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Original Research Article

A Systematic Review & Meta-Analysis on Interrelating Comorbid Conditions and Breathing Practices

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Conflict of interest: Nil

Abstract

Background & Objective: Previous studies have suggested that there is a correlation between cardiovascular and respiratory disorders. The current review was carried out to comprehensively examine the probable relationship between cardiovascular disorder, respiratory disorder, and breathing habits by locating all relevant research & combining their findings.

Methods: A literature search on PubMed, Science Direct databases was performed on past 10 years data. For randomized controlled trials (RCT) studies included cardiovascular & respiratory disorder and accumulated data on breathing practices. The modified Jadad scale was used to evaluate the quality of the evidence. The random effect model was used to compute the mean difference (MD), standardised mean difference (SMD), and 95% confidence interval (CI) for the continuous outcome.

Results: A total of 20 RCT studies with 1,333 participants with age group of 18-85 years were included in these studies. On the basis of heterogeneity breathing practices showed a positive effect on respiratory disorder in COPD (SMD = -0.29,95%CI: -0.74, -0.15) than low positive effect on cardiovascular disorder (SMD = -0.24,95%CI: -0.48, -0.55). The assessed quality of the studies based on the modified Jadad scale was high (5.2).

Conclusion: In current systematic review & meta -analysis found to discover the correlation between respiratory diseases (COPD & asthma) and cardiovascular diseases (hypertension) and breathing practices. The outcome of the systematic review and meta-analysis conformed that breathing exercises are more effective for the adult age group over 26 years for cardiovascular and respiratory diseases.

Keywords: Asthma - blood pressure - breathing practices - chronic obstructive pulmonary diseases - comorbid condition - heart rate - meta-analysis - respiratory diseases - systematic review

INTRODUCTION

Comorbid condition is the presence of two conditions in the same person with a higher than random correlation. respiratory and cardiovascular disorders commonly coincide. This study focused on following comorbid conditions like cardiovascular disorders (hypertension) and respiratory disorder (asthma, COPD) [1].

Although there are many common risk factors, respiratory and cardiovascular disorders frequently overlap. It has been evident that the link between chronic obstructive lung diseases and cardiovascular illnesses is independent of these risk factors, and in fact, the linkage between airflow obstruction security and

the prevalence and mortality of cardiovascular disease is now well established [2]. When peripheral and central blood pressure taken into account, the connection between heart rate and blood pressure becomes more complex [3]. The two chronic lung disorders that are most prevalent worldwide are asthma and chronic obstructive pulmonary disease. In addition to being often seen in clinical settings, these illnesses typically coexist as well [4]. Breathing practices, commonly referred to as deep breathing or diaphragmatic breathing, are effective integrated body-mind training methods for managing illness. Diaphragmatic breathing, pursed-lip breathing, alternative nostril breathing, deep breathing, belly breathing and the Buteyko method are common types of breathing exercises [5]. Breathing exercises are a typical manual technique in clinical practice. One of the exercises utilised and studied the most in clinical practice is diaphragmatic breathing. One compartment of the chest wall may be given priority over another, and they may also alter the degree to which the respiratory muscles are engaged in breathing patterns and thoracoabdominal movement [6]. Patients with chronic obstructive pulmonary disease have been offered common breathing exercises to improve quality of life, increase exercise tolerance, improve respiratory muscle function, and reduce lung hyperventilation [7]. cardiovascular conditions Possibly the most significant comorbidities for COPD are CVDs. People with COPD frequently have CVDs, and having one increases the risk of hospitalization, duration of stay, and death from both CVDs and other causes. It has been thought of that COPD and CVD are two different diseases. The processes thought to be responsible for the correlation between COPD and CVD, with an emphasis on those we think to be most clinically significant [8].

This study shall focus on respiratory diseases (COPD & asthma), cardiovascular diseases (blood pressure, heart rate) and Breathing techniques, and their co-relation with help of a systematic review and meta-analysis.

Material & Method

Information source & search strategy: A systematic search strategy was prepared following PRISMA (Preferred Recommended Reporting Item for Systematic Review & Meta-analysis). Search phrases and their combinations were used. A thorough literature review was carried out using Cochrane Library, Embase and PubMed databases from the past 10 years to identify original studies reporting the relationship between cardiovascular diseases, respiratory diseases and breathing practices. Asthma, blood pressure, breathing techniques, cardiovascular diseases, chronic obstructive pulmonary disease, comorbid conditions, deep breathing, diaphragmatic breathing, heart rate, heart rate variability, hypertension, obstructive lung disease, pursed lip breathing, and respiratory diseases were the keywords used independently to conduct the systematic literature review. Guided search for additional probably pertinent research was also conducted use both the references from the included studies and few chosen research publications.

Selection criteria: Only randomized controlled trials studies that recruited participants with breathing practice data on the presence or absence of hypertension, asthma, and COPD for each participant selected. For this association, MD & SMD with 95% CI or sufficient raw data were selected. There were no size limitations on inclusion. The modified Jadad scale was used for the quality evaluation of the studies that are included.

Data abstraction: The structured data abstraction to extract a form was used. information such as the study title, publication year, first writers name, calendar year, when and where the study

was performed, and the number and demographic information of participants, used to determine blood pressure, heart rate, asthma, COPD with 95% CI, outcomes of the study.

Statistical analysis: The software RevMan 5.3 was used for data analysis (Cochrane, London, UK). Adjusted point estimates for the association between breathing exercise and standard treatment in cardiovascular diseases, breathing exercise and usual care in COPD, breathing exercise and asthma education in asthma were obtained from each study and aggregated using the general inverse variance method previously described in order to inversely weight each study in pooled analysis. The MD and SMD and their 95% CI were used to determine the overall differences between treatment and control groups across trials where the data were assessed on the same scales. SMD, in contrast, was used when results were assessed using many scales. The I2 test results were used to determine the degree of research variety within each meta-analysis. The fixed effect model of the meta-analysis was used when diversity was minimal (I2≤50%)The random effect of the meta-analysis was employed when the diversity was moderate to high (I2≥50%).

Result

A preliminary search yielded over the past 10 years of entries from several databases. 3,442 articles were initially found. 119 articles were left for full text screening after duplicates were removed and titles and abstracts were reviewed. About 100 items were discarded. Finally, 20 studies meeting the criteria were included in this research. The attributes of the 20 included (RCTs). The overall subject count for each trial varied from 17 to 183 individuals; the overall subject count for this study was 1,333. Figure 1 shows the process flow diagram for the search strategy and selection process. The effects of various breathing exercises were examined in this study. Pursed lip breathing, ventilatory feedback training, ventilatory feedback with exercise, diaphragmatic breathing exercise, and mixed breathing exercises were among these BEs (combination of diaphragmatic breathing exercise with other breathing exercises). In this study, the effects of many types of breathing exercises were studied. The 20 studies examined were evaluated using the modified jadad scale. From this assessment, 20 studies (45.2%) were assigned scores of 4, 5, or 6. The mean modified jadad scale was 5.2 and the standard deviation was 0.7. Table 1. The modified jadad of the included study.

The combined analysis found significantly increased effect of breathing exercise on hypertension with standard treatment, the pooled MD of 8.20 (95% CI, −5.13 to 21.53) as shown in Fig. 2(a). Heterogeneity was high with an I2 of 99 percent. Fig. 2(b). SMD of -0.29 (95% CI 1.13, -0.54). Heterogeneity was high with an I2 of 93 percent. As shown in Fig. 3(a), the pooled analysis discovered a significantly increased in breathing exercises for asthma with asthma education; the pooled MD was -0.5 (95% CI, 3.65 to -2.65). Heterogeneity was high with an I2 of 90 percent. SMD of 0.04 (95% CI, 0.48 to 0.55) as shown in Fig. 3(b), as shown in Fig. 3(c). Heterogeneity was high with an I2 of 91 percent. As shown in Fig. 4(a), the pooled analysis discovered a significantly increased in breathing exercise on COPD with usual care, with a pooled MD of -8.90 (95% CI, -25.91 to 8.11). Heterogeneity was low, with an I2 of 55 percent. As illustrated in Fig. 4(b), the SMD is -0.29 (95% CI, 0.74 to 0.15). Heterogeneity was low, with an I2 of 7 percent. Publication bias and the funnel plot's evaluation of its quality Because this study only included RCT publications, Fig. 5, 6, and 7 did not show that there is a publication bias in meta-analysis.

Discussion

As per acknowledged, the link between cardiovascular disease (CVD) (hypertension, heart rate, blood pressure), respiratory disorders (asthma & COPD), and breathing patterns has been studies extensively, but this work is the first systematic review and meta-analysis. However, the quality of studies in this research was high. The breathing exercise-based intervention had a moderately positive effect on symptoms of CVD (hypertension, heart rate, blood pressure) and respiratory diseases (asthma & COPD).

Heart rate and blood pressure have favourable effects on all the factors under consideration, but they only have a "modest effect" (Nivethitha, 2021). Because there are few studies included in our analysis and because not all of them analyse all variables taken into account in this research, there is a high degree of heterogeneity between studies and a low level of stability. Furthermore, a significant degree of heterogeneity may be a sign that all interventions connected to the use of breathing exercises are responsible for the treatment's overall success.

Despite the wide variety of breathing exercises, the research's conclusions were based on some of the most widely utilised strategies from the studies that were considered. The Papworth technique, Buteyko, diaphragmatic breathing, breathing exercises, pursed-lip breathing, alternate nostril breathing, Bhastrika, ujjayi, sheetali pranayama, bee human breathing, deep breathing, and pranayama were all studied in these investigations. This study found that breathing exercise showed some probable improvements in quality of life and hyperventilation as measured by the Asthma Quality of Life Questionnaire, Blood Pressure, Heart Rate, FEV1/FVC, 6 Minute Walk Distance, and Symptoms.

In summary, the current systematic review & meta-analysis sought to discover the concurrence between respiratory diseases (COPD, asthma) and cardiovascular diseases (BP, HR) and breathing techniques. The outcome of the systematic review and meta-analysis conformed that breathing exercises are more effective for the adult age group over 26 years for cardiovascular and respiratory diseases.

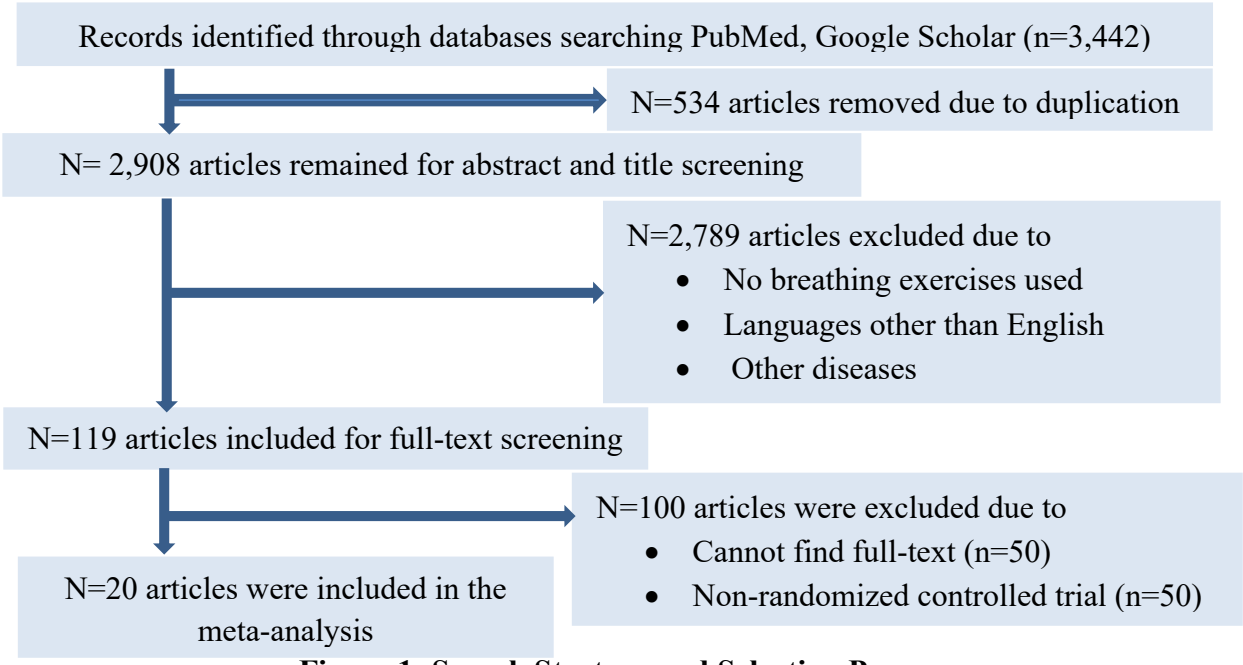

Figure 1: Search Strategy and Selection Process

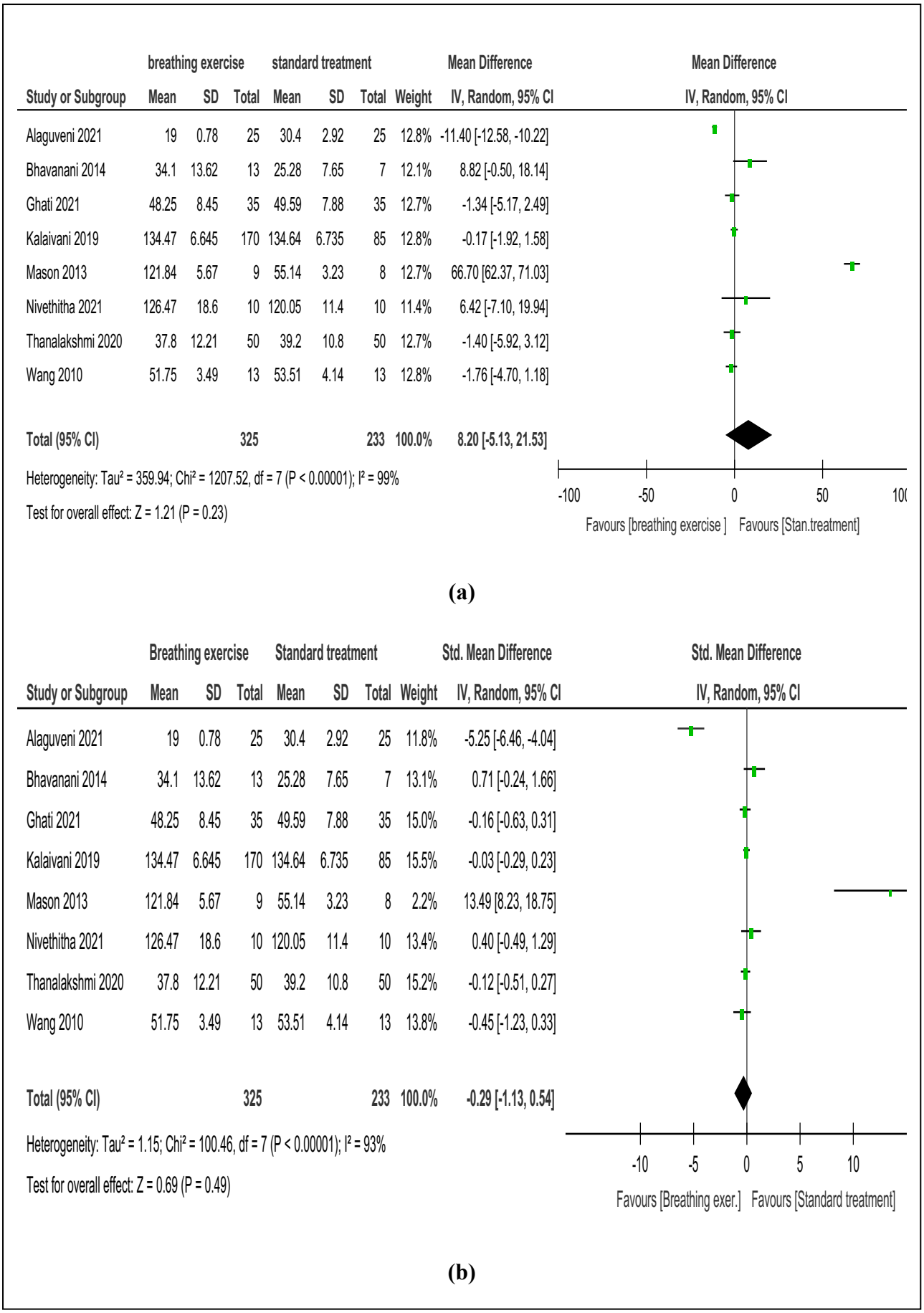

Figure 2: Forest Plot of Breathing Exercise and Standard Treatment

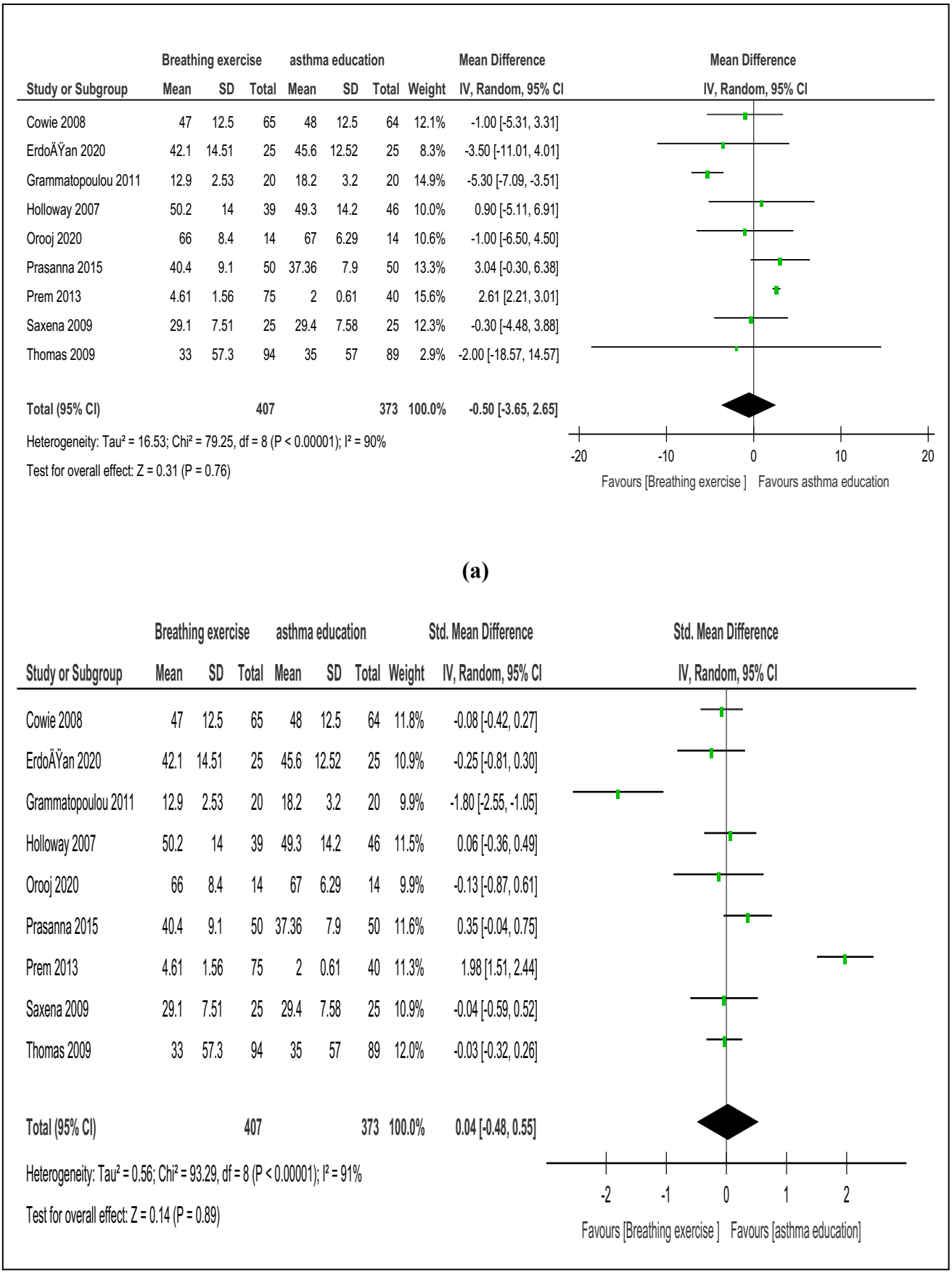

Figure 3: Forest Plot of Breathing Exercise and Asthma Education (a) Mean Difference (MD) (b) Standard Mean Difference (SMD

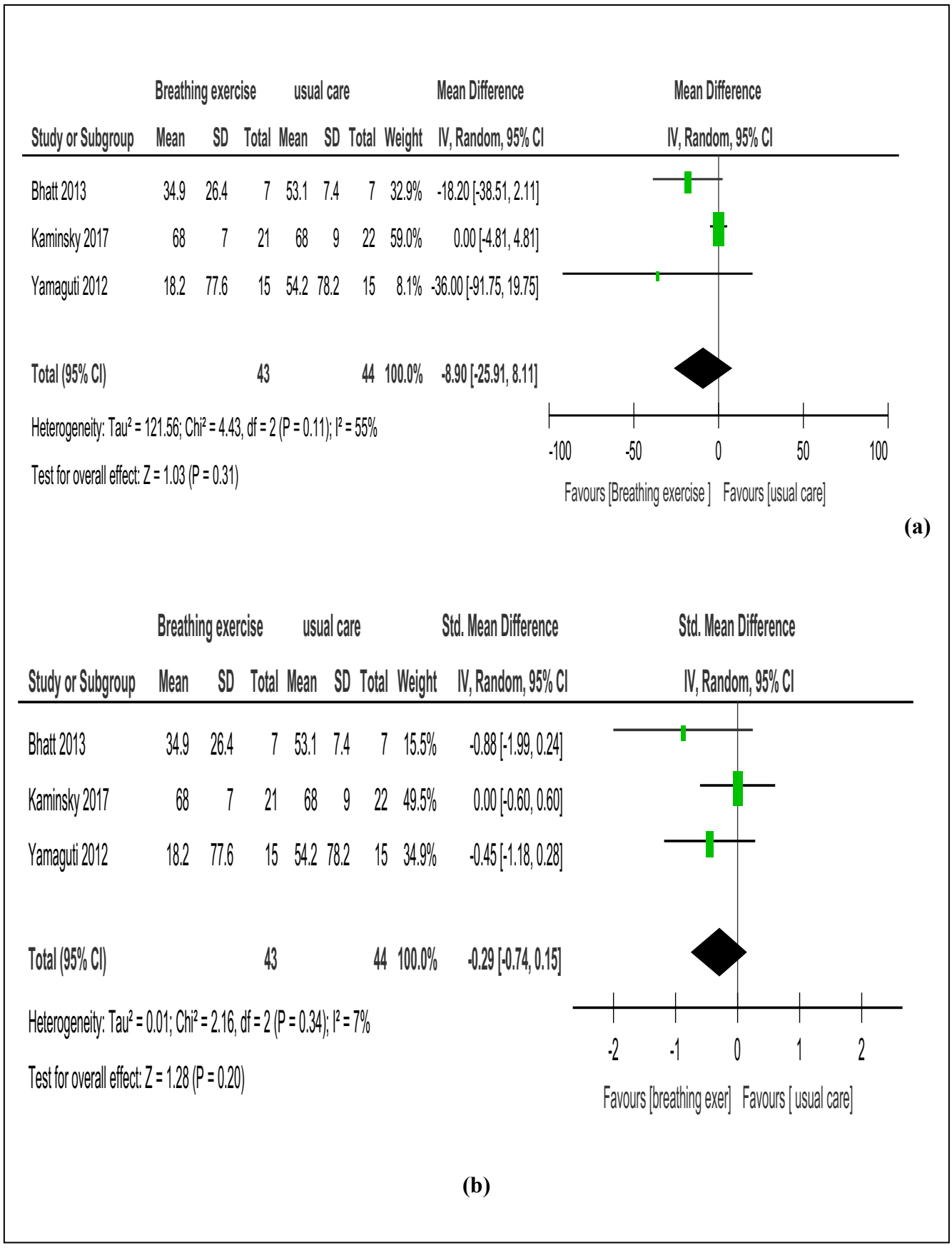

Figure 4: Forest Plot of Breathing Exercise and Usual Care

(a) Mean Difference *(*MD) (b) Standard Mean Difference (SMD)

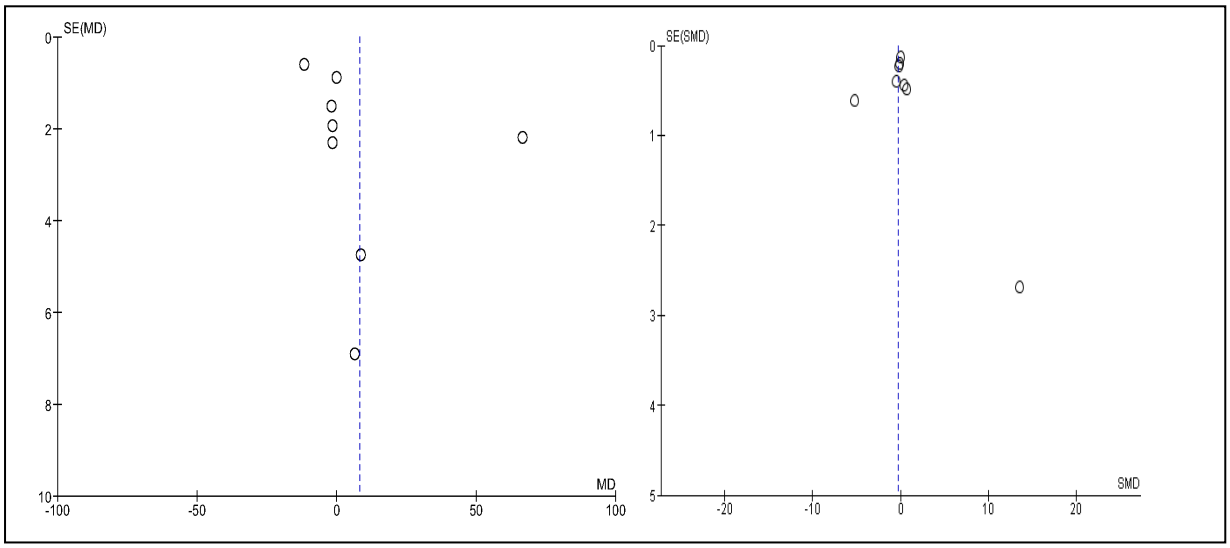

Figure 5: Funnel Plot of Breathing Exercise and Standard Treatment MD & SMD

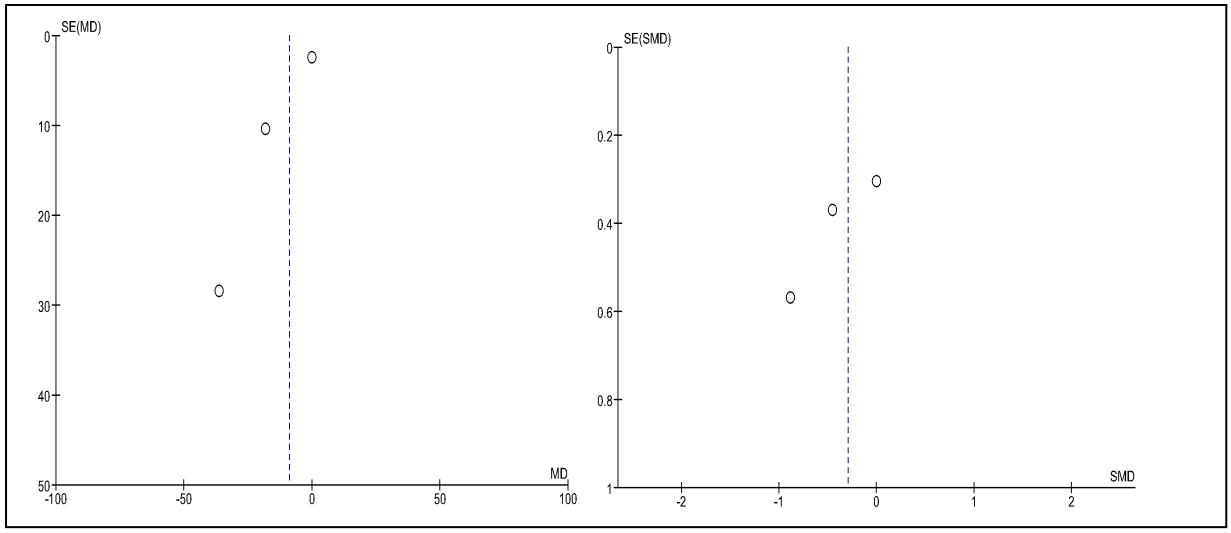

Figure 6: Funnel Plot of Breathing Exercise and Asthma Education MD & SMD

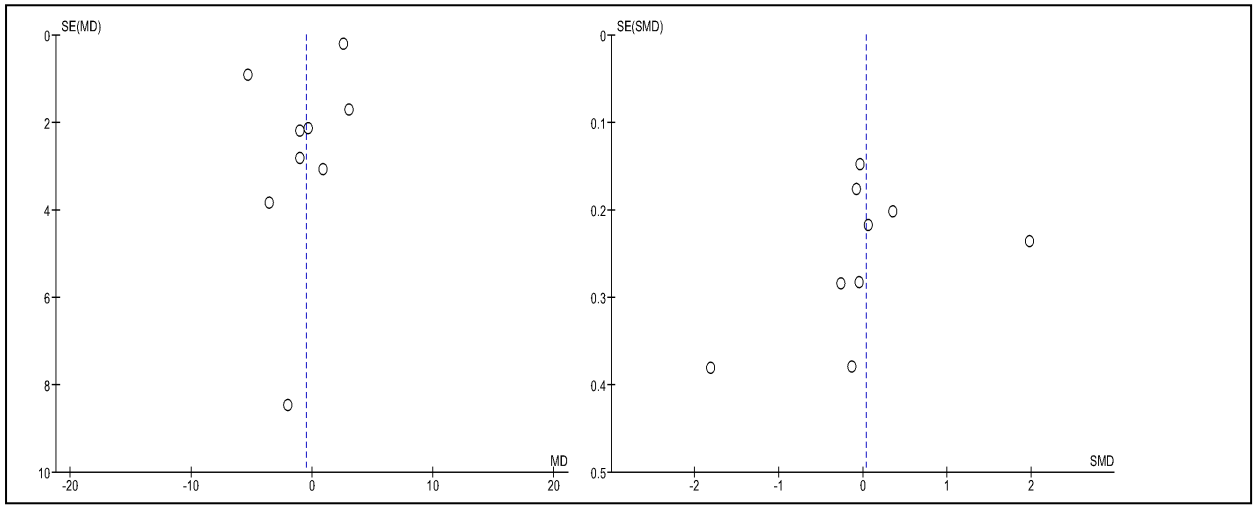

Figure 7: Funnel Plot of Breathing Exercise and Usual Care MD & SM

REFERENCES

1. Sahiner NC, Bal MD. The effects of three different distraction methods on pain and anxiety in children. J Child Health Care. 2016 Sep;20(3):277-85.
2. Akema Kavak F, Altmsoy S., Arslan.M.T., Ergil J. Anesthesiology and Reanimation Clinique, University of Health Sciences Diskapi Yildirim Beyazit Training and Research Hospital, Altindag/Ankara, Turkey. 2019: 1-7.
3. Barrie J. Patient empowerment and choice in chronic pain management Nurs Stand. 2011; 25:31; 38-41.
4. Sahiner NC, Bal MD. The effects of three different distraction methods on pain and anxiety in children. J Child Health Care. 2016 Sep;20(3):277-85.
5. Hamilton M. The assessment of anxiety states by rating. Br J Med Psychol 1959; 32:50– 55.
6. Gogtay NJ, Thatte UM. An Introduction to Meta-Analysis. Journal of The Association of Physicians of India 2017;65;78-85.
7. Duveneck AJ. Introduction to procedures and methods of meta-analysis. In: Seminar Beit winter semester 2014-2015;21-23.
8. Riley R D, Higgins J P T, Deeks J J. Interpretation of random effects meta-analyses BMJ, 2011; 342-349.
9. Cogaltay N. Organizational Commitment of Teachers: A Meta-Analysis Study for the Effect of Gender and Marital Status in Turkey. Educational Sciences: Theory & Practice Journal. 2015;15,4:911-924.
10. Kavak Akelma F, Altınsoy S, Arslan MT, Ergil J. Effect of favorite music on postoperative anxiety and pain. Anaesthesist. 2020 March; 69:3:198-204.
11. Çift A. and Benlioglu C., Effect of different musical types on patient's relaxation, anxiety and pain perception during shock wave lithotripsy: a randomized controlled study. Urology Journal, 2020;17;1:19-23.
12. Kulkarni S, Johnson PC, Kettles S, Kasthuri RS. Music during interventional radiological procedures, effect on sedation, pain and anxiety: a randomised controlled trial. Br J Radiol. 2012 Aug;85; 1016:1059-63.
13. Gokçek E, Kaydu A. The effects of music therapy in patients undergoing septorhinoplasty surgery under general anesthesia. Braz J Otorhinolaryngol. 2020 Jul-Aug; 86:419-426.
14. Wang Y, Dong Y, Li Y. Perioperative psychological and music interventions in elderly patients undergoing spinal anesthesia: effect on anxiety, heart rate variability, and postoperative pain. Yonsei Med J. 2014 Jul; 55:1101-5
15. Zengin S, Kabul S, Al B, Sarcan E, Dogan M, Yildirim C. Effects of music therapy on pain and anxiety in patients undergoing port catheter placement procedure. Complement Ther Med. 2013 Dec; 21:689-96.
16. Liu H, Gao X, Hou Y. Effects of mindfulness-based stress reduction combined with music therapy on pain, anxiety, and sleep quality in patients with osteosarcoma. Braz J Psychiatry. 2019 Nov-Dec; 41:540-545.
17. Zhang ZS, Wang XL, Xu CL, Zhang C, Cao Z, Xu WD, Wei RC, Sun YH. Music reduces panic: an initial study of listening to preferred music improves male patient discomfort and anxiety during flexible cystoscopy. J Endourol. 2014 Jun; 28:739-44.
18. Kishida M, Yamada Y, Inayama E, Kitamura M, Nishino T, Ota K, Shintani A, Ikenoue T. Effectiveness of music therapy for alleviating pain during haemodialysis access cannulation for patients undergoing haemodialysis: a multi-facility, single-blind, randomised controlled trial. Trials. 2019 Nov 19; 20:631.
19. Gogoularadja A, Bakshi SS. A Randomized Study on the Efficacy of Music Therapy on Pain and Anxiety in Nasal Septal Surgery. Int Arch Otorhinolaryngol. 2020Apr; 24:232-

36.
20. Kishida M, Yamada Y, Inayama E, Kitamura M, Nishino T, Ota K, Shintani A, Ikenoue T. Effectiveness of music therapy for alleviating pain during haemodialysis access cannulation for patients undergoing haemodialysis: a multi-facility, single-blind, randomised controlled trial. Trials. 2019 Nov 19; 20:631.