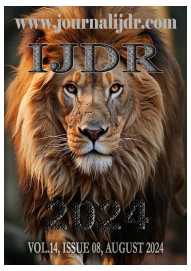
ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of Development Research
Vol. 14, Issue, 08, pp. 66425-66429, August, 2024
https://doi.org/10.37118/ijdr.28621.08.2024



RESEARCH ARTICLE OPEN ACCESS

STANDARDIZATION OF TERMS OF SENSORY RESPONSES

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ARTICLE INFO

Article History:
Received 17th May, 2024
Received in revised form
28th June, 2024
Accepted 16th July, 2024
Published online 30th August, 2024

Key Words:
Autism Spectrum Disorder. Sensory Processing Disorder. Occupational therapy.

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ABSTRACT

There is evidence that autism, or Autism Spectrum Disorder, is associated with Sensory Processing Disorder (SPD), which involves atypical behaviors that are often narrated in the patient's medical records in a non-standardized way and are difficult to identify. To help with this, the aim of this article was to draw up a list to help extract information from medical records. The research was carried out in three phases: in the first, developed by means of a systematic review, there was a definition of the sensory responses that identify SPT; in the second, the identification of these responses in the narratives of medical records; and in the third, the association of the main sensory responses that identify SPT with those identified in the narratives of clinical records. As a result, three lists were obtained: referring to the main sensory responses related to SPT; to the sensory responses identified in medical records; and, associating the main sensory responses related to SPT with those identified in medical record narratives clinicians.It was observed that the list drawn up with the main sensory responses related to SPD helps to extract information, showing that it is possible to use medical records to identify this disorder.

Citation*: *Thais Caroline Pereira and Claudia Maria Cabral Moro Barra. 2024. *"Standardization of terms of Sensory Responses". International Journal of Development Research*, 14, (08), 66425-66429.

INTRODUCTION

There is a lot of evidence that autism is associated with Sensory Processing Disorder (SPD) (1), which is present when sensory signals have difficulty being organized into appropriate responses (2), with behavioral repercussions (3,4). As a result, parents of children with SPT often report these behaviors when they go to see a health professional. These reports and the professionals' observations are recorded in the child's medical records. Thus, when a referral is made to the occupational therapist (OT), he or she has the opportunity to analyze the child's medical records and identify sensory responses that indicate SPD in the texts recorded. In the case of this disorder, there is a concern to prioritize the sensory responses recorded in the medical records in order to draw up the therapeutic plan. However, identifying the child's sensory responses in the medical records is not an easy task, as professionals record them in different ways, since there is no standardization of the terms used for sensory characteristics. This concern is also pointed out in terms of the need to systematize interface languages in order to facilitate the organization and retrieval of information in the virtual environment (5). In addition, there is no assessment tool that satisfactorily contains sensory responses, and professionals must resort to different tools when carrying out their assessment. In general, the instruments currently used to identify SPT include clinical observations, questionnaires and interviews with parents (6).

Among these assessments, we can mention: Infant Toddler Sensory Profile (7), Sensory Intagration and Praxis Test - SIPT - (8), Sensory Profile (9), DeGangi-Berk Test of Sensory Intagration (10), Observations Based on Sensory Integration Theory (11) and Test of Sensory Function in Infants (12). Autism, currently defined as a developmental disorder with neurobiological causes and identified on the basis of eminently clinical criteria, develops with atypical behavior patterns (13), which is why it is commonly associated with SPT. Since this is information that is not easily identified in the text and there is a diversity of assessment instruments, the problem of this article is: "What terms characterize sensory responses and how are they recorded in the narratives of autistic children's medical records?". In order to facilitate the identification of atypical sensory response terms, a list of standardized terms is needed. The aim of this study was therefore to draw up a list of terms relating to SPT, which was analyzed from the perspective of sensory integration and validated by experts.

METHODOLOGICAL PROCEDURES

Because it involved data from medical records and validation by specialists, this research was analyzed and approved by the Research Ethics Committee of the Pontifical Catholic University of Paraná (PUC-PR), under opinion No. 394.095 and, because they belong to the health service of the Curitiba City Hall, the same process took

place in the Research Ethics Committee of the Municipal Health Department of that municipality, under opinion 65/2013.

The study was exploratory and qualitative: The methodological approach began with a systematic review to identify the terms used by researchers to refer to sensory responses related to SPT. For this review, a Google search was first carried out to identify the search terms, using "sensory integration" and "sensory integration", identifying the latter as the most recurrent term and "sensory processing" as a synonym. Next, an advanced search by subject was carried out on the CAPES Periodical Portal, using the terms "sensory and integration and processing" and "sensory and profile". 548 articles were found. Of these, 32 articles met the objective of the search and allowed the database, Gale Cengage Learning, to be identified. These articles were selected by reading the title, followed by the abstract and the full text, ending with 15 articles rticles. The results highlighted the Sensory Profile (14) and the new diagnostic nosology proposed by Miller, Anzalone, Lane, Cermak and Osten (15). The selected articles were explored using the ATLAS.ti 7.0.83 tool. At the end of the analysis, it was identified that the results were flawed, as they referred too much to an assessment and diagnostic terminology, not satisfactorily meeting the objective of the review. A second systematic review was therefore carried out on the identified database, Gale Cengage Learning, using "sensory and integration and processing" and "sensory characteristics and autism and behavior", resulting in 265 articles. The selection proceeded in the same way: 1) by title; 2) by abstract; and, 3) by reading the articles in full, resulting in 30 articles.

The third systematic review was then carried out to identify the assessments adopted by researchers to study this population. This search was carried out with the aim of adopting a standardized method to help analyze the terms identified in the second review, allowing them to be analyzed from the perspective of sensory integration. Also through the Gale Cengage Learning database, a search was carried out using the terms "sensory and integration and processing" and "test and observation and evaluation and checklist", finding 79 articles. To select these, the methodologies adopted were read. This resulted in 32 articles. The SPT assessment instruments most commonly used in the selected articles were the SPM in third place, the SIPT in second place and, in first place, the Sensory Profile, which was then used as the instrument to base the analysis of the terms identified in the second review from the perspective of sensory integration. Thus, with the documents entered into ATLAS.ti, the terms identified as SPT descriptors in the articles selected in the second systematic review were coded as "characteristic", so that codes referring to sensory integration and present in the standardized assessment tool adopted to support this research, the Sensory Profile, were then assigned, such as "AUDITORY PROCESSING", with the aim of forming webs at the end of the analysis, relating the terms, which is possible with this computational resource. Next, a list was drawn up of the terms obtained in the second systematic review. Because the articles selected were all international, the terms were first translated. To help group similar terms, they were organized in alphabetical order and repeated terms were excluded. The terms written in sentences were then related to the unit terms and listed in their sequence. To organize the list even better, words were used to categorize and identify the subgroups formed, helping to locate the information and understand the list. In all, 30 categories were adopted: aggression and self-aggression, stereotypes, behavior, cognitive, repetitive, routine, communication - speech - language, social and communicative, social, pain, attention, proprioceptive processing, auditory processing, visual processing, vestibular processing, olfactory processing, taste/oral processing, balance, tantrums, comorbidities, fine motor, motor, gross motor, motor, cognitive, orientation, balance, sensory processing, imitation and praxis. To optimize grouping, words that were repeated and similar phrases were separated by a dash (/); when they were different but belonged to the same group, they were separated by a hyphen (-). Table 1 shows an example of part of the list of terms drawn up from the second systematic review, which identified the terms adopted by researchers to refer to sensory responses related to SPT, organized according to representative categories.

Table 1. Part of the list of terms referring to sensory responses related to TPS

TERMS
AGGRESSION AND SELF-AGGRESSION
aggression - aggressive - aggressive behavior - fighting (e.g. shouting or getting aggressive) - violent - destruction
self-injury - self-mutilation - self-mutilating - self-injurious / self-damaging / self-aggressive / self-abusive behavior(s), such as biting or head-butting

Source: Author, 2023.

Once this list had been drawn up, the third systematic review was carried out in order to identify the assessment instruments adopted by researchers to study this population, with the aim of adopting a standardized method that would help in the analysis of the terms identified in the second review, allowing them to be analyzed from the perspective of sensory integration. The most common method adopted was the Sensory Profile. This instrument presents categories to represent a set of questions referring to behaviors to be observed in the child being assessed. These questions were compared to the subgrouped terms on the list and, when analyzed as corresponding, the category representing the related question was adopted to analyze the set of terms listed. However, in the course of the analysis, it was identified that there was a need to use other terms, not contained in this instrument, but also related to sensory integration, which are: deficient praxis, deficient sensory processing, stereotyped and restricted interests, autism, developmental delay, and comorbidities.

The list was then validated. The criteria for selecting the specialists were: 1) a degree in Occupational Therapy, 2) 5 (five) years' experience with autism and, 3) 5 (five) years' experience with Sensory Integration. In order to validate the experts, the list was structured in 4 columns, presenting the "TERMS", the "ANALYSIS FROM THE PERSPECTIVE OF SENSORY INTEGRATION", the Likert scale of agreement, made up of 3 (three) levels: 1) "There is a relationship"; 2) "Partial relationship"; and, "There is no relationship", as well as the "COMMENTS" field.

Participants who agreed to take part signed an informed consent form.

The experts' feedback was then analyzed.

The fields marked in the column referring to the Likert Scale were considered, and the terms with at least 70% of responses in the "There is a relationship" field were kept (exactly 77.77%, since there were nine experts who took part) and the comments made by more than one expert were kept, resulting in a new list.

Chart 2. Part of the list of terms referring to TPS identified in the medical records

STEREOTYPES
Snapping fingers / finger snapping behavior since baby / stereotyped hand behavior / manual stereotypy(ies) - stereotyped behaviors / movements / stereotypies - stereotyped and repetitive movements - stereotyped movements, stereotyped movements, especially in the face of new stimuli / stereotyped behaviors in play - stereotyping with the object - stereotyping with trunk rocking / stereotyped movements (trunk forward and backward) / stereotyped movements (in gait) with trunk rocking - stereotyped movements - adaptation of behavior (containment of stereotyped movements) / containment of stereotyped behaviors / containment of stereotyped pattern / rocking - stereotyped repetition

Source: Author, 2023.

We then proceeded to select the medical records, adopting as our data source those relating to patients treated at the Mental Health/Autism Outpatient Clinic of a special school in the city of Curitiba. These records consist of folders containing papers where professionals record all the information about a particular patient. This information refers to assessments, anamneses with guardians, progress of care,

records of case studies between health professionals (physiotherapists, speech therapists, psychologists, social workers, neuropediatricians) and/or school professionals (pedagogues, teachers and inspectors). The inclusion criteria were medical records of patients diagnosed with autism or autistic features, aged between 3 (three) and 10 (ten) years, and the exclusion criteria were medical records of patients with diagnoses other than autism or autistic features, aged less than 3 (three) and more than 10 (ten) years. This was followed by content analysis. The database (the medical records) was entered into the hermeneutic unit of the ATLAS.ti 7.0.83 software and then analyzed to identify the atypical sensory responses reported, highlighting the passages containing this information in the text, associated with codes called "Characteristics" and "Interventions", the latter referring to the treatment objectives related to the child's sensory demands. Both the codes and the passage in the text make it possible to retrieve the information. Based on this information, a list was drawn up, the procedures for which were the same as those adopted in Phase 1: 1) organization in alphabetical order; 2) exclusion of repeated terms; 3) grouping of related terms that were in sequence in the list and grouping of other related terms; 5) categorization of subgroups; 6) words that were repeated and similar phrases were separated by a dash (/); 7) different words, but belonging to the same group, were separated by a hyphen (-).

Part of this list is shown in Table 2. Like the list, the analysis of the terms identified in the medical records from the perspective of sensory integration also followed the procedure adopted to analyze the terms identified in Phase 1, based on the Sensory Profile and the related words mentioned above (deficient praxis, stereotyped and restricted interests, autism, developmental delay, and comorbidities). Finally, the lists from the analysis of the terms resulting from the second systematic review and the analysis of the medical records were associated, where the subgrouped terms from one and the owere compared and, when analyzed as corresponding, were associated. It is worth noting that the list resulting from this comparison contains blank fields, as no terms to be associated were identified in the medical records.

RESULTS

Three lists were developed: 1) the main sensory responses related to SPT and their analysis from the perspective of sensory integration; 2) sensory responses identified in clinical records and their analysis from the perspective of sensory integration; 3) associating the main sensory responses related to SPT with those identified in the narratives of clinical records.

Quadro 3. Parte da análise das principais respostas sensoriais relacionadas ao TPS sob a perspectiva da integração sensorial

TERMS	ANALYSIS FROM THE PERSPECTIVE OF SENSORY INTEGRATION
AGGRESSION AND SELF-AGGRESSION	
self-injury - self-mutilation - self-mutilating - self-injurious / self-damaging / self-aggressive / self-abusive behavior(s), such as biting or head-butting	behaviors and emotional responses - modulation of movement affecting the level of activity - tactile processing
STEREOTYPES	
flaps arms - atypical hand and finger movements - flaps hands repeatedly	tactile processing - modulation of movement affecting the level of activity - deficient praxis
VISUAL PROCESSING	
details of an object are more important than the whole - looks at details in photos - looks at parts of objects - focuses on small details	visual processing - modulation of visual input affecting emotional responses and activity level
visual hypersensitivity - visual hypersensitivity can cause confusion and distress - sensitive to light - a little lighting can be painful	visual processing
in the first year of life spends excessive time looking at nearby objects	modulation of visual input affecting emotional responses and activity level
rotating objects - has a preference for looking at objects that rotate	modulation of visual input affecting emotional responses and activity level added by the experts: vestibular system
unlikely to return to visual stimuli introduced into the environment	modulation of visual input affecting emotional responses and activity level

Source: Author, 2023.

Chart 4. Part of the analysis of sensory responses identified in clinical records from the perspective of sensory integration

TERMS	ANALYSIS FROM THE PERSPECTIVE OF SENSORY INTEGRATION
AGGRESSION AND SELF-AGGRESSION	
controlling aggression - hitting toys - kicking the door - getting nervous and e starting to throw things around / throwing toys / throwing objects on the floor / when contradicted throwing objects on the floor / throwing all the toys he picked up on the floor / trying to throw almost everything he picked up on the floor - when told he shouldn't. insisted and when denied again started throwing everything he saw - hetero aggression insisted and when denied again, started throwing everything he saw - hetero aggression / "headbutts" other children - aggressiveness / aggressive / has periods when he gets aggressive - aggressive behaviors - when contradicted, even by the mother, wants to hit / slap the mother	emotional behaviors and responses - emotional/social responses - praxia deficit
BEHAVIOR	
impatient - impulsive - doesn't know how to wait - tendency to be impulsive - impulsivity	Poor praxis
Anxiety control / anxiety control training / anxiety / high level of anxiety / uses medication to control anxiety - exacerbated / high anxiety - anxious - great anxiety is noticed on the part of the child in different situations, especially when faced with new stimuli	emotional/social responses
AGGRESSION AND SELF-AGGRESSION	**ANALYSIS FROM THE PERSPECTIVE OF SENSORY INTEGRATION**
controlling aggression - hitting toys - kicking the door - getting nervous and starting to throw things around / throwing toys / throwing objects on the floor / when contradicted throwing objects on the floor / throwing all the toys he picked up on the floor / trying to throw almost everything he picked up on the floor - when told he shouldn't. insisted and when denied again started throwing everything he saw - hetero aggression insisted and when denied again, started throwing everything he saw - hetero aggression / "headbutts" other children - aggressiveness / aggressive / has periods when he gets aggressive - aggressive behaviors - when contradicted, even by the mother, wants to hit / slap the mother	emotional moods and responses - emotional/social responses - deficient praxis

Continue……..

extremely self-aggressive - self-injurious - self-injury - self-injury - self-injurious behavior (biting the hand), or out of pain, or because of being upset - self-aggression - self-injurious behavior - self-injurious behavior - self-injurious behavior - tendency to self-harm - self-injurious behavior - self-injurious behavior - self-injurious behavior when being upset - self-aggressiveness - self-injury - self-injury when being upset - self-aggression - self-injurious - self-injurious behavior - self-injurious behavior - self-injurious behavior - self-injurious behavior (punches and slaps in the face) when opposed - self-injurious behavior - self-injurious behavior when opposed - self-injurious behavior - restraining his hands so he wouldn't bite them - periods of self-injury - when opposed, she throws herself, self-aggression - self-aggrandizing - self-aggrandizing when thwarted - self-aggrandizing - self-aggrandizing (punches in the head) - when thwarted, self-injurious behavior is observed, such as punching himself in the face - self-aggression - is head-butting the wall - needed physical restraint to calm down and get organized - self-control training	tactile processing - behaviors and emotional responses - emotional/social responses - tactile processing - modulation of movement affecting the level of activity - deficient praxis
ESTEREOTIPIAS	
finger snapping / finger snapping behavior since baby / stereotyped hand behavior / manual stereotypy(ies) - stereotyped behaviors / movements / stereotypies - stereotyped and repetitive movements - stereotyped movements, stereotyped movements, especially in the face of new stimuli / stereotyped behaviors in play - stereotyping with the object - stereotyping with trunk rocking / stereotyped movements (trunk forward and backward) / stereotyped movements (in gait) with trunk rocking - stereotyped movements - adaptation of behavior (containment of stereotyped movements) / containment of stereotyped behaviors / containment of stereotyped pattern / rocking - stereotyped repetition	tactile processing - vestibular processing - behavioral outcomes of sensory processing - impaired praxis

Source: Author, 2023.

LIST RESULTING FROM THE EXPERTS' ANALYSIS		LIST RESULTING FROM THE ANALYSIS OF MEDICAL RECORDS	
TERMS	**ANALYSIS FROM THE PERSPECTIVE OF SENSORY INTEGRATION**	**TERMS**	**ANALYSIS FROM THE PERSPECTIVE OF SENSORY INTEGRATION**
BALANCE		**BALANCE**	
significant motor deficiencies in balance - balance deficit	vestibular processing - tactile processing	balance deficit	vestibular processing - tactile processing - deficient praxis
MOTOR		**MOTOR**	
Structural restrictions such as tiptoeing, poor motor planning, overweight and weak muscle tone - abnormal movement patterns, such as tiptoeing - lack of walking pattern - atypical movement patterns during locomotion	multisensory processing - sensory processing related to tonus/resistance - tactile processing - deficient praxis	uses tiptoe a lot / walks on tiptoe - slightly equinus feet - contractures with a tendency to deformities (equinus foot) - equinus gait	multisensory processing
BEHAVIOR		**BEHAVIOR**	
low frustration tolerance	emotional/social responses	low frustration threshold / apparently low frustration threshold / low frustration tolerance	emotional/social responses
significantly less static - hyperactivity - noticeable hyperactivity - impulsivity	vestibular processing - tactile processing - sensory search - movement modulation affecting the level of activity	psychomotor agitation / extreme agitation / hyperactivity / exacerbated agitation - motor agitation / quite agitated / well agitated - agitation / agitated - agitated when faced with rules and limits - quite / very agitated - doesn't sit still - doesn't sit down - agitated when put on limits - walked around the room for almost the entire service - restless - has always been an agitated child - agitated when routine changed - impatient - impulsive - doesn't know how to wait - tendency to impulsivity - impulsivity	tactile processing - vestibular processing - behavioral mistakes in sensory processing - poor registration - movement modulation affecting activity level activity - emotional/social responses - behavioral outcomes of sensory processing - impaired praxis

Source: Author, 2023.

Chart 3 below shows part of the list of 772 terms with the main sensory responses related to SPT in the left-hand column and their analysis from the perspective of sensory integration in the right-hand column. Table 4 below shows part of the list of 742 terms with the sensory responses identified in clinical records in the left-hand column and their analysis from the perspective of sensory integration in the right-hand column. Table 5 shows part of the list of terms associating the main sensory responses related to SPT with those identified in the narratives of clinical records, organized as follows.

DISCUSSION

During the development of the third systematic review, it was observed that sensory integration assessments are significantly associated with each other and with different assessments adopted in a complementary way. This indicates that there is no satisfactory assessment tool for SPT. Still in terms of assessment, the adoption of a list of terms related to the state of health to be investigated contributes to this process, which is common in the health area to assist in diagnostic processes. An example of this is the International Classification of Diseases (ICD), which lists terms that identify pathological conditions, providing a medical diagnosis (16). Another example is the International Classification of Functioning, Disability and Health, which lists states of health, providing a functional diagnosis (17). Bulegon (18), in his master's thesis, proposed a method for identifying diagnoses in clinical narratives based on the ICD. This shows the importance of a standardized list for identifying terms in clinical narratives.

Considering that there is no list of terms related to assessment and therapeutic planning information on sensory integration, this list was developed to fill an important gap.

CONCLUSIONS

Based on the systematic reviews carried out, the list of terms drawn up and the analysis of medical records supported by both, it was possible to see in practice the possibility of using a new resource to identify SPT, the adoption of the patient's medical record, which makes it possible to identify this disorder without the need to resort to specific formal assessments, most of which are not validated for Brazil and are costly; in addition to identifying SPT early and making it possible to prioritize this demand in the therapeutic plan, adjust the treatment approach to be adopted and draw up the therapeutic plan in an assertive manner. treatment plan in an assertive manner, favoring the achievement of treatment objectives.

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