CLASSIFICATION OF THE COMORBID SYMPTOMATIC GROUPS ON AUTISM SPECTRUM DISORDER DIAGNOSIS

Ph. Manuel Ojea Rúa

moxea@uvigo.es

ABSTRACT

A total of 126 people with a nuclear diagnosis of autism spectrum disorder (ASD) participated in this study, corresponding to Galicia Community (Spain), found through survey regarding significantly more common symptoms related this disorder nuclear diagnosis. Hence, main aim is delimiting symptoms symptomatic groups that co-occur to each other, regarding basic diagnosis of ASD, in order elaborate predictive processes of comorbid recurrence along ASD diagnosis and develop the related psycho- educational approach.

Data analysis, achieved throughout CLUSTER K-MEDIAS test of SPSS statistic, 23 version, allowed conclude there´s an interaction of symptoms recurrent themselves, which let conclude a classification of 3 symptomatic groups that make up basic comorbidity of ASD diagnosis: 1) group I, formed by epilepsy (2.00) and severe cognitive deficit (1.86) interaction, 2) II group, with significant interrelated scores in schizotypal features (.82) and anxiety processes (.77), and 3) III group, characterized by interaction between motor tics (1.92), cognitive deficit (1.54), hypersensitivity (1.23) and severe behavior problems (1.38).

It´s possible conclude these symptomatic groups are predictors variables of comorbidity associated with ASD to carry out effective psycho- social- educational implementation to people with ASD.

Key words: Autism Spectrum Disorder, Comorbidity, Clinical and Educational Treatment.

INTRODUCTION

Symptoms studies associated with ASD diagnosis is recurring issue in scientific literature. Really, numerous investigations show co- occurrence of different specific symptoms, which are comorbid over ASD nuclear diagnosis. However, there´s very small research regarding relationship between these symptoms themselves and the prediction processes of associated symptomatic groups with diagnosis of individuals with ASD.

Alfageh et al. (2019), agree line of American Psychiatry Association (APA) (2013), affirm autism is permanent neurodevelopmental disability, characterized by deficits and needs on different intensity degrees, in relation to communication and social skills and deficits in stereotyped and repetitive behaviors standard patterns.

However, ASD diagnosis usually isn´t isolated, but it´s find related high comorbidity of symptoms that characterize diagnostic process itself.

Indeed, European Medicines Agency (2007), the World Organization for Health and Care Efficacy (2013) and Simonoff et al. (2008) show that more 65% of people with ASD have some type of associated neuropsychiatric disorder, which, anxiety is disorder most relevant found (29.2%), followed by multiple variables related behavioral disorder.

Brookman-Frazee et al. (2017) and Gagan et al. (2010) say the comorbidity related to psycho-affective disorders in ASD diagnosis is approximately 70% and there´re authors (Joshi et al., 2010) it increase to 85%, however, it´s necessary highlight that intrinsic characteristics of ASD nuclear diagnosis presents own component related cognitive rigidity, hypersensitivity, which, often, co- occur these symptoms with associated symptomatic comorbid groups to ASD itself.

Syriopoulou-Delli et al. (2019) achieve meta-analysis research, which shows the prevalence of related group of sub- clinic symptoms associated to anxiety symptom in people with ASD diagnosis. Characteristics of anxious processes are presented along high intensity indices: 1) fear to asking questions over classroom (19%, 2) students with ASD only speak when someone asks them (17.5%), 3) people with ASD worry about what others think (11.3 %) (which let doubts over global knowledge to Mind Theory basic aspects), 4) usually never take initiatives to ask questions or make comments (23.7%), 5) feeling of fear to making mistakes (13.4%), 6) feeling of fear to being center of attention among social context (11.3%), 7) doubts to take doing work successfully (19.9%), 8) obsessive preoccupation with things different (11.0%), 9) feeling of fear to failing and not completing classroom assignments (8.6%), 10) feeling fear that something bad throughout relationship with social environment (6.2%), etc. In their study, authors also specify anxiety disorder is related to older children, especially, related the adolescence age, while obsessive compulsive disorder is more typical in younger children.

Albantakis et al.   (2020) and also Fietz et al. (2018) find high indices of depression´ subclinical condition symptom regarding ASD diagnosis. Indeed, people with ASD have difficulties expressing and describing their own feelings and emotions, as well as understand feelings and emotions of others in environment, owing alexithymia co- occurrence or evident deficit to recognition of one' s own emotions. This cognitive-perceptive processing may be related to obvious limitations in emotional self- regulation in individuals with ASD.

Nah et al. (2018) found around 50% of people with ASD, especially, in adulthood, present a permanent diagnosis of emotional state severe alteration, which, anxiety, psycho- social phobia and also severe depression as highly recurrent symptomatic group comorbid with ASD diagnosis.

Boothe & Zuna (2019) highlight the symptomatic association of epilepsy as highly recurrent symptom in comorbidity with ASD individuals, with rates significant greater regarding normotypical general people. Likewise, epilepsy symptom shows relevance high level in individual with severe cognitive deficit, therefore, it´d be possible find significant co- occurrences between people with ASD and symptomatic group related with: 1) severe cognitive deficit symptom, and 2) epilepsy symptom.

Wang et al. (2019) point out that hypersensitive and hypersensory processes have a very important intrinsic impact on ASD basic diagnosis, which related to highly restricted and repetitive behaviors, that shape ASD diagnostic criteria. But, it´s noteworthy this variable considerably influences other symptoms that become comorbid processes with the nuclear diagnosis, owing especially from needs among sensory integration

processing, whose consequences can observe in eating disorders, sleep disorders, severe emotional disturbances and adapting behavior problems to different social contexts.

Zacho & Ben-Itzchak (2019) show, however, the most common comorbid symptomatology regarding ASD diagnostic is attention deficit and hyperactivity disorder (ADHD). This symptom is more recurrent in diagnoses don´t concur with severe cognitive disability, which reinforces our hypothesis about existence of certain symptomatic groups it co- occur related in ASD diagnosis comorbidity. This relationship between ADHD and ASD has been widely studied, which 3 basic relational ways highlight: 1) attention deficit with impulsivity and deficits in social relationship skills, 2) stereotyped behaviors with manifest hyperactivity, and 3) attention and meta-attention deficits regarding deficits in understanding information from social environment.

Leader et al. (2020) synthesize there´re common comorbid conditions coexisting with ASD diagnostic, that constitutes related subclinical symptom groups, including above all some gastrointestinal symptoms, eating problems, sleep problems, epilepsy, behavior problems, attention deficit / hyperactivity / impulsivity disorder, anxiety and depression. Seiverling et al. (2018) confirm even that comorbid symptoms presence related specific eating problems, as well as problems of specific selectivity food, which find rates around 75% of children with ASD, being significantly most percentage than normotypic individuals.

However, Rydzewska et al. (2019) researched other health needs in people with ASD regarding visual and hearing difficulties and they conclude that research studies are very limited, as well as there isn´t evidence of severe physical difficulties and, therefore, the comorbidity of ASD diagnosis in relationship with deafness or partial hearing is not very evident.

Hence, this research study aims locate the co- occurrence of comorbid symptomatic groups regarding basic nuclear diagnosis of people with ASD. In this sense, therefore, it arises aim classify different symptomatic groups coexisting with ASD diagnostic.

RESEARCH AIMS

General study aims are related classifying symptomatic groups associated with ASD basic nuclear diagnosis for establish diagnostic comorbid predictions, as well as design psyco- social- educational program right adapted to individuals with ASD:

1. Delimit symptomatic groups that train comorbidity levels associated with ASD diagnostic.
2. Set possible predictions of associated symptoms for analysis of diagnostic process.
3. Adjust the clinical and educational treatment agreed to level of detected comorbidity groups.

METHOD

Design:

This study is based on quantitative analysis over responses found along online survey, regarding more common symptoms associated with diagnosis of ASD people. Different symptoms have been evaluated along intensity degree continuum (0- low deficit degree, 1- half deficit level, 2- high deficit level). Then, symptoms have been operationalized as variables to analysis processes, analyzed throughout CLUSTER

K-MEANS TEST, of SPSS statistic, 23 version. It also another descriptive statistics of general way have been carried out.

Participants:

A total of 126 people with ASD participated in this study, corresponding to Community of Galicia, Spain. Participants distribution can be observed in **Table 1**, in which data have been found from 105 boys of different age ranges, and 21 girls of different age years.

Table 1: Participants distribution.

sex			Galicia, Spain				
			Coruña	Lugo	Ourense	Pontevedra	Total
boys	age	2-5 years	0	6	18	6	30
		6-9	6	12	15	0	33
		10-13	0	3	6	0	9
		14-17	3	0	6	0	9
		>18	3	0	0	21	24
	total		12	21	45	27	105
girls	age	6-9 years			3	0	3
		14-17			6	0	6
		>18			3	9	12
	total				12	9	21
total	age	2-5 years	0	6	18	6	30
		6-9	6	12	18	0	36
		10-13	0	3	6	0	9
		14-17	3	0	12	0	15
		>18	3	0	3	30	36
	total		12	21	57	36	126

Variables:

Study variables are selected of most common symptoms related with ASD diagnosis and indicated for participants. Variables values are operationalized along scores continuum: 0: (low deficit level), 1 (medium level) and 2 (high deficit level).

Variables selected and their values are following: cognitive deficit (cognitive), epilepsy (epilepsy), attention deficit hyperactivity disorder (ADHD), schizophrenia (schizophrenia), anxiety (anxiety), depression (depression), hypersensitivity (hypersensivity), behavior problems (behavior), motor tics (tics), feeding problems (feeding), sleep problems (dream) and others (others): heart disease, clubfoot, otitis, vision problems, etc.

It also statics variables are added: health area (area), participants sex(sex) and age participants (age). Age was distributed along year intervals: 0 (2-5 years), 1 (6-9 years), 2 (10-13 years), 3 (14-17 years) and 4 (> 18 years).

Data analysis:

Data have been found by throughout interactions study between selected different symptoms. Analysis was found through CLUSTER K-MEDIAS statistical analysis, in order classify symptom groups related ASD diagnosis comorbidity. Other descriptive statistics were also found.

RESULTADOS

CLUSTER K- MEANS analysis allow observe, first, Initial Cluster Centers. Cluster Centers lets classify study´ different symptoms on 3 symptom groups regarding people with ASD based on common characteristics interrelated oneself owing iterative repetitions of selected symptoms, configured for maximum of 10 iterations along statistical analysis (see Table 2).

Table 2: Initial Cluster Centers.

	Cluster		
	1	2	3
cognitive	1.00	.00	2.00
epilepsy	2.00	.00	.00
ADHD	.00	2.00	.00
schizophrenia	.00	.00	.00
anxiety	1.00	.00	2.00
depression	.00	.00	2.00
hypersensivity	2.00	2.00	.00
behavior	.00	.00	2.00
tics	2.00	.00	2.00
feeding	2.00	.00	.00
dream	2.00	.00	.00
others	2.00	.00	1.00

As can be seen, iterations indicate that data associated with high deficit levels form 3 differentiated significantly groups:
1) Iteration 1: a group with high scores in epilepsy, hypersensitivity, motor tics, eating problems, sleep and others symptoms.
2) Iteration 2: a new group with maximum scores in ADHD and hypersensitivity symptoms.
3) Iteration 3: a group with high scores in cognitive deficit, anxiety, depression, behavior problems and motor tics.

Iteration history shows iterations number (5) have been carried out classify the 3 symptom groups (see Table 3).

Table 3: Iteration History[a].

Iteration	1	2	3
1	1.87	2.11	2.05
2	.43	.27	.68
3	.00	.12	.23
4	.00	.14	.22
5	.00	.00	.00

a. Convergence achieved owing small change in cluster centers. Maximum absolute coordinate change for

any center is .00. Current iteration is 5. Minimum distance between initial centers is 5.09.

Thus, owing mean score to significant consideration of symptom to may belong inside group is 1.5, being 0= low deficit level, and 2=   high deficit level, cluster centers final table (see Table 4) allows classify clusters following:

1) Cluster I, formed by people with ASD diagnosis associated with epilepsy (2.00), cognitive deficit (1.86), sleep deficits (1.57), other symptoms (1.43), hypersensitivity (1.29), motor tics and feeding problems (1.14).

2) Cluster II, made up to people with ASD diagnosis especially characterized by schizotypal traits (.82), anxiety (.77) and hypersensitivity (.73). People of this group scores are slightly below average (1.5).

3) Cluster III, of people with ASD associated with motor tics (1.92), cognitive deficit (1.54), behavior problems (1.38) and hypersensitivity (1.23).

Table 4: Final Cluster Centers.

	1	2	3
cognitive	1.86	.59	1.54
epilepsy	2.00	.09	.46
ADHD	.00	.55	.31
schizophrenia	.00	.82	.00
anxiety	.71	.77	.38
depression	.14	.18	.46
hypersensivity	1.29	.73	1,23
behavior	.57	.00	1.38
tics	1.14	.00	1.92
feeding	1.14	.27	.69
dream	1.57	.18	.23
others	1.43	.00	.38

However, iterations differential distances to formation of 3 symptom groups are relatively small (see Table 5), which indicates that groups aren´t very different or distant oneself. This difference is greater between groups 2 and 3 and groups 1 and 3, while it´s lower among groups 1 and 2.

Table 5: Distances between Final Cluster Centers.

Cluster	1	2	3
1		3.59	2.73
2	3.59		2.90
3	2.73	2.90	

But, as observed in ANOVA table (see Table 6), differences found between different symptomatic deficits analyzed indicates F statistic significant associated critical level for all research symptoms studied, which let conclude that discriminant differences found between 3 symptom groups classified is significant to significant critical level= .05.

Table 6: CLUSTER ANOVA.

	Cluster		Error			
	Mean Square	df	Mean Square	df	F	Sig.
cognitive	18.31	2	.37	123	48.75	.00
epilepsy	29.14	2	.31	123	91.56	.00
ADH	2.2	2	.54	123	4.5	.01
schizophrenia	1.,51	2	.51	123	2.27	.00
anxiety	5.30	2	.88	123	5.97	.00
depression	1.13	2	.32	123	3.49	.03
hypersensivity	4.31	2	.88	123	4.90	.00
behavior	2.52	2	.36	123	65.21	.00
tics	4.93	2	.19	123	24.34	.00
feeding	6.62	2	.58	123	11.31	.00
dream	1.48	2	.27	123	59.84	.00
others	1.27	2	.31	123	52.17	.00

Finally, participants number belong each group and cases analyzed associated with each cluster can see Table 7.

Table 7: Number of Cases in each Cluster.

Cluster	1	21.00
	2	66.00
	3	39.00
Valid		126.00
Missing		.00

As can be seen, 21 participants with ASD have been assigned to group 1, 66 to group 2 and 39 to group 3. There´s little distance between groups, but the specific groups formation critic level of common symptomatic characteristics can be considered significantly, although, specific symptoms can co-occur in 2 groups, e.g., motor tics symptom, but this clinical symptom is also intrinsic criterion the restrictive-repetitive behaviors of ASD´ own nuclear diagnosis.

CONCLUSION

Final Cluster Centers of this study let deduce it´s there´re 3 clearly differentiated symptom groups associated with nuclear diagnosis of people with ASD. This conclusion allows predicting diagnosis comorbidity proceeding.

Therefore, it´s possible concluded that 3 predictor symptom groups are classified:

I)   Group (I), made up of people with ASD with a comorbid group characterized by 2 related
        common basic symptoms: epilepsy (2.00) and severe cognitive deficit (1.86).

II)   Group (II), formed by people with ASD associated a comorbid group of 2 symptoms: schizotypal characteristics (.82) and anxiety processes (.77).

III)   Group (III) 3, integrated by individuals with ASD related a comorbid group with 4 basic symptoms: tics (1.92), cognitive deficit (1.54), hypersensitivity (1.23) y severe behavior problems (1.38).

It´s also prove a short statistical proximal distance between symptom groups classified, hence it´s necessary weigh other associated symptoms of this study, e.g., hypersensitivity symptom, which is intrinsic criterion of ASD diagnosis regarding APA (op. cit.) norms.

These considerations allow deduce the comorbidity associated with diagnosis of people with ASD isn´t isolated process of standard symptomatic criteria, but it make up multivariate process of interactive symptomatic groups significantly related itself, thus, it´ll associate to comorbidity of basic nuclear diagnosis of ASD setting a whole.

Hence, first group belong basic components related to severe cognitive deficit will involve the existence of epilepsy specific symptom. Both symptoms set a highly relevant comorbid symptomatic group to ASD diagnosis. But, other symptoms are also related to this permanent predictive group as for motor tics. Second symptomatic group get schizotypal symptoms that usually co- occur with anxiety processes, to which other specific symptoms are related less frequency and intensity as the depression symptom. Finally, group 3 made up of 4 recurrent symptoms: motor tics, cognitive deficit (it also associated with group 1), hypersensitivity and severe behavior problems. Those symptoms get highly significant own group that co- occurs with ASD diagnosis.

It´s important think of comorbidity is an essential issue, since its knowledge allows address questions of ASD diagnosis as whole way and, therefore, let give of therapeutic intervention effective level, both clinical and socio- educational, in agreement with analysis data. Otherwise, notable aspects of intervention can be ignored, owing not addressing all symptoms that make up ASD diagnosis global.

But, detection of symptomatic groups allows predict global configuration of ASD diagnosis, as well ease greater efficiency and effectiveness along own diagnosis process and design rightly adjusted intervention program to needs of ASD individuals.

DISCUSSION

ASD diagnosis and its associated interactive complications have significant impact on society and individuals, which cannot be ignored. In this sense, comorbidity analysis and clinical and educational planned treatment get essential dimension to efficacy of effective diagnosis and its consequential intervention.

Indeed, ASD diagnosis almost never occurs loneliness, but it´s associated with multiple symptoms, which co- occur intersecting with multiple relationships themselves, which it´ll condition both own diagnosis and intervention didactic planning.

Although studies regarding configuration of ASD comorbidity symptomatic groups are not very numerous, researches over isolated symptoms have contributed to improving understanding of ASD diagnosis.

Thus, it´s possible avoid the isolated recurrent symptoms of ASD comorbidity be unnoticed within basic nuclear diagnosis, especially, psychiatric type symptoms, such as anxiety, depression or schizotypal symptoms (Hofmann, 2014; Williams et al., 2018).

It also severe mood alterations, leading to symptomatic consequences characterized by alexithymia (Hemming et al., 2019) and, therefore, intervention aims aren´t effective. Above all, comorbid symptoms, if not addressing, can become chronic deficits along adulthood and cause more obstacles in social relationships, in social communication skills, as well as over participation and transition to labor and active life.

Likewise, this co- occurrence is also applicable to presence of associated comorbid symptomatic groups. Hence, e.g., Tsai (2000) & Murray (2010) confirm that when there isn´t evidence of cognitive deficit, co-occurrence of ADHD highly increases, while the presence of severe cognitive deficit, then is recurrent process with epilepsy and tics symptoms, therefore, it´s possible predicted this recurrence as ASD comorbid symptomatic group, which it´ll verify with data.

Just, health programs implemented in schools and clinics develop an important role among psycho-socio-personal evolution of people with ASD diagnosis. Program effectiveness will allow wide range of ASD´ diagnosis comorbid symptomatic groups with purpose develop a global and systemic treatment (Brookman-Frazee et al., 2012).

Therefore, formative consideration of basic nuclear diagnosis constitutes only one part of didactic-programmatic implementation, which will be adapted to symptomatic groups diagnosed, which made up individual specific psycho- educational needs.

Mainly, it´s necessary keep 10 general points to systemic intervention:

1. Specific relational diagnosis of disorder, evaluation of associated symptoms and prediction analysis of possible symptomatic groups.
2. Specific diagnosis of comorbid symptomatic groups.
3. Planning of specific formation regarding this disorder.
4. Formation plan design regarding ASD diagnosis comorbid symptoms analyzed.
5. Global intervention program over ASD nuclear diagnosis and related comorbidity.
6. Systemic implementation of factors psycho- social- educational along intervention: school, clinic, association, family.
7. Co- occurrence assessment of symptoms and comorbid groups.
8. Program assessment along its implementation.
9. Flexibility to get the necessary changes regarding individual evaluation of symptoms and comorbid symptomatic groups.
10. Flexibility to get adjustments over implementation program.

STUDY LIMITATIONS

Indeed, most important limitations are related to sample issue, regarding participants number, therefore more measurement would be necessary of larger. However, within working with people from specific highly groups it´s always difficult access great sample.

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REFERENCES

Albantakis, L., Brandi, M. L., Zillekens, I. Ch., Henco, L., Weindel, L., Thaler, H., Schliephake, L., Timmermans, B., & Schilbach, L. (2020). Alexithymic and autistic traits: Relevance for comorbid depression and social phobia in adults with and without autism spectrum disorder. *Autism, 24*(8) 2046- 2056. DOI: 10.1177/1362361320936024 journals.sagepub.com/home/aut

Alfageh, B. A., Man, K. K. C., Besag, F. M. C., Alhawassi, T. M., Won, I. C. K., & Brauer, R. (2020). Psychotropic medication prescribing for neuropsychiatric comorbidities in individuals diagnosed with Autism Spectrum Disorder (ASD) in the UK. *Journal of Autism and Developmental Disorders, 50*, 625–633. https://doi.org/10.1007/s10803-019-04291-8

American Psychiatric Association (APA). (2013). Diagnostic and statistical manual of mental disorders (5th ed.). APA.   https://doi.org/10.1176/appi.books.9780890425596

Boothe, A., & Zuna, N. (2019). Epilepsy in children with ASD: An overview of evaluation procedures, child characteristics and treatment options. *International Journal of Disability, Development and Education, 66*(1), 1-18. http://dx.doi.org/10.1080/1034912X.2018.1437893

Brookman-Frazee, L., Drahota, A., & Stadnick, N. (2012) Therapist perspectives on community mental health services for children with autism spectrum disorders. *Administration and Policy in Mental Health and Mental Health Services Research, 39*(5): 365–373. https://doi.org/10.1007/s10488-012-0441-9

Brookman- Frazee, L., Stadnick, N., Chlebowski, C., Baker-Ericzén, & Ganger, W. (2017). Characterizing psychiatric comorbidity in children with autism spectrum disorder receiving publicly funded mental health services. *Autism, 22*(8), 938–952. sagepub.com/journals-permissions DOI: 10.1177/1362361317712650 journals.sagepub.com/home/aut

European Medicines Agency. (2007). *Assessment of the paediatric needs psychiatry*. European Medicines Agency.   https://www.ema.europa.eu/en/documents/other/assessment-paediatric-needs-psychiatry_en.pdf

Fietz, J., Valencia, N., & Silani, G. (2018). Alexithymia and autistic traits as possible predictors for traits related to depression, anxiety, and stress: A multivariate statistical approach. *Journal of Evaluation in Clinical Practice, 24*(4), 901- 908. https://doi.org/10.1111/jep.12961

Gagan, J., Petty, C., Wozniak J., Henin, A., Frito, R., Galdo, M., Kotarski, M., Walls, S., & Biederman, J. (2010) The heavy burden of psychiatric comorbidity in youth with autism spectrum disorders: a large comparative study of a psychiatrically referred population. *Journal of Autism and Developmental Disorders 40*(11), 1361-1370. https://doi.org/10.1007/s10803-010-0996-9

Hemming, L., Haddock, G., Shaw, J., & Pratt, D. (2019). Alexithymia and its associations with depression, suicidality, and aggression: An overview of the literature. *Frontiers in Psychiatry, 10*, 1- 7. https://doi.org/10.3389/ fpsyt.2019.00203

Hofmann, S. G. (2014). Interpersonal emotion regulation model of mood and anxiety disorders. *Cognitive Therapy and Research, 38*(5), 483- 492. https://doi.org/10.1007/s10608- 014-9620-1

Leader, G., Tuohy, E., Chen, J. L., Mannion, A., & Gilroy, S. P. (2020). Feeding problems, gastrointestinal symptoms, challenging behavior and sensory issues in children and adolescents with Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders, 50*, 1401–1410 https://doi.org/10.1007/s10803-019-04357-7

Murray, M. J. (2010). Attention-deficit/ hyperactivity disorder in the context of autism spectrum disorders. *Current Psychiatry Reports, 12*(5), 382–388. https://doi.org/10.1007/s11920-010-0145-3.

Nah, Y. H., Brewer, N., Young, R. L., & Flower, R. (2018). Brief report: Screening adults with Autism Spectrum Disorder for anxiety and depression. *Journal of Autism and Developmental Disorders*, *48*, 1841–1846 https://doi.org/10.1007/s10803-017-3427-3

National Institute for Health and Care Excellence. (2013). *Autism spectrum disorder in under 19 s: Support and management*. National Institute for Health and Care Excellence. Autism spectrum disorder in under 19s: support and management (nice.org.uk)

Rydzewska, E., Hughes- McCormack, L. A., Gillberg, Ch., Henderson, A., MacIntyre, C., Rintoul, J., & Coope, S. A. (2018). Prevalence of sensory impairments, physical and intellectual disabilities, and mental health in children and young people with self/proxy-reported autism: Observational study of a whole country population. *Autism, 23*(5), 1201–1209. sagepub.com/journals-permissions DOI: 10.1177/1362361318791279 journals.sagepub.com/home/aut

Seiverling, L., Towle, P., Hendy, H. M., & Pantelides, J. (2018). Prevalence of feeding problems in young children with and without autism spectrum disorder: A chart review study. *Journal of Early Intervention, 40*(4), 335–346. https://doi.org/10.1177/1053815118789396

Simonoff, E., Pickles, A., Charman, T., Chandler, S., Loucas, T., & Baird, G. (2008). Psychiatric disorders in children with autism spectrum disorders: Prevalence, comorbidity, and associated factors in a population-derived sample. *Journal of the American Academy of Child and Adolescent Psychiatry, 47*(8), 921–929.   DOI: 10.1097/CHI.0b013e318179964f

Syriopoulou- Delli, Ch., Polychronopoulou, S. A., Kolaitis, G., & · Antoniou, A. S. G. (2019). Views of teachers on anxiety symptoms in students with Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders, 49,* 704–720 https://doi.org/10.1007/s10803-018-3752-1

Tsai, L. (2000). Children with autism spectrum disorder: Medicine today and in the new millennium. *Focus on Autism and Other Developmental Disabilities, 15*, 138–145. https://www.ncbi.nlm.nih.gov/pubmedhealth/n/cer137/appe

Wang, G., Li, W. L., Han, Y., Gao, L., Dai, W., Su, Y. Y., & Zhang, X. (2019). Sensory processing problems and comorbidities in chinese preschool children with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders, 49,* 4097- 4108. https://doi.org/10.1007/s10803-019-04125-7

Williams, W. C., Morelli, S. A., Ong, D. C., & Zaki, J. (2018). Interpersonal emotion regulation: Implications for affiliation, perceived support, relationships, and well-being. *Journal of Personality and Social Psychology, 115*(2), 224- 254. https://doi.org/10.1037/pspi0000132

Zachor, D. A., & Ben- Itzchak, E. (2019). From toddlerhood to adolescence: Which characteristics among toddlers with Autism Spectrum Disorder predict adolescent Attention Deficit/Hyperactivity symptom severity? A long- term follow- up study. *Journal of Autism and Developmental Disorders, 49*, 3191–3202 https://doi.org/10.1007/s10803-019-04042-9