Clinical Cancer Investigation Journal-ISSN: 2278-0513

Comparison of the Effect of CBT and Positive Psychotherapy on the Locus of control in Hypothyroidism Patients

Abstract

This study was conducted to determine the difference between the effect of cognitive-behavioral therapy (CBT) and positive psychotherapy on the locus of control in patients with hypothyroidism. This was a quasi-experimental study with a pretest-posttest-follow-up (PPF) design and a control group. The statistical population included all patients with hypothyroidism who one of the endocrinology clinics in Tehran in 2021, from which 60 patients were selected by convenience sampling and randomly assigned to CBT, positive psychotherapy, and control groups. The subjects answered the Rotter's Locus of Control Scale (1966) for pretest, posttest, and follow-up. The subjects in 2 experimental groups received 8 sessions of CBT and 8 sessions of positive psychotherapy. The data were analyzed using repeated-measures ANOVA. According to the results, there was no significant difference between the effect of CBT and positive psychotherapy on the locus of control in patients with hypothyroidism ($P < 0.05$), and both methods significantly affected patients' locus of control. The results also indicated that CBT and positive psychotherapy significantly contributed to an increased patients 'locus of control and that CBT and positive psychotherapy could be used as adjuncts to pharmacotherapy in clinical settings to reduce the effects of hypothyroidism, enhance a locus of control, and focus on patients' internal attributions.

Keywords: *Locus of control, Cognitive-Behavioral Therapy (CBT), Positive Psychotherapy, hypothyroidism.*

*** Nahid Zarrati [1], Alireza Aghayosefi [2], Hossein Zare [3], Nila Elmi Manesh [4]**

*[1]PhD in Health Psychology, Department of Health Psychology, Payam Noor University, Dubai Branch, United Arab Emirates. (*Nahidzarrati@hotmail.com)*
2. Associate Professor, Department of Psychology, Payame Noor University, Tehran, Iran e-mail: arayeh1100@gmail.com
3. Professor, Department of Psychology, Payame Noor University, Tehran, Iran e-mail: h_zare@pnu.ac.ir
4. Assistant Professor, Department of Psychology, Payame Noor University, Tehran, Iran e-mail: danravan20@yahoo.com
*Corresponding Author Address: *Nahidzarrati@hotmail.com*

Introduction

Diseases are factors that threaten the public health of individuals in a society, negatively affect it, and also affect the human psyche. One of the most common endocrine diseases is hypothyroidism, which is the most common endocrine disease after diabetes (1). The prevalence of hypothyroidism is about 4 out of every 1000 women and 1 out of every 1000 men. Hypothyroidism is a clinical syndrome that occurs as a result of a defect in the production of thyroid hormones (2). The disease increases with age and is more common in women than men. According to various studies, thyroid hormone is one of the main factors in brain chemistry disorders so in any of these disorders, the imbalance of these hormones seriously affects patients' emotions and behaviors until proper treatment is done (3). As a result of change in thyroid hormone concentrations, symptoms such as anxiety and depression, mood swings, and decreased cognitive function also affect the patient's daily activities and life (4). Studies have shown that changes in thyroid hormone concentrations also play a role in psychological dysfunction, which can manifest as forgetfulness, fatigue, mental slowing, inattention, and emotional lability. Researchers also believe that changes in thyroid hormone concentrations are associated with the onset of anxiety symptoms, severe fears, mood swings, anger and irritability. (5). Having a locus of control, especially in such difficult situations, enables patients to overcome their problems, and a lack of locus of control causes patients to pursue maladaptive goals. The locus of control is a psychological-behavioral component that describes an individual's perception of the world and is measured on an external-internal continuum (6). The locus of control is a set of people's beliefs about the control of their destiny and can be distinguished by internal and external beliefs. The internal belief refers to a person having more control over their destiny and directly trying to control the external environment, while in the external belief the person sees life under the influence of environmental factors and outside of their control (7).

Studies suggest that the locus of control concerns the extent to which people feel they can control the events affecting them. In this way, the internal locus of control is associated with mental health and social adjustment (8). According to studies, people with an internal locus of control are less prone to mental illness than people with an external locus of control (9).

Studies have shown that the use of self-management approaches plays an important role in controlling disease symptoms, in addition to conventional treatments for chronic disease. One of the most important of these approaches are Optimistic training and cognitive-behavioral therapy (CBT) (10).

Studies have shown that due to the fact that optimism is considered one of the correlates of physical health, therefore, increasing optimism in patients with chronic diseases plays a very important role in improving their mental and physical health. Optimism is also related to behaviors that contribute to the improvement of mental and physical health (11). Another approach that can be effective in treating these patients is CBT, which is based on human intellect and is based on two basic principles. First, people's mental attitudes have a controlling

effect on their emotions and behavior, and second, people's actions or behaviors have a strong effect on their mental and emotional patterns (12). Studies show that CBT can improve psychological disorders in patients with endocrine diseases (13). According to researchers, optimistic training has a protective effect on stress and other mental health risk factors (14). Furthermore, CBT is based on changing thoughts and feelings. CBT is a method of treatment in which patients express their thoughts, feelings, and beliefs based on freedom of expression. Next, the therapist modifies the patient's cognitive thoughts and beliefs (15).

The results of differents studies suggest that the advantages that have made this approach one of the most important choices of researchers in the field of mental health prevention and promotion are that it is solidly supported, it is structured, the cognitive-behavioral techniques are teachable, and it addresses cognitive, emotional, behavioral, and social components in multiple ways (16).

Given the relatively high prevalence of hypothyroidism as well as its negative psychological consequences, planning should be done to reduce the occurrence of these consequences. There are various intervention techniques to improve these psychological consequences. Since the application of positive psychotherapy in patients with hypothyroidism is an emerging underlying cause and also few studies discuss the application of this method in patients with hypothyroidism, it seems necessary to conduct a study in this field. Considering that the effectiveness of therapeutic interventions can be rooted in the integration of the concepts and key methods of those approaches, comparing the effectiveness of two intervention approaches and examining the differences between them can clarify the effect of interventions on the locus of control in patients with hypothyroidism so that the best intervention can be used. Despite the importance of addressing the mental health problems of people with hypothyroidism more quickly, more efficiently, and less costly to minimize their stress, it seems that identifying the most effective psychological treatment for the locus of control in these patients significantly helps to improve the psychological condition of these patients to reduce the psychological complications caused by this disease by identifying the best therapeutic intervention for these patients and applying it. Accordingly, this study seeks to answer the question of whether CBT and positive psychotherapy affect the locus of control in patients with hypothyroidism and which of these approaches affects patients more.

Methodology

This was a quasi-experimental applied study with a pretest-posttest-follow-up (PPF) design and a control group. The statistical population included all patients with hypothyroidism who were referred to one of the endocrinology clinics in Tehran in 2021, from which 60 patients were selected by convenience sampling and randomly assigned to CBT (n=20), positive psychotherapy (n=20), and control groups (n=20), using the inclusion and exclusion criteria. The inclusion criteria were overt hypothyroidism, age 20 to 60 years, no diagnosis of severe mental illness, no concomitant use of psychotherapy, willingness and written consent to participate in the study, and being in the chronic phase of the disease. Moreover, the exclusion criteria were exacerbation of hypothyroidism to such an extent that the patient could not participate in the study, unwillingness to participate or withdraw from cooperation, and absence of two or more sessions in the intervention program. The Rotter's Locus of Control Scale (1966) consists of 29 items, each with a pair of items, one of which evaluates the internal locus of control location and the other the external locus of control with a score of 1 for items A and a score of 0 for items B, was used to measure the locus of control. Movaffagh (1996) reported a correlation coefficient of 0.39 and a reliability coefficient of 0.70 for this instrument using concurrent validity with the Nowicki Strickland locus of control as a criterion (17).

The study was conducted in one of the private endocrinology clinics in Tehran in the winter of 2021. The first group received eight 90-minute sessions of CBT (n=20). The second group received eight 90-minute sessions of positive psychotherapy (n=20). However, the control group received no intervention (n=20). After the end of the intervention, the most effective treatment was applied to it to comply with the ethical principles. A 1-month follow-up was then performed for all 3 experimental groups. The intervention sessions were conducted by the researcher under the supervision of the professors. Patients in both experimental groups participated in the intervention in two separate groups on two different days of the week. The topics were the same on both days of the week. So, people who failed to attend one of these two days had the chance to attend on an alternate day. Besides, the members of the control group came every week for drug and diet checks, etc., and interventions other than CBT and positive psychotherapy were performed for them. A special checklist for daily recording of positive psychology exercises was given to patients at the last intervention session to continue applying these skills during the two months of follow-up.

The method of creating a balance was used to prevent possible bias in responding to the questionnaires and increase the validity of the results, and the basis for maintaining balance in the validity of the answers to the items of the questionnaires was provided by changing the order of their presentation. In the present study, written consent was obtained from all participants, and ethical principles including informed consent, confidentiality, and secrecy were observed for all participants.

Data Analysis Method

Demographic variables were analyzed using descriptive statistical methods such as mean and standard deviation. The hypotheses were tested and the dependent variables in the pretest and posttest phases were compared using repeated-measures ANOVA provided that test preconditions, including normal distribution of data, homogeneity of error variances, intra-subject variability, variance-covariance matrix, linearity, Spss-24 software, and significance levels of 0.05 and 0.01 were met.

Intervention

Table 1. A summary of the content of CBT training sessions (Houghton et al., 2009) (18)

Session	Content
First session	Introducing and presenting basic information about CBT, explaining the reason and purpose of holding group CBT sessions, stating the basic principles and rules of treatment sessions, and performing training assignments to make the group members more familiar.
Second session	Explaining the relationship between thoughts, feelings, and behaviors, including how thoughts create feelings and behaviors and how can reduce or increase emotions, using techniques such as ABC (according to the ABC technique, the same event leads to different thoughts that can evoke different feelings and behaviors, and you can find out if your thoughts are right or wrong by examining the facts), rating emotions and the level of belief in thoughts, searching for fluctuations in specific beliefs, examining the advantages and disadvantages, expressing the differences between thoughts, feelings, and behaviors, using techniques such as distinguishing thought from reality, explaining dysfunctional thinking styles and spontaneous thoughts, expressing common cognitive errors, using techniques including identifying cognitive distortions such as personalization, and distributing thought reconstruction worksheets.
Third session	Explaining and reviewing the assignments performed in the second session, explaining the four main steps to reconstruct thoughts (identifying ideas using techniques such as challenge with stereotype thinking, identifying conditional beliefs, examining the value system, evaluating thoughts using techniques such as downward arrow, changing thoughts, determining the effects of modified thoughts using techniques such as defining words, examining evidence, playing a role in both aspects of thought, and redistributing thought reconstruction.
Fourth session	Explaining and reviewing the assignments performed in the third session, examining the cause-response-outcome chain, explaining how outcomes fit into the larger behavioral chain, articulating strategies for breaking the destructive chain in these sessions using techniques such as thought sequencing, examining behavioral fluctuations in different situations, and changing negative thoughts through behavior change.
Fifth session	Explaining and reviewing the assignments performed in the fourth session, defining assertive behavior, imagining a situation in which assertive behavior is difficult, proposing self-talk to increase the audacity of the difference between passive, aggressive, and assertive behavior, and providing an example of negative thoughts and self-talk that will prevent assertiveness.
Sixth session	Explaining and reviewing the assignments performed in the fifth session, defining impulses, discussing impulse management, providing solutions for more self-control and increased mood and pleasant events, and distributing worksheets of pleasant activities.
Seventh session	Explaining and reviewing the assignments performed in the sixth session, explaining about stress, stressors, and stress management, stress management, providing solutions to solve the problem, and muscle relaxation intervention.
Eighth session	Explaining and reviewing the assignments performed in the seventh session, defining self-esteem, stating how negative self-assessments will lead to a lack of self-esteem, providing strategies for improving self-esteem, distributing self-concept worksheets, planning to prevent a recurrence, articulating the need to practice skills acquired during sessions, and evaluating progress and skills learned.

Table 2. A summary of the content of positive psychotherapy sessions (Mohammadi and Aghayousefi, 2020)

Session	Objective	Content
First session	Optimism and its advantages	Addressing endocrine diseases and the importance of paying attention to them, examining the effect of psychological factors on thyroid diseases, reviewing the literature on this subject, and introducing optimism and its high importance in the field of health The first optimistic strategy: Insight into optimism and monitoring it
Second session	Optimism and post-injury growth	The second optimistic strategy: Introducing post-injury growth, positive interpretation of injury and the logic of addressing it, and seeing the positive characteristics of each phenomenon The third optimistic strategy: A positive interpretation and appreciation of the complication of the disease and the logic of addressing it The fourth optimistic strategy: Seeing the positive features of each phenomenon and the logic of addressing it
Third session	Optimism in interpersonal relationships	The fifth optimistic strategy: Social optimism and the logic of addressing it The sixth optimistic strategy: Optimism about the spouse and the logic of addressing it
Fourth session	Optimism through the past and the present	The seventh optimistic strategy: Optimism over time and the logic of addressing it, optimism over the past and the logic of addressing it, and reviewing memories of the past at every opportunity of the day The eighth optimistic strategy: Optimism over time and the logic of addressing it, optimism in the present time and the logic of addressing it, and recording three good events each day and appreciating it
Fifth session	Optimism in the future/hope	The ninth optimistic strategy: Optimism over time and the logic of addressing it, optimism in the future and the logic of addressing it, and imagining three positive events for the coming week The tenth optimistic strategy: Imaging the best possible self in the next five years and the best possible thyroid health in the next five years The eleventh optimistic strategy: setting a thyroid health goal booklet
Sixth session	Optimistic explanation of events (ABCDEF)	The twelfth and thirteenth optimistic strategies: Introducing optimistic and pessimistic explanation style, recording and challenging negative thoughts and emotions, replacing pessimistic thoughts with positive ones based on an optimistic explanatory style according to Seligman ABCDEF model The fourteenth optimistic strategy: Accepting things that cannot be changed by Using the optimistic explanatory style and the logic of addressing it
Seventh session	Optimism when sleeping and waking up	The fifteenth optimistic strategy: Morning optimism (when waking up) and the logic of addressing it The sixteenth optimistic strategy: Optimism when sleeping and the logic of addressing it
Eighth session	Turning optimism into a habit	The seventeenth optimistic strategy: Turning optimism into a habit, the logic of addressing it, and recording optimistic exercises over the next two months according to a checklist

Findings

The maximum number of participants belonged to women in the control group (93.33%) and men in the positive psychotherapy group (33.33%). Moreover, in terms of the age

group of participants, the maximum and minimum frequencies belonged to the positive psychotherapy group of 46-50 and the control group of 41-45 years, respectively. In terms of education level, the maximum and minimum frequencies belonged to the diploma degree in the positive psychotherapy group (66.7%) and the master's degree and higher in the control group (13.3%), respectively.

Table 3. The mean and standard deviation, and Shapiro-Wilk statistics of the variables in CBT, positive psychotherapy, and control groups in the pretest, posttest, and follow-up phases

Variable	Group	Pretest		Posttest		Follow-up		Significance		
		Mean	SD	Mean	SD	Mean	SD	Pretest	Posttest	Follow-up
Locus of control	CBT	26.06	2.34	29.60	2.89	31.06	3.97	0.067	0.097	0.227
	positive psychotherapy	24.53	2.79	29.00	2.44	30.53	3.39	0.066	0.050	0.410
	Control	24.13	2.58	23.60	2.72	23.20	2.62	0.329	0.903	0.298

The mean, standard deviation, and Shapiro-Wilk statistics concerning the scores of the participants in the experimental and control groups in the pretest, posttest, and follow-up phases can be seen in Table 3. According to the table, the data of the variables were normally distributed in 3 groups in the pretest, posttest, and follow-up phases.

Table 4. The results of Levene's Test and Mauchly's Sphericity Test on the variable of the locus of control in the CBT, positive psychotherapy, and control groups in the pretest, posttest, and follow-up phases

Assumption	Phase	Degree of freedom 1	Degree of freedom 2	F	The probability value
Homogeneity of error variations	Pretest	2	42	0.611	0.548
	Posttest	2	42	0.009	0.991
	Follow-up	2	42	1.07	0.350
Intra-subject variability		The probability value	Degree of freedom	Chi-square statistics	Mauchly statistics
		0.388	2	1.89	0.955

According to Table 4, Levene's test was not significant for any of the study phases. So, the assumption of homogeneity of error variances for the variable of the locus of control was observed in three phases. The results of Mauchly's Sphericity Test in Table 3 indicated that the assumption of the equality of intra-subject variability for the variable of the locus of control was established.

Table 5. The results of mixed repeated-measures ANOVA in explaining intragroup, intergroup, and interaction effects

Source of effect	The sum of the squares	Degrees of freedom	Mean squares	F	The probability value	Eta squared
Group	715.39	2	357.69	18.55	0.001	0.469
Time	273.08	2	136.54	44.96	0.001	0.517
Confrontational effect	724.74	2.79	259.74	47.84	0.001	0.467

According to Table 5, CBT and positive psychotherapy had a positive effect on the locus of control (P = 0.001). The effect of time increased the locus of control (P = 0.001) compared to the pretest phase. The interaction effect of the time * group increased the locus of control (P = 0.001) compared to the control group.

Table 6. The results of the Bonferroni test for pairwise comparisons of the means of the effect of time and time * group

The difference between the groups			The mean difference	The standard error	The probability value
Locus of control	CBT	Positive psychotherapy	0.889	0.926	1.000
		Control	5.26	0.926	0.001
	Positive psychotherapy	Control	4.37	0.926	0.001
Time differences			**The mean difference**	**The standard error**	**The probability value**
Locus of control	Pretest	Posttest	-2.48	0.344	0.001
		Follow-up	-3.35	0.404	0.001
	Posttest	Follow-up	-0.876	0.351	0.053

According to Table 6, the results of the Bonferroni test showed a significant mean difference between pretest and posttest phases and between pretest and follow-up phases for the variable of the locus of control, indicating a positive effect of CBT and positive psychotherapy and the continuity in the follow-up phase. The results of Table 5 suggested that there was no significant difference between CBT for the variable of the locus of control.

Discussion

According to the findings, the hypothesis that CBT and positive psychotherapy had a significant effect on the locus of control in patients with hypothyroidism was confirmed. Although the effect of CBT was slightly greater than that of optimistic training, there was no statistically significant difference between the two groups.

Since no print and electronic sources were available on the effect of CBT on the locus of control in patients with hypothyroidism, the results could not be well compared. However, various studies have examined the effect of CBT on the locus of control in patients with various diseases. For example, Fatimah et al. (2019) argued that CBT significantly contributed to an increased locus of control of students experiencing academic stress (19). Furthermore, the results of a study by Mehrtak et al. (2017) indicated that according to the external locus of control in most dialysis patients, the use of CBT affects the internalization of the locus of control in this group of patients and that CBT seems to be essential for internalizing patients' locus of control (20).

The results of studies show that the locus of control is defined as a generalized expectation that is perceived with an internal or external pattern and reflects the degree of belief that the individual considers events to be dependent on his/her relatively stable behavior or characteristics. One sometimes perceives reinforcement as a consequence of some of one's actions but does not consider them to be entirely dependent on one's actions. Such cases are considered the result of luck, fortune, control of powerful others, or unpredictability due to the great complexity of the forces that surround the person. Events are called belief in the external locus of control if they are interpreted in this way. A person has a belief called "internal locus of control" when he/she perceives events in harmony with his/her relatively stable behavior or characteristics (21). People with an external locus of control find events unpredictable due to the complexities of the environment. Individual differences in the generalized beliefs about them can be identified by evaluating the external and internal locus of control.

Given that many of the psychological problems of patients are caused by unfavorable mental status and their negative perceptions about the disease and themselves, researchers consider the role of cognitive factors in behavior, feelings, and emotions to be effective and important. According to studies, people who have an external locus of control have a set of wrong beliefs, cognitions, and attributions (20). These people have beliefs about their abilities that can be changed through the use of various psychological therapies. Studies indicated that it is possible to reconstruct individuals' cognitive constructs and influence their perceptions and interpretations of events, happenings, and behaviors through CBT (22). The main goal of cognitive therapy is to change and improve individuals' cognitive processes. So, desirable changes in patients' behavior are achieved by changing their thought patterns, beliefs, and attitudes. Studies also suggest that the need for psychological therapies in addition to medical treatment is evident in the concept of patients' locus of control. Optimistic people, on the other hand, are more likely to believe in the internal locus of control of their health and benefit from strategies to change the controllable aspects of stressors and positive regeneration (23). Since having a locus of control combined with positive perceptions and attitudes leads to a better assessment of health, the internal locus of control plays an important role in psychological mechanisms (23). Accordingly, having optimism underlies health beliefs and internal control of health by creating positive beliefs and attitudes. Due to the high prevalence of patients with hypothyroidism, variables such as optimism and cognitive-behavioral therapy are used very rarely in the treatment of this type of disease at the same time. However, it is highly effective. The available treatments for hypothyroidism are mainly medication and surgery. These treatments do not take into account the concerns, moods, and problems of patients and do not repair their psychological problems. Given that new approaches to the etiology, control, and treatment of non-

communicable diseases emphasize the psychosocial and psychological aspects in addition to physical symptoms and physical problems, integration of psychological aspects seems to be necessary along with pharmacological interventions to improve the quality of treatment and improve patients with endocrine diseases such as hypothyroidism.

Conclusion

Findings show that the use of CBT and optimism increases the internal control in patients with hypothyroidism. So, steps can be taken to create a locus of control in these patients by designing appropriate programs for the implementation of psychological and optimistic training.

Acknowledgments:NO

Funding

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Conflicts of interest

The authors wish to confirm that there are no known conflicts of interest associated with this publication.

Ethics statement

We declare that neither the article nor its main contents or tables have been or will be published or submitted for publication elsewhere. The manuscript is an original work of the author. All data, tables, figures, etc. used in the manuscript were prepared by the authors in the original, otherwise the sources are cited and reprint permission is included. The manuscript was read and approved by all authors. Authorship is granted only to those who significantly contributed to the research and preparation of this manuscript.

References

1. Chiovato L, Magri F, Carlé A. Hypothyroidism in context: where we've been and where we're going. Advances in therapy. 2019;36(2):47-58.

2. Gosi SKY, Garla VV. Subclinical hypothyroidism. StatPearls [Internet]: StatPearls Publishing; 2021.

3. Liu L, Zhang B, Lin K, Zhang Y, Xu X, Huo X. Thyroid disruption and reduced mental development in children from an informal e-waste recycling area: a mediation analysis. Chemosphere. 2018;193:498-505.

4. Pasyechko NV, Kulchinska VM. Anxiety and depression in women of reproductive age with thyroid disease. INTERNATIONAL JOURNAL OF ENDOCRINOLOGY (Ukraine). 2022 Jun 29;18(3):157-62.

5. Martino G, Caputo A, Vicario CM, Feldt-Rasmussen U, Watt T, Vita R, Quattropani MC, Benvenga S. Interrelations between mental health, generic and thyroid-related quality of life in patients with Hashimoto's thyroiditis receiving levothyroxine replacement. Mediterranean Journal of Clinical Psychology. 2021 Aug 8;9(2).

6. Rotter JB. Generalized expectancies for internal versus external control of reinforcement. Psychological monographs: General and applied. 1966;80(1):1

7. Lima MP, Moret-Tatay C, Irigaray TQ. Locus of control, personality and depression symptoms in cancer: Testing a moderated mediation model. Clinical Psychology & Psychotherapy. 2022 Mar;29(2):489-500.

8. Mikaeili, Niloofar; Eini, Sanaz; Taghavi, Ramin. The role of coping styles, locus of control, and emotional intelligence in predicting social adjustment of veterans with post-traumatic stress disorder. Iranian Journal of War and Public Health. 2018; 10 (4): 195-201

9. Xia Y, Ma Z. Social integration, perceived stress, locus of control, and psychological wellbeing among Chinese emerging adult migrants: A conditional process analysis. Journal of Affective Disorders. 2020; 267:9-16.

10. Bernard P, Romain AJ, Caudroit J, Chevance G, Carayol M, Gourlan M, Needham Dancause K, Moullec G. Cognitive behavior therapy combined with exercise for adults with chronic diseases: Systematic review and meta-analysis. Health Psychology. 2018 May;37(5):433.

11. Marton G, Monzani D, Vergani L, Pizzoli SF, Pravettoni G. "Optimism is a strategy for making a better future": A systematic review on the associations of dispositional optimism with health-related quality of life in cancer patients. European Psychologist. 2022;27(1):41.

12. Ghasemzadeh A, Nazari NH. P-1003-Effects of group counseling with cognitive-behavioral approach on reducing premenstrual syndrome. European Psychiatry. 2012;27(S1):1-.

13. Adegbolagun A, Ani C, Adejumo O, James B, Omigbodun O. Effect of a group-based cognitive-behavioral therapy program on the psychological wellbeing, quality of life, and coping of students with sickle cell disease in Nigeria. International Journal of Disability, Development, and Education. 2022;69(3):1095-104.

14. Rincon Uribe FA, Neira Espejo CA, Pedroso JdS. The Role of Optimism in Adolescent Mental Health: A Systematic Review. Journal of Happiness Studies. 2021:1-31..

15. Reinholt N, Hvenegaard M, Christensen AB, Eskildsen A, Hjorthøj C, Poulsen S, et al. Transdiagnostic versus diagnosis-specific group cognitive-behavioral therapy for anxiety disorders and depression: A randomized controlled trial. Psychotherapy and psychosomatics. 2022;91(1):36-49.

16. Brown VM, Zhu L, Solway A, Wang JM, McCurry KL, King-Casas B, Chiu PH. Reinforcement learning disruptions in individuals with depression and sensitivity to symptom change following cognitive behavioral therapy. JAMA psychiatry. 2021 Oct 1;78(10):1113-22.

17. Barzegar, F.; Salehpoor, M.; Emam Jomeh, M. R. The relationship between locus of control and self-esteem with creativity in Ardakan city high school students. Journal of School Psychology and Institutions. 2015; 3 (4): 6-21.

18. Houghton S, Saxon D, Bradburn M, Ricketts T, Hardy G. The effectiveness of routinely delivered cognitive behavioural therapy for obsessive-compulsive disorder: A benchmarking study. British Journal of Clinical Psychology. 2010 Nov;49(4):473-89.

19. Fatimah S, Suherman MM, Rohaeti EE. Penerapan Cognitive-Behavioral Therapy dalam Meningkatkan Locus of Control Peserta Didik yang Mengalami Stres Akademik. Jurnal Penelitian Bimbingan dan Konseling. 2019;4(2).9-42.

20. Mehrtak M, Habibzadeh S, Farzaneh E, Rjaei-Khiavi A. Effectiveness of teaching cognitive-behavioral techniques on locus of control in hemodialysis patients. Electronic physician. 2017;9(10):5631.

21. Kesavayuth, D., Poyago-Theotoky, J., & Zikos, V. (2020). Locus of control, health, and healthcare utilization. *Economic Modelling*, *86*, 227-238.

22. Ryle A, Kerr IB. Introducing cognitive analytic therapy: Principles and practice of a relational approach to mental health. John Wiley & Sons; 2020 Jun 8.

23. Zhang, A. and Jang, Y., 2017. The role of internal health locus of control concerning self-rated health in older adults. *Journal of gerontological social work*, *60*(1), pp.68-78.