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RESEARCH ARTICLE (ORIGINAL)

Program of animal-assisted interventions for children with autism spectrum disorder

Programa de intervenções assistidas por animais para crianças com transtorno do espectro autista

Programa de intervención asistida con animales para niños con trastorno del espectro autista

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Abstract
Background: Autism spectrum disorder implies adjustments in the daily care of the child. In this scenario, animal-assisted interventions seem to act as a facilitator in maintaining the quality of life of these individuals.
Objective: To develop an animal-assisted intervention program for children with autism spectrum disorder (AAIPC-ASD).
Methodology: Methodological study for the construction of a program of animal-assisted interventions, applicable to children with autism spectrum disorder, based on the model of complex interventions of the Medical Research Council that consists of four stages: identifying the evidence base, identifying/developing theory, modeling process, and assessing effectiveness.
Results: The AAIPC-ASD development process has resulted in the construction of Version 1 of the program, consisting of the following items: program planning, session planning, implementation, field notes, and final evaluation.
Conclusion: The structure of Version 1 of the AAIPC-ASD is aligned with the characteristics of its target group, based on primary field research data and updated bibliographic data. Its effectiveness and validation will be assessed in later stages.

Keywords: child; autism spectrum disorder; animal-assisted therapy; family

Resumo
Enquadramento: O transtorno do espectro autista implica adequações no quotidiano de cuidado da criança. Neste cenário, as intervenções assistidas por animais parecem atuar como facilitador na manutenção da qualidade de vida destes indivíduos.
Objetivo: Desenvolver um modelo de programa de intervenções assistidas por animais aplicável às crianças com transtorno do espectro autista (PIAAC-TEA).
Metodologia: Estudo metodológico para a construção de um programa de intervenções assistidas por animais, aplicável às crianças com transtorno do espectro autista, baseado no modelo de intervenções complexas do *Medical Research Council* que consiste em quatro etapas: identificação da evidência, identificação e desenvolvimento da teoria, processo de modelagem, avaliação da eficácia.
Resultados: O processo de desenvolvimento do PIAAC-TEA resultou, até ao momento, na construção da versão 1 do programa que consta dos seguintes itens: planeamento do programa, planeamento da sessão, implementação, notas de campo e avaliação final.
Conclusão: A versão 1 do PIACC-TEA apresenta formatação alinhada às características do seu público-alvo, ancoradas em dados primários de investigação em campo e bibliográfica atualizada. A sua eficácia e validação será avaliada em etapas posteriores.

Palavras-chave: criança; transtorno do espectro autista; terapia assistida por animais; família

Resumen
Marco contextual: El trastorno del espectro autista implica ajustes en el cuidado diario del niño. En este escenario, las intervenciones asistidas con animales parecen actuar como un facilitador para mantener la calidad de vida de estas personas.
Objetivo: Desarrollar un programa modelo de intervenciones asistidas con animales aplicable a niños con trastorno del espectro autista (PIAAC-TEA).
Metodología: Estudio metodológico para construir un programa de intervenciones asistidas con animales, aplicable a niños con trastorno del espectro autista, basado en el modelo de intervenciones complejas del Consejo de Investigación Médica, que consta de cuatro fases: identificación de la evidencia, identificación y desarrollo de la teoría, proceso de modelización, evaluación de la eficacia.
Resultados: El proceso de desarrollo del PIAAC-TEA ha dado lugar hasta ahora a la construcción de la versión 1 del programa, que consta de los siguientes elementos: planificación del programa, planificación de la sesión, implementación, notas de campo y evaluación final.
Conclusión: La versión 1 del PIACC-TEA presenta un formato alineado con las características de su público objetivo, basadas en los datos primarios de la investigación de campo y en la bibliografía actualizada. Su eficacia y validación se evaluarán en fases posteriores.

Palabras clave: niño; transtorno del espectro autista; terapia asistida por animales; familia

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Introduction

The diagnosis of autism spectrum disorder (ASD) indicates the need for adaptations in the daily life of children and their families. Daily life is understood as the way of living of human beings expressed in the interactions, beliefs, values, meanings, symbols, and images that outline their process of living. This daily life appears as a scenario and as integrating the scenes of living and living together (Nitschke et al., 2017). In this scenario, animal-assisted interventions (AAI) emerge as a possibility for the care and promotion of the health of children with ASD, who may present difficulties in communication, social interaction, and behavior. In this condition, the animal seems to stimulate the child by constructing affective bonds in a sensitive way that may sometimes be difficult in the relationship with humans.

The modalities of AAI are divided into therapy, education, and animal-assisted activities, and the main distinguishing factor is the objective that each of them intends to achieve. In the last decade, there has been increased interest in the development of these interventions. The description of studies to demonstrate the benefits of this relationship in the daily lives of these children and, therefore, in their families is being developed so that this practice can be reproduced in various contexts (Haire, 2017; Smith & Dale, 2016; Yap et al., 2017).

The increased interest in developing AAIs and research in the area does not in itself guarantee their quality. One of the main limitations for implementing the AAIs reported in related studies is the lack of specific knowledge and standardization of interventions (Haire et al., 2015; Smith & Dale, 2016). This limitation hinders the replication and even the comparison of studies to produce scientific evidence in this area.

From this knowledge gap, the present study aims to develop an AAI program for children with ASD (AAIPC-ASD).

Background

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) criteria, ASD is a neurodevelopmental disorder characterized by a dyad of symptoms: quantitative or qualitative alteration in social communication and behavioral changes characterized as restricted and repetitive. These characteristics of the child diagnosed with ASD guide the family in the search for therapies that stimulate them and, at the same time, keep them comfortable within their spectrum. In this scenario, AAIs demonstrate their potential. The modalities of AAIs are divided into therapy, education, and animal-assisted activities, and the main distinguishing factor is the objective and each modality. The description of reports and studies to demonstrate the benefits of this relationship to the daily lives of these children and, consequently, their families is being developed so that this practice can be reproduced in various contexts (Haire, 2017; Smith & Dale, 2016; Yap et al., 2017). A suitable environment, a qualified team, a trained and certified animal, care for the animal's well-being, and knowledge of the child's needs and health condition are some variables that permeate these scenarios. Regardless of the type of intervention to be implemented, AAIs should be structured, planned, and implemented by a qualified team (Yap et al., 2017).

Research question

What are the theoretical-conceptual contributions of the state of the art and research with primary data for the development of an AAIPC-ASD model?

Methodology

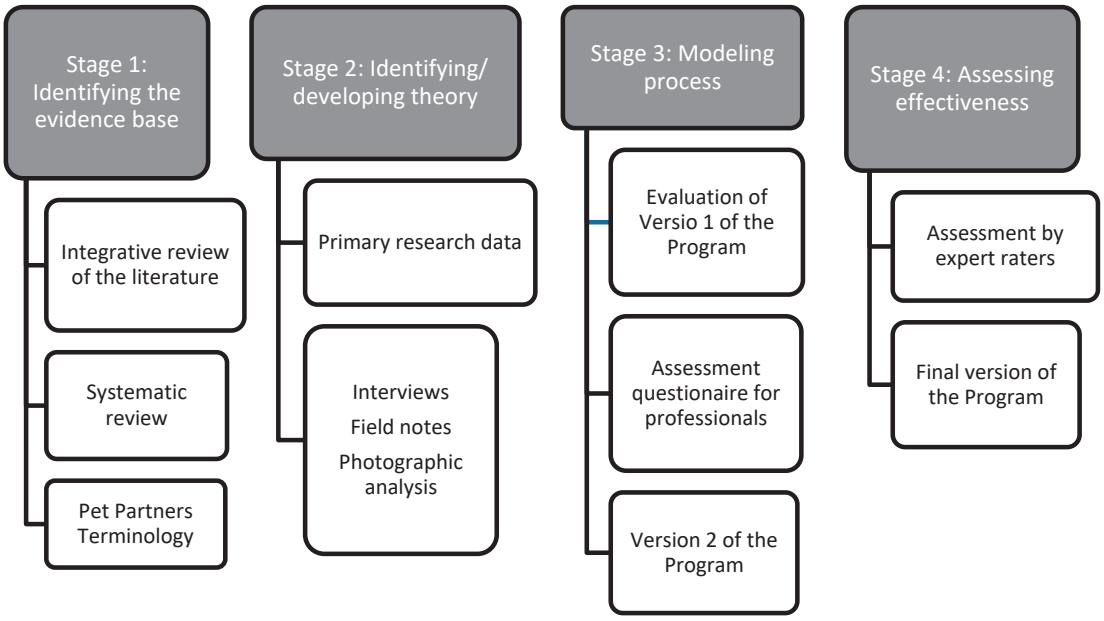
This methodological study aims to design an AAI program for children with ASD based on the model of complex interventions of the Medical Research Council (Craig et al., 2008; Polit & Beck, 2011).

Methodological studies are concerned with developing, evaluating, and validating research instruments, techniques, or methods to develop an effective and reliable instrument that can be used by professionals in the field (Polit & Beck, 2011). On the other hand, complex interventions are characterized by a significant number of interacting components; a difficulty of behaviors required by those delivering or receiving the intervention; a significant number of groups or organizational levels targeted by the intervention; variability or dimensions of outcomes; and degree of flexibility or tailoring of the intervention (Craig et al., 2008).

The model of complex interventions is based on four stages, according to Figure 1.

Figure 1

Diagram of the stages and phases of the development of the AAIPC-ASD



Note. Adapted from the model of complex interventions of the Medical Research Council (2019).

In the stage of identifying the evidence base, an integrative review was carried out with the following MeSH terms: *autistic, autism; autistic disorder, Kanner's syndrome, infantile autism, early infantile autism, autism spectrum disorder, animal assisted therapy, animal assisted therapies, animal facilitated therapy, animal facilitated therapies, pet therapy, pet therapies, pet facilitated therapies, animal assisted intervention*, associated with the Boolean operators *AND* and *OR*, in the databases of Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medical Literature Analysis and Retrieval System Online - MEDLINE (via PubMed), Web of Science (WOS), Scopus, SciELO, Latin American and Caribbean Literature in Health Sciences (LILACS), and Nursing Database (BDENF).

The following criteria were applied for inclusion: available in full-text, research articles, and published between 2015 and 2018. Twenty-eight articles were selected for full reading, and three articles were included (Becker et al., 2017; Germone et al., 2019; Guérin et al., 2017).

In order to provide support on the benefits of AAIs for children with ASD, a systematic review developed by experts in the field was selected (Haire, 2017). In order to provide conceptual support to animal-assisted therapy, the concept internationally used by the institution Pet Partners (Pet Partners, 2019) was adopted.

To identify and develop the theory (stage 2), that is, develop a theoretical understanding of existing evidence and theories complemented by a primary research, primary data resulting from a holistic multiplecase study of five cases of children with ASD receiving animal-assisted therapy were used, with the opinion of the Ethics Committee on Research with Human Beings (Opinion 2.815.017 in CAAE: 90845118.6.0000.0121). These data were collected from interviews with family members, health professionals, and canine educators, the researcher's field journals, and the photographic analysis of AAI sessions. All participants signed the free and informed consent form. The interviews (*entrevistas*) were coded with the letter E followed by ordinal numbering to maintain anonymity. The photographic analysis (*análise fotográfica*) was coded with the letters AF, followed by an ordinal number that represents the case to which the image belongs.

The modeling process (stage 3) will consist of the following phases: analysis of the information from the first two stages with modeling of the first version of the program; implementation of Version 1 of the program in a real-life scenario; questionnaire for professional participants, using a Likert-type scale.

Finally, effectiveness will be assessed (stage 4). At this stage, the results of the previous stages will be gathered, the expert raters will assess the program, and the final version of the program will be presented.

Results

Stage 1 - identifying the evidence base for the construction of the intervention program - was performed based on an integrative review of the literature, a systematic review, and the conceptualization of AAI adopted by Pet Partners.

Stage 2 -identifying/developing theory - was developed based on primary data from qualitative research of the holistic multiplecase study type, as described in Table 1.

Table 1

Results of Stages 1 and 2 of the development of the AAIPC-ASD

Stage	Phase	Results
1. Identifying the evidence base	Integrative literature review	The dynamics to be used in the AAT sessions was identified: animal selection, child assessment, duration and frequency of the sessions, objectives of the session, and examples of activities carried out in AAI sessions.
	Selection of a systematic review (Haire, 2017)	The main benefit of AAIs in children with ASD was identified: improved social interactions.
	Use of the Pet Partners concept	It differentiates the types of AAI: animal-assisted education, animal-assisted activities, and animal-assisted therapy.
2. Identifying/developing theory	Use of primary data from qualitative research, through the holistic multiple–case study method	Concerning the benefits of AAI for children with ASD: the animal stimulates and relaxes the child, reducing crises and stereotypic behaviors; As for the dynamics of the sessions: planning by the team of professionals, the animal must be selected and receive prior training. Duration of the sessions: 45-50 minutes, every two weeks, for at least three months; The objective of the session should be discussed with the team and the family; All sessions must be planned and evaluated.

The integrative literature review conducted in the first stage of the method for developing the program involving complex interventions (Craig et al., 2008) sought to identify the dynamics used to develop an AAI session/program with dogs for children with ASD. With regard to the selection/certification of the animal, a study points out that the choice of the animal based on the child's preference can improve interaction and optimize the results, as well as reduce stress and anxiety (Guérin et al., 2017). The cost, ease of implementation, and characteristics of the human-animal interaction should be taken into account. The dogs were certified by internationally recognized bodies and prepared on the day of the session: they took a bath before the visit and wore an identification vest (Becker et al., 2017; Germone et al., 2019).

The sessions took place every week for 12 weeks. The authors suggest a longer duration of intervention (Becker et al., 2017). Each session followed the following steps: review of previous skills, introduction to the session goal and activity, modeling and practice, and review of the target skill, each of which was guided by a previously defined objective, being part of a program module (Becker et al., 2017). Each session was subdivided into moments: the moment of introduction, the receptive language activity, and the final activity. The session lasted 10-15 minutes every two weeks. The duration of the program was not reported (Germone et al., 2019).

A systematic review of the literature was also used as evidence. This review aimed to synthesize the studies on AAIs for autism. AAI programs generally include one animal per participant, the number of professionals in AAIs with dogs is 1:1, sessions ranged from 15 to 60 minutes, one to two times a week for 8 to 12 weeks, with a total amount of time around 10 hours per program. The main benefit of the intervention identified in this study was increased social interaction (Haire, 2017).

Although this review indicates the need for programs to use a manual that guides the organization of AAIs, it does not suggest any. It also indicates that the practice is not standardized and that, therefore, studies are needed that follow the same standards (Haire, 2017).

Finally, in order to provide a conceptual basis for AAI, the terminology used by Pet Partners was adopted. Pet Partners is an American non-profit institution that has been developing studies on AAIs since 1970. AAIs is a term that includes animal-assisted therapy, animal-assisted education, and animal-assisted activities (Pet Partners, 2019).

While animal-assisted therapy is used in health contexts to promote and improve living conditions, animal-assisted education is practiced in educational contexts and focuses on the development of educational skills (Pet Partners, 2019). Animal-assisted activities, in turn, are informal and usually recreational, aimed at generating motivational and recreational benefits and improving the well-being of the target audience (Pet Partners, 2019).

Both AAI modalities require that professionals have theoretical knowledge about the area and specific training. The dog must go through proper selection and training and a specific assessment by specialized bodies and/or professionals.

To identify and develop the theory (Stage 2), the authors suggest the use of evidence from primary sources to justify the implementation and identify the potential of the intervention (Craig et al., 2008). Thus, this study

was based on a qualitative research of a holistic multiple case study on five cases of children diagnosed with ASD, who benefited from an AAI program.

The following benefits were identified: the dog has both a stimulating and calming influence, reduction of crises and stereotypies, improvement of the child's behavior, speech development, development of body expression, reduction of frustration and irritability, increased eye contact, improved tactile perception, increased bonding and social interaction.

The findings are expressed in the following narratives: "He comes back calmer (from the AAI), is more concentrated, has no crisis" (E2); "She even increased her self-esteem" (E3); "The language, the affectivity, an amazing improvement" (E7); "He started talking, looking at us, interacting, being more affectionate, reduced the stereotypies" (E10); "He started getting closer to people" (AF1).

In order to identify the dynamics adopted in the sessions, the following steps were identified: program planning, session planning, implementation, and evaluation of results.

The first stage of program planning should be the organization of the work team, which must be composed of at least two professionals: one responsible for the dog - the dog's guardian - and another responsible for the child.

"The professionals of this team need to know how the dog works in an intervention. Health professionals must have basic knowledge of what the AAI would be" (E11).

Both professionals of the team need to have a basic knowledge of the dynamics of AAIs, as well as the health specificities of their target group.

After the team is built, the selection and preparation of the animal begins. The selection of the animal, in this case, the dog, must follow the specificities of the target audience of the AAIs. It is suggested that this stage be carried out with the help of a canine educator.

"When I work with a child with autism spectrum disorder, I have to choose a large dog. It can't be that most active dog; it has to be a very passive dog" (E4).

After the dog is trained, an assessment should be made by a specific body or entity that provides a certification of the animal. In Brazil, the *Confederação Brasileira de Cinofilia (CBKC)* is recommended for this certification.

After this process, some permanent care for the dog becomes necessary, which is then under the responsibility of its guardian. The dog's guardian is understood here as the person responsible for the animal and with whom the animal lives.

The dog's guardian is responsible for reinforcing the commands and training taught by the canine educator and for looking for new commands and teaching new activities. He must keep a record of the animal's health and another for behavior tests carried out regularly by a veterinary professional and dog trainer (Dotti, 2014).

On the day of the sessions, some steps of hygiene care of the dog are necessary, which are the responsibility of the guardian, namely: brushing (dry bath) to remove excess hair and wash the paws before and after entry into hospital environments or health services.

"On the day [of the session], I brush the dog before leaving the house, the bath is once a week, and I dry bathe the dog" (E4).

Concerning contraindications for AAIs, professionals report that they are minimal, for example, children with some physical impairment or associated diseases. However, if a health professional recommends the treatment after making an evaluation, the AAI may be indicated. "I believe it should be indicated for all children because all aspects improve." (E7)

Moreover, the importance of preserving and ensuring suitable conditions is emphasized so that the animal does not suffer any aggression.

For AAI sessions to have a significant impact, some suggestions are made concerning their duration and frequency: they should be held once a week, each session lasting about 45-50 minutes. For programs indicated for animal-assisted therapy and animal-assisted education, a minimum duration of 3 months is suggested, "Three months, more or less. And weekly sessions" (E4).

Next, the session is planned, the stage when information is requested that will support the construction of the program according to the client's needs. Thus, the following steps are suggested: an interview with professionals who are in contact with or who maintained contact with the child, an interview with family members, the definition of objectives, and the preparation of necessary materials.

The interview with family members provides information about the child's condition, behavior, preferences, and triggers that can lead to a crisis. "He is distracted by other things inside the room, especially if there is an electronic device" (E1).

The interview with the professionals accompanying the child is important to identify the clinical conditions and care needs. "It will depend on the child's age, the stage of development of the ASD, whether the child has an intellectual disability" (E10).

With the information collected in the interviews, the objectives are set out by the professionals in the area of health (animal-assisted therapy) or education (animal-assisted education) based on the needs identified.

Needs that have emerged from issues evidenced by the family in their daily lives can also be worked on. "We've trained hygiene care, brushing the teeth. When going for a walk, caring for the dog (E10); I ask what he wants to work on, if it's in the area of education, he tells me the alphabet; if he's a psychologist and he wants to treat a problem in family relationships" (E11).

It is important to note that the objectives of the first sessions of an AAI program may be only to get closer to the child, raise the child's awareness, and create a bond and trust between the child and the animal and the professionals involved.

For a good execution of the AAI session, materials are needed to promote the interaction between the child and the animal. Materials such as balls, cones, puppets, ropes, dice, the child's favorite toys, costumes, Velcro vests, or a bag to store tokens, among others, can be used; "Our dogs wear vests that identify them, have a zipper or Velcro" (E11); "pocket vest to save objects, letters, numbers, motricity vest, there is a vest that can be used for drawing" (AF1).

In the health scenario, simulators of syringes, plasters, dressings, and other materials can be used to familiarize the child with the procedures necessary to promote and recover their health (Tooker, 2016).

On the day of the session, early arrival at the site is essential to prepare the environment. Throughout the activity, attention must be given to the interaction between the child and the dog, as well as to possible external stimuli that may cause discomfort. "You have to be very careful with the child with ASD because the child has a limit, go slowly as you pass this limit" (E4); "I need to get there first, I arrive with my dog, I greet my co-workers, we organize the material" (E11).

The session should be divided into different moments, always respecting the child's interest and preferences, being susceptible to changes in activity.

During the first period of the session, the child should have an opportunity to get familiar with the environment. It is the moment when the child gets used to the scenario of the intervention.

"We went on creating activities for him to get close to the dog" (AF1).

"The first activities were more for interaction actually, then we began the literacy activities" (AF2).

The duration of this moment for the child to get closer to the dog must respect the child's need. In some cases, it may last only for part of the session, the entire session, or even the first sessions of a program. After the child is familiar with the scenario and with the animal, the interaction process begins.

The interaction refers to the moment when the child will receive a greater stimulus from the animal. At that time, the child will interact with the dog according to the planned activity and the materials developed to achieve the goal. "We start the activity based on the objective and by interacting with the dog" (E10).

"He was going to stick the words to the dog's Velcro suit. This was a session with a *festa Junina* [popular Midsummer celebration in Brazil] theme, there was mulled wine, fireworks, and he had to catch the fish, and so he was already working on motor coordination" (AF1).

Outdoor activities and walks can also be planned, simulating everyday situations and facilitating the day-to-day life of children with ASD and their families.

"(The professional) gave her some fruits that she had to find and feel the texture, size, and weight, and then she had to write down in the notebook the fruits she had identified. We took a walk to a snack shop where she had to ask for what she wanted" (AF2).

Also in the interaction phase, professionals need to identify and avoid possible situations that may impair the progress of the intervention, whether related to the well-being of the child or animal. "If I see that the dog is not well, I will stop using the dog and close the session with other activities" (E4).

Approximately 30 minutes should be made available for this stage.

The final stage of the session refers to the moment when the child is completing the main activity, thus including a freer activity. "The session is divided like this. Initially free, then the activity that was planned from the objectives, what I want [to achieve] with that child, if it is to read, for example, then the walk" (E11).

At this moment, the following activities can be done: walking outside, organization of the room and the materials used, asking for the child's help, or even a conversation with the child explaining that the animal needs to rest. The last 10 minutes of the session are suggested for this stage.

At the end of the activities, it is necessary to evaluate the results and, therefore, it is suggested that activities be recorded in field notes. "We always do a mini-evaluation. Today this worked, that didn't work" (E10).

The field notes should be made immediately after the end of the session and include information about the course of the session, the achievement of the proposed objectives, the complications and any changes in activity during the session, the interaction between the child and the animal, and the child's reactions. In all types of AAI, reports and the evaluation of visits should be recorded so that this material can be used as a source of information and proof of the work carried out (Dotti, 2014).

The written record can be supplemented with the photographic record. This makes it possible to evidence the child's reactions and interactions, besides serving as a tool for parents/family members to accompany the activities carried out. "She always sends me photos and videos at the end of the sessions, which is very good for us to have an idea of what is happening" (E14).

To verify the effectiveness of AAIs, it is necessary to evaluate the program of the sessions carried out. An evaluation should be made every four weeks. "Sessions take place once a week, and the evaluation is made every 4 to 6 sessions" (E11).

The evaluation should mention if the previously defined objectives were achieved and analyze possible complications and the child's improvement or lack thereof. Based on this analysis, the plan for the next sessions of the program is established.

The modeling process - the third stage of program creation - will be carried out in three phases. In the first phase, based on the analysis of the information gathered in the first two steps, Version 1 of the AAIPC-ASD program was built. In the next phase, the project will be submitted for approval to the Ethics Committee on Research with Human Beings, so that this version can be implemented in a real-life scenario.

At this stage, a questionnaire will be applied to the professionals involved in this process to identify potential biases and suggest relevant changes to the program. In the end, the second version of the AAIPC-ASD will be designed, including the necessary changes.

Finally, in the effectiveness assessment stage, the results of the previous steps will be gathered, expert raters will assess the program, and the final program version will be presented.

Discussion

According to the Pan American Health Organization

(PAHO), the prevalence of ASD has increased significantly in the last 50 years. Although there are no extensive studies worldwide on this prevalence, it is estimated that one in 160 children has an ASD (PAHO, World Health Organization, 2017). In the United States, where a monitoring network provides this information, data point to one in 45 children (Baio et al., 2018).

Although several reasons have been given for this increase in cases of ASD, special attention should be given to the possibilities of therapeutic care that can offer a better quality of life to these children and their families.

In this scenario, a proposal that has been developed and refined is the AAIs. This type of intervention already demonstrates promising results in improving the quality of life of children with ASD and their families. The main benefits identified are improved social skills, decreased behavioral problems, increased social interactions, decreased stress and anxiety before the procedures, and increased eye contact (Funahashi & Gruebler, 2014; Smith & Dale, 2016; Yap et al., 2017).

However, one of the limitations pointed out by these studies is the need to standardize AAIs so that they can be replicated and their benefits better evaluated. The lack of validated programs hinders the operationalization of these interventions and may interfere with their quality. The lack of models to guide the implementation of AAIs with children with ASD makes it difficult for professionals in the area to perform these activities properly.

The development and subsequent validation of this program follows the model of complex interventions and is supported by updated international scientific evidence, specific international guidelines in this field, and primary data collected from the target audience of these interventions (Craig et al., 2008). This first version of the program will be applied in real-life scenarios to identify weaknesses and potential adjustments. To this end, questionnaires will be applied to the professionals involved in the program's implementation. This stage will culminate in the second version of the AAIPC-ASD.

Then, an evaluation will be requested from health experts who work with or have experience in working with children with ASD and AAIs. The opinion of experts in this area will culminate in the final version of the program.

Despite modulating the premises of AAIs, this proposal leaves room for the singularities of each individual, especially when it comes to children with ASD. This study does not intend to delimit the boundaries for carrying out the interventions but rather to outline strategies that maintain the safety of the child receiving the intervention and the team implementing it.

Conclusion

The AAIPC-ASD was developed based on the complex intervention model, following the guidelines of the Medical Research Council. The first version of the program is well-described and detailed, operationalizing the stages of an AAI program: program planning, session planning, implementation of the intervention and its evaluation.

This study presents the first version of the program - Version 1 - built after a literature review and based on concepts internationally accepted in this area. Primary data collected from families of children living with ASD and participating in AAIs were also used as theoretical support, as well as data from professionals working in the area of AAIs.

The validity of the AAIPC-ASD still needs to be tested in real-life scenarios and evaluated by experts, culminating in the final version of the instrument. After this process, the program is expected to be used in clinical practice, systematizing AAIs with children with ASD and contributing to the development of further research in the area with technical and scientific rigor.

Author contributions

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