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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

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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.*

INTRODUCTION

Cardiovascular diseases (CVDs) are the leading cause of death globally for approximately 17.9 million people each year. Cardiovascular disease is a type of disease in the heart and blood vessels such as coronary heart disease, cerebrovascular disease or stroke, rheumatic heart disease, and other conditions. About four out of five patients with cardiovascular disease die of heart attack and stroke (1).

The main risk factor for death in patients with cardiovascular disease in the community is behavioral factors. An unhealthy diet, lack of physical activity, tobacco use, harmful alcohol use, anxiety, stress, and lack of rest and sleep are behaviors that are most at risk of causing death in patients with cardiovascular disease (1,2). Cessation of tobacco use, diet reducing the use of salt in diet, consuming lots of fruit and vegetables, regular physical activity, and not consuming alcohol are healthy behaviors that have been shown to reduce the risk of death in patients with cardiovascular disease. Interventions that create a conducive environment are essential to motivate patients with cardiovascular disease to adopt and maintain healthy behaviors (1).

Cognitive behavioral therapy (CBT) is a type of cognitive behavioral therapy that is structured by cooperating with patients. Cognitive behavior therapy aims to help patients change their cognitive and behavioral assessments from unhealthy ones to healthy, evidence-based, and adaptive assessments of cognitive and behavioral health (3). CBT has been widely studied and proven to be able to overcome various psychological health problems in patients with mental health problems. The application of CBT in patients with cardiovascular disease has also been discussed and is useful in overcoming psychological problems such as anxiety, stress, and depression (4,5). This study aims to synthesize various research results to see in general the effect of cognitive behavioral therapy (CBT) on various conditions or behaviors of cardiovascular disease patients in a wider and more diverse range.

METHODS

Study Design

This study is a systematic review to determine the results of research on the effect of cognitive behavioral therapy on the behavior of patients with cardiovascular disease. This research was conducted using the PRISMA systematic approach without conducting a meta-analysis test on quantitative data (6).

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).

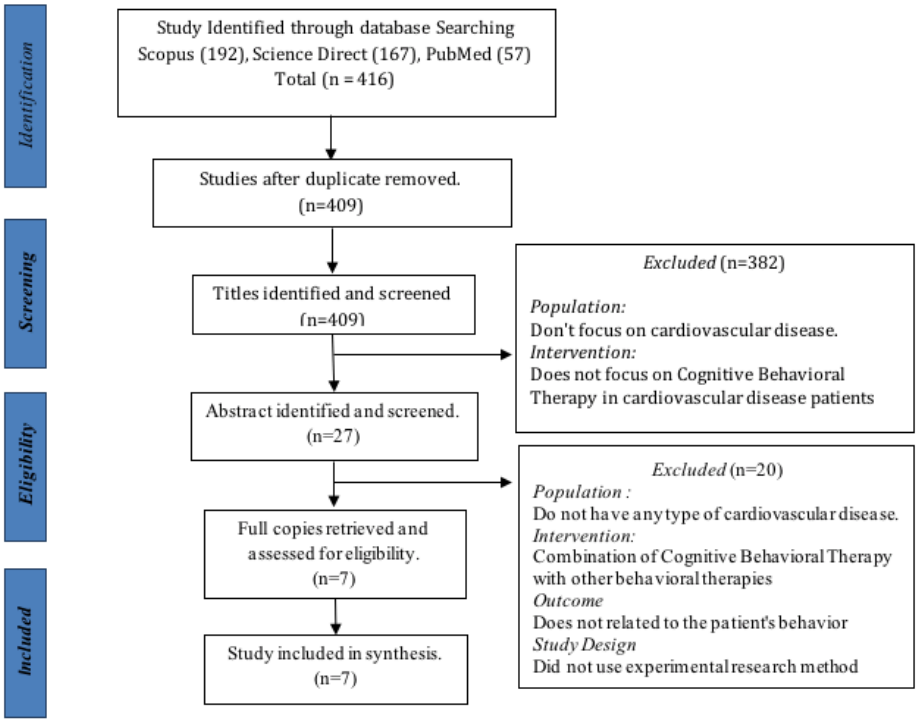

Figure 1. PRISMA flow diagram of the article selection process (8).

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, arrhythmias, 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)

No	Researcher, Year	Country	Research design	Types of cardiovascular disease	Sample	Patient's condition or behavior	Forms of CBT Intervention in the Treatment Group	Action duration	Form of treatment in the control group	Research result
1	Siebmanns et al. 2021 (2)	Sweden	a randomized controlled trial	Angina pectoris, myocardial infarction, heart failure, atrial fibrillation and atrial flutter, and arrhythmias	48 patients 31 men (65%), and 17 women (35.4%), average age of 72.5 years 24 people in the intervention group, 24 people in the control group	Insomnia	Cognitive behavioral therapy (CBT) is internet-based in the form of modules	9 weeks	The self-study program contains several modules without receiving support and feedback from health workers	The intervention has a good treatment effect on insomnia problems in CVD patients during the treatment and follow-up period
2	Schneider et al. 2020 (9)	Canada	a randomized controlled trial	Myocardial infarction or unstable angina	53 patients 31 men (58.5%), and 22 women (41.5%), average age 58 years 25 people in the intervention group, 28	Anxiety and depressive symptoms	Cognitive behavioral therapy (CBT) internet-based in the form of a Heart Wellbeing Course	8 weeks	No intervention; waiting for the opportunity to receive intervention after the eight-week waiting period ends.	Decreased patient general anxiety, depression, distress, cardiac anxiety, and increased physical activity behavior, mental health, and improved quality of life

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„continuation Table 1: Summary of findings on the effect of Cognitive Behavioral Therapy on the behavior of patients with cardiovascular disease (n=7)

No	Researcher, Country Year	Research design	Types of cardiovascular disease	Sample	Patient's condition or behavior	Forms of CBT Intervention in the Treatment Group	Action duration	Form of treatment in the control group	Research result
				people in the control group					
3	Heenan et al. 2020(10) Canada	Pre-post trial study	Myocardial infarction, arrhythmia	47 patients 25 men (53.2%), and 22 women (45.8%), average age 62 years	Insomnia, anxiety, and depression	Cognitive behavioral therapy (CBT) in the form of the Heart Healthy Sleeping Group (HHSG)	6 weeks	No control group	Improved sleep duration, maintenance, efficiency, latency, and sleep quality, and decreased symptoms of anxiety and depression
4	Johansson et al. 2020(11) Sweden	a randomized controlled trial	Myocardial infarction/ angina, atrial fibrillation, heart failure	144 patients 89 men (61.8%), 55 women (38.2%), average age 63 years. 72 people in the intervention group, 72 people in the control group	Depression	Cognitive behavioral therapy (CBT) is internet-based in the form of modules	9 weeks	Online discussion	Decreased depressive symptoms and increased physical activity.

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„continuation Table 1: Summary of findings on the effect of Cognitive Behavioral Therapy on the behavior of patients with cardiovascular disease (n=7)

No	Researcher, Year	Country	Research design	Types of cardiovascular disease	Sample	Patient's condition or behavior	Forms of CBT Intervention in the Treatment Group	Action duration	Form of treatment in the control group	Research result
5	Norlund et al. 2017(12)	Sweden	a randomized controlled trial	Coronary heart disease	362 patients 277 men (76.5%), and 85 women (23.5%), average age of 61.5 years 192 people in the intervention group, 170 people in the control group	Stress, somatic anxiety, vital exhaustion, and depression	Cognitive behavioral therapy with face-to-face meetings	0 and 11 months, the average intervention was 26 days or about 3.7 weeks	Usual care	CBT has a moderately positive effect on somatic anxiety
6	Zhang et al. 2016(13))	Republic of China	randomized controlled trial	Cardio-metabolic syndrome	58 patients Male 25 (43.1%), female 33 (56.9%), average age 48.6 years 28 people in the intervention group, 30 people in the control group	Lifestyle; smoking, diet, lack of physical activity	Patient-centered Cognitive behavioral therapy (PC-CBT) in the form of workshops equipped with modules	12 weeks with workshop activities 2 days a week	Usual information via weekly text messages about CMS standard care	Improvement of physical and mental health conditions due to lifestyle changes; smoking reduction, healthy diet, and good physical activity

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„continuation Table 1: Summary of findings on the effect of Cognitive Behavioral Therapy on the behavior of patients with cardiovascular disease (n=7)

No	Researcher, Country Year	Research design	Types of cardiovascular disease	Sample	Patient's condition or behavior	Forms of CBT Intervention in the Treatment Group	Action duration	Form of treatment in the control group	Research result
7	Doering et al. United State of America 2016(14)		Coronary artery bypass, aortic or mitral valve replacement, a combination of both	53 patients Male 44 (83.01%), female 9 (16.9%), average age 66 years 33 people in the intervention group, 20 people in the control group	Depression, postoperative pain control	Cognitive behavioral therapy with face-to-face meetings	No description Therapy provide Eight sessions in one hour nurse and patient	Usual care	Decreased depressive symptoms, improved coping skills and pain control after cardiac surgery, and improved quality of life

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

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.

REFERENCES

1. WHO. Cardiovascular diseases. 2021; Available from: https://www.who.int/health-topics/cardiovascular-diseases#tab=tab_1
2. Siebmanns S, Johansson P, Ulander M, Johansson L, Andersson G, Broström A. The effect of nurse-led Internet-based cognitive behavioural therapy for insomnia on patients with cardiovascular disease: A randomized controlled trial with 6-month follow-up. Nurs Open. 2021;8(4):1755-1768.
3. Beck AT, Dozois DJA. Cognitive therapy: Current status and future directions. Ann Rev Med. 2011;62:397-409.
4. Pedersen SS, Andersen CM, Ahm R, Skovbakke SJ, Kok R, Helmark C, et al. Efficacy and cost-effectiveness of a therapist-assisted web-based intervention for depression and anxiety in patients with ischemic heart disease attending cardiac rehabilitation [eMindYourHeart trial]: A randomised controlled trial protocol. BMC Cardiovasc Disord. 2021;21(1):20.
5. Johansson P, Svensson E, Andersson G, Lundgren J. Trajectories and associations between depression and physical activity in patients with cardiovascular disease during participation in an internet-based cognitive behavioural therapy programme. Eur J Cardiovasc Nurs. 2020;124-131.
6. PRISMA. Welcome to the Preferred Reporting Items for Systematic Reviews and. 2020; Available from: https://www.prisma-statement.org/
7. JBI. Critical Appraisal Tools. Joanna Briggs Inst. 2020; Available from: https://jbi.global/critical-appraisal-

tools%0Ahttps://jbi.global/critical-appraisal-tools%0Ahttps://jbi.global/critical-appraisal-tools?msclkid=13a37d7ab52d11ec8cff276f44fef232

8. PRISMA. PRISMA Flow Diagram. Available from: https://www.prisma-statement.org//PRISMAStatement/FlowDiagram
9. Schneider LH, Hadjistavropoulos HD, Dear BF, Titov N. Efficacy of internet-delivered cognitive behavioural therapy following an acute coronary event: A randomized controlled trial. Internet Interv. 2020;21:100324.
10. Heenan A, Pipe A, Lemay K, Davidson JR, Tulloch H. Cognitive-Behavioral Therapy for Insomnia Tailored to Patients With Cardiovascular Disease: A Pre–Post Study. Behav Sleep Med. 2020;18(3):372-385.
11. Johansson P, Svensson E, Andersson G, Lundgren J. Trajectories and associations between depression and physical activity in patients with cardiovascular disease during participation in an internet-based cognitive behavioural therapy program. Eur J Cardiovascular Nursing. 2021;20, 124-131.
12. Norlund F, Olsson EM, Pingel R, Held C, Svärdsudd K, Gulliksson M, et al. Psychological mediators related to clinical outcome in cognitive behavioural therapy for coronary heart disease: A sub-analysis from the SUPRIM trial. Eur J Prev Cardiol. 2017;24(9):917-925.
13. Zhang Y, Mei S, Yang R, Chen L, Gao H, Li L. Effects of lifestyle intervention using patient-centered cognitive behavioral therapy among patients with cardio-metabolic syndrome: A randomized, controlled trial. BMC Cardiovasc Disord. 2016;16(1).
14. Doering L V, McGuire A, Eastwood J-A, Chen B, Bodán RC, Czer LS, et al. Cognitive behavioral therapy for depression improves pain and perceived control in cardiac surgery patients. Eur J Cardiovasc Nurs. 2016;15(6):417-424.
15. Edwards KS, Hoover V. Insomnia and Heart Disease. Am Coll Cardiology. 2016; Available from: https://www.acc.org/latest-in-cardiology/articles/2016/08/02/07/25/insomnia-and-heart-disease
16. Sofi F, Cesari F, Casini A, Macchi C, Abbate R, Gensini GF. Insomnia and risk of cardiovascular disease: A meta-analysis. Eur J Prev Cardiol. 2014;21(1):57-64.
17. Frøjd LA, Munkhaugen J, Moum T, Sverre E, Nordhus IH, Papageorgiou C, et al. Insomnia in patients with coronary heart disease: Prevalence and correlates. J Clin Sleep Med. 2021;17(5):931-938.
18. Larsson SC, Markus HS. Genetic Liability to Insomnia and Cardiovascular Disease Risk. Circulation. 2019;140(9):796-798.
19. Zheng B, Yu C, Lv J, Guo Y, Bian Z, Zhou M, et al. Insomnia symptoms and risk of cardiovascular diseases among 0.5 million adults: A 10-year cohort. Neurology. 2019;93(23):E2110-20.
20. Andersen ML, Poyares D, Tufik S. Insomnia and cardiovascular outcomes. Sleep Sci. 2021;14(1):1-2.
21. Espie CA, Emsley R, Kyle SD, Gordon C, Drake CL, Siriwardena AN, et al. Effect of Digital Cognitive Behavioral Therapy for Insomnia on Health, Psychological Well-being, and Sleep-Related Quality of Life: A Randomized Clinical Trial. JAMA Psychiatry. 2019;76(1):21-30.
22. Redeker NS, Jeon S, Andrews L, Cline J, Mohsenin V, Jacoby D. Effects of Cognitive Behavioral Therapy for Insomnia on Sleep-Related Cognitions Among Patients With Stable Heart Failure. Behav Sleep Med. 2019;17(3):342-354.
23. Samantha Conley, Redeker NS. Cognitive Behavioral Therapy for Insomnia in the Context of Cardiovascular Conditions. Curr Sleep Med Rep. 2015;1(3):157-165.
24. Sommaruga M, Angelino E, Porta PD, Abatello M, Baiardo G, Balestroni G, et al. Best practice in psychological activities in cardiovascular prevention and rehabilitation: Position Paper. Monaldi Arch Chest Dis. 2018;88(2):47-83.
25. Von Känel R. Psychosocial stress and cardiovascular risk - Current opinion. Swiss Med Wkly. 2012;142(1):1-13.
26. Chauvet-Gelinier JC, Bonin B, Cohen BE, Edmondson D, Kronish IM, Celano CM, et al. State-of-the-art review: Depression, stress, anxiety, and cardiovascular disease. Am J Hypertens. 2017;60(11):1-14.
27. Chauvet-Gelinier JC, Bonin B. Stress, anxiety and depression in heart disease patients: A major challenge for cardiac rehabilitation. Ann Phys Rehabil Med. 2017;60(1):6-12.
28. Celano CM, Shapter C, Styra R, Czick M. Depression and anxiety in cardiac disease. Psychiatr Times. 2016;33(12):1-14.
29. Levy R. Distress, Depression, Anxiety and Cardiovascular Disease : A Call to Action. J Clin Prev Cardiology. 2014;(4):107-140.
30. Hare DL, Toukhsati SR, Johansson P, Jaarsma T. Depression, and cardiovascular disease: A clinical review. Eur Heart J. 2014;35(21):1365-1372.
31. Ivanovs R, Kivite A, Ziedonis D, Mintale I, Vrublevska J, Rancans E. Association of depression and anxiety with the 10-year risk of cardiovascular mortality in a primary care population of Latvia using the SCORE system. Front Psychiatry. 2018;9:1-14.
32. Hudiyawati D, Prakoso AM. Effectiveness of Cognitive Behavioral Therapy to Reduce Depression,

Anxiety and Stress among Hospitalized Patients with Congestive Heart Failure in Central Java. J Ners. 2020;14(3):367-373.

33. Pizga A, Kordoutis P, Tsikrika S, Vasileiadis I, Nanas S, Karatzanos E. Effects of cognitive behavioral therapy on depression, anxiety, sleep and quality of life for patients with heart failure and coronary heart disease. A systematic review of clinical trials 2010 – 2020. Heal Res J. 2021;7(3):123.
34. Lv J, Yu C, Guo Y, Bian Z, Yang L. Europe PMC Funders Group Adherence to healthy lifestyle and cardiovascular diseases in Chinese. J Am Coll Cardiol. 2017;69(9):1116-1125.
35. Rippe JM. Lifestyle Strategies for Risk Factor Reduction,Prevention,and Treatment of Cardiovascular Disease. Am J Lifestyle Med. 2019;13(2):204-212.
36. Livingstone KM, Abbott G, Ward J, Bowe SJ. Unhealthy Lifestyle, Genetics and Risk of Cardiovascular Disease and Mortality in 76,958 Individuals from the UK Biobank Cohort Study. Nutrients. 2021;
37. Jiskoot G, Timman R, Beerthuizen A, Dietz de Loos A, Busschbach J, Laven J. Weight Reduction Through a Cognitive Behavioral Therapy Lifestyle Intervention in PCOS: The Primary Outcome of a Randomized Controlled Trial. Obesity. 2020;28(11):2134-2141.
38. Derakhshanpour A, Mousavi MKV, Taheri H. The effect of the special cognitive-behavioral intervention on the commitment to exercise and adherence to the exercise routine. Ann Appl Sport Sci. 2018;6(2):61-68.
39. Onyechi KCN, Eseadi C, Umoke PCI, Ikechukwu-Ilomuanya AB, Out MS, Obidoa JC, et al. Effects of a group-focused cognitive behavioral health education program on cigarette smoking in a sample of Nigerian prisoners. Med (United States). 2017;96(1):1-8.
40. Fayaz A, Watt HC, Langford RM, Donaldson LJ. The Association between Chronic Pain and Cardiac Disease A Cross-sectional Population Study. Clin J Pain. 2016;32(12):1062-1068.
41. Lim JA, Choi SH, Lee WJ, Jang JH, Moon JY, Kim YC, et al. Cognitive-behavioral therapy for patients with chronic pain: Implications of gender differences in empathy. Med (United States). 2018;97(23).
42. Ewnetu Tarekegn G, Derseh Gezie L, Yemanu Birhan T, Ewnetu F. Health-Related Quality of Life Among Heart Failure Patients Attending an Outpatient Clinic in the University of Gondar Comprehensive Specialized Hospital Northwest, Ethiopia, 2020: Using Structural Equation Modeling Approach. Patient Relat Outcome Meas. 2021;12:279-290.
43. Rice RH. Cognitive-Behavioral Therapy. Fish Digit Publ. 2015; Available from: https://core.ac.uk/download/pdf/213033752.pdf