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The Effects of Laughter Therapy for the Relief of Employment-Stress in Korean Student Nurses by Assessing Psychological Stress Salivary Cortisol and Subjective Happiness

Ji-Soo Lee, Soo-Kyoung Lee*

College of Nursing, Keimyung University, Daegu, Korea.

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ABSTRACT

Objectives: Korean student nurses may be exposed to stress caused by their future employment (employment stress). The aim of this study was to investigate the effects of a Laughter Program on psychological stress, by assessing salivary cortisol and the subjective happiness of student nurses in order to relieve employment stress.

Methods: A quasi-experimental, non-equivalent, control-group, and pre-test/ post-test was conducted in 4th year student nurses (n = 48) from 2 universities in Korea at a time when participants' final exams and job searches were simultaneously occurring. Physiological stress (salivary cortisol), and psychological stress measured using modified Cornell Medical Index questionnaire and the Subjective Happiness Scale were used to determine the effects of the program.

Results: The results of the study showed that the Laughter Program was effective in relieving employment stress and increasing the subjective well-being of student nurses. Psychological stress (p < 0.001), salivary cortisol levels (p < 0.001), and subjective happiness (p < 0.001) were statistically significantly improved after the intervention compared with before the Laughter Program.

Conclusion: This study is an effective evidence-based intervention to reduce student nurses employment stress and improve subjective happiness.

Introduction

The number of young adults (15-29 years) in the world is currently at the largest it has ever been, at 1.8 billion [1]. Around 500 million of them are unemployed or underemployed as of last year in Korea [2]. Whilst every generation is suffering, young adults in particular, have been greatly affected by unemployment and this has been increasing worldwide [1]. In Korea such young adult unemployment and employment rates are emerging as a serious problem According to the National Statistical Office, the young adult unemployment rate in Korea increased from 7.4% in 2005 to 9.7% in 2016, and the young adult employment rate decreased from 45.3% in 2005, to 42.7% in 2016, highlighting the severity of the problem [2]. It has been reported that even college freshmen suffer from the pressure and worry about employment in their preferred career choice [1,2]. As such, college students experience high levels of employment stress in an uncertain future where the number of job-seekers makes the market competitive [3]. Even student nurses, who have a comparatively greater potential for employment, are not an exception to employment stress. With an increase in the number of student nurses enrolling in newly founded nursing departments in colleges during the past 5 years, there are more graduates with nursing degrees applying

*Corresponding author: Soo-Kyoung Lee
College of Nursing, Keimyung University, Daegu, Korea
E-mail: soo1005s@gmail.com
ORCID: Ji-Soo Lee https://orcid.org/0000-0003-1439-1607, Soo-Kyoung Lee https://orcid.org/ 0000-0002-7633-7051

for nursing posts [4]. This has led to the students making every effort to achieve high grade point averages, participate in volunteer work, and international activities, gain certificates, and high foreign language scores, due to the increasing competition in the job market for their desired career and preferred hospitals [5]. In addition, if the student nurse does not pass the national nurse licensing examination a nursing post that was previously offered at a hospital, is withdrawn [6]. Consequently, the employment stress of student nurses is on the rise [6,7].

Furthermore, student nurses are unable to participate in various job-support programs operated by universities due to clinical practice on the wards. This leads to a lack of job seeking information, qualifications, relevant skills, and interview skills, as well as difficulties in decision-making at the time of the job search [8]. As a result, it has been reported that student nurses hope for a job search support program that reflects student nurses' requirements, and provides help with writing resumes and self-presentation, criteria for hiring, and hold mock interviews, which can be of practical help during the job search [9].

Failure to alleviate or manage employment stress can result in psychological tension, anxiety, and depression, and may lead to rebellion, excessive drinking, drug abuse, frustration, and even physical illness [10]. In addition, if stress persists and becomes a chronic condition, the production of hormones such as cortisol increases [11]. Increased cortisol production reduces immune function and increases the risk of psychological and physiological illnesses [12,13].

Intervention programs to help student nurses deal with stress that have been reported include a "job search support program," "career coaching program," and "laughter therapy to alleviate the practical stress of student nurses" [9,14]. Of these intervention programs, laughter therapy can affect the brain and the autonomic nervous system, and cause physiological changes and emotional reactions [15], it reduces depression and anxiety, turns negative emotions into positive emotions, and is particularly effective at alleviating stress [16,17].

Looking at the employment stress of student nurses, there was a fear of adaptation in the preferred hospital. Thus practical advice given by nurses working in actual clinical fields of interest to the student/newly qualified nurse, as well as preparatory experience to settle in before working in that environment as a new nurse would be beneficial [18]. However, in reality, such programs in which nurses employed at hospitals provide training and give advice in order to help newly qualified nurses adapt and prepare is rare.

Laughter therapy has been shown to affect the brain and the autonomic nervous system, cause physiological changes and emotional responses [15,19], and reduce depression and anxiety, and positively alter negative emotions, particularly for aiding stress relief [17]. Research on the use of laughter therapy has been reported in patients with cancer, and diabetes [18-21]. Laughter therapy had the effects of reducing depression and psychological stress, alleviating sleep disorders, and increasing subjective happiness [22,23]. Previous research on laughter therapy for nurses demonstrated that laughter therapy had the effects of mitigating role-conflict among nurses and reducing job stress [24]. For student nurses, research has been performed on the effect of laughter therapy on stress and depression induced by clinical practice, as well as goal immersion and self-respect [14,25,26].

However, there is a lack of research on the effects of laughter therapy on employment stress, cortisol concentration, and subjective happiness of student nurses. Therefore, this study used laughter therapy in 4th year student nurses in order to examine its effect on psychological stress, salivary cortisol, and subjective happiness.

Materials and Methods

1. Research design

This study used a quasi-experimental, non-equivalent, control-group, and pre-test/post-test design. The purpose of this study was to investigate the effects of a Laughter Program on psychological stress, salivary cortisol and subjective well-being of student nurses in order to relieve the employment stress of student nurses in Korea.

2. Participants

The participants of this study were recruited from 2 nursing colleges located in Daegu city. The experimental group was selected from K University, while the control group was selected from D College. There were no differences in school size and employment rate, and there were regular courses in similar nursing classes in both K University and D College, therefore, showing homogeneity. The participants of the experimental group and the control group were selected differently in order to minimize the effect of selection bias. In addition, the study was conducted in order to minimize the impact on psychological stress by avoiding the exam period or job interview season. The calculation of the sample size needed for a significance level of 0.05, effect size of 0.80, and power of 80%, conducted using the G*power 3.1 program, determined that 21 participants were necessary in the experimental and in the control groups, with a total minimum number of 42 participants to be included in this trial. In this study, a 15% study drop-out rate was considered leading to 25 participants being recruited for both the experimental and the control groups, with a total of 50 participants.

The detailed selection criteria for the participants were as follows: 1) Those who were currently in their 4th year of nursing

school and had over 6 months of clinical experience. 2) Those who were not employed at any point of the duration of the study. The exclusion criteria for the participants of this study were as follows: 1) Those who had accepted a job position at their preferred hospital 2) Those who suffer from illnesses that affect salivary cortisol (for example, hyperthyroidism, Cushing syndrome, and atopic dermatitis).

One participant from both the experimental group and the control group were excluded during the study period due to insincere survey responses and non-collection of saliva. The total number of participants who completed the study were 24 in the experimental group and 24 in the control group, a total of 48 participants.

3. Research procedure

This study was conducted for 1 month (June 1st to 30th, 2017). The study was approved by the head of both K University, and D College located in Daegu City (Ethical approval: IRB no. 40525-201704-HR-020-02). After explaining the research purpose and procedure to students in the Department of Nursing, those who fitted the selection criteria from among those who had given voluntary informed consent, were enrolled in the study. The overall flow of this study is shown in Figure 1.

The survey comprised of items about general characteristics, employment stress, and subjective happiness, using the self-report method. To examine physiological markers, salivary cortisol was measured once before, and once after the intervention. In this study, saliva was collected under fasting conditions to measure physiological stress once before, and once after the program intervention.

Salivary cortisol measurement can be easily affected by diet and is affected by localized hormones therefore lip balm and hand cream, food and beverages that stimulate saliva secretion were prohibited for 1 hour before the measurement. The salivary cortisol measurement method is non-invasive and has the advantage of being easily measured without pain or discomfort [27]. After stabilizing the participant according to the measurement sequence and explaining the reason for saliva collection, the mouth was rinsed with water for 30 seconds and spat out, and then saliva (2 mL-3 mL) collected in the tube. The collection time was recorded and the saliva was stored in a mobile refrigerator and then stored at -20°C or lower. The

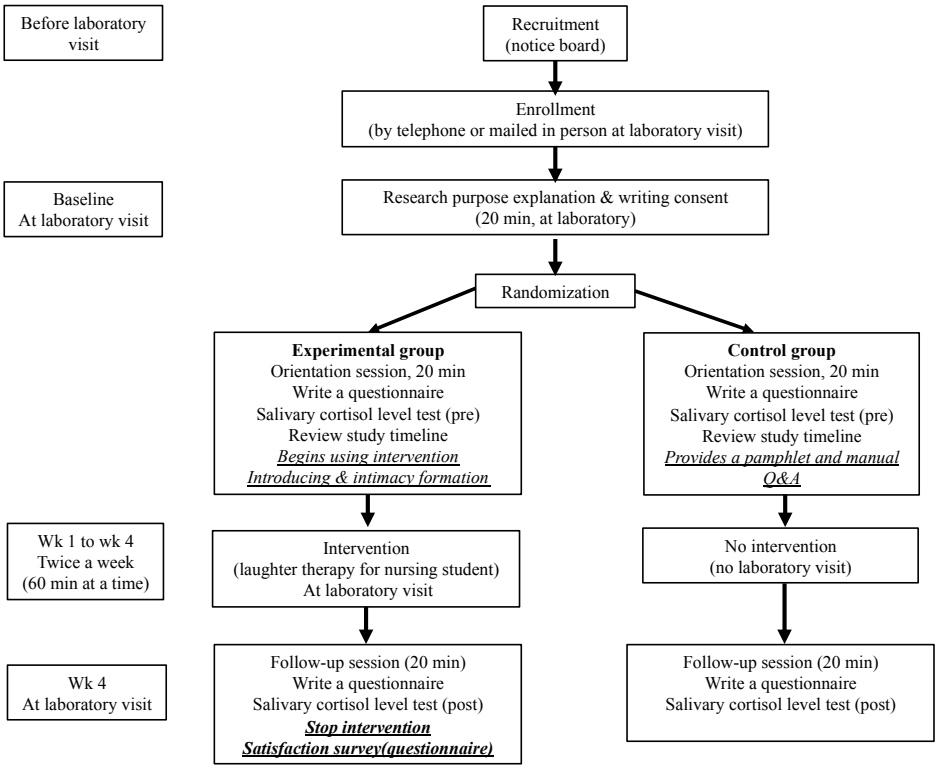

Figure 1. Flowchart showing activities of students participating in laughter treatment program for employment-stress in Korean student nurses.

salivary cortisol test was conducted using an enzyme-linked immunosorbent assay, the cortisol parameter assay kit (R&D Systems Inc., Minneapolis, USA).

To measure the psychological stress of student nurses for employment stress, Kim and Hong's [28] version of edited Cornell Medical Index (CMI) was used [28]. In this study, higher levels of salivary cortisol, which is a physiological marker of stress, indicated higher employment stress [27]. To measure subjective happiness, the Subjective Happiness Scale (SHS) developed by Lyubomirsky and Lepper was used [29].

4. Intervention

This study was conducted with the purpose of developing laughter therapy to reduce employment stress of student nurses, preparing researchers, and conducting preliminary surveys, advance surveys, interventions, and follow-up surveys. This study was conducted by 2 instructors specializing in laughter therapy who designed the study between February and May of 2017. The authors first investigated employment stress experienced by student nurses, and the current status of the use of laughter therapy by performing an extensive literature review. Thereafter, laughter therapy for easing the employment stress of student nurses was developed. For the program content, a draft of the laughter therapy was developed by adding suitable elements to the contents of previous articles in order to ease employment stress of student nurses [5,8].

We requested advice and validity confirmation from experts regarding the laughter therapy. The group of experts was comprised of 5 persons: 1 nurse from the S national university hospital, who is also the head of The Korea Laughter Clinic Academy, 2 general hospital nurses with over 20 years of experience, 1 laughter therapist, and 1 professor of nursing college. We asked for opinions on the validity of the program contents, the process, and acquired validity confirmation. With regards to the topic, goals and content of the program, "Do you think it is appropriate for student nurses?" The items had 4 sections including relevance, interest, effectiveness, and applicability. Each item was on a 4-point Likert scale, and the content validity value was greater than 0.80.

The program was revised and supplemented to provide a "laughter assignment" at each session of the program to process the positive effects of laughter. Moreover, the content was also designed to allow learning based on actual scenarios to help prepare for working in a new hospital as a qualified nurse. This addressed the student nurse biggest fear and was in addition to helpful hints for job interviews taught at job camps, and advice given on "a good image of nurses."

Content related to nursing interviews was added to the draft of laughter therapy. Based on advice from 5 experts who spent a long period lecturing on laughter therapy on-site, as well as developing and researching the program, the contents were modified and supplemented to fit student nurses (Table 1).

Table 1. Contents of the Laughter Program for relieving job search stress in student nurses.

Session	Participant	Detailed goal	Detailed activity	Time (min)
1	Laughter and the connection of happiness	Intimacy formation Getting to know laughter therapy definition	-Positive self-introduction -Self-improvement training	60
2	With a smile open thoughts	Positive effect of laughter The secret of laughter	-Recognizing the need for laughter -Facial muscle stretching	60
3	Smile power	The power of laughter Training for a good impression	-Smile power* -The secret of laughter -Nurse good image*	60
4	The positive response is a shortcut to happiness	How to share happiness positive response training method	-Positive response training method -Happiness sharing communication -Laughter together	60
5	With a smile open the body	Effect of laughter diet the importance of core exercise	-Imagine skipping -Laughter diet exercise	60
6	In the hospital communication	Good image training communicating with laughter	-Attitude is everything* -Communicating through* (Case and role-playing)	60
7	Practice laughter	Practicing family, acquaintance and laughter the importance of laughter practice	-Make a good impression -Making laughter muscle -Living in laughter area	60
8	Clinical laughter therapy	Use of clinical Laughter Program and preliminary experience	-Clinical laughter therapy* -Preliminary experience, share your opinion*	60

* Curriculum revised and supplemented for student nurses.

The laughter therapy program was conducted by a researcher and 2 instructors. The researcher conducted 6 out of 8 laughter treatments (1, 2, 3, 4, 6, 7) and the 5th laughter treatment was carried out by a lecture therapist. The invited lecturer was conducted by a nurse specializing in wards of the S national university medical school. In this study, the lecture was given after the lecture on clinical experience of laughter in the hospital.

In the early stages (1-2), introducing themselves was the introduction stage of laughter therapy, self-evaluation of self-image, relaxation through face stretching and massage, conversation and laughter to form trust and a connection amongst the participants. This is the stage to introduce the effects of laughter therapy and a warm greeting with an open heart.

The middle stages (3-6), were the growth stages of laughter therapy where a happy life is recognized and lauded through laughter therapy. In the middle stages, the effects of a good impression for the employment of the student nurse who has job stress, and the direction of the "nurses good image" when working as a new nurse in the hospital were constituted, and the importance of the good attitude of the nurse.

The termination phase (7-8) was the stage of maturity of laughter therapy and was the stage where students really laughed. Activities were performed to give confidence that happiness comes with laughter, and the aim was to find happiness in everyday life that was due to laughter.

At every session, lighter greetings such as laughing greeting, positive letter sending were given, teaching, and giving positive affirmations to family and friends, so that laughter therapy could be continuously received.

5. Statistical analysis

The data collected in this study was analyzed using SPSS/WIN 23.0 (IBM Corp., Armonk, NY, USA). For general characteristics of research participants, raw numbers, percentages, averages, and standard deviations were used. For homogeneity test between the 2 groups, Chi-square test and Fisher's exact test were used. Homogeneity of dependent variable prior to intervention was calculated using a t test, a test for normality was conducted using the Kolomogorov-Smirnov test, and Independent t test was used to analyze and identify the effects of laughter therapy on stress, salivary cortisol, and subjective happiness

6. Ethical considerations

This study was approved by the Institutional Review Board of the Keimyung University for research purposes, methodology, participant rights guaranteed and use of the questionnaires (IRB no. 40525-201704-HR-020-02). The purpose and method of this study was fully explained to the participants and they understood that they could stop participating in the study at any time during the research. All the questionnaires were written anonymously, and explanations and results were not used except for the research purposes of this study, and the participants who voluntarily participated in the study were selected and the experiment was conducted with written informed consent.

Results

1. Participants' general characteristics

A total of 48 participants were included in this study. There were 24 individuals in the experimental group who received laughter therapy and 24 participants in the control group who did not participate in laughter therapy. There were 42 participants (87.5%) who were female. No statistically significant differences were observed in the homogeneity test conducted on the experimental and control group regarding general characteristics thus, it was shown that the 2 groups were similar.

"It fits my aptitude" was the most commonly cited reason for applying to enrol on the nursing course (25 individuals, 52.1%). Most participants (41individuals, 85.4%) answered that they were "satisfied" with the major that they had chosen and just over half the students had a grade point average "Between 3.5 and 4.0" (26 participants, 54.2%). Most student nurses wanted to work for a "university hospital in a metropolitan area," (36 participants, 75%), followed by a "university hospital in a rural area" (12 participants, 25.0%). Grades were perceived by the student nurses to influence potential employment (25 participants, 52.1%), followed by the "interview" itself (20 participants, 41.7%), and "Test of English for International Communication" (3 participants, 6.2%).

2. Changes in pre-test and post-test results

The pre and post-comparison of the experimental group participating in the laughter treatment, and the control group were is shown in Table 2. The experimental group psychological stress score was 50.20 ± 11.97, which was significantly lower than the 70.87 ± 6.75 score before applying the program ($t = 7.94$, $p < 0.001$). The control group scored 73.33 ± 53.33 before application. It increased to ± 5.82 points ($t = -8.09$, $p = 0.630$). The experimental group whose participants received laughter therapy, experienced reduced psychological stress in comparison to the control group.

The experimental group Salivary cortisol levels decreased from 0.91 ± 0.74 ng/ml before intervention to 0.61 ± 0.05 ng/ml after intervention ($t = 4.65$, $p < 0.001$). The control group

Table 2. A comparison of psychological stress, salivary cortisol, and subjective happiness pre- and post-intervention (N = 48).

Variable	Group	Pre	Post	t	p
		M ± SD	M ± SD		
Psychological stress	Exp (n = 24)	70.87 ± 6.75	50.20 ± 11.97	7.94	< 0.001
	Cont (n = 24)	53.25 ± 9.63	73.33 ± 5.82	-8.09	0.630
Salivary cortisol*	Exp (n = 24)	0.91 ± 0.74	0.61 ± 0.05	4.65	< 0.001
	Cont (n = 24)	0.88 ± 0.68	1.21 ± 0.75	-8.09	< 0.001
Subjective happiness	Exp (n = 24)	17.91 ± 3.83	22.87 ± 2.81	-5.97	< 0.001
	Cont (n = 24)	19.75 ± 3.37	18.04 ± 3.44	1.80	0.840

* unit = ng/mL.
exp = experimental; cont = control.

increased from 0.88 ± 0.68ng/ml before intervention to 1.21 ± 0.75 ng/ml after intervention (t = -8.09, p < 0.001). A statistically significant improvement in salivary cortisol levels was observed after laughter therapy.

The experimental group experienced elevated subjective happiness in comparison to the control group participants. When subjective happiness was compared before and after laughter therapy, a statistically significant difference was observed (t = -5.97, p < 0.001). Comparing the subjective happiness between the two groups before and after the laughter treatment program, the experimental group showed a statistically significant difference of 17.91 ± 3.83 points before the program application and 22.87 ± 2.81 points after the program application. The control group showed no statistically significant difference in subjective euphoria from 19.75 ± 3.37 before application to 18.04 ± 3.44 after application (t = 1.80, p = 0.840).

There were no statistically significant differences observed at the start and end of the assessment period in the control group for psychological stress, salivary cortisol levels, and subjective happiness.

Discussion

This study was conducted in student nurses who are awaiting employment, to verify the effect of laughter therapy on employment stress and subjective happiness. The laughter therapy used in this study was adapted from a previously described therapy [8,25], and was validated by a group of experts. Laughter therapy for the alleviation of employment stress of student nurses included a total of 8 intervention sessions over 4 weeks for the experimental group.

In this study the changes in psychological stress of student nurses in the experimental group showed significantly lower psychological stress after laughter therapy (t = -8.50, p < 0.001), whereas the control group showed no difference.

The average employment stress of student nurses in this study was 2.97 on a scale of 5 (62 out of 110 points). This value showed that student nurses' employment stress is equivalent to regular college students, whose averages have been reported to be 2.99 (64 out of 110 points) and 2.95 (61 out of 110 points) [14]. This high employment stress seems to be due to the numerous employment-preparation activities, such as studying for qualifications and preparing for interviews, which student nurses must do in order to apply to and be selected for their preferred hospitals [6].

This study was conducted to avoid the period of midterm and final exam, and the employment season, in order to accurately measure the stress level of the experimental group and the control group. Both groups had high levels of psychological stress at the start of the study. It would not be ethical for the control group to be denied access to the intervention, so after the study was completed, the researchers gave the control group the same laughter treatment as the experimental group.

Specific plans are necessary for students who prefer to be employed at a large hospital, which is generally akin to large corporations, in order to reduce employment stress while

appropriately preparing for employment. Thus, it may be important to lead students to decide on the area and hospital that fits their aptitude and grades, to conduct job search employment activities during early years of nursing school, and to increase activities that reduce employment stress (which increase as graduation comes closer).

The results of this study are in line with previous research on the job stress reduction effects of laughter therapy [14,25,26,30]. The job stress reduction effect of laughter therapy was given in 8 sessions, across 4 weeks, and perceived stress reduction effect of laughter therapy was given once per week for 2 hours, for 4 weeks, for student nurses in 1 study [14]. In another study, the effect of laughter therapy was given for 1 90-minute session per week, for 6 weeks to 780 cancer patients [30]. A study reported the stress reduction effects of laughter therapy in clinical practice, given for 1 60-minute session per week, for 6 weeks in student nurses [25]. Another study reported the stress-reduction effect of applying one-time laughter therapy for breast cancer patients before surgery [26].

The results of this study are similar to observations that have reported continuous laughter therapy (4 weeks of 8-session laughter therapy) was effective at managing psychological stress [5,11,15], and is in line with laugher therapy reducing stress by replacing negative thoughts of stress with positive attitudes and beliefs [17,31,32].

Laughter therapy not only helps reduce psychological stress of the student nurse, but also leads to the interpersonal dissemination of positive energy amongst the nurses. Based on these results, laughter therapy was an effective intervention easing the psychological stress of student nurses.

Salivary cortisol, which is a marker for psychological stress, showed a statistically significant decrease in concentration from 0.91 ± 0.74 ng/mL before the intervention, to 0.61 ± 0.05 ng/mL after the intervention (t = -6.53, $p < 0.001$). This supports the results that laughter therapy has a positive effect on helping individuals respond to stress [33]. Significantly, laughter therapy is effective at reducing salivary cortisol and also showed a reduction in psychological stress.

Although the results in this study cannot be directly compared to previous research measuring salivary cortisol among student nurses, our results are in line with previous research on the effects of applying a 60-minute session of laughter therapy per week, for 4 weeks, on the stress response of marriage-migrant women where the experimental group's salivary cortisol level showed a statistically significant decrease from 4.27 ± 1.01 mg/dL to 3.32 ± 0.65 mg/dL after laughter therapy (t= -2.757, $p = 0.005$) [34].

In contrast, the results of this current study are not in line with research on breast cancer mastectomy patients, and the stress experienced by obese women [19,35], stress experienced by middle-aged women [34], and the stress reduction effect experienced by nurses in burns units [36] showed conflicting results to this current study by reporting that laughter therapy did not have an effect on reducing serum cortisol levels [19,34,35].

It may be plausible that in previous studies, invasive blood sampling to measure serum cortisol levels induced discomfort in participants, approximately 15 minutes after the onset of stress, cortisol levels rise systemically and remain elevated for several hours [34,36]. The salivary cortisol measurement method used in this study is simple, non-invasive, and painless in comparison to the serum cortisol level measurement method and leads to reduced discomfort in participants [37]. Thus, using salivary cortisol to measure psychological stress in the future may be helpful in extracting reliable results.

The average subjective happiness points in this study was 64. A general study on college students by Kim [38] showed that average participant happiness was 70 points, and in a study by Lee and Nam [8] it was reported to be 77 points. A study by Park and Lee [7] in student nurses subjective happiness reported that the average points for participants' happiness was 63, and another study by Jo and Park [39] that reported it to be 66 points. The subjective happiness of student nurses was lower than college students in general. The reason for this may be that student nurses experience heavy school workloads and clinical practice, which results in more difficulty than other students with role adaptation, employment stress in the process of preparing for exams and after graduation, and the fear of nursing as a qualified nurse [39]. Thus, it is important to find the strengths of student nurses to increase subjective happiness.

In this study, the effect of laughter therapy on subjective happiness of student nurses was shown to be statistically significantly higher after laughter therapy in the experimental group (t = 5.32, $p < 0.001$). Moreover, it was shown in a study on adults, that laughter value and happiness value increased after laughter therapy. The effect of laughter therapy participation showed that the happiness value was higher if an individual could laugh at themselves, rather than laugh at others [16].

It is important to reduce the employment stress of student nurses, increase subjective happiness, strengthen positivity, and encourage confidence. Thus, laughter therapy is an effective intervention for reducing employment stress and improving subjective happiness. Moreover, this program is significant in that it is an individualized program for student nurses that is differentiated from other laughter therapies because it is able to provide psychological support and motivation to student nurses in anticipation of employment at hospitals, by being an intervention in which nurses who work in the clinic personally teach and train.

This study has a few limitations. Firstly, this study selected

participants from 2 colleges in D City, so the research results are limited in their generalizability. Secondly, this study was conducted at a time when participants' final exams and job searches were simultaneously occurring, which limited the exact identification of whether the participants' stress and salivary cortisol levels were related to school work or job searching. Therefore, collecting salivary cortisol not only before and after the intervention, but also at regular intervals may increase the reliability of the results. Thirdly, the development of 1- or 2-day short-term focused intervention programs should be considered, considering the busy schedule of student nurses who have to do school work and clinical work in parallel.

Conclusion

This study was conducted to test the effects of laughter therapy on employment stress and subjective happiness of 4th year student nurses anticipating employment. Results in this study showed that the experimental group that underwent laughter therapy experienced a significant decrease in employment stress and psychological stress, and a significant increase in subjective happiness, an observation not observed in the control group. Therefore, laughter therapy may be actively employed in clinics, and potentially in schools as an intervention to ease employment stress of student nurses, and to help increase their subjective happiness.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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