharmacological therapy or treatment regimens should be prioritized to produce a greater positive impact on the health of CVD patients (25).

**Study Limitations**

This systematic review has limitations. One of them is that it did not perform a statistical meta-analysis of the data. In addition, the data obtained in this study are limited data on the effects of CBT in patients with cardiovascular disease. However, this study allowed to obtain evidence indicating that CBT is an important therapy of choice in improving healthy behavior in patients with cardiovascular disease.

**CONCLUSION**

Cognitive behavioral therapy (CBT) in patients with cardiovascular disease can overcome various conditions and behaviors, namely insomnia or rest and sleep disorders, treat anxiety, stress, and symptoms of depression, and improve lifestyle and healthy lifestyle behaviors such as physical activity, smoking reduction, healthy diet, improvement of coping skills and pain control, and improvement of mental health and quality of life of patients with cardiovascular disease. Although CBT has many positive effects, adjustment of CBT interventions and pharmacological therapy or treatment regimens remain the main ones supported by CBT to produce a better impact on the health of CVD patients.

**Conflict of Interest**

The authors declare that there is no conflict of interest regarding the publication of this paper.

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