

Review of psycho-educational interventions in children with autism spectrum disorder

Revisão de intervenções psico-educativas em crianças com perturbação do espectro autista

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Abstract

Introduction: Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder causing impairments in socialization; verbal and non-verbal communication; and repetitive and restrictive behaviours; whose prevalence is rising. Psycho-educational interventions assess these main impairments, contributing to a more successful development of diagnosed children. The objective of this paper is to describe the different comprehensive psycho-educational interventions, their theoretical basis, practical effectiveness and the importance of this knowledge to health professionals.

Materials and Methods: We conducted a literature review to find scientific articles about psycho-educational interventions in children with autism spectrum disorder.

Results: These approaches are the most scientifically proven interventions for children with ASD. There are developmental, behavioural and combined approaches. Despite the differences, there are concordant characteristics that guarantee a successful intervention.

Discussion and Conclusion: Psycho-educational interventions become difficult to evaluate due to their subjective parameters. Regardless, literature supports that the best option is to combine different approaches. However, there is need in the literature for randomized controlled trials that assess programs/models/interventions that merge all of these understandings, and to develop a clear method that can cover all of the main goals, as well as to raise awareness in health and political decision makers.

Resumo

Introdução: A Perturbação do Espectro do Autismo (PEA) é uma perturbação do neuro desenvolvimento, com prejuízo na capacidade de socialização; comunicação verbal e não-verbal; e presença de comportamentos repetitivos e restritivos; cuja prevalência está a aumentar. As intervenções psico-educativas dirigem-se a estas incapacidades, contribuindo para um melhor desenvolvimento das crianças afetadas. O objetivo deste trabalho é descrever as intervenções psico-educativas, a sua base teórica, eficácia e a importância para os profissionais de saúde.

Materiais e Métodos: Realizámos uma revisão científica sobre intervenções psico-educativas em crianças com perturbação do espectro do autismo.

Resultados: Estas são as intervenções mais comprovadas cientificamente para crianças com PEA. Existem abordagens baseadas no desenvolvimento, no comportamento ou combinadas. Apesar das diferenças, existem características concordantes e que garantem uma intervenção bem-sucedida.

Discussão e Conclusões: As intervenções psico-educativas são difíceis de avaliar pelos seus parâmetros subjetivos. Através da análise da literatura, aferimos que a melhor opção é combinar as diferentes abordagens. Contudo há a necessidade de maior investigação e realização de mais estudos randomizados para avaliar as diferentes intervenções e para criar um método que consiga atingir da melhor forma todos os objetivos, tal como aumentar o conhecimento na área por parte dos decisores na área da saúde e política.

Keywords

Autism spectrum disorder, children, psychoeducation, intervention

Introduction

Autism spectrum disorder (ASD) is a neurodevelopmental disorder, with a probable multifactorial aetiology (1, 2) which may cause significant impairments to those who endure it and also to their close ones. It's characterized by qualitative deficits in: 1) socialization, 2) verbal and nonverbal communication and by 3) restrictive and repetitive behaviours, interests or activities. The damage in social communication and social interaction is manifested by: lack of social-emotional reciprocity, nonverbal communication used for social interaction, developing and maintaining relationships. (3) These features have to be present at early age, usually during the developmental period (12-24 months). (3) However there is a large variability within different patients, which can range from severe mental retardation to normal IQ individuals.(4)

ASD's prevalence has moved towards 1% of the population, in adults as well as in children. (3). It's still unknown if this increase is due to the change in criteria (Diagnostic Statistic Manual of Mental Disorders (DSM) IV to DSM V), which now includes Asperger's syndrome, Pervasive Developmental Disorder not otherwise specified and Autistic disorder per se (3); or if it is due to growing awareness of the disorder or a real increase in the number of cases. This disorder is diagnosed four times more in males than in females, which allows us to hypothesize if this is a result of the female ability to manifest in a more subtle way their social difficulties, remaining unrecognized.(3)

These are not uncommon disorders amongst children. As a result, it is even more important for general practitioners, paediatricians and health professionals to be aware of the symptoms, treatment and management of the disorder, since it causes social impairments that condition their life and integration in civil society. (4)

Although scientific research aiming to develop biomedical treatment for this disorder is being done, it hasn't been discovered an intervention targeting its aetiology. (5) Besides the core deficits, there are also comorbid problems associated with ASD, such as hyperactivity, obsessive compulsive symptoms, maladaptive behaviours (such as aggressiveness and self-injury), which may compromise the children's engagement in education and treatments. (4) In case of comorbidities there is need for pharmacological interventions, and usually the drugs chosen are antidepressants, psychostimulants, neuroleptics and alfa-agonists. However none of these treat the child's social and communication features. (5)

Psycho-educational approaches are the most promising and scientifically proven interventions when it comes to improving social communication and interaction as well as diminishing repetitive behaviours. (6) They are described as interventions addressing the main impairments in ASD: social interaction, verbal and nonverbal communication and stereotyped behaviours. (6) These interventions have various philosophical basis, and are defined as strategies to address and improve the multiple core deficits present in ASD children (7), including behavioural strategies and facilitative therapies (language, occupational, speech therapies) and are so far the best method to help children with autism to be integrated in society. (8)

The purpose of this review is to describe the different comprehensive psycho-educational interventions published in scientific literature, their theoretical basis, practical effectiveness and the importance of this knowledge to health professionals, such as general practitioners or paediatricians that will work with children and their families, helping them achieve a successful development.

Materials and Methods

We conducted a literature review searching for scientific articles about psycho-educational interventions in children with autism spectrum disorder. The papers were obtained from PubMed portal, using the query “autism spectrum disorder educational intervention children”. Search results were complemented by articles cited in the ones obtained from the query. We included articles that described and compared psycho-educational interventions in children (age less than 18 years old) diagnosed with ASD disorder using the DSM IV criteria and written in English.

Results

The research resulted in a total 56 articles of interest for this review. There were 9 reviews, 2 books, 6 systematic reviews and 5 randomized clinical trials that contributed to this review.

PSYCHO-EDUCATIONAL INTERVENTIONS PUBLISHED IN SCIENTIFIC LITERATURE

From the review described above we found that there are different types of instructional strategies applied in the comprehensive models of educational programs developed so far that can be summarized as it follows:

- 1) **Behavioural strategies** are based in altering or reducing unwanted behaviours using aversive approaches, functional analysis, and differential reinforcement of other behaviours, extinction, antecedent manipulation or a combination of these strategies - positive reinforcements are used more frequently than aversive techniques. (9)
- 2) **Developmental strategies** compare the skills of an autistic children with the ones of a typically developing peer, and it is assumed that the child is reinforced by their internal and natural motivation for learning. (9)

3) Augmentative and alternative strategies use assistive procedures for a symbolic communication, such as visual schedules, pictures exchange system, and signal communication in place of verbal language. (9)

These diverse strategies are then implemented into programs in various proportions. Despite the dissimilarities, it is known that the maximum effects of any direct treatment for children with ASD are achieved through the process of generalization of the knowledge learned, when in work with parents and typically developing peers. (9)

B. THEORETICAL BASIS

Theoretically, there are two groups of orientation – behavioural and developmental – which guide the procedures of psycho-educational programs and their final goals.

The behavioural orientation emphasizes the acquisition of discrete skills in order to produce evolution in the child's social behaviour, rewarding when appropriate actions happen.

The developmental orientation states that the results are better when intervening at key deficits of ASD producing bigger changes.

C. PRACTICAL EFFECTIVENESS

The programs that are more studied in terms of efficacy and that represent these theories are UCLA Young Autism Project (UCLA YAP); Denver Model and Treatment and Education of Autistic and Communication Handicapped Children (TEACCH), that are representative of behavioural theory, developmental theory and a mix of these two, respectively. (9) To be included in Eikeseth S. review (6) the study has to meet the criteria: of comprehensive psycho-educational intervention; be published in a peer-reviewed journal and the participants must be 6 years or less.

This review considered 20 studies based on Applied Behaviour Analysis (ABA)/Loovas UCLA YAP intervention, 3 on TEACCH and 2 on Denver Model. From these three, UCLA YAP is the one with more scientific validity, comparing parameters of diagnosis, study design, dependent measures (used to assess intellectual and adaptive functioning) and treatment fidelity. (6)

The **UCLA Young Autism Project (UCLA YAP)**, being representative of the behavioural approach, was the first with efficacy described in the literature. Loovas and colleagues (10) designed and developed a manual so it could be replicated by practitioners. (11) Applied behaviour analysis and discrete trial training remain as the main techniques used in children. (5) This approach focuses on ameliorating the child's impairment in communication, social and emotional abilities through reducing undesired behaviours and acquisition of adaptive skills. It also aims at integrating autistic children in typically developing peers setting, in order to promote generalization from schooling. The main characteristics are: an early intervention (if possible before 3.5 years of age); involvement of parents or guardians as co-therapists, thus helping the generalization of the skills taught; individual work with one child at a time, with schedules from 20-40 hours a week, for at least 2 years; and inclusion in a typical class. (6) In order to allow a more personalized approach, functional behaviour analysis is completed consisting in collecting the description of the behaviour problems, looking at the children's background and environment. Subsequently is formulated and hypothesised what motivates the behaviours and what strategies could modify it.(8) UCLA is the most studied therapy and it brings great profits to children with ASD, as well as it has a high degree of parental satisfaction. (5) In terms of results level, children receiving an ABA treatment, which is the base for Loovas's UCLA YAP had significantly more gains than the control groups in IQ, language developed, and adaptive functioning. (12)

The **Denver Model**, representative of the developmental theory, was developed by Rogers and Colleagues(13) and it's based on the theory of cognitive development of Piaget being mainly play-based. (6) The core goals are enhancing social perception, theory of mind and emotion sharing. The model includes sessions in a total of more than 20 hours per week, in divided sessions of activities and games applied to children from 2 to 5 years that ultimately improve relationships, symbolic thought and foster communication. They're focused on improving the social skills of children as well as their personal independence (through teaching chores, eating, dressing and grooming).

The **Treatment and Education of Autistic and Communication Handicapped Children (TEACCH)** was designed by Shopler and colleagues(14). It's a program that addresses multiple deficits in children with autism, being classified as eclectic for combining developmental and behavioural approaches. It's grounded on the understanding of how autistic people perceive and experience the world, in order to prepare them to be autonomous, exercising and enhancing education, social and communication skills. It relies in a structured and predictable teaching, using visual cues and timetables, fostering generalization. Before the program initiates, an assessment is carried out to identify the main problems to be improved in such a way that the program is individualized and promotes better results. (5) Some of the main components of this program are the organization of their surrounding environment; the use of a communication system by gestures, images, printed words or signs; encouraging the independent work of the child; teaching a visual system to help them complete more complicated tasks and boost parent involvement as co-therapists in their own homes, to exponentially improve what's been taught in the sessions.(6) There are many reports of children's improvement using this model (17).

Regardless of the existence of many psycho-educational programs, there is literature that supports that the best intervention is to combine different approaches, in a way which will lead to better and more complete results, so that the main objectives and mandatory requirements are fulfilled. (6)

Despite the differences in the theoretical basis from where they derive; these interventions share many goals and similarities. There is consensus concerning the **mandatory characteristics that interventions should follow in order to guarantee success:** psycho-educational Interventions should include a combination of developmental and behavioural approaches, and begin as soon as possible. It is scientifically proven that earlier approaches result in better outcomes, such as IQ gains, language and adaptive functioning, academic performance, as well as some measures of social behaviour, in children enrolled in these programs comparing with the ones in control group. (6) As soon as an ASD diagnosis is seriously considered the children should join immediately the intervention, as an alternative to waiting for the confirmation of the definitive diagnosis. (8) The family and/or caregiver must be actively involved in the intervention. (7) Children's outcomes from family-implemented intervention show better response to parents and adults, more words spoken and understood and lower classifications on the Autism Diagnostic Observation Schedule. Caregivers also benefit from the improvement in their knowledge about the disease, however a significant increase in stress/work load is referred from parents joining the implementation of the intervention in comparison to a regular Applied Behaviour Analysis intervention. As a counterpart, parents develop a greater synchrony. Summing up, training parents in specific skills will have positive changes in their offspring as there is evidence for positive modification in parental perceptions and in objective measures of child's behaviour. (15) It is recommended a low student-ratio to allow individual and adjusted objectives. On the other hand,

time to interact with and be involved in activities with typically developing peers must also be considered. Intervention and its development should be documented and measured, to evaluate and adjust the program when needed. The inclusion of routines, visual activities schedule and clear boundaries helps minimize disruptions. Besides the behavioural and developmental components it is also indispensable to encourage several other skills: spontaneous communication, joint attention, reciprocal interaction, adaptive skills, cognitive skills and academic skills. Another aim should be to reduce disruptive strategies as well. (8)

D. IMPORTANCE OF THIS KNOWLEDGE TO HEALTH PROFESSIONALS

The implementation of a comprehensive program requires high levels of practice training from the professional, as well as human and financial resources. A larger knowledge of these interventions will help to reduce an inefficient use of resources, as well as reduce errors and difficulties. (16)

It's a Health and Education Professionals' responsibility to raise awareness about ASD, the most effective treatments and to promote inclusion of these children in society. In order to potentiate this outcome it's crucial that the government and economic and health policies are notified. Health and economic policy makers should be warned in order to promote the training of professional and creating services that allow children's access to services that will help them to develop and have an easier and healthier integration in society. (17)

Discussion

This review sheds light on the present knowledge of psycho-educational interventions, their foundations and the access of children to this type of services. We found consensus when it comes to required characteristics to guarantee a successful intervention.

A limitation to this review is that the selection of the articles was not systematic, reducing the validity of the results and their generalization.

One of the big obstacles to overcome during this review was the wide variety of terminology in the area of psycho-educational interventions. Despite the same meaning and principles applied, the approaches are titled dissimilar in the literature, such as Applied Behaviour Analysis, Intensive Behavioural Treatment and Early Intensive Behavioural Treatment.

Since psycho-educational interventions are such subjective interventions, it becomes difficult to evaluate and to measure its efficacy in quantitative extents, which is reflected in the small number of studies that assess and compare effectively the different interventions.

There has been literature criticising the overstated efficacy of UCLA program, claiming that the success percentage of Loova's model isn't that higher, because there were various studies following the method and never obtained such pronounced results. (18) Additionally, this approach is condemned by literature for the fact that its fundamentals are focused more on specific behaviours than the underlying basis of the disease, as well as its very time consuming and costly. (5) Nevertheless, this program was selected to represent the behavioural approach for its vast appearance in literature and efficacy results. (5) However there are new Intensive Behavioural Treatment that undergo the same theoretical basis to the practice. (11) There is need to report better

these evolutionary methods as they may represent a bridge to overcome the lapses described in the literature. (11) Concerning the Denver model there is still a lack of controlled trials to certify rigorously the assumptions mentioned. (8, 19) and looking at TEACCH there is still lack of scientific validation. for its results (20)

Regardless of the existence of many psycho-educational programs, and different report in number and in results of each of them, there is literature that supports that the best intervention is to combine different approaches.(21, 22) This will lead to better and more complete results, so that the main objectives and mandatory requirements are fulfilled. Developing these types of interventions should be a goal to achieve. It is also of major importance an overview on access of children with autism spectrum disorder and their families to these interventions, nationally. This evidence is crucial to policy makers so that there is a larger access to those in need.(17)

In a multifactorial study (17) Portugal is included in the subgroup of Southern Europe along with Italy, Spain and the Former Yugoslav Republic of Macedonia. The investigation was addressed to parents of children with ASD diagnostic with age bellow 7, in 18 countries. The survey evaluated the characteristics of participants (families of ASD children), use of interventions and predictors of use of interventions.

When it comes to Participants it is of notice the bigger percentage of high educational level (59% of the Portuguese respondents were graduate and post-graduate), which will in turn affect the knowledge of the disease, its available treatments and ultimately the real use of interventions.

Regarding the use of interventions, 93.8% of the Portuguese parents conveyed that their child had access to at least one type of intervention, and in the rest of families that their kid had zero access to interventions; it's important to mention that from the percentage that claimed no use

of interventions there were significantly more parents with lower educational level. This information raises the possibility that the educational level influences greatly the use of interventions. Given that the educational level of respondents to the questionnaire is higher than the general population, it is a possibility that a much bigger percentage of families don't enrol their children in these interventions. From the interventions measured (behavioural, developmental, relationship-based; and speech and language therapy; Occupational Therapy; Other Educational and psychological interventions; Parent Training), speech and language therapy was the most used (72.9% in Portugal). The behavioural, developmental and relationship-based interventions were used in 45%, being its use significantly higher in Southern Europe (54%), however if we analyse closely the particular case of Portugal we can see that this percentage is much lower (17.4% of the respondents uses Behavioural interventions (BEH) and 27.8% uses developmental and/or relationship-based interventions (DEV and/or REL)) in comparison to the neighbours Spain (30.3% of BEH use and 46.3% of DEV and/or REL) as well as the higher level of use in Italy (64.4% of BEH use and 26.0% of DEV and/or REL). If as stated before, it's scientifically proved that the most efficacious treatments are psycho-educational interventions, regardless of whether they are behavioural, developmental or eclectic treatments, we should be concerned for the possibly lower use of these interventions in Portugal.

There was a significant association in Southern Europe parents who had a lower level of education were four times more likely to not provide any assistance to the child. Once more, a reminder that the population that held the questionnaire had an unusually higher level of education in comparison to the general population, which lead us to hypothesize that the picture is much more disturbing, and there are probably bigger discrepancies between richer and poorer populations.

In Southern as well as in Eastern Europe the association between lower educational level and no use of interventions may be an indication that the Public Health National System does not provide the access to these interventions (behavioural, developmental and relationship-based), and if there is interest from the families (not to mention that prior knowledge is needed) they have to do the an economic effort to support their children's treatment.

Conclusion

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder with a complex and still unknown aetiology, which causes a discrepancy in the development of social and communication skills as well as repetitive and restricted interests and activities. In general, this disorder is suspected before three years of age, since children show atypical behaviours such as lack of interest in joint attention, eye-contact. It is essential that paediatrician and general practitioners detect this developmental conducts in order to begin interventions as soon as the diagnosis is of high suspicion.

The literature reports a vast range of possible interventions for children with ASD, from pharmacological to pshyco-educational, occupational to language therapy. Even though there is a higher proportion of population that uses drugs to control some of the symptoms and behaviours presented by autistic children, and there are benefits in controlling disruptive behaviours, there aren't medications that mend the core deficits. This is where psycho-educational interventions come into play and have a noticeable positive effect.

There is a subset of division of this therapies, accordingly to their philosophy: developmental, behavioural or a fusion of these two (considered eclectic). But then again they

share common goals and are implemented with some common practices. The keys to success when it comes to psycho-educational interventions are:

- Begin intervention as soon as a diagnosis is of high suspicion, in order to have a bigger and more positive development of the child;
- Low student ratio and an individualized intervention based on prior assessment of the child and its antecedents;
- Involvement of parents or guardians as co-therapists;
- Combining developmental and behavioural techniques to achieve a more complete approach.

So we can come to conclusion that there is need in the literature of randomized controlled trials that assess programs/models/interventions that merge all of these understandings, and to develop a clear method that can cover all.

We must know the Portuguese reality when it comes to the availability of public services that provide these interventions, as well as if families have an equal access to them. It's a health and education professionals' responsibility to raise awareness for ASD in the general population, so that there is an inclusive civil society and prepared to deal with individuals with different needs. A more essential step must be given in economic and health policies, so that decision makers are holders of knowledge that allows the growth of services that will help and improve the quality of life of ASD children and their families.

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