CONTRIBUTION OF PHYSICAL EXERCISE ON THE EMOTIONAL REGULATION OF ADULTS WITH AUTISM SPECTRUM DISORDER

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ABSTRACT

Purpose: To identify the effect of physical exercise on the emotional regulation of 4 adults with autism spectrum disorder (ASD) between the ages of 22 and 39. In this population it was found that one of the difficulties presented in these subjects is emotional regulation (empathy) in their daily activities, such as variations in their routine, these can be changes in time or activities, disorder in their things, sleeplessness at night, etc.

Methodology: Qualitative approach with case study design, the Atlas Ti program was used for semantic analysis, for this 4 subjects diagnosed by the Colombian League of Autism were selected, subsequently 15 interventions were carried out from a physical activity proposal and interviews were developed to the parents of the 4 participating subjects, to learn about the effect of exercise on the population of adults with autism.

Results and Conclusions: It was found that there are various behaviors that subjects express in different situations, whether on the street, home or other space, in conclusion, the effect of physical exercise on emotional regulation contributes to improving moods, decreasing the escalation phases and generating better empathy towards the execution of activities or exercises in the 4 adults.

Implications: This research provides implications for educational and government policy to continue to strengthen public policies for people with ASD.

Originality/value: This research offers novelty by glimpsing the impact of exercise and physical activity on people with ASD.

Keywords: Autism Spectrum Disorder, Emotional Regulation, Adults, Physical Exercise.

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CONTRIBUIÇÃO DO EXERCÍCIO FÍSICO NA REGULAÇÃO EMOCIONAL DE ADULTOS COM TRANSTORNO DO ESPECTRO AUTISTA

RESUMO

Objetivo: Identificar o efeito do exercício físico na regulação emocional de 4 adultos com transtorno do espectro do autismo (TEA) com idades entre 22 e 39 anos. Nesta população constatou-se que uma das dificuldades apresentadas nestes sujeitos é a regulação emocional (empatia) em suas atividades diárias, como variações em sua rotina, podendo ser mudanças de horário ou atividades, desordem em suas coisas, insônia noturna, etc.

Metodologia: Abordagem qualitativa com desenho de estudo de caso, utilizou-se o programa Atlas Ti para análise semântica, para isso foram selecionados 4 sujeitos diagnosticados pela Liga Colombiana de Autismo, posteriormente foram realizadas 15 intervenções a partir de uma proposta de atividade física e foram desenvolvidas entrevistas para o pais dos 4 sujeitos participantes, para aprender sobre o efeito do exercício na população de adultos com autismo.

Resultados e Conclusões: Verificou-se que são vários os comportamentos que os sujeitos expressam em diferentes situações, seja na rua, em casa ou neutro espaço, concluindo, o efeito do exercício físico na regulação emocional contribui para melhorar o humor, diminuindo as fases de escalada e gerando melhor empatia para a execução de atividades ou exercícios nos 4 adultos.

Implicações: Esta pesquisa fornece implicações para as políticas educacionais e governamentais para continuar a fortalecer as políticas públicas para pessoas com TEA.

Originalidade/Valor: Esta pesquisa oferece novidade ao vislumbrar o impacto do exercício e da atividade física em pessoas com TEA.


CONTRIBUCIÓN DEL EJERCICIO FÍSICO SOBRE LA REGULACIÓN EMOCIONAL DE ADULTOS CON TRASTORNO DEL ESPECTRO AUTISTA

RESUMEN

Propósito: Identificar el efecto del ejercicio físico sobre la regulación emocional de 4 adultos con trastorno del espectro autista (TEA) entre edades de 22 a 39 años, en esta población se encontró que una de las dificultades presentadas en estos sujetos es la regulación emocional (empatía) en sus actividades cotidianas, como lo son las variaciones en su rutina, estos pueden ser cambios de horario en tiempo o actividades, desorden en sus cosas, desvelo en las noches, etc.

Metodología: Enfoque cualitativo con diseño estudio de caso, se utilizó el programa atlas ti para el análisis semántico, para ello se seleccionaron 4 sujetos diagnosticados por la Liga Colombiana de Autismo, posteriormente se realizaron 15 intervenciones desde una propuesta de actividad física y se desarrollaron entrevistas a los padres de los 4 sujetos participantes, para conocer acerca del efecto del ejercicio en la población de adultos con autismo.

Resultados y Conclusiones: Se encontró que existe diversas conductas que expresan los sujetos frente a situaciones diferentes ya sea en la calle, casa u otro espacio, en conclusión, el efecto del ejercicio físico sobre la regulación emocional contribuye a mejorar los estados de ánimo, disminuyendo las fases de escalación y generando una mejor empatía frente a la ejecución de actividades o ejercicios en los 4 adultos.

Implicaciones: Esta investigación proporciona implicaciones para que la política educativa y gubernamental continúe fortaleciendo las políticas públicas de las personas con TEA.

Originalidad/Valor: Esta investigación ofrece novedad al vislumbrar el impacto del ejercicio y actividad física en las personas con TEA.

Palabras clave: Trastorno del Espectro Autista, Regulación Emocional, Adultos, Ejercicio Físico.

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1 INTRODUCTION

Autism Spectrum Disorder (ASD) is a neuropsychological condition that affects a significant number of people and has been the subject of several studies. According to data from the World Health Organisation (WHO, 2017), an estimated 1 in 160 children worldwide have ASD, highlighting the importance of understanding this disorder. The impact on individuals and families is significant, since family dynamics are altered and stressful situations arise in the care of the child, visits to the doctor and adaptations at home and the request for support in institutions, among others (Lavado & Muñoz, 2023).

In this sense, Delgado and Agudelo (2021) state that the nosological classifications the two “most important and recognised are the International Classification of Diseases (ICD) and the Diagnostic and Statistical Manual of Mental Disorders (DSM)” (p.58). These highlight that autism spectrum disorder entails problems in verbal and non-verbal communication, interaction processes and repetitive, restricted and inflexible patterns (Valdez-Maguiña & Cartolin-Príncipe, 2019). The potential presence of genetic disorders and psychiatric problems is also recognised.

Research on ASD focuses on understanding the disorder, developing new treatments and improving the quality of life of individuals and their families, as well as raising awareness and reducing stigma and discrimination (Cuesta et al., 2016). In this regard, it is important to promote inclusion and full participation in society (García et al., 2020; Penagos et al., 2023), along with working with multidisciplinary teams to guarantee rights in all aspects of life (Bernate et al., 2020; Santos, 2022; Silva de Andrade, 2023).

In historical terms, it highlights what was raised by the Austrian Kanner, who, in 1943, published an article in which he described eleven children who presented a similar pattern of behaviour and social and communicative skills, which he called "early childhood autism". Kanner observed that these children had difficulty interacting with other people, exhibited repetitive patterns of behaviour, and obsessively became interested in specific objects and activities. At the same time, the Austrian psychiatrist Asperger in 1944 also described a similar pattern of behaviour in children, but emphasising skills and strengths and termed it "autistic psychopathy" (Bautista, 2021; Mariño et al., 2021).


2 THEORETICAL FRAMEWORK

In the 1980s, the understanding of Autism Spectrum Disorder evolved into a broader approach, which included different degrees of severity and diversity in the abilities and characteristics of people with ASD. Since then, important advances have been made in understanding and diagnosis, as well as in the development of effective treatments and supports (García and Gonzales, 2021). According to the above, within autism spectrum disorders (ASD) is autism, which has alterations in communication, language, social interaction and cognitive functions, along with stereotyped behaviours that can manifest in moments of happiness. Comorbid conditions are also common (Cuesta et al., 2016; Romero et al., 2016; Suárez et al., 2017; Valdez-Maguiña & Cartolin-Príncipe, 2019).

In this sense, the intervention of the family is essential, since it is essential to recognise the situations or activities that can cause nervousness or well-being in the autistic person, taking into account the environment, routines and breaks in order to avoid stress (Cuesta et al., 2016; WHO, 2017). For this reason, it is necessary to have a specialised orientation, so that personalised interventions are made adapting to the rhythm and the needs of the family nucleus. Experiences that promote meaningful learning and a positive impact on quality of life should be promoted, in an inclusive way at the physical and social level (Cuesta et al., 2016; Mira et al., 2019; Latorre et al., 2019; Lavado & Muñoz, 2023).

Likewise, Poenitz & Arizabalo (2015) and Mira et al., (2019) argue that behavioural problems, aggressiveness, aggression, social uncontrol, anger, anxiety and hyperactivity are common. These excessive responses may be due to problems recognising, managing, and regulating your emotions. In this regard, the Colombian Autism League explains the 3 phases of escalation in which these behaviours can manifest:

**Phase 1:** The adult demonstrates dissatisfaction with something that affects them in their environment through passive sounds or movements.

**Phase 2:** Expresses their dissatisfaction in a more intense way either by sudden movements or loud and guttural sounds, as well as repetitive and stereotyped behaviours.

**Phase 3:** This is considered the highest escalation phase, where it is possible for the adult to prove it with self-aggression or physical aggression to his family or people around him.

It is important to understand these phases in order to provide support and appropriate emotional regulation strategies for people with ASD.

Physical activity (PA) has several benefits, including increased self-confidence, improved health, and cognitive functioning. In addition, it has been identified as an effective
treatment for psychological disorders such as depression, stress or anxiety (Márquez, 1995; Bernate et al., 2020). Regular physical activity contributes to emotional stability and increases self-esteem. It also helps prevent manifestations of self-aggression, relieves tension and stress, and promotes positive self-perception.

According to Luarte et al., (2022) physical exercise can be an alternative treatment for various disorders, as it produces beneficial effects at the psychological and physical level. For their part, Bernate and Fonseca (2022) point out that physical activity improves quality of life and increases personal and social self-fulfilment. In this sense, these authors reinforce the theory that exercise not only contributes to a state of physical, but also mental health, personal well-being and the overall improvement of quality of life.

People with ASD struggle to develop physical skills and often live sedentary lives. Physical exercise contributes to improving the quality of life and helps prevent obesity; in the same way it generates contributions at the cognitive, communication and motor level. It is recommended to conduct classes with the participation of up to 6 people and activities based on imitation and interaction (Soldan et al., 2021).

Interventions have been carried out through individual games with a duration of 7 to 14 weeks observing improvements in social, coordination, motor and communication skills. Likewise, when implementing strategies such as hydrogymnastics, swimming, equine therapy and walking, benefits are generated in the integration of the family and social group, as well as a reduction of aggressive behaviours (Fessia et al., 2018). Physical exercise contributes to improving motor skills and promotes positive changes at the behavioural level. In this regard, it is necessary to have adequate physical and social scenarios, as well as trained teachers who provide continuous accompaniment. This ensures a safe and supportive environment for their development and well-being.

López et al. (2009) show how autism studies have evolved since Kanner's findings, as he pointed out that people with autism have difficulties in communication, social interactions and at the intellectual level. The scarce imagination and stereotyped speech in some cases are also highlighted (Solís et al., 2021). Additionally, intervention programmes in people with autism have been shown to contribute to the well-being of them, their families and people in their environment (Lavado & Muñoz, 2023).

In a study carried out by Ojea (2004), the educational needs of 10 children and 2 girls with Generalised Development Disorder (GDD) were evaluated and psychoeducational intervention (PIP) programmes were designed, taking into account social aspects, basic psychological processes and communication. Similarly, in Cuba, Jiménez (2017) performed an
intervention for the development and improvement of basic motor skills in schoolchildren through equinotherapy. This intervention methodology not only contributed to the physical development but also to the social, communicative and behavioural skills of the participants.

With regard to interventions based on physical exercise and emotional regulation, it is important to note that physical capacities gradually decline as the person ages, being the range of greatest athletic potential between 20 and 30 years (López, 2009).

Based on the above, this study seeks to establish the relationship between autism spectrum disorder, emotional regulation and physical exercise focusing on adulthood. Although each of these factors has been extensively investigated separately, there is little research linking them to each other. In addition, physical exercise is a motivational tool, due to the taste they usually have for their practice. For this reason, the main objective of this study is to identify the effect of physical exercise on the emotional regulation of adults with autistic disorder of the Colombian Autism League, with the purpose of improving their emotional control avoiding their state of escalation.

3 METHODOLOGY

The study is of qualitative approach because interpretations, analysis and questions are generated before, during and after the research in order to maintain a constant search action, in addition to having logic in it. In relation to this, the data can be collected through observations, interviews, interventions or interactions with the population, etc. Then, the collection of the data is reflected in various ways that are not standardised as they are in the quantitative approach (Hernández et al., 2014), additionally, the methodology is in case study, Yin (cited by Martínez, 2006) considers that this is a safe tool to analyse behaviours of the populations with which it is worked and, in addition, Chetty (cited by Martínez, 2006) raises that the data obtained can be collected through interviews, observations and participations.

Likewise, the study is cross-sectional, for Betancourt et al., (2020) the cross-sectional investigations collect information in a set time limit in order to analyse the events that occur at each moment of the intervention. Obviously, these three aspects are related to this study, since there is an analysis of the responses offered by 4 parents through semi-structured interviews that were developed previously.

Now, to begin with, among the 6 members of the Colombian Autism League participants of the programme “Enhancing my sports skills, young people and adults”, 4 adults between ages of 22 and 39 years are selected, this is because the remaining 2 participants are minors.
Contribution of Physical Exercise on the Emotional Regulation of Adults with Autism Spectrum Disorder

Subsequently, interventions were developed in the professional practice space with these subjects, which have as main characteristic autism spectrum disorder (ASD). For this reason, an additional accompaniment is generated by their parents, who answered written interviews about the behaviour of their children, since they are the people who know them most and possibly know how they react to physical exercise.

According to the above, it was proposed to develop a work plan through 15 interventions focused on physical exercise to the 4 subjects with autism spectrum disorder during the professional practice carried out in the space of the Simón Bolívar sports complex. It is important to note that the work plan was specific to each individual. In addition to this, the four parents responded in written form to a semi-structured interview consisting of 7 questions regarding their children's behaviour in different spaces or activities, including participation in the field of physical exercise. Finally, it is important to add that the interviews were validated by a psychologist and a physiotherapist who work in the Colombian Autism League. Likewise, the parents of the individuals signed a consent on a voluntary basis to only expose the written answers for the development of this study.

4 PROCEDURE

For the analysis of the information, the ATLAS software was used. It 22, through which it was possible to organise the primary documents (individual interviews) to carry out their respective organisation and start with the coding process in the hermeneutic unit.

Figure 1
Description of content analysis

Source: Own-made (2023)
In the analysis process, 4 primary documents were taken into account, of which the information was segmented to obtain 28 codes considered also as the system of categories necessary for the interpretation and location of findings according to the degree of relevance. In addition, three memorandums were registered, the purpose of which was to produce comments on concurrent facts relevant to the interpretation process.

Figure 2

List of citations and main categories in the hermeneutic unit.
category Behaviour in quiet situations was coded in 31 citations, thus being one of the categories with greater influence within the analysis process. Likewise, the category Behaviour in stressful situations demonstrates a coding in 17 appointments as well as the category Behaviour during physical exercise, then the category Behaviour after exercise with 16 citations and finally Difference in behaviour when performing and not performing physical exercise with 13 citations that rest on the interviews analysed.

5 RESULTS AND DISCUSSION

For the content analysis corresponding to the primary documents, the ATLAS software was used. Ti 22, with the intention of coding and categorising the information of the individual interviews, of which the following categories are related to their respective frequency in the following table generated by the software in question:

Table 1

*Code system with its respective frequency.*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggression</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Behavioural disturbance</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Attention</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Collaboration</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Decreased anxiety</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Distancing</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Sound emission</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Empathy</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Anger</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Happiness</td>
<td>0</td>
<td>6</td>
<td>7</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Indisposition</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Interest</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Irritability</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>
Gr, indicates the rooting of the code, that is, the number of citations that have been encoded by that code.

In this table 28 codes are displayed, within which 5 located at the top were selected as main categories according to the degree of rooting and, on the right side you can find 23 codes that presented a lower rooting, but at the same time present an association with each other, since they were elements that emerged from the same citations in each of the primary documents.

In the case of the category Behaviour in quiet situations, it can be observed that it has a rooting (Gr) of 31 times, being the most frequent category in the citations of the primary documents, in turn it is associated with 3 subcategories, such as the Little tolerance (Gr9) which presents a greater coincidence with the category indicating that it can have an interesting finding in relation to this behaviour, likewise the subcategory Routines (Gr5) is found, giving account of the daily activities that adults with autism spectrum disorder can perform and, finally Tranquillity as a subcategory with a rooting of 1, although it is a low indicative, it has a direct relationship since within the narrations it is a concept that reflects constant behaviour.

In the daily activities of adults with autism spectrum syndrome, calming behaviours are identified when social interaction occurs in an environment with known people either at home or in public places. However, there are situations where there is a lack of tolerance, specifically in contexts where there are unknown people or excessive hearing pollution.

<table>
<thead>
<tr>
<th>Category</th>
<th>Gr</th>
<th>Rooting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved communication</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Behavioural improvement</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Nerves</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Participation</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Low tolerance</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Rejection</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Relaxation</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Routines</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Routine</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Tolerance</td>
<td>9</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Own-made (2023)
Table 2

Discursive fragments

<table>
<thead>
<tr>
<th>Social actor participate</th>
<th>Narrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject 1</td>
<td>“When the environment is known, their behaviour is very calm”</td>
</tr>
<tr>
<td>Subject 2</td>
<td>“At home you can sit in the living room or in your bed lying down watching tv or playing with the tablet. On the street, he likes to be in a car that moves him to pick up. He also likes to be in a mall, go and eat ice cream and burgers.”</td>
</tr>
<tr>
<td>Subject 3</td>
<td>“In the house he likes to listen to music, he collaborates with the elementary daily craft of ordering his spaces; punctual for the bathroom and personal toilet, he is aware of his medications and time to take them”</td>
</tr>
<tr>
<td>Subject 4</td>
<td>“He has little tolerance for waiting, but in general, he has proper behaviour.”</td>
</tr>
</tbody>
</table>

Source: Own-made (2023)

From the discourse of the participants in the research, it is corroborated that in the daily activities of living both at home and in public areas, they are usually normal routines of a conventional person, such as watching television, using a Tablet to entertain with applications that stimulate your senses and at the same time allow you to be distracted and not be locked in a single activity, in addition to being able to go out to public spaces such as shopping centres and eat what you like most. All of this is the responsibility of contributing to household functions, such as helping with cleaning and personal hygiene, organising your toys, and being aware of the schedule for taking your medicines in the appropriate time.

In general, the behaviour is always controlled when the activities that take place occur in spaces in which it is frequently attended and with the people belonging to its social nexus, thus promoting tranquillity in the individual. However, there are episodes in which other behaviours that imbalance tranquillity occur, such as making contact with strangers, having to wait a long time or endure constant and exaggerated noises, giving way to intolerance for any extrinsic stimuli that are perceived negatively.

5.1 CATEGORY BEHAVIOURS IN STRESSFUL SITUATIONS.

Through the analysis of cooccurrences, it can be observed that this category presents a rooting of 17 coded citations, likewise it is familiar with 9 subcategories, within which can be found the anger (Gr6) and happiness (Gr6) that co-occur with 6 codings in the citations related to the main category, demonstrating in this way that it has a high degree belonged. Next, we can find the Tranquillity (Gr 9) with a categorical familiarisation of 4 citations and successively, we find the Emission of sounds (Gr4), Indisposition (Gr4), Nerves (Gr3) and Little tolerance (Gr8) which coincide with a cooccurrence of 3 times with the main category.
Taking into account the above, this category aims to publicise those behaviours that occur in those situations by which emotions are altered and the way of manifesting in a certain context, since tranquillity does not always endure. In stressful situations, a behavioural alteration usually manifests itself due to extrinsic stimuli that provoke anger towards either a person or an object. Nervousness is also noticeable when they hit their hands and head against some surface showing self-aggression and at the same time they emit sounds like screams due to stress, being intolerant of any attempt to control that others make.

**Table 3**

*Discursive fragments*

<table>
<thead>
<tr>
<th>Social actor participate</th>
<th>Narrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject 1</td>
<td>“He becomes unprepared and begins to make nonsensical sounds and seeks a quiet place”</td>
</tr>
<tr>
<td>Subject 2</td>
<td>“He is bothered by some routine changes, not sleeping results in altered behaviours. Dogs alter it.”</td>
</tr>
<tr>
<td>Subject 3</td>
<td>“Especially quiet. He gets angry with someone who annoys him, he is well placed in space, but he gets nervous when he feels alone at home”</td>
</tr>
<tr>
<td>Subject 4</td>
<td>“In situations that he does not tolerate, he manifests it by raising his voice and sometimes by hitting each other's hands”</td>
</tr>
</tbody>
</table>

Source. Own development (2023)

In the discursive fragments of the social actors involved, it is possible to identify that the main behaviours under stress situations are framed in the sudden changes of their daily routine, such as lying down late and sleeping less than usual, and loud noises or sounds such as the barking of dogs or when a person performs a stimulus that generates anger, this leads to situations where they can even cause harm or assault people around them.

5.2 CATEGORY BEHAVIOUR DURING PHYSICAL EXERCISE.

Continuing with the process of cooccurrence analysis, the present category recorded a rooting 17 encodings in different citations and a density of 7 subcategories in which Happiness is distinguished (Gr6) with a cooccurrence of 7, followed by subcategories Decreased anxiety (Gr4), Improved communication (Gr6) and Improved behaviour (Gr8) with a cooccurrence range with the general category of 5, likewise there is Attention (Gr6), coinciding with Collaboration (Gr4) with a coincidence of 4 last but not least Tranquillity (Gr9) with a coincidence of 2 with the general category.
Taking into account the behaviours in a state of relaxation and in situations of stress, the present category is composed of conceptual elements that show attitudinal changes given thanks to physical exercise, since it turns out to be an experience that allows to stabilise emotions and behaviour in adults with autism spectrum syndrome, since, through praxis, the interaction with oneself and with others, it is possible to attract attention with appropriate activities that facilitate concentration and motor performance. In the same way, physical exercise promotes tranquillity, as it generates spaces where happiness endures and the pleasure of play allows communication to flow with the other protagonists of the scene. The reception of the information and the motor stimuli that are made, leave answers reflected in the achievement of the objectives raised, that is, it becomes more manageable the class session, with harmony without any alterations or conflicts since anxiety decreases, there are fewer emotional crises and therefore the behaviour improves.

**Table 4**

**Discursive fragments**

<table>
<thead>
<tr>
<th>Social actor participate</th>
<th>Narrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject 1</td>
<td>“It positively improves your behaviour and shares more, improves your communication”</td>
</tr>
<tr>
<td>Subject 2</td>
<td>“It calms him down a lot, he likes him, he lowers his anxiety, he's not that disruptive at home. He participates in sports activities from a very young age, swimming pool, bicycle, skates, etc.”</td>
</tr>
<tr>
<td>Subject 3</td>
<td>“He is willing to do the exercises, sometimes with apathy, but for now he changes his attitude and collaborates”</td>
</tr>
</tbody>
</table>
| Subject 4               | “Allows you to keep attention”  
“Follow instructions”  
“Keeps him happy” |

Source: Own-made (2023)

Parents recognise that physical exercise turns out to be a tool that allows to control the alterations in the behaviour of their children, because they realise changes in the interaction with other people, behave more and establish more efficient communication channels, they also tend to be calmer without less anxiety and find themselves happier, although sometimes they can be apathetic, voluntary, but they are momentary characteristics that are easily channelled through practices.

**5.3 BEHAVIOUR AFTER EXERCISE CATEGORY**

Continuing with the dynamics, this category evidences a rooting with 16 citations in the primary documents and an association with 5 subcategories, where Relaxation (Gr6) presented
Contribution of Physical Exercise on the Emotional Regulation of Adults with Autism Spectrum Disorder

a cooccurrence of 6 with the main category, consecutively Happiness (Gr 6) with a cooccurrence of 5, Tolerance (Gr8) recording a cooccurrence of 3, then Tranquility (Gr9) with an association of 2 and finally Participation with a cooccurrence of 1 with the main category.

During the process of categorical association, the behaviour of adults with autism in the social environment is evidenced, after the praxis given in the routines of physical exercise, whose behaviours reflect that, this social group improves its participation in the other contexts in which it performs as for example in the home, because their parents are witnesses and claim that they look happier, calmer with greater tolerance with those factors that altered their patience.

Table 5

<table>
<thead>
<tr>
<th>Social actor participate</th>
<th>Narrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject 1</td>
<td>“He's happier and more relaxed” “Yes because since the day before everything is ready and when the practice ends he is very relaxed and happy”</td>
</tr>
<tr>
<td>Subject 2</td>
<td>“He is calmer” “Yes, he gets up early and whenever asked he shows interest”</td>
</tr>
<tr>
<td>Subject 3</td>
<td>“He feels happy and eager to continue participating in other opportunities, he is more calm and eager to rest. Look for something to eat and stay active all day.”</td>
</tr>
<tr>
<td>Subject 4</td>
<td>Subject 4 Yes, he asks insistently when the sports teacher arrives and shows a lot of joy when he comes home to work with him”</td>
</tr>
</tbody>
</table>

Source: Own-made (2023)

Physical exercise results in positive changes in these people's behaviour, because their social interactions at home improved and they show a greater interest in physical exercise, as it helps them increase energy expenditure and at the same time control their emotions to remain calmer.

5.4 CATEGORY DIFFERENCE IN BEHAVIOUR WHEN PERFORMING AND NOT PERFORMING PHYSICAL EXERCISE

The difference in the behaviour when performing and not performing physical exercise is a main category with a rooting of 16 citations in the primary documents and is composed of a density of 8 subcategories, where the Decrease of anxiety (Gr4), Irritability (Gr5) and Tolerance (Gr8) share a cooccurrence of 4 with the main category. Likewise, the subcategories Distancing (Gr5), Empathy (Gr3) and Rejection (Gr4) with cooccurrence level of 3 and Interest (Gr3) with a cooccurrence of 2 with the general category, it is worth emphasising that these subcategories give meaning to the general category to perform the interpretation process and the identification of findings.
Similarly, the present category shows how participants of the activities manifest variable changes in their behaviour at the time of not having physical exercises at a respective time. As mentioned above, during physical exercise individuals feel more tolerant, empathetic, reduces anxiety and reflect much more interest in practices, however, at the time of not having the routines of physical exercise, they manifest irritability, distancing and rejection by others, that is, the absence of movement, energy expenditure and fun directly affects the mood and therefore behaviour in the family context.

Table 6
Discursive fragments

<table>
<thead>
<tr>
<th>Social actor participate</th>
<th>Narrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject 1</td>
<td>Subject 1 “Yes, because not having the routine, seeks to get away and be alone”</td>
</tr>
<tr>
<td>Subject 2</td>
<td>Subject 2 “If physical changes are evident, because you lose weight, your levels of attention are improved and there is more empathy and interest to participate in these spaces”</td>
</tr>
<tr>
<td>Subject 3</td>
<td>Subject 3 “By not carrying out a constant routine, initially rejects all activity, when performing it, it is already attentive; it disperses easily and seeks to be isolated from the group that this. By not doing exercises or activities remain calm”</td>
</tr>
<tr>
<td>Subject 4</td>
<td>Subject 4 “When doing physical exercise: improves your behaviour by being more tolerant, calms your anxiety. By not doing so, there is more energy retention that manifests itself with anxiety, less tolerance, irritability, among others.”</td>
</tr>
</tbody>
</table>

Source: Own-made (2023)

Parents recognise that the absence of physical exercise affects their children emotionally causing isolation and loneliness by not wanting to share with others, anxiety stands out and are intolerant, express bad temper, and irritability about anything. By not continuing with the routine constantly, when they resume, they show apathy and it is difficult for them to participate again.

This research aimed to identify the effect of physical exercise on the emotional regulation of adults with autistic disorder of the Colombian Autism League. Based on the results of the study, taking into account what was proposed by the parents, it is highlighted that the absence of physical exercise affects young people emotionally, sometimes causing isolation and loneliness. That is why to combat this, physical activity is recommended for at least 30 to 40 minutes a day, which can help reduce stress levels and symptoms of anxiety and depression.

Likewise, subjects with ASD, when they encounter close people, manifest safety and tranquillity behaviours in daily activities at home and public areas (Cuesta et al., 2016). However, being in open spaces with a lot of noise and with other unknown people, they can alter behaviour (Negrão, 2023) and at the same time communicative dysfunction excels in such
events, preventing assertive communication to promote a passive social manifestation (Cañari, 2022). Another type of behaviour in adults with autism spectrum syndrome is physical self-aggression, due to external stimuli that occur in the social environment, which depends on their biological and psychological state that when altered can cause difficulties in emotional control, which leads to self-harm (Pérez, 2016; Fonseca et al., 2019).

All these symptoms that affect people with autism, do not allow them to lead a satisfactory social life, because the overflow of emotions and behaviours lead to negative perceptions in the social context. For this reason, it is necessary to use tools to promote social interactions and at the same time improve the quality of life. Thus, the practice of physical activities favours motor abilities since they allow concentration and self-control, which can benefit behaviour and positively favour in the social field allowing a good performance in interpersonal relationships (Luarte et al., 2022), which is beneficial also in the reduction of behavioural symptoms that alter tranquillity and even instability in sleep, which is very important for rest, physical and psychological recovery (García, 2020; Fonseca et al., 2022).

Faced with the school context, special programmes should be designed that allow meaningful learning, through physical and social inclusion, articulated with individual and group physical activities. Likewise, work with this population must be sequential, through continuous and clear tasks, organised with certain degrees of difficulty. Hence, the importance of the family for the reinforcement of daily activities with continuous control and progress in the development of basic life skills until adulthood, where gradually autonomy must be generated. (Fonseca et al., 2023)

In relation to families of people with ASD, they recognise that physical exercise is a useful means to control changes in behaviour, since positive changes in interaction with other people have been observed. Although they can sometimes present momentary characteristics such as apathy or voluntarism, these behaviours can be easily channelled through the practice of physical exercise. It is important to note that behaviour is usually controlled when physical activities take place in spaces where children frequently attend and with people belonging to their social context (Lavado-Candelario, S., & Muñoz-Silva, 2023). Given the above, family members become a base support for the development of the person in this condition, so they must be trained to work with this population, have diagnoses at an early age and rely on experts in autism issues (Cuesta et al., 2016; Romero et al., 2016; Valdez-Maguíña & Cartolin-Príncipe, 2019).

According to the above, in programmes in people with AD it is recommended to work on motor development, attention and communication skills and the regulation in behaviour,
studies carried out show that when students with ASD participate in inclusive classes, as well as, paused activities, with precise indications can increase communication and interaction through physical activity (Maravé et al., 2021). In this regard, physical exercise improves anxiety as it provides relaxation and tranquillity, as well as through adapted riding exercises, contribute to balance and multisensory development, facilitate sensory integration, improve tolerance and acquisition of adapted behaviours (Vives et al., 2021; Puerto et al., 2024; Bernate et al., 2024).

Regarding other findings, Peiró et al., (2011) proposed that among the benefits of moderate physical exercise is the improvement of mental health due to the low levels of anxiety, depression, and stress, resulting in improved mood and mental relaxation. In addition to this, it is worth mentioning the approach of Serra and Bagur (2004) who consider that within the psychological effects of physical exercise are the motivational factors that contribute to mental health, improve self-confidence, mood, personal well-being, emotional balance and generate self-control. It also decreases anger, anxiety, depression, aggression, irritability, and even phobias.

It is emphasised that planned and directed physical activity brings health and well-being benefits for people with autism spectrum disorder (ASD). Thus, through it it turns out to be an experience that stabilises emotions and behaviours that allow individual and collective recognition, also improves communication processes, socialisation, concentration and interaction with the environment. On the other hand, different studies mention that intervention strategies from physical activity in this type of population have a positive impact on the development of motor skills, balance, flexibility and coordination. Likewise, the strengthening of attention and the reduction of stereotyped and aggressive behaviours (Fessia et al., 2018, Soldan et al., 2021).

In this sense, Bravou (2022) and Rojas et al., (2019), mention that physical activity increases self-esteem, energy levels and improves behaviour in general, reducing tension in healthy people or people with disabilities, since it facilitates the cognitive area and prevents mental disorders. In fact, physical exercise contributes to mental health in such a way that it generates an emotional balance, decreasing harmful behaviours for people. (Cuesta et al., 2016; Romero et al., 2016; Suárez et al., 2017; Valdez-Magüïña & Cartolin-Príncipe, 2019; Fonseca et al., 2024).

This study coincides with the authors Lavado et al., (2023) and Mira et al., (2019), who mention that the diagnosis of people with Autism Spectrum Disorder (ASD) has implications on the quality of life and family functioning in relationships between parents and children with
and without ASD, as well as the siblings of the person diagnosed. Therefore, providing strategies from physical activity turns out to be a therapeutic strategy that helps to improve the family context and socioemotional development. It is also important to emphasise that such strategies must be guided by an interdisciplinary team, due to their impact on long-term social adaptation. (Bernate et al. 2024; Araruna et al. 2024)

The studies mentioned above suggest that physical activity and physical exercise in short periods, have benefits at the motor level, executive functions, levels of attention, follow-up to instructions, as well as, the reduction of levels of anxiety and stress, behaviours that in some cases can be managed by parents.

6 CONCLUSIONS

Physical exercise has an important and preponderant contribution in the emotional regulation of adults with Autism Spectrum Disorder (ASD). It can also have beneficial effects on anxiety, stress, and mood. In this sense, it helps regulate emotions by increasing the production of endorphins and neurotransmitters, such as serotonin and dopamine, which are related to emotional well-being. It can also lower cortisol levels, improve sleep quality, and have a positive impact on mood. Activities such as walking, swimming or cycling can be beneficial for the mental and physical health of this population.

Physical activity improves self-esteem and confidence, which can help people with ASD develop social skills and improve their interaction with others. Importantly, the type and intensity of physical exercise can be important and is an opportunity for socialisation and teamwork, which can be particularly important for people with ASD, who often have difficulty interacting socially. Physical exercise can provide a way to interact with others in a safe and structured environment, which is beneficial for improving the ability to interact with others in daily life.

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