



The Effectiveness of Laughter Therapy for Managing Stress: A Meta-Analysis

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Abstract

Stress is an issue frequently faced by the Indonesian population, and laughter therapy is one of the interventions believed to be effective and widely used, particularly in Asian countries. However, findings from previous research have yielded inconsistent results regarding the effectiveness of laughter therapy. This study evaluates the effectiveness of laughter therapy as an intervention to reduce stress in the Indonesian population through Hedge's G meta-analysis, following the PRISMA 2020 guidelines. The analysis involved 160 participants from 6 previous studies. The results indicate that laughter therapy has a significant effect in reducing stress levels in individuals. Laughter therapy with 15 steps proved to be the most effective model. The implications of these findings are significant in understanding the role of laughter therapy as a potential strategy in addressing stress in the community. This study provides substantial empirical evidence for mental health practitioners and researchers to incorporate laughter therapy, particularly with proven effective approaches, as an integral part of comprehensive mental health efforts in Indonesia. Nevertheless, this study still has several limitations, such as the inability to conduct moderator analysis due to the limited number of effect sizes, as well as the diverse participant characteristics and measurement tools. Based on these findings, this study recommends that future research consider moderator variables and compare effect sizes from uniform measurement tools.

Keywords: *laughter therapy, meta-analysis, stress*

1. INTRODUCTION

Today, stress is becoming an increasingly prevalent mental health issue in Indonesian society. For instance, work stress, a type of stress commonly found among workers (Lestari & Widyaningrum, 2021). Stress can also occur among students, commonly known as academic stress, which involves tension resulting from self-adjustment, social adjustment, academic demands, and socio-cultural environmental demands (Juhamzah et al., 2018). Stress is a fundamental mechanism as a response to pressure experienced by every living being. Generally, stress can be categorized into eustress and distress (Kataria, 2004). Eustress is a condition where the pressure experienced by an individual generates drive or motivation for them to accomplish specific tasks. Meanwhile, distress is a condition where an individual feels unable to cope with the pressure they are experiencing (Kalat, 2011). Based on these definitions, it can be understood that stress has both positive and negative impacts on humans.

Stress has negative impacts when individuals do not have the appropriate abilities to cope with it. The ability of individuals to cope with stress is referred to as coping (Kataria, 2004). Individuals who can cope properly will be able to face the pressures they encounter in their daily

lives. There are two types of coping: problem-focused coping and emotion-focused coping. Problem-focused coping involves efforts to deal with stress by solving problems or eliminating the sources of stress. Meanwhile, emotion-focused coping focuses more on draining the negative emotions experienced by individuals due to stress (Weiten, 2013).

According to WHO, stress ranks as the 4th most prevalent disease globally. Approximately 350 million people worldwide are estimated to experience stress. Not only globally, but a portion of the Indonesian population also experiences stress. Approximately 10% of the Indonesian population experiences stress. Data from the Riset Kesehatan Dasar (Riskesdas) states that there are around 1.33 million people, or about 14% of the population of DKI Jakarta, experiencing stress, with 1-3% experiencing acute stress and 7-10% experiencing severe stress (Luthfiyati et al., 2020). A study conducted by Ambarwati et al., (2019) on 101 students at Muhammadiyah University of Magelang found that 35.6% of the participants experienced mild stress, 57.4% experienced moderate stress, and 6.9% experienced severe stress. Not only among students, another study conducted by Oktari et al. (2021) on 101 hospital nurses also found that 26.5% of the participants experienced mild work stress, 49.6% experienced moderate work stress, and 23.9% experienced severe work stress.

There are two previous studies that performed meta-analyses on the effectiveness of laughter therapy on stress from a biological perspective. Van Der Wal and Kok (2019) investigated the impact of laughter therapy and found a reduction in cortisol levels, commonly known as the stress hormone, following laughter therapy. A similar finding was reported by Kramer and Leitao (2023), who found that laughter therapy lowers cortisol levels in humans. To enrich our understanding, we need to examine the psychological impact or benefit of laughter therapy on individual stress. For example, use laughter therapy as a medium for coping mechanism to reduce stress level.

Psychological mechanisms that can help individuals cope with stress are called coping mechanisms (Kalat, 2011; Weiten, 2013). Laughter is one coping method that can provide a relaxing effect and help reduce stress in individuals. Laughter can be trained or taught through laughter therapy, which, according to previous research it brings positive impacts to humans, such as reducing stress levels by up to 69.5% (Kataria, 2004 as cited in Widyastuti, 2019). This is supported by the findings of a study by Lestari and Widyaningrum (2021), which found that laughter therapy is effective in reducing stress levels among administrative staff at Muhammadiyah University of Yogyakarta. However, there are other studies that suggest laughter therapy is less effective in reducing stress. Ozturk and Tekkas-Kerman (2022) in their study on nursing students found that laughter therapy is effective in reducing depression levels but less effective in reducing levels of stress, anxiety, and loneliness. Referring to inconsistent research results, a meta-analysis is needed to determine the effects of laughter therapy intervention on stress, particularly in the Indonesian population.

This meta-analysis review will analyze data from various studies to obtain a more comprehensive picture of the effectiveness of laughter therapy in managing stress. This review will use meta-analysis methods to integrate the results from various studies. The results of this review are expected to provide more accurate information about the effectiveness of laughter therapy in managing stress. This information can be used to develop more effective laughter-based interventions for managing stress.

2. METHODS

2.1. Protocol Design

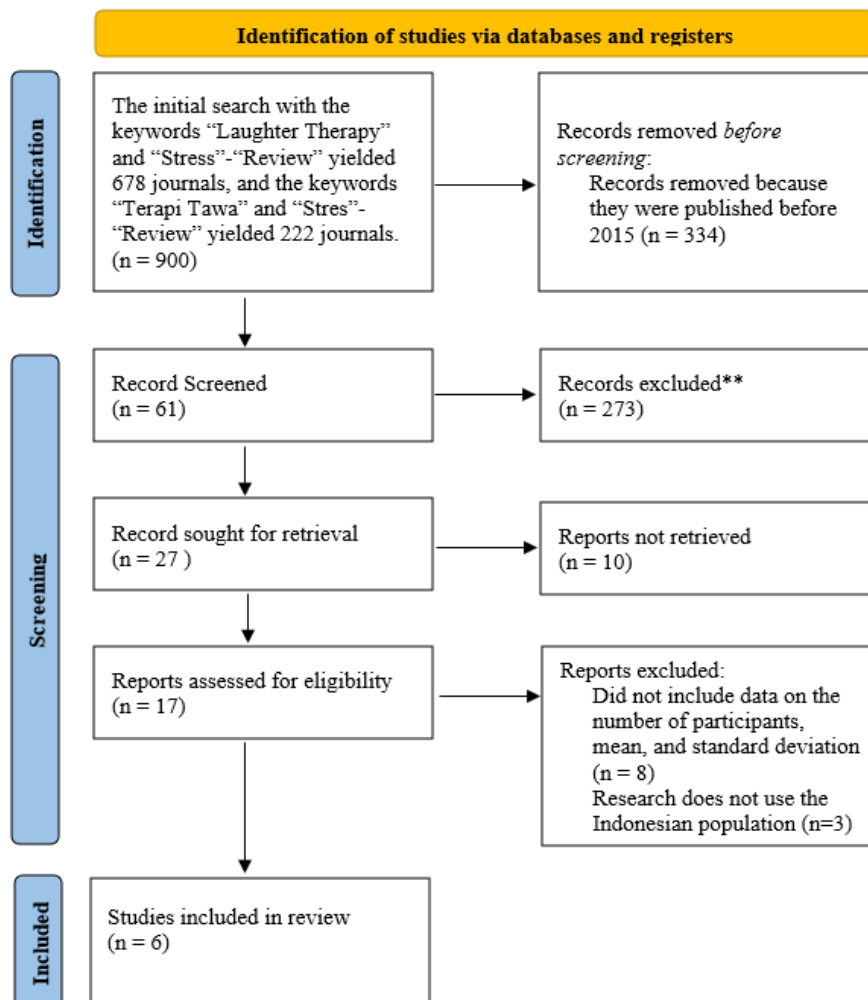
This study utilizes meta-analysis methodology, which is a statistical technique that combines data from multiple studies and re-evaluates the effectiveness of the given treatment or intervention. Meta-analysis can enhance statistical power and demonstrate the effect size across the body of research (Israel & Richter, 2011; Shelby & Vaske, 2008). The system employed to search for references follows the methods outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) of 2020 (Page et al., 2021).

2.2. Literature Search

The researcher utilized Google Scholar as a platform to search for references. The study began with a search using the keywords "Laughter Therapy" and "Stress"-Review", as well as "Terapi Tawa" and "Stres"-Review". The researcher then applied filters, restricting the research to the period from 2015 to 2022. Out of 566 research articles found, the researcher conducted sorting based on titles and abstracts. Finally, 6 studies meeting the predetermined inclusion criteria were identified.

Figure 1

Path of Literature Search



2.1.1. Inclusion criteria

The inclusion criteria in the reference search were studies with experimental between group design, containing data on N (number of participants), mean, and standard deviation for each group, published from 2015 to 2022, in either English or Indonesian language, and discussing laughter therapy intervention for managing stress in Indonesian population.

2.1.2 Exclusion criteria

The exclusion criteria for this study are research that does not utilize experimental methods, published before 2015, in languages other than English, and Indonesian, and the participant is not from Indonesian population.

2.3 Data Analysis

The meta-analysis used for this study is Hedge's G model, which involves using mean values, standard deviations, and the number of participants for analysis. These data are analyzed using the JAMOVI 2.2.5.2.3 software.

3. RESULTS

This meta-analysis included six studies conducted in Indonesia with a total of 160 participants from various demographics, such as university staff, teenage students, nursing students, military personnel, and elderly individuals. The studies employed diverse measurement tools, including the Perceived Stress Scale (PSS-10), DASS-42, and work stress questionnaires, to assess the effectiveness of laughter therapy on stress reduction. Different methods of intervention were applied, ranging from virtual laughter sessions to structured 15-step laughter therapy protocols. The results of the 6 previous studies are summarized in Table 1.

The analysis results using the Random-Effects Model showed that laughter therapy has a significant effect on reducing stress, with an estimated effect size of -1.59 (SE = 0.393, Z = -4.05, $p < 0.001$). This effect is quite stable, as indicated by the 95% confidence interval (-2.363 to -0.821), which does not include zero. These findings suggest that laughter therapy is a consistently effective intervention for reducing stress levels, regardless of the differences in the contexts of the studies analysed.

The meta-analysis examined the effects of laughter therapy on stress, as summarized in the forest plot (Figure 2). Individual study effect sizes (presented as standardized mean differences) varied, ranging from small to large negative effects, with negative values indicating reductions in stress. The effect size for each study is represented by black squares, with the size of the squares reflecting their relative weight in the analysis. The corresponding 95% confidence intervals (CIs) are illustrated as horizontal lines.

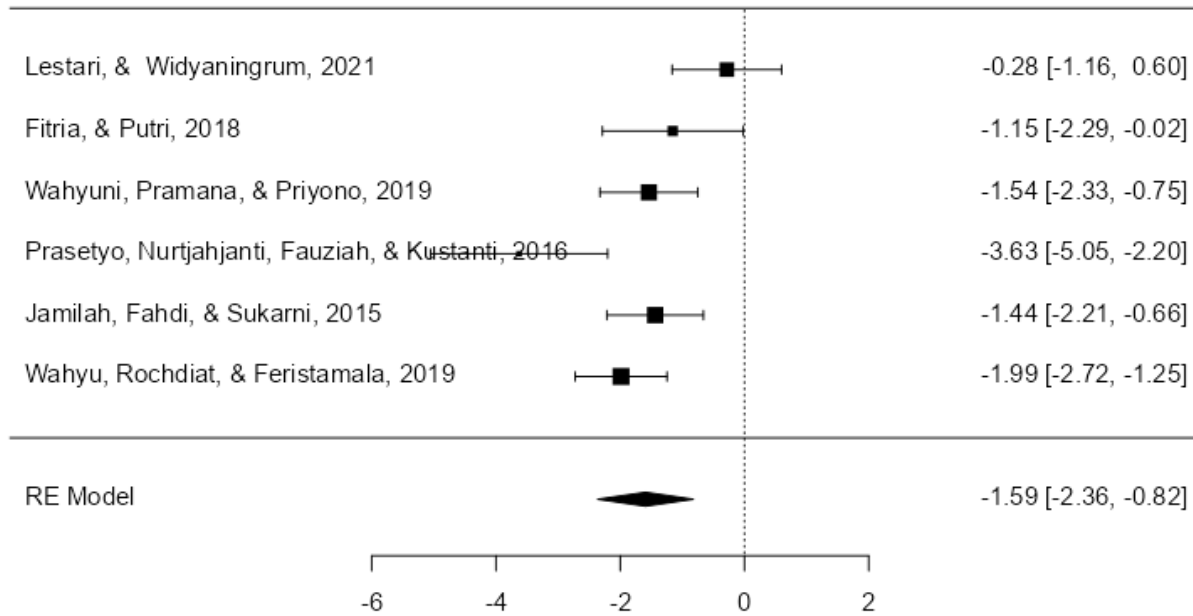
The asymmetric funnel plot indicates that there are studies with differing effect sizes within the analysis. This can be understood because not all studies included in this analysis used the same intervention or measurement methods. An asymmetric funnel plot can also be interpreted as an indication of publication bias. The potential for bias may be caused by the tendency of journals to publish only significant results and reject non-significant results (Boutron et al., 2024). However, overall, the results indicate that the findings from this meta-analysis are robust and reliable. Statistically, there is no significant evidence of publication bias, which means that the results obtained are not merely due to a tendency to publish positive or significant results. This enhances the credibility of the findings from this meta-analysis.

Table 1

Summary of the previous studies

Researcher's Name	Country	Participants	Measurement Tool	Intervention Method
Lestari & Widyaningrum (2021)	Indonesia	20 Staff from Muhammadiyah University	Modified work stress questionnaire	The intervention was given three times.
Fitria & Putri (2021)	Indonesia	14 teenage students from Surabaya experiencing academic stress	Perception of Academic Stress (PAS), The Coping Humor Scale (CHS)	The intervention was delivered virtually, involving three techniques: waving laughter, spring laughter, and giggle laughter.
Wahyuni et al. (2019)	Indonesia	32 senior-level nursing students undergoing thesis	Perceived Stress Scale (PSS-10)	Laughter therapy was conducted twice.
Prasetyo et al. (2016)	Indonesia	20 military pilots from the Army in Semarang, Central Java	Work stress scale based on Cooper & Straw theory (2005)	Using the 15-step laughter session model (Kataria, 2004), and conducted five therapy sessions, each lasting 60 minutes.
Jamilah et al. (2015)	Indonesia	32 elderly individuals	SAQ (Stress Assessment Questionnaire)	Providing laughter therapy to the experimental group (no detailed explanation provided).
Wahyu et al. (2019)	Indonesia	42 nursing students	DASS 42	The intervention was conducted with the assistance of a therapist over two weeks, for a total of four sessions.

Figure 2
Forrest Plot of Laughter Therapy Effect on Stress



The Fail-Safe N value of 147 with a p-value <0.001 indicates that the meta-analysis results remain significant even if a large number of studies with negative or null effects are added (Table 3). The very high p-value (1.000) from Begg and Mazumdar Rank Correlation indicates no significant relationship between effect size and study sample size ranking, suggesting that there is no indication of publication bias in the analysed data. A p-value of 0.186 in Egger’s Regression indicates that there is no significant publication bias in the data. The non-significant value suggests that the meta-analysis results do not show strong evidence of publication bias.

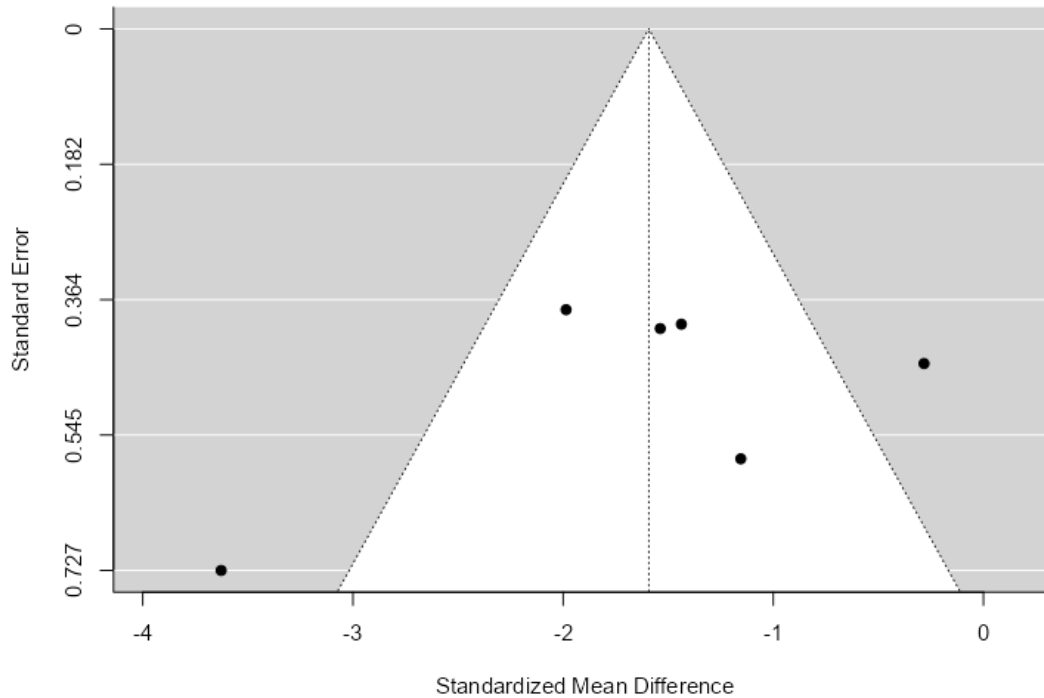
Table 3
Publication Bias Assessment Table

<i>Test Name</i>	<i>Value</i>	<i>p</i>
Fail-Safe N	147.000	<.001
Begg and Mazumdar Rank Correlation	0.067	1.000
Egger’s Regression	-1.323	0.186

4. DISCUSSION

The results of the meta-analysis of the 6 previous studies reinforce the concept that laughter therapy is a highly relevant intervention in reducing stress levels. This analysis reveals that laughter therapy has an average large effect size of -1.59 on stress, indicating a consistently significant level of effectiveness. These findings provide strong support for the utility of laughter therapy across various settings and for various subjects. The section that may indicate signs of publication bias is the funnel plot results, which show an asymmetric shape. However, this cannot

Figure 3
Funnel Plot of The Studies Used in This Research



be identified as publication bias because the funnel plot is difficult to interpret with only 6 effect sizes. On the other hand, the Fail-Safe test, Begg and Mazumdar tests, and Egger's test reinforce that there is no publication bias in the results of this study.

While the studies included in the meta-analysis had participants from diverse categories, attention should be given to the consistently large effectiveness of laughter therapy. Kataria's (2004) statement that laughter therapy can be applied to everyone seems to be confirmed in these findings. The success of laughter therapy is not limited to specific age groups or backgrounds but is relevant to various societal groups. Activities in laughter therapy can be adopted by everyone, except for those with certain health conditions, such as individuals with respiratory-transmitted diseases, conditions causing shortness of breath, or specific conditions involving excessive diaphragmatic laughter, such as severe hemorrhoids.

The results from the forest plot (Figure 2) indicate that the study by Prasetyo et al. (2016) had the largest effect size, while the study by Lestari and Widyanigrum (2021) had the smallest effect size compared to other studies. This difference may be due to variations in the intervention models used in these two studies. Prasetyo et al. (2016) used the 15-step laughter therapy model by Kataria (2004), applied in five sessions. Meanwhile, the study by Lestari and Widyanigrum (2021) only conducted laughter therapy with three sessions. One factor that may contribute to differences in outcomes among previous studies is the inconsistency in measurements or measurement tools used in these studies.

Based on the previous exposition, it can be concluded that laughter therapy has been proven to have a significant effect size in addressing stress, making it a potential intervention for individuals with various backgrounds. Laughter therapy intervention using the 15-step model, and conducted more than once, yields a larger effect size than other laughter therapy models. This is

also because the 15-step laughter therapy by Kataria (2004) helps individuals enhance their mood, strengthen social bonds (as it is conducted in groups), and provides effective coping techniques. As a result, laughter therapy helps participants feel happier and more capable of facing life's challenges. This suggests that there may be advantages in this specific approach in reducing stress levels in individuals.

In comparison to previous research, this study also shows that laughter therapy has a positive impact both biologically and psychologically in reducing stress levels. These findings are consistent with other studies indicating that laughter therapy can lower cortisol levels, commonly known as the stress hormone, and provide significant relaxation effects for individuals (Van Der Wal & Kok, 2019; Kramer & Leitao, 2023). Psychologically, laughter therapy can serve as an effective coping mechanism, helping individuals manage the pressures and emotional challenges they face. Furthermore, this therapy not only enhances mood but also strengthens social relationships among individuals, which in turn can contribute to stress reduction (Kataria, 2004). Thus, the results of this study emphasize the importance of laughter therapy as a multifaceted intervention in addressing stress, making it a beneficial alternative in psychological and mental health practices. Nevertheless, this study still has limitations in providing insights into the effectiveness of laughter therapy in reducing stress.

One limitation of this study is the variation in participant types and the differences in age among the participants in the studies used. Variations in participant types can create differences in responses to laughter therapy, as individuals with different backgrounds, experiences, and characteristics may react differently to the same intervention. Additionally, age differences can affect the effectiveness of laughter therapy, as factors such as psychological, social, and cultural development may play a role in how an individual responds to laughter experiences. Therefore, the lack of uniformity in participant types and ages can obscure the research findings and make it challenging for researchers to draw clear conclusions about the effectiveness of laughter therapy across various demographic groups.

Another significant limitation is the inability to perform moderator analysis due to the limited number of effect sizes. Moderator analysis is important for understanding the factors that may influence the relationship between laughter therapy and stress reduction. With a limited number of effect sizes, researchers cannot explore how variables such as gender, age, or stress severity may impact the outcomes of laughter therapy. The inability to conduct this analysis can result in the loss of valuable insights needed to optimize future interventions. Therefore, it is crucial for future research to involve more participants from diverse backgrounds and to collect sufficient data to enable moderator analysis, allowing for a deeper understanding of the effectiveness of laughter therapy in a broader context.

Although the study from Prasetyo et al. (2016) shows promising results with a high effect size, indicating the potential benefits of laughter therapy in reducing stress. However, it should be noted that the study involved only 20 participants. The small sample size may limit the generalizability of the results and increase the potential for variability. Additionally, potential publication bias should be considered, which could affect the findings. Therefore, while the results are positive, it is important to interpret these findings cautiously and consider the limitations of the sample size and potential bias in the interpretation of the results.

To support a deeper understanding of the influence of laughter therapy on stress, more research in the future is needed. Recommended steps include exploring various laughter therapy models, involving a broader and more diverse range of groups, and considering moderator factors that may influence outcomes. These studies can provide further insights into the effectiveness of

laughter therapy in broader contexts and help identify specific variables that may strengthen or moderate the relationship between laughter therapy and stress reduction.

As a suggestion for future research, it would be beneficial to focus on comparing effect sizes between studies using uniform measurement tools. This can provide a clearer picture of result consistency and can help develop practical guidelines for implementing laughter therapy in various contexts. A better understanding of moderator variables such as age and gender, or other demographic characteristics can also enrich the scientific literature and provide practical guidance for practitioners who wish to implement laughter therapy as a stress intervention.

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“Not applicable”