




ALEXITHYMIA: PREVALENCE AND ASSOCIATION WITH EXECUTIVE FUNCTION AMONG PHYSIOTHERAPY STUDENTS IN KARACHI, PAKISTAN


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ABSTRACT

Background of the Study: Alexithymia is a set of cognitive traits, including the inability to verbalize and recognize one's emotions. Physiotherapy students are more vulnerable to developing Alexithymia due to their academic workload and intense clinical postings. This neurobiological deficit involves frontal lobe dysfunction and reduced anterior cingulate cortex function, impacting executive function. This study aims to determine the prevalence of Alexithymia and its association with executive function among physiotherapy students.

Methodology: A cross-sectional survey was conducted among physiotherapy students using the Toronto Alexithymia scale (TAS-20) to assess prevalence and executive function. It was evaluated through two neurophysiological tasks: Trail making and Verbal fluency tests. Data was analyzed using SPSS Version 26.0.

Result: Out of 400 participants, the private license of Alexithymia was estimated to be 55%. Among physiotherapy students 24% were found to be at risk of possible Alexithymia. Alexithymia and executive function showed significant association with 85% of students demonstrating reduced performance on the trail-making test A ($p=0.001$). 83.3% of students had low outcomes on the trail-making test B ($p=0.002$), and 90% of students had low performance on verbal fluency tests ($p=0.002$).

Conclusion: Alexithymia is linked with male gender, marital status, academic year, smoking, internet use and bullying history. We are increasing awareness and developing interventions to enhance the mental well-being of students.

Keywords: *Alexithymia, executive function, physiotherapy, students, emotions, prevalence.*

Introduction

Emotions involve psychological functions such as cognitive capabilities, decision-making, learning and behavior. Emotions are essential for human survival and safety. It helps us systematize rapid actions crucial for immediate challenges and coping with things like anger and fear. During the transition to adulthood, profound changes occur in physical and psychological autonomy, including emotional experience. This transition is often challenging, marked by acquiring new responsibilities and developing social skills. This process can be complicated

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generating significant mental health risks such as depression and anxiety. The term Alexithymia originates from the Greek words "No words for emotions." It refers to a set of cognitive traits, including the inability to verbalize and recognize one's emotions, difficulty interpreting other's emotions from facial expression or body language, decreased capacity to process emotions, and restricted imaginal capacities¹. The Alexithymia's prevalence has been estimated at approximately 10% of the general population, affecting men (9-17%) almost twice as women (5-10%)². The prevalence of Alexithymia is much higher in adolescents (18%) than in adults (8-10%)³. Alexithymia was first coined by psychiatrist Dr. Peter Stifneos in 1973, who identified characteristics observed in his patients such as trouble identifying their feelings, difficulty communicating them, and externally oriented cognitive style⁴. It is not a medical diagnosis, although it co-occurs with certain mental health disorders like autism spectrum disorder (ASD), post-traumatic stress disorders (PTSD), addictive disorders, eating and psychosomatic disorders⁵. The prevalence of Alexithymia also appears to be affected by various sociodemographic and familial factors. Sociodemographic factors include male gender, low educational level, increasing age, low socioeconomic status, smoking and experiencing childhood trauma such as violence, abuse or bullying. It is also inherently linked with a lack of family support, parental styles and a dysfunctional family environment, leaving a negative impact on an individual's life⁶. In early studies, alexithymia traits have more prevalent among men than women as a consequence of the traditional male ideology, which discourages young men from expressing their feelings⁷. There are two distinct types of Alexithymia based on two fundamental potentials: Nature and Nurture.

Primary Alexithymia

It is considered a stable personality trait. It can be derived from childhood trauma or negative interactions with a family that can lead to psychosomatic illness, and that is, therefore, a personality that is present since birth and changes little over time or with changing circumstances.

Secondary Alexithymia

It is also referred to as state alexithymia, which occurs as a response to psychological events occurring later in life, such as medical surgeries or direct insult to the brain⁸. Individuals who encounter Alexithymia are more prone to developing maladaptive patterns, including suicidal tendencies, substance abuse, low academic performance and low self-care care, as well as causing a lot of social problems and attachment difficulties. They are more likely to exhibit poor coping styles such as smoking cigarettes, alcohol consumption, excessive internet use, disordered eating behavior and excessive exercise as a way to avoid their emotions⁹. Another sign of Alexithymia is the inability to generate spontaneous metaphors and having trouble interpreting them, such as, "You need to see the light at the end of the tunnel" or "You are a loose cannon," commonly used expressions. This can lead to complete social isolation, even with a group. They tend to use vocabulary of limited complexity and more concrete in their thinking, making it harder to articulate feelings to others, creating distress in social settings and utilizing distancing strategies¹⁰. Emotion plays a significant role in our appraisal of experiences and environment, guiding one's thoughts, actions and attainment of goals. Having control over when and how one experiences emotions is thought to be impacted by higher-order mental processes, which are executive functions. Difficulty in emotional regulation, as if they become tense or out of control, leads to executive dysfunction¹¹. Executive function is defined as a multidimensional cognitive function that enables an individual to self-monitor and self-regulate, which helps them plan, prioritize and sustain efforts towards accomplishing daily tasks. Executive function domains include working memory, cognitive flexibility, response inhibition, abstract reasoning, decision-making, and sustained and selective attention¹². Alexithymia is linked to poorer cognitive domains with increasing age. The neurobiological deficit involving frontal lobe dysfunction and circuits impacts executive functioning and anterior cingulate cortex function. People with high traits of Alexithymia will report trouble with problem-solving, fluency and set-shifting than people with low alexithymia¹³. Physiotherapy students go through an emotional roller coaster during their education, dealing with

the stress of hectic schedules and academic life. They also face physical strain from long hours and insufficient sleep. The most challenging part is regularly interacting with patients and hearing them and their families who are going through difficult times and strong emotions. Because of their tiring academic workload, they often struggle with expressing emotions. This difficulty in emotional expression can contribute to mental health conditions like anxiety and depression. Due to strenuousness in observing emotional self-regulation and mentalizing, individuals with Alexithymia often appear to be unemotional and unsympathetic. They tend to be rigid and distant. One of the biggest challenges with this is that it can go unrecognized even to the individual experiencing it, thinking that they are not a socialite or introvert who cannot connect with others

Methodology

Study design and setting

This analytical cross-sectional study was employed among physiotherapy undergraduates of several medical colleges in Karachi, Pakistan. This study was conducted from August 2023 to December 2023, and participants were selected through convenience sampling.

Inclusion and exclusion criteria

From first to final year, physiotherapy students were invited to participate in this study. Students who had any known past medical or psychiatric illness, recent history of brain injury and learning disability were excluded from our study.

Instruments

According to our study objectives, the survey was divided into three segments. The first segment included socio-demographic variables such as age, gender, marital status, internet usage, smoking status, academic year, history of past medical or psychiatric illness, history of recent trauma, history of learning disability like dyslexia and whether they had experienced bullying in their lives. The second segment contained the Toronto alexithymia scale to assess the prevalence of Alexithymia among students. The Twenty-Item Toronto Alexithymia Scale (TAS-20) is considered a gold standard and validated scale to measure Alexithymia. The TAS-20 consists of three subscales: Difficulty identifying feelings (DIF), Difficulty describing feelings to others (DDF) and externally oriented cognitive thinking style (EOT). It contains 20 items on a 5-point scale in which 1 = strongly disagree to 5 = strongly agree. TAS-20 uses cut-off values of less than 51, meaning no alexithymia. Scores between 52 to 60 indicate possible Alexithymia and a score greater than 61 for high-end Alexithymia. It demonstrates good internal consistency of 0.81 and test-retest reliability of 0.77¹⁴. The third segment involves well-accepted neuropsychological tests: trail making test (TMT) and verbal fluency test (VFT). The trail-making test consists of part A, which requires connecting numbered circles, and part B, which requires letter and number circles in alteration. It is used to measure visual search, processing speed and mental flexibility. The verbal fluency test also consists of two parts that are semantic fluency wh, which involves producing words of a given category, such as fruits, and letter fluency wh, which involves producing words related to the given letter in one minute, such as S, F, etc¹⁵.

Data analysis

All data was analyzed using the IBM SPSS version 26.0. Descriptive statistics including means, percentages, ranges and standard deviation were conducted to describe data regarding Alexithymia and demographic characteristics of the participants. Pearson's chi-square test was used to determine the association between Alexithymia with executive function and sociodemographic variables. Statistical significance was set at a P value less than 0.05.

Result

Demographic characteristics of the participants

A total of 400 physiotherapy undergraduates participated in this study. The mean age of participants was 21.25 ± 1.54 , out of which 348 (89%) were females and 52 (13%) were males. Most of the 97 (24.2%) were from the final year, followed by 95 (23.7%) students from the first year. 382 (95.5%) were single, and 23 (5.75%) were smokers. Around 151 (37.75%) students were using the internet for more than 6 hours, and 205 (51.2%) were bullied, as illustrated in Table 1.

Variables		Frequency	Percentage
Gender	Male	52	13
	Female	348	87
Marital status	Single	382	95.5
	Married	18	4.5
Academic year	1 st Year	95	23.8
	2 nd Year	66	16.5
	3 rd Year	52	13
	4 th Year	90	22.5
	5 th Year	97	24.3
Internet use	< 4 hours	111	27.8
	4 to 6 hours	139	34.8
	hours	150	37.5
	>6 hours		
Smoking status	No	337	94.2
	Yes	23	5.7
Bullied	Yes	205	48.8
	No	195	51.2
Psychiatric illness	Yes	0	0
	No	100	100
Learning disability	Yes	0	0
	No	100	100

Table 01: Demographic characteristics of the participants

Prevalence of Alexithymia

The prevalence of Alexithymia was estimated to be 55 % among physiotherapy students, while 24 % were found to be at risk of possible Alexithymia and illustrated in Figure 1.

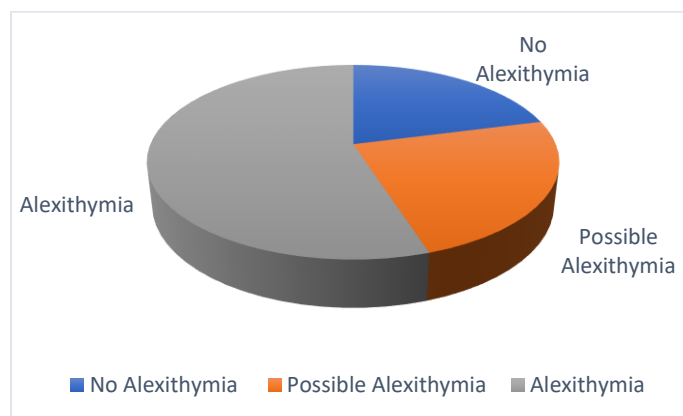


Fig 01: Prevalence of Alexithymia among physiotherapy students

Association between Alexithymia and Sociodemographic factors

A statistically significant association showed between Alexithymia and different factors. A total of 38 (73%) of male undergraduates had Alexithymia as compared to 182 (52.2%) females ($p = 0.015$). Additionally, 94.4 % students had Alexithymia were married ($p = 0.002$). 100 % students who were smokers and 88% students who use internet for more than 6 hours had Alexithymia. A

total of 162 (79%) out of 205 students who had experienced bullying had Alexithymia. According to academic year, students who experiences high-end Alexithymia were from final year (59.7%), third year (55.7%) followed by fourth year (54.4%) with a (54.4%) with a statistical significance of $p = 0.024$ and illustrated in Table 2.

Variables		No Alexithymia		Possible Alexithymia		Alexithymia		P Value
		N	%	N	%	N	%	
Gender	Male	5	9.6	9	17.3	38	73.07	$P = 0.015^*$
Marital status	Single	84	21.9	95	24.8	203	53.1	$P = 0.002^*$
Years	Married	1	5.5	0	0	17	94.4	$P = 0.024^*$
	1st year	13	13.6	32	33.6	50	52.6	
	2nd year	20	30.3	12	18.1	34	51.5	
	3rd year	8	15.3	15	28.8	29	55.7	
	4th year	21	23.3	20	22.2	49	54.4	
Internet use	5th year	23	23.7	16	16.4	59	59.7	$P = 0.016^*$
	< 4 hours	59	53.1	33	29.7	19	17.1	
	4 - 6 hours	24	17.2	46	33	69	49.6	
Smoking	> 6 hours	2	1.3	16	10.6	132	88	$P = 0.024^*$
	Yes	0	0	0	0	23	100	
Bullied	No	85	22.5	95	25.1	197	52.2	$P = 0.013^*$
	Yes	17	8.29	26	35.3	162	79.02	
	No	68	34.8	69	12.6	58	29.7	

Table 02: Association between Alexithymia and sociodemographic variables

Association between Alexithymia and Executive function

Higher alexithymia traits indicate significant association with reduced executive functioning. A total of 85% (n=187) of students with Alexithymia showed poor performance on trail making test A compared to students who do not exhibit Alexithymia ($p = 0.001$). In addition, 83.3% (n=183) students with Alexithymia also showed poor outcomes on trail making test part B ($p = 0.002$). lastly, 90% (n=198) students with greater Alexithymia produced low performance on verbal fluency test ($p = 0.002$). They illustrated in Figure 2.

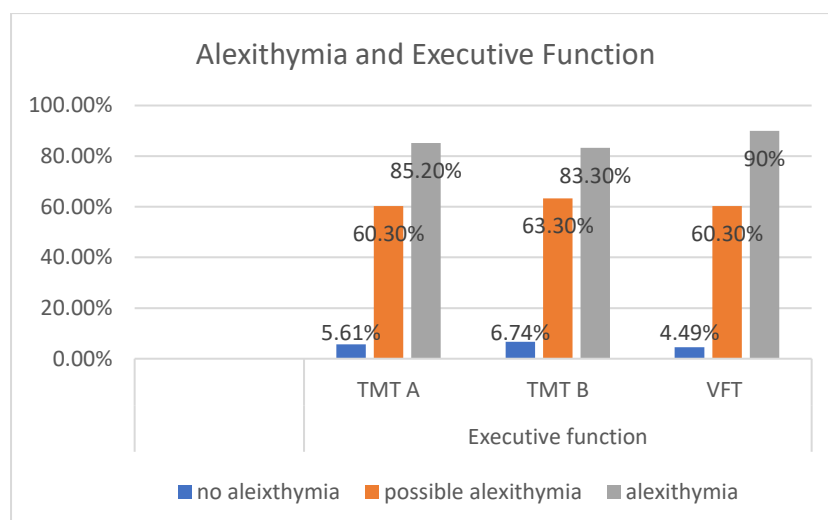


Fig 02: Association between Alexithymia and Executive function

Discussion

Our research findings confirmed the hypothesis that Alexithymia is a negative predictor of executive function in physiotherapy undergraduates. Our study shows a statistical association

between Alexithymia and gender showing higher prevalence in males than females. This finding is consistent with some previous studies conducted by Karki et al., in 2023 and Yaxin et al., in 2017^{16,17}. In contrast, fewer studies had claimed higher prevalence in females. According to our results, Alexithymia is more prevalent in students who got bullied in their childhood. Levantini et al., in 2023 have also found similar finding that Alexithymia is directly associated with bullying and victimization¹⁸. Our results revealed that students who smoke cigarettes were associated with higher alexithymia traits, aligning with the findings of Youssef et al., who claimed Alexithymia increases propensity towards maladaptive behaviors such as smoking and alcohol addiction¹⁹. This current study highlighted that those students who exhibit Alexithymia display an excessive involvement in internet use. A similar cross-sectional study was conducted by Germani et al, in 2023 which observed that there is significant association between Alexithymia and problematic internet use²⁰.

Limitation and Future Recommendations

This research has many several limitations that need to be addressed. Firstly, the cross-sectional study design impairs the possibility to establish a valid cause and effect association. In order to make our findings more reliable, it would require further longitudinal studies. Furthermore, we relied on participants to provide self-reported information in which biases may occur. Future studies must examine the influence of factors such as GPA, physical activity, parent interaction and cultural values. Despite these challenges, our study is esteemed as it is one of the first in Karachi exploring the link between Alexithymia and executive function in physiotherapy students.

Conclusion

Physiotherapy students often face challenges with Alexithymia, struggling to express and communicate emotions due to the intense academic pressure, extensive knowledge requirements, frequent exams, and competitive environment. This difficulty not only negatively affects their mental health but also limits their effectiveness in tasks like processing information, following treatment plans, making critical decisions, and satisfying patient's needs. Ultimately, it impacts the quality of care, physical therapist-patient relationships and patient health outcomes. The results could guide mental health professionals in creating effective interventions to enhance mental well-being of students. Promoting physical activity and emphasizing initiatives specifically for male students can be beneficial. Engaging in shared activities and group therapy sessions with individuals with Alexithymia can provide a sense of belonging and help them navigate the associated challenges.

AUTHORS' CONTRIBUTION:

The following authors have made substantial contributions to the manuscript as under:

Conception or Design: Sahara Saleem

Acquisition, Analysis or Interpretation of Data: Nida Zakir, Syed Hassan Abbas Rizvi, Sahara Saleem, Vaneeza Fatima, Bakhtawar Zulfiqar

Manuscript Writing & Approval: Nida Zakir, Syed Hassan Abbas Rizvi, Sahara Saleem, Vaneeza Fatima, Bakhtawar Zulfiqar

All authors acknowledge their accountability for all facets of the research, ensuring that any concerns regarding the accuracy or integrity of the work are duly investigated and resolved.

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