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Derleme Makale/Review Article *2022 - 4(3)*

The Effect of Laughter Therapy on Physical and Mental Health: Systematic Review*

Kahkaha Terapisinin Fiziksel ve Ruhsal Sağlığa Etkisi: Sistematik Derleme

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Abstract

Objective: This systematic review was conducted to determine the effects of laughter therapy on physical and mental health in individuals with different health conditions.

Materials and Methods: The PICOS format was used to determine eligibility criteria in this systematic review. The PRISMA checklist was used for data summarization and result reporting. In this systematic review assessed randomized controlled trials published in Turkish and English in the EBSCO, Web of Science, Wiley Online Library, PubMed, National Thesis Center, National Academic Network and Ulakbim databases from January 2005 to November 2020. The keywords "laughter therapy OR laughter yoga" were used for the search. The quality assessment of the included studies was performed with the Critical Appraisal Checklist tool prepared by The Joanna Briggs Institute. This study was completed with 16 randomized controlled trials meeting the research criteria.

Results: At the end of the study, the laughter therapy was found to be effective in reducing pain, depression, stress, and anxiety in individuals and increasing sleep quality. There was limited evidence for the effect of therapy on somatization, blood glucose, blood pressure, endorphin, and cortisol levels.

Conclusion and recommendations: It was determined that laughter therapy can be considered as an appropriate approach for public health nurses to improve the physical and mental health of individuals and its effectiveness can be tested. Laughter therapy can be recommended by healthcare professionals working in hospitals or community centers as a non-pharmacological, simple, inexpensive and therapeutic method that they can benefit from in care.

Keywords: Laughter, therapy, nurse, public health, systematic review

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ÖZ

Amaç: Bu sistematik derleme, farklı sağlık koşullarına sahip bireylerde kahkaha terapisinin fiziksel ve zihinsel sağlık üzerindeki etkilerini belirlemek amacıyla yapılmıştır.

Gereç ve Yöntem: Bu sistematik derlemede uygunluk kriterlerinin belirlenmesi için PICOS formatı kullanıldı. Veri özetleme ve sonuç raporlama için PRISMA kontrol listesi kullanıldı. Bu sistematik derlemede Ocak 2005'ten Aralık 2020'ye kadar EBSCO, Web of Science, Wiley Online Library, PubMed, Ulusal Tez Merkezi, National Academic Network ve Ulakbim veri tabanlarında Türkçe ve İngilizce olarak yayınlanan randomize kontrollü araştırmalar değerlendirildi. Arama için "kahkaha terapisi veya kahkaha yogası" anahtar kelimeleri kullanıldı. Dahil edilen çalışmaların kalite değerlendirmesi, The Joanna Briggs Institute tarafından hazırlanan Kritik Değerlendirme Kontrol Listesi aracı ile yapılmıştır. Bu çalışma, araştırma kriterlerini karşılayan 16 randomize kontrollü araştırma ile tamamlandı.

Bulgular: Çalışmanın sonucunda kahkaha terapisinin bireylerde ağrı, depresyon, stres ve kaygıyı azaltmada ve uyku kalitesini artırmada etkili olduğu bulundu. Terapinin somatizasyon, kan şekeri, kan basıncı, endorfin ve kortizol seviyeleri üzerindeki etkisine dair sınırlı kanıt vardı.

Sonuç ve Öneriler: Kahkaha terapisinin bireylerin beden ve ruh sağlığını iyileştirmede halk sağlığı hemşireleri için uygun bir yaklaşım olarak görülebileceği ve etkinliğinin test edilebileceği belirlendi. Kahkaha terapisi, hastanelerde veya toplum merkezlerinde çalışan sağlık profesyonelleri tarafından bakımda yararlanabilecekleri farmakolojik olmayan, basit, ucuz ve tedavi edici bir yöntem olarak önerilmektedir.

Anahtar Kelimeler: Kahkaha, terapi, hemşire, halk sağlığı, sistematik derleme.

INTRODUCTION

According to Nursing Interventions Classification (NIC), humor is one of the interventions used in nursing care (Butcher et al., 2018). In recent years, studies regarding humor have been carried out by nurses and it has been stated in these studies that humor improves the quality of life and health of individuals, reduces stress and anxiety, increases pain tolerance, and strengthens the immune system (Sousa et al., 2019). Laughter is a natural response to humorous stimuli (Smitha 2017). A balance is maintained between the body's chemicals and hormones with laughter (Decaro & Brown, 2016). During laughter, stress hormones (such as adrenaline and cortisol) in the body decrease while the happiness hormones (such as endorphin and serotonin) increase. This hormonal change has positive physiological and psychological effects such as relaxation of muscles, relaxation of breathing, strengthening of the immune system, and reduction of stress and anxiety (Gonot-Schoupinsky & Garip, 2018; Yim, 2016). Besides, laughter increases the quality of life and happiness of individuals (Cha & Hong, 2015).

The healing processes occurring in the body with laughter was first demonstrated by William Fry (Kuru & Kublay, 2017). The brain responds to spontaneous or simulated laughter and provides the same benefits to the body (Lee et al., 2020). With this information, researchers have developed programs with the purpose on simulating laughter (Kataria, 2018).

Laughter yoga/therapy is a non-humorous laughter inducing exercise consisting of breathing techniques and positively changes the mood (Kuru & Kublay, 2017). It is referred as laughter yoga or laughter therapy in the literature (Ozer, 2019; Ozturk, 2018). In this systematic review, the phrase laughter therapy is used. Laughter therapy, developed in 1995 by Madan Kataria and her yoga instructor husband, is actively used in health promotion programs in international and national literature (Yim, 2016). Laughter therapy sessions include hand clapping, warm-up exercises, deep breathing exercises, childlike games and laughing exercises. Purpose in the sessions is to make the simulated laughter turn into spontaneous laughter. Laughter therapy can be performed as individual or group activities under the leadership of a certified expert (Varghese, 2017). It is recommended that each session should be at least 20 minutes, should be applied for at least 8 weeks, and these sessions should turn into a routine after the 8th week (Patra & Kumar, 2019).

In recent meta-analysis and systematic review studies, the positive effect of laughter therapy on mental health of individuals with certain age groups and health conditions were stated; such as increasing the quality of life, reducing depression and anxiety (Sung-Ho et al. 2019; Wal & Kok 2019), and improving sleep quality (Ghodsbin et al., 2015; Zhao et al., 2019). However, there is limited evidence for the physiological effects of laughter therapy, such as reducing pain, increasing endorphin and cortisol levels (Ellıs et al., 2017; Fujisawa et al. 2018; Ozer, 2019). In all studies, it was observed that the effectiveness of laughter therapy was studied in certain groups (older people) (Ellıs et al., 2017; Gonot-Schoupinsky & Garip, 2018; Kuru et al., 2018 Kuru & Kublay, 2017) and subjects (depression and quality of life) (Bressingtona et al., 2019; Cha & Hong, 2015; Ghodsbin et al., 2015; Ko & Youn, 2011), and more evidence-based studies were needed .

Aims

The aim of this review is to determine the effects of laughter therapy on physical and mental health. At the end of this systematic review, it is aimed to create strong evidence for the public health nursing literature about the laughter therapy's effect on physical and mental health. The research question of this systematic review is determined as "What are the effects

of laughter therapy on physical and mental health in individuals with different health conditions?"

MATERIAL AND METHOD

Design

PICOS (participants, interventions, comparators, outcomes, and study design) format was used to improve the search strategy of this systematic review (Table 1) (Smith et al., 2011). PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) checklist was used for data summarization and reporting of results (Karaçam, 2013; Moher et al., 2009). In order to reduce the potential risk of bias in the study, literature scan, article selection, data extraction and article quality evaluation procedures were performed independently by the first and second researchers.

Table 1: PICOS Format

Category	Description
Participants (P)	All individuals of various age or health condition getting laughter therapy
Interventions (I)	Laughter therapy or laughter yoga
Comparators (C)	Those who are not getting laughter therapy or laughter yoga
Outcomes (O)	All results regarding physical and mental health
Study Design (S)	Randomized controlled trials

Search Strategy

In this systematic review assessed randomized controlled trials (RCTs) published in Turkish and English in the EBSCO, Web of Science, Wiley Online Library, PubMed, National Thesis Center, National Academic Network and Ulakbim databases from January 2005 to November 2020. The keywords "laughter therapy OR laughter yoga" were used for the search. All the reference lists of this and previous systematic reviews are examined for additional searches. Detailed information in this study process was presented in Figure 1.

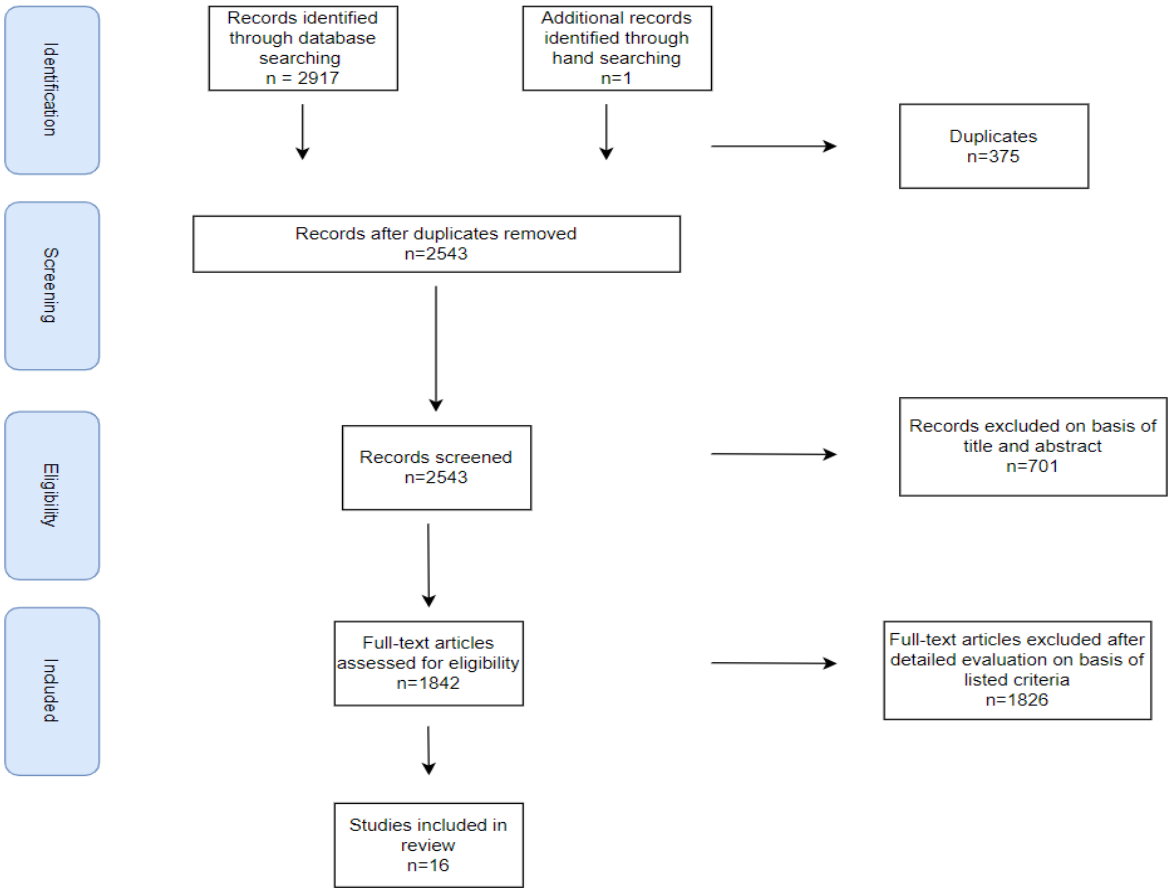

Figure 1. Flow diagram for study selection according to PRISMA

Inclusion criteria

- Articles addressing issues related to laughter yoga/therapy,
- All individuals of various age or health condition
- Studies published in Turkish and English,
- Randomized controlled studies on the subject.

Exclusion criteria

- Pre-posttest design studies, books, conference abstracts, theses, gray literatüre, studies with a high risk of bias, studies with low scores in quality assessment, published in different languages studies were excluded from the study.

Quality appraisal: The quality assessment of the studies included in this systematic review was performed with the 13-item Critical Appraisal Checklist for Randomized Controlled Trials tool prepared by The Joanna Briggs Institute (Tufanaru et al., 2017). Each item in these lists was evaluated as "yes", "no", "unclear" and "not applicable" (Table 2).

Data abstraction: According to the research selection criteria, two researchers reviewed the titles and summary of the studies. The articles were determined independently by evaluating the full texts. The included studies were evaluated considering the following data: year, design, setting, sample size, study population, intervention, program length; measurements, conclusion, and effect size (Table 2).

Data Synthesis: The synthesis of the data was done by the researchers through narrative synthesis. Narrative synthesis is a method that can be used to synthesize both quantitative and qualitative research and is used to interpret study findings included in the systematic review (Ryan, 2013; Snilstveit et al., 2012). Results were presented in the form of a systematic review.

Evaluation of effect sizes: In the studies included, the effect sizes data were not available, the effect sizes were calculated by the researchers. The effect size was calculated according to the difference in the mean scores of the groups between the pre-test and post-test. The results were analyzed according to Cohen's effect size (small: 0.20-0.49, medium: 0.50-0.79, large: 0.80 and higher) (Cohen, 1988).

Ethical aspects of the study: Since this study is a systematic review, ethics committee approval is not required. In addition, the researchers declare that there is no conflict of interest in this systematic review.

Search outcomes: At the beginning, a total of 2918 studies were reached from all databases as the result of the scanning (additional records of 1 study were determined by manual search). Studies were examined according to the title, abstract and full text in order. the remaining record after the duplicates were removed is 2543 studies. The number of studies that are not suitable for title and abstract evaluation is 701. Of the remaining 1842 studies, full text articles excluded after detailed evaluation on basis of listed criteria, 1826 were excluded. This study was completed with 16 randomized controlled trials meeting the research criteria (Figure 1).

Limitations of the Study: This systematic review was made only in English and Turkish databases. Sixteen studies were included as part of the systematic review, showing that Randomized Controlled Trials in this area are few. Meta-analysis could not be done because the studies within the scope of systematic review were heterogeneous.

Table 2. Characteristics of RCTs included in the systematic review

Author, Year and Country	Sample and Study Design	Measurements	Intervention	Results	Quality Score	Effect Sizes
Kanji N. et al. (2006) United Kingdom	93 nursing students 19-49 ages Laughter group (n=24) Control group (n=25) (2nd month follow-up) Attendance Rate: 82%	State-Trait Anxiety Inventory Blood pressure	20 minutes, 8 sessions	The state and trait anxiety scores of the laughter therapy group were lower than the control group. The systolic and diastolic blood pressure of the laughter group at the posttest was lower than the control group.	Yes:8 /13 No:4 /13 Unclear: 1/ 13	Laughter therapy had a low effect size in reducing state and trait anxiety (Cohen's d= 0.43 and 0.14) Laughter therapy had a low effect size in reducing systolic and diastolic blood pressure (Cohen's d= 0.18 0.06)
Ko HJ and Youn CH (2011) Korea	109 individuals over the age of 65 Laughter group (n= 48) Control group: (n= 61) Attendance Rate: 100%	Geriatric Depression Scale SF-36 Quality of Life Scale Pittsburgh Sleep Quality Index (PSQI)	60 minutes, 4 sessions	Laughter Depression=6.94 ±3.19 Control Depression = 8.43 ±3.44 Laughter PSQI= 6.04 ± 2.35 Control PSQI =7.30 ± 3.74 Laughter SF-36= 52.24 ± 20.89 Control SF-36= 50.32 ± 19.66	Yes:9 /13 No:4 /13	Laughter therapy had a low effect size on depression (Cohen's d= -0.44) Laughter therapy had a low effect size on sleep quality (Cohen's d= -0.39 Laughter therapy had a low effect size on quality of life (Cohen's d= 0.04)
Shahidi M. et al. (2011) Iran	60 depressed old women Laughter group (n= 20) Control group (n= 20) Attendance Rate: 85%	Yesavage Geriatric Depression Scale (YGDS) The Satisfaction with life Scale (LSS)	30-45 minutes 10 sessions	Laughter YGDS=10.0± 6.9 Control YGDS= 15.2±6.1 Laughter LSS=25.9±5.6 Control LSS= 20.0±5.1	Yes:7 /13 No:5 /13 Unclear: 1/ 13	Laughter therapy had a large effect size on depression (Cohen's d= -0.78) Laughter therapy had a large effect size on quality of life (Cohen's d= 1.08)
Čokolič M. et al. (2013) Slovenia	211 diabetic patients Laughter group (n= 110) Control group (n= 101) (Blood glucose level results after 2 hours) Attendance Rate: 100%	Postprandial blood glucose measurement (PPBG)	120 minutes, 1 session	Laughter PPBG= 8.34 (1.71±0.81; <0.001) Control PPBG= 10.05	Yes:3 /13 No:5 /13 Unclear: 5/ 13	Laughter therapy had a low effect size on postprandial blood glucose (Cohen's d= 0.43)

Carlos MC et al. (2014) Philippines	60 to 85 years Laughter group (n=11) Control group (n=11) Attendance Rate: 100%	WOMAC Index (Pain, Physical disability)	20 minutes, 10 sessions	Laughter Pain = 59.7 ± 17.52 Control Pain= 68.3 ±16.57 Laughter Physical Disability=52.1 ± 14.61 Control Physical Disability=57.2 ± 22.62	Yes:10 /13 No:3 /13	Laughter therapy had a medium effect size on pain (Cohen's d= 0.50) Laughter therapy had a low effect size on physical function (Cohen's d= 0.50)
Ghodsbin F. et al. (2015) Iran	72 individuals aged 60 and over Laughter Group (n=36) Control Group (n=36) Attendance Rate: 90%	General Health Questionnaire (GHQ-28) (somatic symptoms, insomnia, anxiety, and depression)	90 minutes, 12 sessions	Laughter somatic symptoms= 3.47±3.44, Control somatic symptoms = 4.91±3.40 Laughter insomnia=3.84±2.77 Control insomnia=4.33±3.22 Laughter depression= 4.24±4.20 Control depression= 4.44±4.41 Laughter life quality= 18.33±16.16 Control life quality= 20.25±16.52	Yes:8 /13 No:5 /13	Laughter therapy depression (Cohen's d=-0.04), sleep (Cohen's d=-0.16), quality of life (Cohen's d=-0.11) somatic symptoms (Cohen's d= 0.42) had a low effect size on it.
Kim SH. et al. (2015) Korea	60 cancer patients Laughter group (n=31) Control group (n=29) Attendance Rate: 97%	Numeric Rating Scale (for anxiety, depression and stress)	60 minutes, 4 sessions	Laughter anxiety = 1.48 ± 1.46 Control anxiety = 3.31 ± 2.22 Laughter Depression = 1.65 ± 1.62 Control Depression =3.31 ± 2.04 Laughter Stress=1.26 ± 1.32 Control Stress=3.72 ±1.81	Yes:8 /13 No:5 /13	Laughter therapy had a large effect size on depression (Cohen's d=-0.89), anxiety (Cohen's d= 0.98), stress (Cohen's d=-1.56).
Choi W. et al. (2016) Korea	42 adults Laughter group (n=30) Control group (n=12) Attendance Rate: 100%	Stress Index (SI)	60 minutes, 12 sessions	Laughter SI= 38.13 ± 25.14 Control SI= 53.89 ± 33.64	Yes:9 /13 No:4 /13	Laughter therapy had a medium effect on stress. (Cohen's d= 0.56)
Fujisawa A.et al. (2018) Japan	120 individual Laughter group (n=40) Control group (n=40) (2nd measurement after 30 minutes) Attendance Rate: 100%	Cortisol levels	30 minutes 1 session laughter therapy 30 minutes 1 session comedy film.	Laughter cortisol= 3.74 (3.14) Comedy Film cortisol= 2.24 (1.59)	Yes:9 /13 No:4 /13	Laughter therapy had a medium effect size on cortisol level (Cohen's d=-0.60)

Ozturk FÖ (2018) Turkey	72 university students Laughter group (n=36) Control group (n=36) Attendance Rate: 96%	Brief Symptom Inventory (Anxiety, Depression, Somatization) Salivary cortisol level	40 minutes, 8 sessions	Laughter Anxiety = 0.67±0.50 Control Anxiety = 0.84±0.58 Laughter Depression = 0.89±0.55 Control Depression = 1.25±0.57 Laughter Somatization= 0.51±0.39 Control Somatization= 0.70±0.49 Laughter Salivary Cortisol= 0.41±0.21 Control Salivary Cortisol= 0.5 9±0.29	Yes:9 /13 No:4 /13	Laughter therapy had a moderate effect size on depression (Cohen's d=-0.63) Laughter therapy somatic symptoms (Cohen's d=0.42) It had a low effect size on anxiety (Cohen's d=0.31) Laughter therapy had a medium effect size on cortisol level (Cohen's d=-0.71)
Tavakoli T.et al. (2019) Iran	Irritable Bowel Syndrome (IBS) patients Laughter group (n=20) Control group (n=20) Attendance Rate: 100%	IBS Symptom Severity Scale (IBS-SSS) Beck's Anxiety Questionnaire (BAQ)	60 minutes, 7 sessions	Laughter IBS-SSS=15.6±5.4 Control IBS-SSS=22.3±6.7 Laughter BAQ=13.3±4.6 Control BAQ=17±8.3	Yes:5 /13 No:5 /13 Unclear: 3/ 13	Laughter therapy had a medium effect size on anxiety (Cohen's d=0.55) Laughter therapy had a large effect size on IBS symptom severity (Cohen's d=1.10)
Namazi Nia M. et al. (2019) Iran	69 cancer patients Laughter Group (n=34) Control group (n=35) Attendance Rate: 88%	Warwick-Edinburgh Mental Well-being Scale (WEMWBS)	20-30 minutes, 4 sessions	Laughter WEMWBS= 46.3±9.8 Control WEMWBS= 46.3±9.0	Yes:7 /13 No: 5/13 Unclear: 1/ 13	Laughter therapy was found to be ineffective on mental well-being (Cohen's d=0.00)
Bressington D. et al. (2019) China	18-60 years 50 patients with depression Laughter group (n=23) Control group (n=27) Attendance Rate: 100%	Depression Anxiety Stress Scale Sort Form 12 Health Survey (self-reported physical composite score (PCS-12) and mental composite score (MCS-12)	45 minutes, 8 sessions	Laughter Depression = 24.23±1.95 Control Depression = 22.81±1.75 Laughter Anxiety = 24.17±1.55 Control Anxiety = 21.92 ±1.84 Laughter Stress= 27.34±1.45 Control Stress= 24.56±1.72 Laughter PCS= 36.26±1.97 Control PCS= 38.14±1.44 Laughter MCS= 34.84 ±1.58 Control MCS= 35.77±1.74	Yes:9 /13 No:4 /13	Laughter therapy had a medium effect size on depression (Cohen's d=0.75) It had a large effect size on physical function (Cohen's d: 1.10), anxiety (Cohen's d: -1.31), stress (Cohen's d= -1.73) It had a medium effect size on mental well-being (Cohen's d= 0.55)

Morishima T. et al. (2019) Japan	40-64 years 56 cancer patients Laughter group (n= 26) Control group (n=30) Attendance Rate: 92%	European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30)	60 minutes, 4 sessions	Laughter Pain sore= 15.4±20.5 Control pain score=12.2±19.5 Laughter Insomnia score= 21.8± 21.0 Control ınsomnia score=22.2±22.0 Laughter Physical functioning score= 87.9±10.2 Control Physical functioning score= 89.1±9.8	Yes:8 /13 No:4 /13 Unclear: 1/ 13	Laughter therapy had a low effect size on sleep (Cohen's d= -0.01), pain Cohen's d= -0.01), physical function (Cohen's d=-0.12).
Ozer Z. (2019) Turkey	68 hemodialysis patients Laughter group (n=33) Control group (n= 34) Attendance Rate: 98%	Visual Analog Scale (VAS) Pittsburgh Sleep Quality Index (PSQI) Beta endorphin level	30 minutes, 16 sessions	Laughter Beta Endorphin = 57.32 ± 37.98 Control Beta Endorphin= 49.12 ± 28.94 Laughter VAS= 2.03± 0.64 Control VAS=7.38 ±1.23 Laughter PSQI=2.61 ±1.62 Control PSQI=10.76 ±1.65	Yes:10 /13 No:3 /13	Laughter therapy had a large effect size on sleep (Cohen's d= 4.98) and pain (Cohen's d= 5.43). It had a low effect size on endorphins (Cohen's = -0.24).
Bennett PN. et al. (2020) USA, California	151 hemodialysis patients Laughter group (n=72) Control group (n=79) Attendance Rate: 56%	Patient Health Questionnaire (PHQ-4) Scale	30 minutes, 8 sessions	Patient Health Questionnaire (PHQ) Laughter Depression: 5 (8%) Control Depression: 16 (20%)	Yes:7 /13 No:5 /13 Unclear: 1/ 13	Laughter therapy had a medium effect size on depression (Cohen's d=-0.67)

RESULTS

Features of the interventions and measurements

Laughter therapy was a collective study in all studies addressed, and the shortest duration was 20 minutes (Carlos et al., 2014; Kanji et al., 2006), and the longest duration was 120 minutes (Čokolič et al., 2013). The number of sessions varied across studies. There was a minimum of one session (Čokolič et al., 2013; Fujisawa et al., 2018), and a maximum of 16 sessions (Ozer, 2019). The attendance rate in studies, differs between studies and is between 56% (Bennett et al. 2020) and 100% (Ko & Youn, 2011; Čokolič et al., 2013; Carlos et al., 2014; Choi et al., 2016; Fujisawa et al., 2018; Tavakoli et al., 2019; Bressingtona et al., 2019). Various measurement tools were used in studies. To evaluate mental health; State-Trait Anxiety Inventory, Geriatric Depression Scale, General Health Questionnaire and Brief Symptom Inventory were used. To evaluate physical health; measurement of beta endorphin level in blood, salivary cortisol level, postprandial blood glucose level and blood pressure measurement, Pittsburgh Sleep Quality Index were used.

The Effects of Laughter Therapy on Physical Health (Clinical Outcomes)

Effect on cortisol / endorphin level

Two studies with university students and one study with hemodialysis patients evaluated effect on cortisol levels. One of the studies conducted with university students was a 40-minute session, 8 sessions (Ozturk, 2018), the other was a 30-minute single session (Fujisawa et al., 2018). In both studies, LT was found to have moderate effect size on cortisol levels (d=0.60-0.71). In the study conducted with hemodialysis patients, laughter therapy, which was applied for 16 sessions of 30 minutes, LT was found to have small effect size beta endorphin levels (d=0.24) (Ozer, 2019).

Effect on systolic / diastolic blood pressure

One study evaluated effect on systolic /diastolic blood pressure with university students. At the end of the study, LT which was applied 8 sessions of 20 minutes, was found to have small effect size on systolic and diastolic blood pressures, d=0.18 and 0.06 respectively (Kanji et al., 2006)

Effect on sleep quality

Four studies evaluated the effect on sleep quality, two were conducted in the elderly, one was cancer patients, and one was in hemodialysis patients. In one of the studies with the elderly, four 60-minute sessions were used, the other was 12 sessions of 90 minutes (Ghodsbin et al., 2015; Ko & Youn, 2011). In the results of both studies, LT was found to have small effect size in sleep quality (d= 0.39-0.16). Four-session 60-minute LT was found to have small effect size sleep quality in cancer patients (d=0.01) (Morishima et al., 2019), also a 30-minute 16-session LT was found to have large effect size in hemodialysis patients (d = 4.98) (Ozer, 2019).

Effect to reduce pain / increase physical function

Four studies evaluated effect on reducing pain/increasing physical function, two were conducted with the elderly, one with cancer patients, and one with hemodialysis patients. In one of the studies conducted with the elderly, 20-minute 10-session LT was found to have moderate effect size in reducing pain (d=0.50) and physical function (d= 0.26) (Carlos et al.,

2014). In the other study, 45-minute 8-session of LT was found to have large effect size in increasing physical function (d=1.10) (Bressingtona et al., 2019).

In a study with cancer patients, a 60-minute 4-session LT was found to have small effect size on physical function and pain (d= 0.12-0.15) (Morishima et al., 2019). In a study conducted with hemodialysis patients, 16 sessions of 30-minute LT were found to have large effect size on reducing pain, and symptoms (d = 5.43) (Ozer, 2019).

Effect on decreasing blood sugar level

One study evaluated effect on decreasing blood sugar level. In this study, LT was applied a single session of 120 minutes in diabetic patients, it was found small effect size in controlling postprandial blood glucose (d= 0.43) (Čokolič et al., 2013).

The Effects of Laughter Therapy on Mental Health

Depression / anxiety / stress

Six studies evaluated effect of LT on reducing depression, four were conducted with the elderly, one with hemodialysis patients, and one with cancer patients. In two studies with the elderly, LT was applied to 4 sessions of 60 minutes and 12 sessions of 90 minutes in the other. The results of both studies were that LT was found to have small effect size in reducing depression (Ghodsbin et al., 2015; Ko & Youn, 2011). Two other studies with the elderly included LT, one in 8 sessions of 45 minutes (Bressingtona et al., 2019), the other in 10 sessions of 30-45 minutes (Shahidi et al. 2011). The results of both studies found that LT was found to have moderate effect size on reducing depression (d = 0.75-0.78).

In a study conducted with hemodialysis patients, LT in which 8 sessions of 30 minutes were applied, LT was found to moderate effect size on reducing the depressive symptoms (d = 0.67) (Bennett et al. 2020). In a study conducted with cancer patients, a 60-minute 4-session laughter therapy was found to have large effect size on reducing depression (d = 0.89) (Kim et al., 2015).

One study examining the effect of LT on reducing anxiety and stress was conducted with the elderly, one study with cancer patients, and 1 study with smartphone addicts. In the study with the elderly, a 45-minute 8-session LT was found to have large effect size on reducing anxiety and stress levels (d = 0.98-1.56). 60 minutes and 4 sessions of LT was found to have large effect size on reducing anxiety and stress levels in cancer patients (d = -1.31-1.33) (Bressingtona et al., 2019; Kim et al., 2015). Laughter therapy, in which 12 sessions of 60 minutes were applied, LT was found to have moderate effect size on reducing stress in smartphone addicts (d = 0.56) (Choi et al., 2016).

In another study, LT was applied 7 sessions of 60 minutes to individuals with irritable bowel syndrome, İt was found have large effect size on reducing symptom severity (d =1.10) and reducing anxiety (d = 0.55) (Tavakoli et al., 2019).

State / trait anxiety

The effect of LT on reducing state/trait anxiety was examined in one study. This study was applied 20-minute, 8 sessions with university students. LT was found to have small effect size on reducing students' state and trait anxiety (d = 0.43-0.14) (Kanji et al., 2006).

Life quality

The effect of LT on quality of life was examined in the elderly in 2 studies. One of these exercises was carried out in 4 sessions of 60 minutes and the other in 12 sessions of 90 minutes. Laughter therapy was found to have small effect size on quality of life (d = 0.04-0.11) (Ghodsbin et al., 2015; Ko & Youn, 2011).

Somatization

The effect of LT on somatization was evaluated in one study. LT was applied 12 sessions of 90 minutes, individuals over 60 years of age, İt was found have small effect size on somatization symptoms. (d = 0.42) (Ghodsbin et al., 2015).

Discussion

The results of the research reflect the effects of laughter therapy on physical and mental health in individuals with different samples and health conditions.

Discussion of the effects of laughter therapy on physical health

It is stated in the literature that laughter therapy activates cortisol and endorphin hormone release (Fujisawa et al. 2018; Ozer, 2019). In this systematic review, it was determined that the therapy was effective in increasing cortisol levels in university students, and it was low in increasing endorphin levels in hemodialysis patients. Wal and Kok (2019) stated in a meta-analysis study that the evidence for the effect of laughter therapy on cortisol levels in adults is insufficient (Wal & Kok, 2019). With these results, more evidence is needed for the effect of therapy on cortisol levels.

It is reported that hormonal changes occurring in the body with laughter therapy will be effective in lowering blood pressure. In this systematic review, laughter therapy was found to be less effective in reducing blood pressure levels in university students. Study, it was reported that the therapy was effective in reducing blood pressure in hemodialysis patients (Macedo et al., 2019). Although it is stated in the literature that it is effective in different samples, this effect should be tested in university students. However, it should be kept in mind that the blood pressure of university students is within normal limits since they constitute a young population. The physical health effects of laughter therapy have been most commonly studied to improve sleep quality. In the two studies reviewed, laughter therapy was less effective in improving sleep quality in individuals over the age of 65. In a meta-analysis study on the subject, it was reported that laughter therapy was effective in increasing sleep quality in individuals over 65 years old (Zhao et al., 2019). In one study examined in this study, it was determined that laughter therapy was less effective in improving sleep quality in cancer patients (Morishima et al., 2019), while another study was effective in increasing sleep quality in hemodialysis patients. Based on these results, it can be said that therapy has a positive effect on improving sleep quality in different sample groups. Endorphin hormone secreted during laughter therapy activates the sympathetic and parasympathetic system and reduces pain (Lee, 2020; Yim, 2016). According to two studies examined in this systematic review, it can be said that laughter therapy is effective in reducing pain and improving physical functions in individuals over the age of 65 (Bressingtona et al., 2019; Carlos et al., 2014). One study found that laughter therapy was effective in reducing pain in hemodialysis patients (Ozer, 2019). In a previous systematic review on the subject, similar therapy was reported to be effective in reducing pain in hemodialysis patients (Macedo et al., 2019). In

one study in this systematic review, laughter therapy was less effective in reducing blood sugar levels in individuals with diabetes. In a semi-experimental study by Ahmadi et al. (2020), it was found that laughter therapy was effective in lowering blood sugar in individuals over 65 years of age with diabetes (Ahmadi et al., 2020). Since there is limited evidence on the subject, this effect should be tested in future studies.

Discussion of the Effects of Laughter Therapy on Mental Health

At the end of the study, it was determined that laughter therapy was most frequently studied and effective in reducing depression and loneliness symptoms in individuals over 65 years of age (Bressingtona et al., 2019; Kuru et al., 2018; Shahidi et al., 2011). Wal and Kok (2019) reported in a meta-analysis study that laughter therapy was effective in reducing depression and perceived stress in individuals over the age of 65 (Wal & Kok, 2019). It reached similar results in other systematic reviews and meta-analysis findings (Gonot-Schoupinsky & Garip, 2018; Zhao et al., 2019).

In a study examined in this systematic review, it was determined that laughter therapy was effective in reducing depressive symptoms in cancer patients (Kim et al., 2015). In a previous meta-analysis study, it was stated that laughter therapy was not effective in reducing depression in individuals with breast cancer (Coutiño-Escamilla et al., 2019). Within this result, more studies are needed to show whether laughter therapy reduces depressive symptoms in cancer patients.

In a study examined within the scope of this review, it was determined that laughter therapy was effective in reducing depressive symptoms in hemodialysis patients (Bennett et al., 2020). In a study conducted on the subject, it was reported that 4-week breathing and stretching exercises under the leadership of a nurse decreased the symptoms of depression in hemodialysis patients (Tsai et al., 2015) and improved the mental health of the individuals in the other two studies (Bennett et al., 2020; Heo et al., 2016). Within these results, it can be said that laughter therapy has a positive effect on improving the mood of individuals in the dialysis environment. However, it is unclear whether this positive effect continues over the long term. Again, these studies in the literature should be interpreted with caution as they are a combination of both randomized and non-randomized studies.

In recent meta-analysis studies, it was stated that laughter therapy was effective in reducing anxiety and stress in individuals over 65 years of age and cancer patients, but this effect should be tested in future studies because of the limited literature (Demir Dogan, 2020; Zhao et al., 2019). In two studies examined, it was determined that laughter therapy was effective in reducing anxiety / stress levels in cancer patients and individuals over 65 (Bressingtona et al., 2019; Kim et al., 2015). In this systematic review, a study found that laughter therapy was effective in reducing stress in smartphone addicts (Choi et al., 2016). However, as this result was obtained from a single study, it provides limited evidence. In a quasi-experimental study in the literature, there is a finding that laughter therapy increases sleep quality in smartphone addicts (Salunke & Shah, 2019). These effects should be tested in future studies.

In one of the recent meta-analysis studies, it was stated that therapies, including laughter sessions, were effective in reducing symptom severity, stress, and anxiety in patients with irritable bowel syndrome (Hui et al., 2020). In this systematic review, it was determined that laughter therapy was effective in reducing symptom severity and anxiety in patients with irritable bowel syndrome (Tavakoli et al., 2019). Since this result is obtained from a single study, this effect should be tested in future studies.

In the two studies examined, laughter therapy had a low effect on the quality of life in individuals over 65 years of age (Ghodsbin et al., 2015; Ko & Youn, 2011). Sung Ho and Ji Won (2019) stated in their meta-analysis study that laughter therapy has a significant effect on increasing the quality of life in individuals over 65 (Sung Ho et al., 2019).

Conclusion and Recommendations

As a result of the studies conducted, laughter therapy has positive effects in reducing depression, reducing stress and anxiety, increasing sleep quality, reducing pain, and increasing physical functions in individuals of different age groups and health conditions. However, there is limited evidence for the effect of laughter therapy on anxiety level, somatization, blood sugar, blood pressure, endorphin, and cortisol levels in different sample groups. In future studies, it is recommended to test the effects of laughter therapy in less studied sample groups (such as university students, hemodialysis patients, irritable bowel syndrome patients, smartphone addicts) and to increase the evidence.

Implications for Public Health Nursing Practice

With this systematic review, evidence-based information was presented to the public health nursing literature about the effects of laughter therapy on the mental and physical health of individuals with different samples and health conditions, and their effect sizes. The results of the systematic review showed that laughter therapies are useful in a wide variety of settings and for a wide range of groups. But here are needed more evidences. This result is a good starting point for randomized controlled trials by public health nurses. Laughter therapy can be recommended by public health nurses and healthcare professionals working in hospitals /community centers as a non-pharmacological, simple, inexpensive and therapeutic method that they can benefit from in care. Also, laugher therapy is can be powerful communication tool who nurses working in mental health.

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