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The Effectiveness of Laughter Yoga to Improve Individual and Peer Happiness Among Cancer Patients

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ABSTRACT

Background: Cancer therapy during the pandemic causes physical and psychological problems. It impacts happiness in their lives. Laughter yoga is an intervention that can increase happiness. The purpose of this study is to prove that laughter yoga can increase the achievement of individual and peer happiness in cancer patients undergoing therapy in a pandemic situation.

Methods: This was a quasi-experimental with a non-equivalent control group design. The total sample was 40 cancer patients at the Indonesia Cancer Foundation East Java selected through the inclusion and exclusion criteria. In the implementation, 20 people belong to the intervention group (IG) and 20 other people belong to the control group (CG). The IG provided laughter yoga 2x/a week for 4 weeks with 14 steps, while CG only through daily activities. Both groups conducted pre-test and post-tests using The Subjective Happiness Scale. The scale consists of two indicators: individual happiness and peers' happiness. In addition, the calculation of the two indicators is done separately. The instrument has been tested for its validity and reliability. The data were normally distributed (Shapiro-Wilk test $p > 0.05$). Statistical test was conducted using paired t-test ($p < 0.05$) to test the pre-post data in both groups and independent sample t-test ($p < 0.05$) to test the effectiveness of the intervention compared to the control group.

Results: Demographic data of respondents was homogenous. The mean score of individual and peer happiness before and after intervention in the IG increased. It means that respondents had better happiness. Meanwhile, in the CG there was a stagnation score of individual and peer happiness. Paired t-test in the IG showed that individual and peers' happiness got the same p-value < 0.001 each. In the CG, individual happiness records $p = 1.000$ and peers' happiness $p = 0.083$. Statistical tests conducted by Independent t-test to compare IG and CG had the $p = 0.012$ for individual happiness and $p = < 0.001$ for peers' happiness.

Conclusions: Laughter yoga has a significant effect to enhance individual and peer happiness compared to respondents who only carry out normal daily activities, especially for cancer patients undergoing therapy during the COVID-19 pandemic.

INTRODUCTION

Cancer patients have a higher negative effect than healthy individuals [1]. The COVID-19 pandemic has had a major impact on cancer patients because screening and treatment programs are postponed or canceled. Besides patients are also afraid of the risk of being exposed to the COVID-19 virus which harms cancer patients [2]. A study stated that cancer patients undergoing palliative therapy feel pressure from COVID-19 peritraumatic stress [3]. Another study explained a similar result and stated that during the pandemic, there was an increase in depression and anxiety in cancer patients due to delays in their treatment process [4]. The prevalence of new cancer cases in the world in 2020 reached 19.3 million with nearly 10 million cases. It is even predicted to continue to increase to 47% in 2040, which is around 28.4 million cases [5]. The prevalence of cancer in Indonesia in 2018 shows that there is an increase from 1.4‰ to 1.49‰ and a significant increase occurred starting at the age of 35 years and over. The highest cancer prevalence in 2018 is in the 55-64 year age group of 4.62‰, and the most cases are breast cancer at 19.18%, cervical cancer at 10.69%, and lung cancer at 9.89% [6].

A cancer diagnosis has a significant psychological impact. A study of 80 people who had just been

diagnosed with cancer for 2 to 4 weeks caused moderate to severe psychological distress [7]. Patients with chronic diseases who experience stress tend to be unhappy even though some feel happy with their condition [8]. Another study reported the same results and stated that middle-aged women who experienced a decline in health function felt unhappiness [9]. Happiness is difficult to find in patients with terminal illnesses [10]. The happiness of cancer patients is not the same from one patient to another and the mental status of patients determines their level of happiness [11].

A study shows that cancer patients who are undergoing chemotherapy in a hospital and given laughter yoga for 20—30 minutes can significantly improve their mental health [12]**.** Happiness is directly correlated to the emergence of psychological well-being, positive effect, improved health, life satisfaction, and better quality of life [13]**.** Laughter yoga can reduce cortisol, epinephrine, and 3,4-dihydro-phenylacetic acid levels which have an impact on reducing psychological stress [14]. A study found the effectiveness of laughter yoga in promoting positive subjective well-being [15]. Similar results were also presented in another study. It stated that patients with chronic multiple sclerosis experienced a decrease in frustration and aggressiveness after being given a 10-session laughter yoga intervention [16]. Likewise, patients with other chronic diseases such as coronary heart disease were given laughter yoga intervention. They experienced a significant reduction in depression, anxiety, and stress. They also improved their quality of life, and general physical and mental health [17]. Laughter yoga given for 30 minutes has proven to stimulate autonomic, endocrine, and psychological responses as assessed by salivary cortisol, and salivary alpha-amylase [18]. Individuals who can be grateful and have a positive effect can increase their happiness and life satisfaction [19]. Other research showed that laughter yoga given to the elderly helps increase their positive mood and happiness [20]. Another study explains that a positive mood triggers high levels of happiness, while anger, fear, and sadness reduce happiness [21]. Happiness is a subjective emotional component. Therefore, happy people do not feel stress, depression, and anxiety [22]. This study aims to prove the effect of laughter yoga to achieve individual and peer happiness in cancer patients in a pandemic situation.

METHODS

This study was quasi-experimental with a non-equivalent control group design. In this design, the respondents were not selected randomly but based on certain eligible criteria. The Inclusion criteria were obtained from a questionnaire given to respondents related to their condition, consisting of (1) the patient has had a physical complaint (such as tolerable pain, decreased appetite, mild nausea, vomiting, and constipation) and psychological complaints (such as sad, easy to get angry, depressed, and irritable) in the last 1 month, (2) the patient is not in a condition of severe pain/fatigue/nausea that can interfere with activities, (3) and the patient does not have a jaw injury. While the exclusion criteria were (1) patients did not follow the intervention completely and (2) the patient suddenly develops severe physical symptoms while the intervention is in progress. The treatment was given to the intervention group and a control group was used as a comparison. The research was conducted in June 2021. The number of samples was 40 cancer patients at the Indonesia Cancer Foundation of East Java Indonesia consisting of 20 people who belong to the intervention group (IG) dan the other 20 people who belong to control group (CG). The samples were selected based on eligibility criteria.

Each respondent fills out an instrument. The instrument used is The Subjective Happiness Scale. The validity and reliability tests were carried out by the researcher before the research process by giving the instrument to the 15 cancer patients who had the characteristics according to the eligibility criteria in the Driyorejo Gresik area, which was then tested for validity using the Pearson Correlation ($r = 0.914–0.954$) and reliability test with Cronbach alpha $\alpha = 0.942$. The results of this valid and reliable instrument are then used to collect research data. The Subjective Happiness Scale consists of two indicators. Each of the indicators has a 7-point Likert scale. The first indicator was individual happiness which has a score range of 2–4. The higher the score, the higher the individual's happiness will be. Likewise, peers' happiness has a score range of 2–14. The higher the score, the higher the peer's happiness will be [23]. The research process in detail is described in **Figure 1**.

While the laughter yoga intervention steps are as follows. The laughter yoga intervention was carried out in the large hall of the Indonesian Cancer Foundation, located in the East Java Branch which has an area of about 50 $m^{2.}$ Laughter yoga is carried out in small groups consisting of 5 to 6 people/group by applying the standard COVID-19 prevention protocol. It means trainers/ researchers and participants were wearing masks and maintaining a distance of about 1.5 meters. The steps for laughter yoga consist of (1) warming-up movement. It is done by moving all the muscles of the face, neck, hands, and feet for 2 minutes. (2) Rhythmic laughter. It is done by laughing ha..ha..ha..ho..ho..ho and followed by clapping, stomping, and shaking head five times for two minutes. (3) First pranayama breathing. It is done by closing one nostril and the respondent is asked to inhale deeply through another open nostril. After that, they are asked to open the other nostril and exhale through it five times for two minutes. (4) Laughing like Snow White: It is done by laughing while looking at your palms like a mirror and saying "it's me" five times for

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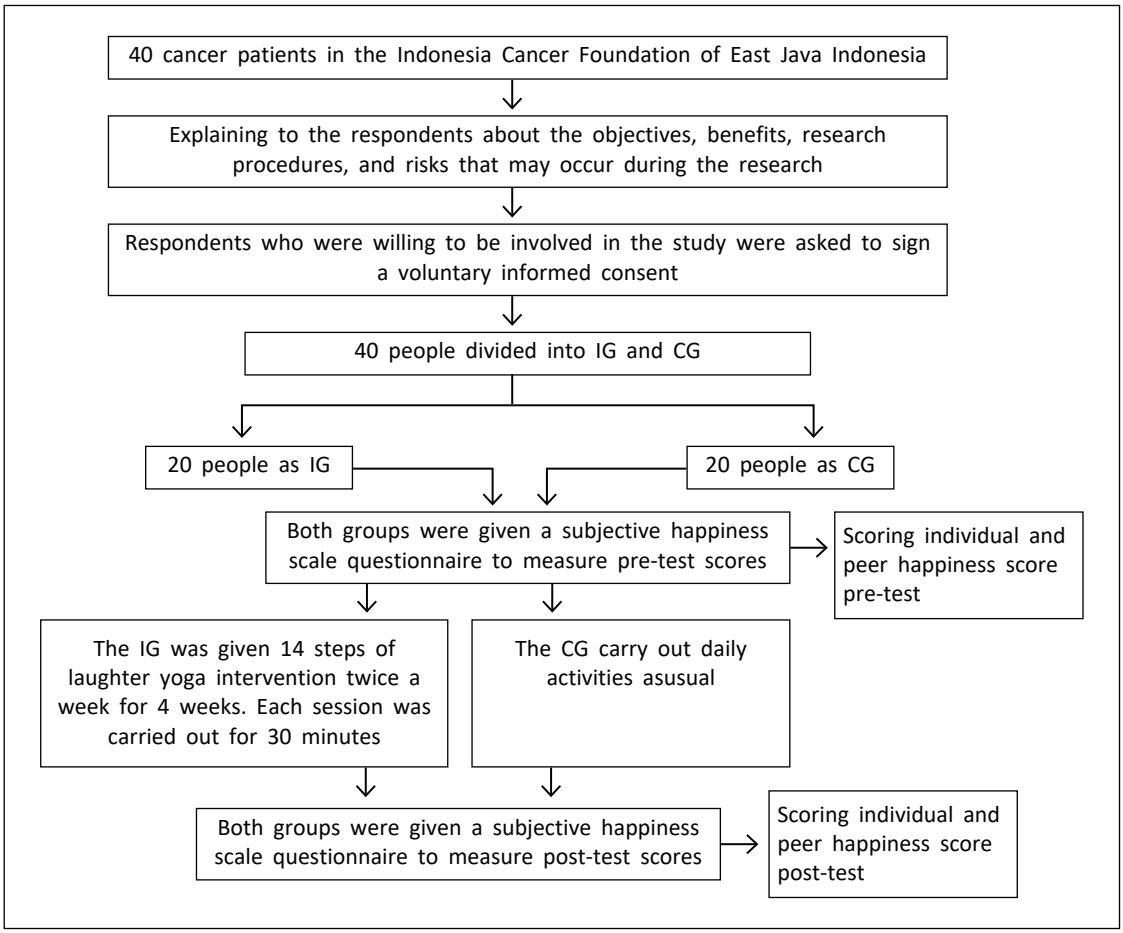

Figure 1. Flow chart of research process

two minutes. (5) Cell phone laughter. It is done by laughing while walking independently with hands like holding a cell phone five times for two minutes. (6) The second pranayama breathing with the same steps as the first pranayama breathing five times for two minutes. (7) One-meter laughter. It is done by performing a long laugh aa..ee..aa..ee..while spreading both arms five times for three minutes. (8) silent laughter. It is done by laughing silently and showing body language like someone who is laughing out loud five times for two minutes. (9) The third pranayama breathing with the same steps as the first pranayama breathing five times for two minutes. (10) Laughing like a lion. It is conducted by roaring and followed by facial expressions and hands like a lion five times for two minutes. (11) laughing like a celebrity It is done by imitating the laughing style of a celebrity in Indonesia five times for three minutes. (12) The fourth pranayama breathing with the same steps as the first pranayama breathing five times for two minutes.. (13) Laughing and dancing. It is done by laughing while moving the body like dancing five times for two minutes. (14) Relaxation. This last step is done by being calm for a moment and inhaling through both noses and exhaling through mouths five times for two minutes.

The happiness scale instrument consists of 2 indicators. They are individual happiness and peer happiness which are calculated separately. Each of the indicators has a score. Furthermore, all data collected were tested for normality with Saphiro-Wilk ($p > 0.05$), and all variables were normally distributed, namely individual happiness pre-test and post-test (IG) = 0.477 and 0.290, (CG) = 0.599 and 0.358. While peer's happiness pre-test and post-test (IG) = 0.616 and 0.462, (CG) = 0.299 and 0.179.

Next, two stages of statistical tests were carried out. They consist of stage 1 of paired t-test ($p < 0.05$) that is used to assess pre-test and post-test scores on each variable and in each group. Stage 2 is an independent sample t-test ($p < 0.05$) conducted to compare the intervention group and the control group and assess the effect of the intervention on individual variables and peers' happiness.

RESULTS

The findings of this research showed that all the demographic data were homogenous with Levene homogeneity test $p > 0.05$, which means that there are

no differences in both groups. Respondents in the intervention group were 52.9 years old and the duration of the cancer diagnosis was 2.52 years, while in the control group, the average age was 51.9 years old and the respondents have been diagnosed with cancer for 2.47 years. Both groups are dominated by females. All group has similar dominant physical complaints. Most of the respondents both in the intervention group and the control group had decreased appetite. Its percentage is sequentially 35% and 30%. While the dominant psychological complaints were feeling sad in both groups. Its percentage is sequentially 55% and 65%. In terms of cancer stage, cancer stage III dominated in the intervention group with 85% and 65% in the control group. While cervical cancer dominated both groups with 40% in the intervention group and 35% in the control group. Regarding cancer therapy, most of the respondents in the intervention group have undergone surgery, chemotherapy, and radiotherapy (35%), while surgery + chemotherapy + radiotherapy (35%) and chemotherapy + radiotherapy (35%) dominated the control group (**Table 1**).

Table 2 showed that in the intervention group, the mean increased in individual happiness from 10.30 to 11.45 In peer happiness, the mean score also increased from 9.70 to 10.80. This indicates an improvement in the situation occurs in both happiness variables. Meanwhile, in the control group, there was a stagnation of the mean score on the individual happiness variable, namely 10.05 both in the pre-tests and post-tests. While in peer happiness, there was a slight increase in the mean score from 8.05 to 8.20. This indicates that the two variables of happiness did not experience significant changes.

Table 3 showed that in the intervention group, there was an enhancement in the happiness of individuals and peers before and after the intervention as indicated by the p-value < 0.001 in both variables. Meanwhile,

Table 1. Demographic Data of Respondents

Demographic Data	Characteristic	Intervention Group (n = 20)		Control Group (n = 20)		Levene Homogeneity Test
		n	(%)	n	(%)	P > 0.05
Age	(years) (mean±SD)	52.9±13.3		51.9±13.09		0.839
Duration Cancer Diagnosed	(years) (mean±SD)	2.52±1.97		2.47±1.91		0.062
Gender	Female	15	75	14	70	0.825
	Male	5	25	6	30	
Dominant Physical complaints in the last 1 month	Pain	6	30	5	25	0.898
	Nausea - Vomiting	4	20	5	25	
	Decreased appetite	7	35	6	30	
	Constipation	3	15	4	20	
Dominant Psychological complaints in the last 1 month	Easy to get angry	3	15	2	10	0.399
	Irritable	3	15	3	15	
	Sad	11	55	13	65	
	Depressed	3	15	2	10	
Cancer Stage	II	3	15	5	25	0.114
	III	17	85	13	65	
	IV	0	0	2	10	
Cancer Types	Breast	5	25	5	25	0.986
	Cervical	8	40	7	35	
	Lung	3	15	3	15	
	Nasopharynx	0	0	3	15	
	Colon	3	15	1	5	
	Parotid	1	5	0	0	
	Ovary	0	0	1	5	
Cancer therapy	Radiotherapy	5	25	0	0	0.110
	Chemotherapy	2	10	2	10	
	Surgery + Chemotherapy	0	0	4	20	
	Surgery + Chemotherapy + Radiotherapy	7	35	7	35	
	Chemotherapy + Radiotherapy	6	30	7	35	

SD = Standard Deviation

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Table 2. Descriptive Statistic of Individual and Peers Happiness on Intervention dan Control Group

Variable	Intervention Group n = 20		Control Group n = 20	
	Mean	SD	Mean	SD
Pre-Test Individual Happiness	10.30	1.97	10.05	1.46
Post-Test Individual Happiness	11.45	1.73	10.05	1.60
Pre-Test Peers Happiness	9.70	2.67	8.05	1.82
Post-Test Peers Happiness	10.80	2.21	8.20	1.88

SD = Standard Deviation

Table 3. Comparison Statistical Test of Individual and Peer's Happiness in Intervention and Control Group

Variable	Paired T-Test							
	Intervention Group n = 20				Control Group n = 20			
	Δ	95% CI		p-value	Δ	95% CI		p-value
		Lower	Upper			Lower	Upper	
Individual Happiness (pre-test – post-test)	1.15	-1.37	-0.92	<0.001	0	-0.15	0.15	1.000
Peers Happiness (pre-test – post-test)	1.11	-1.39	-0.80	<0.001	0.15	-0.32	0.02	0.083

Table 4. The Effect of Laughter Yoga on Individual and Peer's Happiness (comparison between the Intervention group and control group)

Variable	Independent Sample T-Test			
	T	95% CI		p-value
		Lower	Upper	
Individual Happiness	2.65	0.33	2.46	0.012
Peers Happiness	4.00	1.28	3.91	<0.001

in the control group, there was no significant change pre-test and post-test in the happiness status of individuals and peers as indicated by p-value > 0.05.

The results of the combined comparison tests between IG and CG through the Independent Sample T-Test ($p < 0.05$). The result showed that the intervention group experienced a significant increase in happiness compared to the control group with the p-value of individual happiness was 0.012 and the p-value of peers' happiness was < 0.001 (**Table 4**).

DISCUSSION

Before the intervention, the two groups showed almost the same scores of happiness. Overall, the happiness levels of individuals and peers in both groups did not achieve high scores. This was presumably because there were still physical symptoms that arise due to cancer and side effects of therapy in both groups such as pain, nausea, vomiting, decreased appetite, and constipation. A study explains that symptoms of impaired physical function experienced by individuals can inhibit daily activities and have an impact on the emergence of psychological negative affect [24]. Another research stated that the physical symptoms that patients experienced during the previous six months could be the cause of psychological disorders in the form of symptoms of anxiety and depression [25]. This is similar to the findings in this study showing that patients also felt psychological symptoms such as anger, offensiveness, sadness, and depression. Some previous research results also found almost the same results. The severity of symptoms is accompanied by anxiety and depression and tends to have low happiness [26]. Furthermore, depressed individuals cannot feel happiness [27]. Moreover, depression has a significant effect on the incidence of low life satisfaction and unhappiness [28].

Another finding of this study was an increase in the mean score of happiness in the intervention group after performing laughter yoga. Individual happiness scores increased by 1.15 (from 10.30 to 11.45) and peer happiness also increased by 1.1 (from 9.7 to 10.8). In another study, happiness was described in terms of subjective well-being, and proved that laughter yoga

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could increase subjective well-being scores from 71.95 to 76.55. This proved that laughter yoga was effective in increasing individual and peer happiness significantly. Happiness is a feeling of satisfaction with life that makes individuals excited and happy to live their lives [29]. A study found that happiness was closely related to being physically healthy, having a higher positive affect, and having greater life satisfaction [30]. The domain of happiness includes feelings felt by individuals (individual happiness) and is also related to happiness reflected in social relationships, including family, friends, and neighbors (peers' happiness) [31]. Someone who has a sense of individual and peer happiness will feel less depressed and anxious, have fewer psychosomatic problems and have high social adaptation, high self-esteem, and cooperative behavior [32]. Another study found that patients who were able to be happy had greater energy and better achievement each day as well as reduced functional limitations [33].

Laughter yoga is laughter followed by relaxation breathing techniques in yoga [34]. Furthermore, laughter yoga is a fun activity that provides an opportunity for individuals to reduce the pressures of life and increase the individual's ability to make good decisions in life [35]. This study also found that the majority of respondents are women. Based on the results of previous studies, it was stated that it is easier for women to have a negative effect, but when they perform laughter yoga therapy, it turns out that the negative effect decreases and the positive effect increases [36].

A study showed that giving a laughter yoga therapy intervention to cancer patients was proven to improve their mood, increase their happiness [37], and increase their life satisfaction [38]. Laughter therapy is useful for improving mental health such as increasing positive emotions, reducing stress, increasing mental health, and improving interpersonal relationships [39]. Another previous study stated that laughter therapy given to patients who were hospitalized was proven to reduce anxiety and increase happiness during the patient's stay [40]. Through laughter yoga, individuals can accept their condition positively even though they are suffering from a dangerous disease and also increase their life expectancy and resilience [41]. Thus, laughter yoga creates a positive sensation to reduce psychological stress in cancer patients undergoing chemotherapy [42].

Laughter therapy intervention can significantly increase serotonin plasma concentrations and decrease salivary chromogranin [43]. A similar result was conveyed in a study reporting that after performing laughing therapy, there was an increase in serotonin levels which had an impact on decreasing psychological symptoms of depression [44]. Laughter Yoga can relax the sympathetic nervous system by increasing the secretion of endorphins, serotonin, interferon-gamma (IFN-γ), and growth hormone [16]. Serotonin and endorphins are neurotransmitters that play a role in controlling happiness [45]. Likewise, endocannabinoids and melatonin also increase feelings of happiness [46]. Laughter can increase pleasant taste sensations and trigger the release of endogenous opioids in the thalamus, caudate nucleus, and anterior insula. Besides, laughter is a neurochemical pathway that supports the formation, strength, and maintenance of social relationships between humans [47].

Meanwhile, in the control group, there was no significant increase in scores on individual and peers' happiness, but in general, their happiness scores were not too low and they still felt happy.

Cancer patients sometimes do not want to think that their disease is dangerous. Therefore, it creates a sense of optimism about the future so that they feel quite happy with their lives [48]. The results of other previous studies stated that cancer patients with various stages and varying lengths of diagnosis still have high expectations and psychological well-being [49].

The limitations of this study are that the researchers did not select the type of cancer, stages of cancer, or specific therapy. besides, the sample size was not too large because the study was conducted during a pandemic so the number of patients was limited. To overcome this, the researchers entered the data into demographic status. Besides, the sample selection was also not done randomly due to certain eligibility criteria. However, the findings of this study prove that laughter yoga is useful for cancer patients to help them increase their happiness.

CONCLUSIONS

The uncertain situations due to the COVID-19 pandemic affect the physical and psychological functions of cancer patients, but laughter yoga which is done regularly and continuously can reduce the negative effect on cancer patients who are undergoing therapy (surgery, chemotherapy, and radiotherapy) so that they can increase their sense of happiness including individual and peer happiness.

DECLARATIONS

Ethics Approval

This research has gone through an ethical due diligence process and has been declared ethically worthy by the health research ethics committee of the Widya Mandala Catholic University of Surabaya, Indonesia, No. 136/ WM12/KEPK/DOSEN/T/2021. Explanations to respondents about the objectives, benefits, procedures, risks, and confidentiality of the study were presented at the beginning before the study, and respondents who wished to be involved in the study were asked to sign informed consent as proof of consent.

Competing of Interest

I declare that there is no competing interest between the researcher and the study fund.

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N/A

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