Impact of Epilepsy-Based Progressive Muscle Relaxation Exercises on Epileptic Seizure Frequency, Sleep Quality, and Stress Severity among Children

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Abstract

Background: Education for children with epilepsy is viewed as a therapeutic consequence for people who suffer from the condition as well it is a crucial component of high-quality therapy. Patients with epilepsy must follow a variety of self-management practices in order to manage their condition. **Aim**: The study was carried out to determine the impact of epilepsy-based progressive muscle relaxation exercises on epileptic seizure frequency, sleep quality, and stress severity among children. **Subjects and method**: Pre-test and post-test interventions were used in a controlled, blinded, randomized study with a control group. The research was conducted in Mansoura city, Egypt, at the neurological pediatrics divisions of the Mansoura University Children's Hospital (MUCH). For the study, a purposive sample of 80 children with epilepsy (40 for the study group and 40 for the control group) were included. All were gathered during a 6-month period. **Tools**: Five tools were used to get the data, including: **Tool 1:** Interview questionnaire for children (pre, post), **Tool II:** The GASE Scale (a global assessment of epilepsy severity- pre/post). (2 parts), Tool II: The GASE Scale (a global assessment of epilepsy severity) (pre/post), Tool (III): Jacobson's progressive muscles relaxation technique, Tool V: The Sleep Quality Scale (SQS), Tool IV: The Perceived Stress Scale (PSS) (pre/post). **Results:** After application of the progressive relaxation exercises; small percentage of the study group had daily epileptic attack, poor sleep quality and high stress level compared to the control group. **Conclusion:** Progressive relaxation exercises had a good impact on children with epilepsy, As shown by a decrease in epilepsy' severity, frequency, stress level as well as an increase in sleep quality of the evaluated children post implementation of the Progressive relaxation exercises among the study group. **Recommendation:** To reduce seizure events among children with epilepsy, progressive relaxation techniques should be incorporated into routine nursing care.

Key words: epilepsy, progressive muscle relaxation exercise, seizure frequency, sleep quality, stress severity, children.

Introduction:

The complications brought on by epilepsy are sometimes more severe among children with epilepsy than seizures. According to studies, pediatric patients with epilepsy are more likely to experience stress than the general children, and they also suffer from sleep problems more frequently due to the medications they received and psychosocial factors associated with their condition **(Puskarich, Whitman, Dell, Hughes, Rosen & Hermann, 2015)**. Pediatric patients with epilepsy experience 2- to 3-times more sleep issues than the general population. In addition, nightmares, frequent awakening, daytime napping, and fatigue all are some of the most frequent sleep problems they exposed to **(Kassie, Kebede & Duguma, 2014).**

Epileptic seizures that occur frequently could harm the body and result in suffocation, bleeding, injuries, fractures, burns, and even

death. Children may struggle with executive functioning, perception, mood, memory, attention deficit and cognitive dysfunction when they had seizures. As a result, these young patients face discrimination, struggle in their academic, familial, and social environments, and possess a lower quality of life **(Megiddo, Colson & Chisholm, 2016)**. Due to all of these problems, children and their families also receive behavioral treatment; instructions, counseling, and support in addition to anti-seizure medication**s** (ASM) which become ever more an important intervention regarding their condition. These behavioral therapies include art, music therapy, bio/neurofeedback, self-control, mindfulness, yoga, meditations, cognitive behavioral therapy and progressive muscle relaxation exercises **(Moffat, Dorris, Connor & Espie, 2019; Haut, Vouyiouklis & Shinnar, 2017)**.

Exercises for progressively relaxing the muscles are mind-body methods that regularly and voluntarily relax the major muscles throughout the body to promote relaxation. Furthermore, the approach calls for consecutive systemic muscular contraction followed by relaxation (for 5-7 seconds) to reach a deep state of relaxation (for 10–12 seconds) **(Gitanjali & Sreehari, 2018)**. This method or intervention was developed by Edmund Jacobson and was first presented in the literature in 1938. It helps the user to recognize the variations between contraction and relaxation' sensations within the same muscle location. **(Jacobson, 1938)**. PMR exercises balance the posterior and anterior hypothalamus functions, which protect against the negative effects of stress and anxiety. They offer a variety of advantages, including enhancing the physical and mental health by reducing stress and anxiety with its harmful effects, lowering tiredness, encouraging sleep, and diverting attention from discomfort **(Wilczyńska, Łysak-Radomska & Podczarska-Głowacka, 2019)**.

The advantages of progressive muscular relaxation exercises are simple to learn, use and often with no negative consequences, inexpensive / free, it considered popular with patients as well as with the nurses who use it independently to control the illness **(Rice, Glasper & Keeton, 2018)**. PMR exercises are becoming more common as a suggested behavioral therapy, particularly among pediatric patients with epilepsy. According to some studies, PMR exercises are a useful treatment strategy for lowering stress levels, improving sleep quality, and improving quality of life among pediatric patients with epilepsy **(Masih, Dimmock & Guelfi, 2019)**.

Significance of the study:

It is well known that stress and sleep issues are common among children with epilepsy that could negatively impact life' quality. A careful assessment of the literature indicated that only a small number of studies both globally and in Egypt had looked into this issue, particularly as it relates to children with epilepsy. Furthermore, only a small number of these studies used a trustworthy research design and generated reliable investigations results **(Mohammed, Mohammed & Hassan, 2019)**. The art of nursing is represented through non-medical therapies like PMR exercises, which considered a component of nursing' care. It might assist nursing personnel in providing better therapeutic treatment and fostering a close bond between them and their patients **(Boergers, Hart, Owens, Streisand & Spirito, 2017)** For this reason, the existent study was directed to determine how children's stress levels, sleep quality, and frequency of epileptic seizures were affected by epilepsy-based progressive muscle relaxation exercises (PMR).

Aim of the study

The purpose of this study was to determine the impact of epilepsy-based progressive muscle relaxation exercises on epileptic seizure frequency, sleep quality, and stress severity among children.

Hypothesis

Epileptic seizure frequency, sleep quality, and stress severity among children are expected to be improved after implementation of epilepsy-based progressive muscle relaxation exercises.

Subjects and methods

Design:

Pre-test and post-test interventions were used in a controlled, blinded, randomized study with a control group**.**

Study settings:

The study was carried out at Mansoura University Children's Hospital (MUCH) in Mansoura city.

Study Subjects:

Eighty children with epilepsy who attended the aforementioned settings during the time frame for data' collection in six months were chosen for the study as a purposive sample. They were alternately divided into two equal groups with fourteen (40) child in each group.

Group one: The study group received the regular hospital management along with the progressive muscle relaxation technique.

Group two: The control group received the regular hospital management only to.

Inclusion criteria:

Children who met the following criteria were enrolled in the study: Aged from 6 to 18 years, old diagnosed with epilepsy, free of other chronic illnesses, receiving treatment for more than one year in the study setting, aware, well-organized, and free from major impairments in cognition and communications, and eager to participate.

Exclusion criteria:

Children with muscle atrophy, flaccidity, or spasticity.

Sample size justification

The Epi-Info 7 application utilizing the following standards to establish the sample size:

- ❖ Target population is 360 people every three months.
- ❖ The anticipated frequency is 50%.
- ❖ The permitted error is 10%.
- ❖ Level of confidence is 95%

Sample size is 80

- ✓ Eighty children were chosen for the study sample, and they were divided into studied and controlled groups utilizing the randomized block procedure. The randomization block for this experiment was carried out manually in accordance with the following steps:
- ✓ The researchers created a list of numbers from 1 to 80.
- ✓ Again, numbers from 1 to 80 were written on individual pieces of paper, which were then all rolled up until the number was invisible before being combined and gathered into a sizable ball.
- ✓ The eighty pieces of paper were separated into 4 blocks, each of which had 20 random numbers, at random and in the dark.
- ✓ Ten numbers were blindly selected at random from each block and given to children with epilepsy who underwent progressive muscle relaxation training (study group) and the remaining 10 to the control group.
- ✓ The cases were then registered in order on the list that had been previously created (the researcher had written CG or SG in front of each number).

Tools:

Tool 1: Interview questionnaire for children (pre, post)

The researcher wrote it in straightforward Arabic after reviewing the pertinent literature. It includes 2 parts.

Part (1): It concerned about the children attributes, including their age, gender, education, and place of residence.

Part (2): It concerned about the children medical history, which included type of epilepsy, the frequency of seizure attacks, the source of the seizures and how they were treated.

Tool II: The GASE Scale (a global assessment of epilepsy severity). (pre/post)

It developed by a team of experts in pediatric neurological, epidemiological, and neuropsychological scopes in order to measure this single item and provide an efficient assessment tool suitable for both the clinical and research requirements **(Speechley et al., 2008)**. In order to gauge the total severity of a child with epilepsy at the time of clinical examination. as a clinician-report measure. Seven clinical features of epilepsy identified by specialists as influencing the clinical assessment which were being considered by the researchers. The seven factors are: seizure frequency, seizure intensity, falls or injuries during seizures. The post-ictal phase's duration and its intensity, the total dose of medications, the number of AEDs used and its adverse effects, as well how much epilepsy or its medications is interfering with the patients' everyday activities.

Scoring system:

A seven-points Likert response scale, where used as "one" denotes "none, never, or mild" and "seven" denotes "extremely frequent, severe, or high," the clinical descriptions range from the highly severe to not at all severe **(Speechley et al., 2008)**. By considering that all the clinical factors, were ratings to determine the severity condition of an individual with epilepsy in general.

Tool (III): Jacobson's progressive muscles relaxation technique

It adapted by the researchers from Edmund Jacobson's work then translated into Arabic. She obtained the essential data by observing up the kids with epilepsy closely and using checklists at the same time. Four key elements were used to give muscle feeling during contraction and relaxation including: deep breathing exercises, starting or increasing technique sites, muscles contraction phase, muscles relaxation phase, frequent comparisons, and re-demonstrations (Jacobson, 1938).

Scoring system

During the two phases of training implementation (pre and post), scores were calculated to evaluate the children's performance levels in relation to Jacobson's progressive muscles relaxation technique. Each step that was completed completely received a score of 2, while incompletely correct steps received a score of one, and uncompleted items received zero score **(Sorour & Mohamed, 2019)**. The practice of the youngsters under study received a total grade of 132. which, based on the median result (66), it was separated into two categories: Unsatisfactory performance when the achievement scores less than 66 grades and satisfactory performance if the achieved scores equals or more than 66 grades; incompetent if the obtained score is between 66 grades and less than 99 grades; competent if the obtained score is between 99 grades and 132 grades.

Tool V: The Sleep Quality Scale (SQS)

It was created by Yi, Shin, and Shin in 2006; it included 28 items that evaluated the following six elements of sleep quality: daytime symptoms, sleep restoration, trouble walking, problems falling asleep and staying asleep, and sleep satisfaction. The scale was created with the intention of acting as a universal, practical tool for evaluating the sleep caliber among teenage patients as well as a range of patient and research populations. It takes five to ten minutes to administer the scale, as it is a simple self-report test **(Yi, Shin & Shin, 2006)**.

Scoring system

It includes a four-point Likert scale (0 for "few," 1 for "sometimes," 2 for "often," and 3 for "almost always"); the participants' rate how frequently they engage in certain sleep patterns. Prior to adding up the results, the scores of the questions two and five are inverted and linked to criterion (restoration after sleep and satisfaction with sleep). Total scores range from 0 to 84, with higher values indicating more severe sleep difficulties while a lower value indicating subjective quality of sleep **(Yi, Shin & Shin, 2006)**.

Tool IV: The Perceived Stress Scale (PSS) (pre/post)

It is a popular measure for evaluating stress. Perceived Stress Scale (PSS) developed by Levenstein et al. 1983; it is still a popular choice for helping us comprehend how diverse

situations affect our feelings and how we perceive stress. A patient is asked to rate his thoughts and feelings from the previous month using this scale. The scale estimated time to fill in is from 10- to 15-minute self-report task, requires a pencil and paper. Respondents rate how frequently they experience various signs of stress on a scale from 1 ("almost never") to 4 ("usually"). Higher scores indicate high stress level (**Levenstein et al., 1983).**

Scoring system:

The four positively stated items on the PSS—items 4, 5, 7, and 8—are scored by inverting the responses, such that, for instance, zero equals four, one equals three, two equal two, three equal one, and four equal zero. After that, the results are summarized throughout the entire scale. A quick four-item scale could then be developed utilizing the PSS's questions 2, 4, 5, and 10. Values range from 0 to 40 for patients; higher values denote greater stress level **(Levenstein et al., 1983)**.

- ❖ Low felt stress is indicated by total scores. From 0 to 13
- ❖ Moderate perceived stress is indicated by total scores from14 to 26
- ❖ Severe perceived stress is indicated by total scores from 27 to 40.

II –Methods

Field work:

- The general director of the Mansoura University Children's Hospital received official letters from the nursing faculty at the university. After giving them with an explanation about the study's goal, children with epilepsy or their caregivers and their verbal agreement to participate in the study.

A panel of 7 specialists in the field of neurological, psychiatric medicine and pediatric nursing evaluated and revise the study instruments' content for validity, clarity of the content, sequence of items, and relevance or irrelevancy of the content. The required alteration and/or modifications, according to their suggestions, were made in the study form: also they are adding scoring system at the end of sleep quality scale.

- To determine reliability, a statistician test of the internal consistency of the developed tools over the entire questionnaire were using Cronbach's alpha coefficient test. With a r of.867, Tool 1 was reliable. Tool II the r is.793, Tool III the r is.875, Tool V the r is.823, and Tool V the r is.778.

Ethical considerations

- The researcher adhered to the following ethical research standards:

- After being made aware of the goal of the study, each participant (the children) or their caregiver verbally consented before beginning of the research. The faculty research and ethical committee of the nursing school at Mansoura University gave its approval to the study protocol. The fact that children could decline or exit from the program at any time and without providing a reason was made clear to them. According to the researcher, the study is safe and could not cause any psychological or physical harm to the children. The right to withdraw from the study at any time without being held accountable for anything throughout the study's duration was provided to each participant, and the privacy and confidentiality of the data gathered were also assured.

The pilot study.

In order to demonstrate the tools' viability, clearly and applicability, as well as to estimate the time needed to fill in the study tools a pilot study was carried out on 10% of the entire population of the study subjects (8 children, 4 children from each group). Since no significant changes to the research tools were required, the participants of the pilot study were included in the study sample.

- Data collection started on December 2019, and it ran for six months, ending on May 30, 2020.
- The researcher introduced herself to the moms and kids before giving a brief explanation about the goals and parameters of the study.
- Before beginning the training and progressive relaxation exercises, each child was

questioned individually in order to gather the children's baseline data and medical history using the study tool(I) part (1 and 2).

- Using a tool (II) to determine the total severity condition of the children with epilepsy at the clinical evaluation time (pre assessment)
- Assessment of children' practice about Jacobson's progressive muscle relaxation exercises was done by using tool (III)
- Tool (V) was used to assess children subjective sleep quality.
- Instrument (IV) was used to evaluate the child's perceived level of stress.
- Eight groups of three to five moms each were formed from the children in the study. During the interview, the researcher used questions, discussion, and a variety of teaching techniques like group discussions, brainstorming, demonstrations, and redemonstrations. A power point presentation and many didactic tools, such as handout guidelines, were also used.
- Following the evaluation phase (after the first session), a colorful instruction manual outlining Jacobson's progressive muscle relaxation technique was given to each kid to grab their attention, inspire them, and let them repeat its material as necessary.
- . Each interview was conducted with the researcher using clear, unambiguous language, and each session ended with a succinct summary.
- Through using tool (II, III, V, IV), each child was independently questioned following the training program to determine the severity of their epilepsy, practice, sleep quality, and stress level. To determine the effects of Jacobson's progressive muscular relaxation' exercises, this was done by comparing the results of the pretest and posttest right after the program implementation.

Statistical design

The acquired data were coded, computed, and statistically assessed using SPSS (statistical program for social sciences), version 22. Data were provided using quantitative continuous variables, including frequency and percentages as well as mean SD. When comparing categorical variables, the chi square (2) method was used, but the Fisher exact test (FET) or Mont Carlo exact test was used in place of it if any cell's expected value was less than 5. The Student's t test and the Paired t test (two groups: before and after) were both used to compare two independent sets of continuous quantitative data. In order to calculate the correlation coefficient, Pearson's correlation (r) was used. The distinction was considered significant when P 0.05 was used.

Result

Mothers mean ages were 20.50±11.96 and 22.23±9.28 for the studied and controlled groups, respectively, **table (1**) showed that 55% and 32.5% of children in the study' and control' groups respectively were between the ages of 10 and 14 years old. In study' and control' groups, boys made up about 57.5% and 52.5%, respectively. In terms of schooling, 60% and 30% of the study' and control' groups' children, respectively, had preparative education. Furthermore, 80% and 72.5 percent, among the study' and control' groups' members respectively resided in rural areas. Regarding their medical histories, approximately 55% and 40% of the study and control group respectively as well as 27.5% and 30% of the study and control group respectively diagnosed as Petit Mal epilepsy.

Table (2) showed that 45% of the studied children were prone to the daily epileptic seizure attack before implementing the relaxation exercises, compared to 7.5 % of them only were suffering from attacks after implementing the relaxation exercises. Additionally, it was found that, 5% of the studied children did not suffered from epileptic attacks before relaxation exercises while, 60% of them did not suffered from epileptic attacks after relaxation exercises with a statistically significant difference at $p< 0.001$

According to table 3, there were severe epileptic events among 50% of the studied group and 40% of the controlled group, with no statistically significance differences among the two groups before relaxation activities. In contrast, following the relaxation exercises, 35% of the studied group and 45% of the controlled group both experienced severe

epileptic attacks, with a statistically significant difference between the two groups at p equal 0.001**.**

Table (4): Regarding the total practice of the progressive muscle relaxation exercise among the study group before and after program application, these findings clarified that, 77.5% of them had unsatisfactory practice before intervention compared to 7.5% of them had unsatisfactory practice after intervention. While 45% and 47.5 % of them had good satisfactory practice and competent satisfactory practice respectively after the intervention with statistically significance in variations at p< 0.001 before and after relaxation exercises implementation.

According to table (5), the majority of the study group (85%) had poor sleep quality compared to the vast majority of the control group (92.5%) prior to the intervention, with no statistically significant difference between the two groups. Whereas, after the intervention, the higher percentage of the studied group who with poor sleep quality decreased to 12.5% with a statistically significance in differences among the studied group with p< 0.001 before and after relaxation exercises

Table (6); found that, 82.5 % of the study group had high stress level compared to 85% of the control group before the intervention, with no statistically significant difference between the two groups. While 7.5% of the study group had high stress level after the intervention with a statistically significance differences among the studied group at p< 0.001 before and after relaxation exercises

Table (7) portrayed that, there was a negative association between progressive muscle relaxation exercises and gender as well as residence of both group after intervention at (P = 0.552 and 0.702 respectively). Furthermore, it illustrated from the same table that, there was a positive association between progressive muscle relaxation exercises (PMRE) and age as well as education of both groups after intervention with statistically significance differences at (P = 0. 002 and 0.004 respectively)

Table (8) portrayed that, before and after the intervention, there was a significant difference between the studied groups regarding the frequency of attacks that was positively correlated with sleep quality as (P = 0.02 and 0.001, respectively), additionally, the practice of progressive muscle relaxation technique is correlated with the frequencies of attack among the studied groups with a statistically significance differences after intervention at (P = 0. 003)

Table (1): frequencies of the studied children according to their demographic characteristics (N=40 in each group)

Characteristics	Study group (40)		Control group (40)	
	No	%	No	%
Age (years)				
▪ 6-<10	7	17.5	13	32.5
▪ 10-<14	22	55.0	13	32.5
▪ 14-18	11	27.5	14	35
	20.50±11.96		**22.23±9.28**	
Gender				
▪ Boys	23	57.5	21	52.5
▪ Girls<	17	42.5	19	47.5
Education				
▪ Uneducated/ illiterate	0	0.0	1	2.5
▪ well-read	2	5.0	7	17.5
▪ Prime education	4	10.0	6	15.0
▪ Preparative education	24	60.0	12	30.0
▪ Subordinate	8	20.0	8	20.0
▪ College	2	5.0	6	15.0
Residence				
▪ Rural	32	80.0	29	72.5
▪ Urban	8	20.0	11	27.5
Types of epilepsy				
▪ Petit Mal	22	55.0	16	40.0
▪ Tonic-Clonic Seizures	9	22.5	12	30.0
▪ Partial Seizures	5	12.5	9	22.5
▪ Myoclonic Seizures	4	10	3	7.5
Underlying cause:				
▪ Intracranial infection	2	5.0	2	5.0
▪ Febrile episodes	12	30.0	10	25.0
▪ Head injury	7	17.5	5	12.5
▪ Psychic trauma	3	7.5	2	5.0
▪ Hypertension	6	15.0	7	17.5
▪ Non	10	25.0	14	35.0
Medications				
▪ Midazolam	10	25.0	12	30.0
▪ Depakin	11	27.5	12	30.0
▪ Tegretol	10	25.0	11	27.5
▪ Decal	7	17.5	2	5.0
▪ Topamax	2	5.0	3	7.5

Table (2): Study group distribution in relation to seizure attacks' frequency

Items	Before (40)		After (40)		Significant test
	No	%	No	%	
▪ Every day	18	45.0	3	7.5	
▪ every week	12	30.0	2	5.0	$\chi 2$= 48.672
▪ every month	6	15.0	5	12.5	P <0.001
▪ every four months	1	2.5	3	7.5	
▪ every six months	1	2.5	3	7.5	
▪ nothing happened.	2	5.0	24	60	

Table (3): The number of studied children (both groups) and their proportion distribution in terms of the severity of their epilepsy before and after PMR exercise

Severity of Epilepsy		Study group (40)		Control group (40)		Significant test
		No	%	No	%	
Before						
-	Extremely severe	18	45.0	17	42.5	$\chi^2$0.809,
-	Sever	20	50.0	16	40.0	P 0.408
-	Mild / never	2	5.0	7	17.5	
After						
-	Extremely frequent or severe	7	17.5	15	37.5	
-	Sever	14	35.0	18	45.0	χ^2=54.291,
-	Mild / never	19	47.5	7	17.5	P <0.001
Significance test		χ^2=61.199, P <0.001		χ^2=1.125, P 0.147		

Table (4): Frequencies of progressive muscle relaxation exercise practice level among the study group children before and after the intervention (N=40)

Practice level		Values	Before program		After program	
			No	%	No	%
▪	Un satisfactory	< 50.0%	31	77.5	3	7.5
▪	Good Satisfactory	50.0 - < 75.0%	4	10	18	45.0
▪	Competent satisfactory	75.0- 100%	5	12.5	19	47.5
Significance test			χ^2=66.47, P<0.001			

Table (5): Percentage Distribution of the children (study &control group) concerning their sleeping' quality before and after intervention (N=80)

Sleep pattern		Study group (40)		Control group (40)		Significant test
		No	%	No	%	
Before						
▪	Lower sleep quality (0-50)	1	2.5	0	0.0	$\chi^2$0.911
▪	moderate sleep quality (50- 67)	5	12.5	3	7.5	P 0.379
▪	Higher quality (67-84)	34	85.0	37	92.5	
After						
▪	Lower sleep quality (0-50)	5	12.5	1	2.5	
▪	moderate sleep quality (50- 67)	30	75.0	6	15.0	χ^2=65.251
▪	Higher quality (67-84)	5	12.5	33	82.5	P <0.001
Significance test		χ^2=58.271 P <0.001		χ^2=1.171 P 0.247		

Table (6): Distribution of the studied children (study &control group) regarding their perceived stress before and after intervention (N=80)

Stress level		Study group (40)		Control group (40)		Significant test
		No	%	No	%	
Before						
▪	Lowly (0-13)	0	0.0	3	7.5	$\chi^2$0.931
▪	Moderately (14-26)	7	17.5	3	7.5	P 0.689
▪	Highly (27- 40)	33	82.5	34	85.0	
After						
▪	Lowly (0-13)	7	17.5	1	2.5	
▪	Moderately (14-26)	30	75.0	9	22.5	χ^2=76.1
▪	Highly (27- 40)	3	7.5	30	75.0	P <0.001
Significance test		χ^2=68.371 P <0.001		χ^2=1.163 P 0.378		

Table (7): Association between progressive muscle relaxation' exercises and demographic data among the studied children after intervention (N=40)

demographic data of children (n=40)	progressive muscle relaxation' exercises	
	R	**P**
▪ Age	0.298	0. 002*
▪ Gender	-0. 105	0.552
▪ Education	−0.374	0.0042*
▪ Residence	0.087	.702

Table (8): Association between practices of progressive muscle relaxation' exercises with attack' frequency and between Sleep scale with attack' frequency among the study' group before and after intervention (N=40)

r – P values Variables	R	P
Before program		
▪ Practice of progressive muscle relaxation technique with Frequency of attack	0.165	0.813
▪ Sleep scale with Frequency of attack	**.382**	**.02***
After program		
▪ Practice of progressive muscle relaxation technique with Frequency of attack	0.464	.003*
▪ Sleep scale with Frequency of attack	**0.521**	**.001***

Discussion

The most frequent complaints of children after an epileptic seizure are tension, pain, and sleep difficulties. In fact, the rate of epileptic seizures (ES) among children is quickly rising throughout the world. As a result, this rise in the frequency of epileptic seizures calls for the creation of efficient and secure interventions to help kids return as soon as possible to their regular lifestyles **(Gelisse, Genton & Coubes, 2015)**.

More than half of the youngsters in the study and among the control groups were males, according to the current study's analysis of their characteristics. The current result was consistent with the finding of study done by **Mohammed, Mohammed, and Hassan (2019)**, in titled “Effect of developing a nurse education regimen on the frequency of epileptic events", who reported that the majority of the pediatric study participants were male. These findings may be related to that boys are more than girls engaged in juggling and aggressive play, which increases their vulnerability to accidents and brain injuries that could lead to epilepsy.

The current study's findings regarding the occurrence of seizure' attacks among the study' group before and after relaxation exercises application showed that over a third of the pediatric patients had epileptic seizure each day before implementing the relaxation exercises, as opposed to 7.5% of them experiencing daily attacks after implementing the relaxation exercises, in addition nearly two thirds of them not experiencing epileptic attacks after implementing the relaxation exercises with a statistically significant difference as $p< 0.001$. This finding was in agreement with the finding of study done by **Dinka, Simegnew & Shambu, (2020)**, who conducted an Ethiopian study about " Evaluation of the variables linked to poor treatment outcomes for epileptic patients receiving anti-epileptic drug at Shambu' Hospital in north-western Ethiopia" and found that the study's children were more likely to experience daily epileptic attacks prior to non-medical treatment for epilepsy than they started to do so after it. This current finding may be due to lack of training and information from educational programs for kids about the progressive relaxation techniques.

As regards severity of epilepsy among the children in the study and control group before and after PMR exercise, the current study finding showed that, half of the study' group and over a third of the controlled group experienced severe epileptic attacks with no statistical significance differences between the studied and controlled groups before implementing the relaxation exercises which decreased after its implementation with a statistical significance in variations between the two groups with p< 0.001. The current study result was in contrast to the finding of study done by **Polak, Privitera, Lipton & Haut, (2018)**, who conducted a study about " Designing a clinical study for behavioral intervention as an additional treatment for epilepsy" and discovered that a greater percentage of the studied children had extremely severe epilepsy before the intervention, with its frequency decreasing to a mild degree after implementation of the intervention with a statistical significance difference as p 0.001. This result may be explained by the fact that inadequate knowledge or lack of training on the relaxation techniques among children or their caregivers had a significant and independent role among the execution of practice that negatively affects the severity of the epileptic attack.

It was demonstrated that the majority of the analyzed pediatric patients had insufficient expertise about the progressive muscle relaxation' exercises prior to its implementation within the study' group before and after intervention. When comparing between before and after the implementation of the relaxation exercises, more than two fifths of the children had good satisfactory practice and competent satisfactory practice, respectively, after the intervention. The current study finding was consistent with a study done by **Lekhjung Bhandari and Shrestha, (2020)** entitled " Epilepsy Awareness, Beliefs, and Practices Among Children in Central Nepal," and reported that more than three quarters of the children had poor Jacobson progressive muscle relaxation technique scores prior to program implementation but most of them their scores had improved after the intervention. The study showed how this finding may be related to a lack of clinical expertise, incorrect child monitoring, and teaching that is not age appropriate.

The current investigation made it clear that, before the intervention, while most of the children among the study' group had poorer sleep quality than most members of the controlled group, with no statistical significance difference between the two groups. While the larger percentage of the study group who had poor sleep quality had decreased after the intervention, with statistical significance differences between the study' group before and after relaxation' exercises (p 0.001)**.** These findings were supported in a study done by **Sorour & Mohamed, (2019)** under the entitled " Effect of gradual muscle' relaxation on the frequency of epileptic episodes in teenagers," and found a higher proportion of the children among the study group had sleep deprivation prior to the implementation of the technique, which improved after implementation into practice. This conclusion may be supported by the fact that young patients with epilepsy had 2- to 3-fold higher sleep problems, difficulty falling asleep, waking up weary, frequent awakenings, and daytime napping as a result of the drugs they administered and disease-related psychosocial factors.

The current study result discovered that, the majority of the studied and controlled group had high stress level before PMRE application, with no statistical significance difference between the two groups. While 7.5% of the study' group had high stress level after the PMRE application with statistical significance differences among the study' group at p< 0.001 before and after intervention of the relaxation exercises**.** This result differed from that of a study conducted by Hall-Patch, Brown, and House (2017) entitled " An Acceptable and Effective Diagnosis Communication Strategy for Psychogenic Non-Epileptic Seizures " and stated that more than one third of the study group, and more than three quarters of the control group experienced excessive stress prior implementing to the educational protocol, while the majority of the study group experienced low levels of stress after implementing the educational protocol. These results may be due to the effect of anti-epileptic medications as

well as mental stress, which is another factor that triggers epilepsy.

Pertaining to the association between progressive muscle relaxation' exercises and demographic data of the studied children after PMRE application, it was illustrated from the present study that, there was a confident association between progressive muscle relaxation exercises and age as well as education among both group after intervention with a statistical significance differences at (P = 0. 002 and 0.004 respectively)**.** This result was not in the same line with the finding of study done by **Dionisio & Tatum, (2019)** about "Techniques and methods for stopping partial seizures " and found a significant inverse correlation between age, education, and gender before and after the application of the technique. These findings might be due to the fact that the increase of age group among the children and higher educational level help in understanding and updating information that valued their practices.

It was portrayed in the current study that, there was a correlation between sleep scale with frequency of attack among the study' group before and after intervention respectively with a statistical significance difference at (P = 0.02 and 0.001 respectively**.** These results corresponded with a study done by **Mohammed, Mohammed& Hassan, (2019),** who reported that, there was a clear correlation between sleep, apparent strain, and attack' frequencies among the investigated children before and after the intervention. This current result could be explained by the fact that inadequate sleep is a known epilepsy trigger that increases epileptic events.

Conclusion

It was determined that, progressive relaxation' exercises (PMRE) had a good impact on children with epilepsy, as shown by a decrease in epilepsy' severity, frequency, stress level as well as an increase in sleep quality among the studied children.

Recommendation:

The study recommended that**,** to reduce seizure events among children with epilepsy, progressive relaxation techniques should be incorporated into routine nursing care.

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