A Novel Research Protocol to Evaluate Psychological Perception Using Brain Gym Exercises in Physiotherapy Students

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Backgroung

Brain Gym is an academic kinesiological program that is promoted and applied with a consistent learning purpose that aims at enhancing performance such as memory, psychological perception and cognitive skills. The technique requires the participant to communicate with a series of activities that help the body to understand the primary behaviour and learn how to coordinate the brain and entire body. Brain Gym activities includes of 26 basic motions, which are believed to improve perception and stimulates brain hemisphere by neural re-modelling to facilitate whole brain learning. By ways of balancing both the side of brain, behavioral difficulties, social and intellectual burdens are expected to be reduced.

Aims and Objective: This study aims to evaluate the psychological perception and decrease depression in the undergraduate physiotherapy students.

Method: Here's a idea we suggest to check the psychological perception with brain gym intervention and the duration for practices comprises of three days a week session, duration of 25 minutes, which is completed in one hour. The depression anxiety stress scale (DASS 21) is used to evaluate disorder which is a valid and reliable tool. This study will be conducted in Ravi Nair Physiotherapy college, Sawangi, Meghe, Wardha. The duration of the study will be six months. The study design is of before after-type with simple randomized sampling.

Result: The data will be analysed using Student paired t test.

Conculsion: The expected outcome includes the detection of stress, depression and anxiety levels which will be evaluated by using DASS-21. Data analysis will be done using students paired t test and conclusion of the study will be published after the results are analysed.

Keywords*: Psychological perception, Depression, Stress, Anxiety, DASS-21, Brain gym*

Background

It is an interventional type with before-after study design which focuses on the evaluation of the psychological perception after intervention of brain gym exercise. Brain Gym was developed in 1970 as an educational and psychological training system developed and enforced with a specific learning intent. Brain Gym activities includes of 26 basic motions, which are believed to improve perception and stimulates brain hemisphere by neural re-modelling to facilitate whole brain learning [(1)]. The neural mechanism and white matter connectivity of the brain is influence by the intervention of the exercises [(2)].

Brain Gym is a instructional curriculum intended to improve social, mental, emotional and physical efficiency and use 26 moves [(3)] [(4)].According to Brain

Gym literature, the abstract framework on which brain activity is conceptualised is generally simplified and defined along dimensions: laterality, attention and centring [5]. Laterality, the synchronization between the brain's right and left hemispheres, which is considered important for reading, writing, hearing, communicating and being able to walk and think. Focusing, the ability to process information in the brain, which is connected to perception and lack in attention / hyperactivity. The final section, centring, the top and bottom brain parts organized as necessary to combine rational thought with emotion [5]. Brain gym intervention aims at the optimization of activity, social participation, and quality of life, as well as the health condition of people with acute and chronic disabilities. The most beneficial way to stimulate the brain is by incorporating kinesthetic and tactile learning, techniques and audio and visual activities to combine the high- and low-brain functions. Brain exercise contributes to sensory integrity, motor learning and a link between brain and body. Recently, brain-inspired methods have gained more popularity in overcoming command and decision-making challenges [6]. A motion in the mental workout has been shown to have increased blood circulation and stability, good oxygen levels and healthy metabolism [7].

As per the founders, the daily practice of brain gymnastics leads to activation and development of various sections of the brain, particularly the cortex which allows for smoother and more organized communication between the two sides of the brain for high-level thinking [8]. The brain is a complex organ which focuses on motion and according to Hannaford, "activity is necessary for learning" [9]. Brain stimulation is very important in neuro-rehabilitation, reducing atrophy, lessen the risk of brain structure lesions and increasing cognitive performance. It is important therapy for elderly patients with depression, as its neuronal advantages have increased for age-related atrophy exacerbated by neuropathology [10]. Neuroimaging research has indicated motor development, improve perception and integral approach involve stimulation of domains of auditory perception and more operation of cerebral cortex. The study describes the importance of brain gym exercise in physiotherapy. Exercise can stimulate the brain in such a way that neurons are often in a condition to handle the different data from outside and are capable of responding to a "corporate member" of their duty in compliance with parts of brain activity using the principle of "brain-body link". Brain Gym is a great source of personal development, enabling individuals to obtain rapid transformations and also improve the quality of life in a different age group.

Many recent experiments have been carried out to determine the efforts required to enhance and stimulate the psychological perception of brain [11]. Perception is defined as a essentially relational process in which visual stimuli is translated progressively into projections which serve as the basis for action [12]. If a person is nervous or distressed then automatically the energy is pumped into the brain and the brain loses control, thus caused the primed, unexpectedly impaired reaction. Brain gym training can minimize mental stress and encourage brain concentration and perception[13]. Students nowadays are under stress from waking up to not having proper sleep in addition to all the pressure of appraisals and examinations[14]. This undoubtedly influences the attitude of the student towards leaning and academic success[4].

Dr. Chaitanya Kulkarni, Dr. Sanjivani Ramesh Khandale have done a project to detect the effects of brain gym exercise on the attention span of the young students and concluded that the mechanism of reading, recoding and comprehension has been improved. Also, the effect of these exercises demonstrated an improvement in eye power and hand control, as well as helping to focus on the same focal point while reading and writing concurrently. E Effendy, N Prasant Conducted a analysis demonstrating the effect of brain gymnastics on the population of Nursing Home Care Medan 's and found that brain gymnastics increased PSQI and HARS score levels in the intervention category and reduce stress and depression, in year 2019[15] here they have found a significant change in life style and improved quality of life in the elderly patient. Keith J. Hyatt in year 2007, conducted a study on school students and finished with a segment explaining Brain Gym exercises to encourage literacy ability, oral reading comprehension, communication skills, pronunciation and learning, self-esteem, memory, analytical thought, imaginative thinking. Brain exercise has seen to be effective in attention improvement, in research and more on it is shown to be very helpful in enhancing concentration, attention, vision and memory as well as

helping to relieve stress.

This research explores the impact on the psychometric characteristics of undergraduate students in the exercise program called as brain gym [16]. Specially because it seems to be a accurate and easy-to-administer scale, the Depression Scale, Anxiety, and Stress-21 are chosen. The DASS-21consist of three self-report measuresused to assess depression, anxiety, and emotional tension[17].Depression spectrum tests dysphoria. Anxiety assessment tests autonomic activation, psychological anxiety[18]. Stress is the very common condition faced by students nowadays and causes disturbance in their daily lives.

Thanch Duc Tran, Jane Fisher performed a study on the Efficacy of DASS-21 in a cohort of Northern Vietnamese people in rural communities as a screening tool and the study concluded that it can useful in clinical practice and the components such as depression, and stress levels are determined by summing the ratings for the elements in question [18].

The research aims to calculate the impact of brain gym exercise on stress, anxiety and depression in the student of undergraduate physiotherapy using the scale of DASS-21 as an evaluation method. The brain gym exercise intervention will be performed in all the subjects and then evaluation of the psychological perception will be conducted.

Methodology

The study will be conducted in Ravi Nair Physiotherapy College, after the approval the Institutional Ethics Committee (IEC) of Datta Meghe Institute of Medical Sciences, Deemed to be University, Sawangi (Meghe).The study design is of before after-type with purposive sampling.

Study design: Interventional study

Sample Size: 220

Duration of study: 6 months

INCLUSION CRITERIA:

-Age group - 18 to 23 years

-Physiotherapy undergraduate students

-Moderate range according to DASS-21 scale [19]

Exclusion Criteria:

- Not-willing to participate

-Student with migraine headache

-Diagnosed with psychological condition

- History of neurosurgery or cognitive damage

Outcome Measure:

-Depression, anxiety and stress scale (DASS-21)

-The DASS-21 is a valid and reliable instrument for determining the mental status, with reliability for depression = 0.81, anxiety = 0.89, stress = 0.78 respectively.

-The DASS-21 has sensitivity = 89% and specificity = 76%.

Need of Study

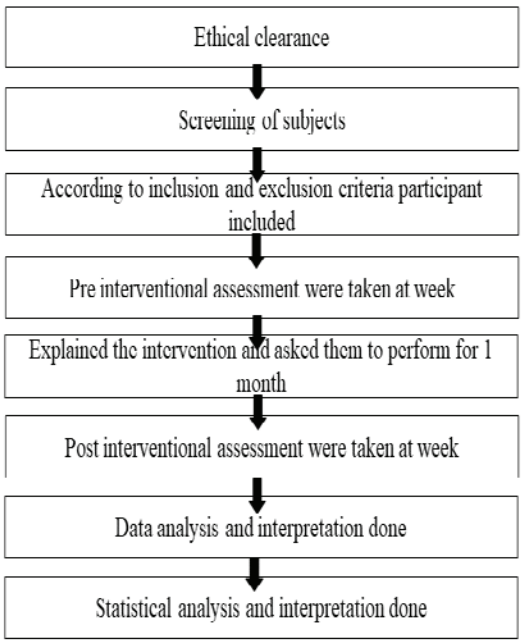
1. To calculate the psychological perception among undergraduate students in physiotherapy.

2. To reduces depression, anxiety and emotional stress in undergraduate students.

3. To assess the effects on psychometric properties in undergraduate students.

PROCEDURE:

The Institutional Ethics Committee (IEC) Clearance will be obtained priorly. Students will be selected as per the inclusion criteria that has been mentioned. The participants will be informed the aim of the research and will get informed consent. They will be given pre and post interventional assessment using DASS-21 scale, reading will be recorded and the exercise intervention will be given for a month. After the results have been obtained, data collection will be done and statistical analysis will be obtained and the conclusion will be given and a research paper will be created according to the study and published.



BRAIN GYM EXERCISESTREATMENT PROTOCOL:

The **Marching** it is done as the beginning as warm up, in which subjects stand straight and lift both the legs continuously slight above [20] [21] for a time duration of 1 minute. A **Cross Crawl** is performed to enhance the coordination between both the sides of the brain, it is done for time duration of 2 minute (5 sets of 8 repetition). Subject is instructed to stand straight and lift up the leg up to the chest and touch the knee with opposite elbow[22].

Positive Points helps to improves memory and reduce stress levels. The subject is instructed to breathe deeply and gently press the eyeballs with eyes closed [23] for time duration of 1 min (10 repetition).It helps to stimulate the lateral and side to side coordination. A **Step Touch** is done and it is performed in standing position and the subject is instructed to simultaneously move right legs toward left and left towards right. should be done for a duration of 5 minutes (30 repetition).

A Neck Circles exercise helps to reduce stress on the neck muscle, head movement coordination and move the neck in circular motion for a time frame of 2 minutes [3] (20 repetition). A **Cook's Hook-Up** helps it stimulates the neurons and enhances the balance between hand and brain[21]. where subject is instructed to extent and cross both the hands and fix the fingers together and internally rotate the hands for a time duration: 5 minutes (repetition).

A Brain Button- This exercise is performed and helps to improve the flow of electromagnetic energy and, helps in relaxation. The subject is instructed to palpate belly button with one hand and other hand over the collarbone and perform circular motion with finger for a time duration of 2 minutes(10 repetition)[17]. **The Thinking Cap** helps to enhance learning speed and mood, increase attention span, and improve memory. The subject is instructed to press the top of ear and the bottom continuously(3)duration:1 minute (15 repetition) [24].

A Lazy Eight helps in boosting eye muscle control, balance, and concentration. The subject is instructed to extend the hand and make the figure of Eight horizontally in front[3] Duration: 1 minute (5 repetition). **A Trace X** helps to increase attention span and improve focus [25]. where the subject to close eyes and imagine a figure of "X" and do eyeball movement the duration is 2 minutes (10 repetition).

Expected Result

Once the study is completed statistical analysis will be done using Student paired t test and presented in the form of research paper.

Discussion

The study protocol aims to evaluate the psychological perception in a undergraduate student by using the DASS-21 scale. We hypothesis that there will be improved ability to concentrate and improved focus. The research will help to prevaricate the effectiveness of brain gym exercise on stressed student and help with strategies involved to decrease stress and anxiety.

The DASS-21 is chosen as the aspects addresses the challenges faced by the current generation i.e. stress, anxiety and depression and it entirely evaluate the mental status of a person. The Adaptive practices for students include everyday life activities, effective speech, cognitive skills, adaptability, and learning skills that are observable and based on national norms.

Conclusion

The expected outcome includes the detection of depression and anxiety levels in Undergraduate physiotherapy students which will be done by using DASS-21. Brain gym exercises as an intervention will be taught to the participants to evaluate the psychological perception and solve their intellectual and behavioural challenge.

Ethical Clearance: Institutional Ethics Committee (IEC) of Datta Meghe Institute of Medical Sciences, Deemed to be University, Sawangi (Meghe).

Conflict of Interest: None

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References

1. Spaulding LS, Mostert MP, Beam AP. Is Brain Gym® an Effective Educational Intervention? Exceptionality. 2010 Jan 19;18(1):18–30.
2. Gujral S, Aizenstein H, Reynolds CF, Butters MA, Erickson KI. Exercise effects on depression: Possible neural mechanisms. Gen Hosp Psychiatry. 2017 Nov;49:2–10.
3. Montgomery AL, Li S, Srinivasan K, Liechty JC. Modeling Online Browsing and Path Analysis Using Clickstream Data. Mark Sci. 2004 Nov;23(4):579–95.
4. Spaulding LS, Mostert MP, Beam AP. Is Brain Gym® an Effective Educational Intervention? Exceptionality. 2010 Jan 19;18(1):18–30.
5. Dennison,P. E.,& Dennison,G. E. Brain Gym®teacher's edition–- Revised. Ventura,CA:Edu-Kinesthetics. 1994;
6. Chen J, Chen J, Zhang R, Hu X. Toward a Brain-Inspired System: Deep Recurrent Reinforcement Learning for a Simulated Self-Driving Agent. Front Neurorobotics. 2019 Jun 28;13:40.
7. Doewes M. EXERCISE AND BRAIN HEALTH IN ELDERLY. 2009;45(2):4.
8. Hyatt KJ. Brain Gym®: Building Stronger Brains or Wishful Thinking? Remedial Spec Educ. 2007 Mar;28(2):117–24.
9. Weslake A, Christian BJ. Brain Breaks: Help or Hindrance? 2015;1:10.
10. Li S. Spasticity, Motor Recovery, and Neural Plasticity after Stroke. Front Neurol [Internet]. 2017 Apr 3 [cited 2020 Aug 11];8. Available from: http://journal.frontiersin.org/article/10.3389/fneur.2017.00120/full
11. Abduh B, Tahar MM. The Effectiveness of Brain Gym and Brain Training Intervention on Working Memory Performance of Student with Learning Disability. J ICSAR. 2018 Jul 15;2(2):105–11.
12. Zacks JM, Speer NK, Swallow KM, Braver TS, Reynolds JR. Event perception: A mind-brain perspective. Psychol Bull. 2007 Mar;133(2):273–93.
13. As'adi. M. Tutorial Senam Otak untuk Umum. Yogyakarta: FlashBooks. 2013.
14. Sahu A, Naqvi WM. Quarantine Exercises in the Time of Covid-19- A Review. J Evol Med Dent Sci. 2020 Jun 29;9(26):1922–7.
15. Samal S. The incidence of upper quadrant dysfunction in nursing brothers. 2018;4.
16. Watson A, Kelso GL. THE EFFECT OF BRAIN GYM® ON ACADEMIC ENGAGEMENT FOR CHILDREN WITH DEVELOPMENTAL DISABILITIES. Int J Spec Educ. 2014;29(2):9.
17. Sakakibara Y, Sekiya M, Saito T, Saido TC, Iijima KM. Cognitive and emotional alterations in App knock-in mouse models of Aβ amyloidosis. BMC Neurosci. 2018 Dec;19(1):46.
18. Tran TD, Tran T, Fisher J. Validation of the depression anxiety stress scales (DASS) 21 as a screening instrument for depression and anxiety in a rural community-based cohort of northern Vietnamese women. BMC Psychiatry. 2013 Dec;13(1):24.
19. Henry JD, Crawford JR. The short-form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample. Br J Clin Psychol. 2005 Jun;44(2):227–39.
20. Selkar SP, Ramteke GJ, Dongare AK. Effect of eccentric muscle training to reduce severity of delayed onset muscle soreness in athletic subjects. Electron J Gen Med [Internet]. 2009 Oct 15 [cited 2020 Aug 5];6(4). Available from: http://www.ejgm.co.uk/article/effect-of-eccentric-muscle-training-to-reduce-severity-of-delayed-onset-muscle-soreness-in-athletic-6727
21. Hafez R. EFFECT OF BRAIN GYM ON MANIPULATING SKILLS AND BALANCE FOR BEGINNERS IN RHYTHMIC GYMNASTICS.

2017;(1):7.

22. Marpaung MG, Sareharto TP, Purwanti A, Hermawati D. Brain Gym To Increase Academic Performance Of Children Aged 10-12 Years Old (Experimental Study in Tembalang Elementary School and Pedalangan Elementary School Semarang). IOP Conf Ser Earth Environ Sci. 2017 Feb;55:012017.
23. Ayán C, Sánchez-Lastra MA, Cabanelas P. APLICACIÓN DE EJERCICIOS DE BRAIN GYM® EN PERSONAS INSTITUCIONALIZADAS CON DETERIORO COGNITIVO. Rev Int Med Cienc Act Física Deporte. 2018 Dec 19;18(72):753.
24. Gibbs KL. Study Regarding the Effects of Brain Gym on Student Learning. :95.
25. Panse DR, Deshpande M, Yeole DU, Pawar P. Effect of Brain Gym® Exercises on Balance and Risk of fall in Patients with Diabetic Neuropathy. 2018;(4):6.