

The impact of COVID-19 on the adaptive functioning of Italian children with Autism Spectrum Disorder: role of the online intervention.

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Abstract

This study investigated the impact of lockdown due to COVID-19 pandemic on the adaptive functioning, problematic and repetitive behaviors of an Italian sample of preschoolers and schoolers with Autism Spectrum Disorder. We evaluated whether after the compulsory home confinement, in comparison to a baseline evaluation performed during the months preceding COVID-19, any improvement or worsening was reported by parents of ASD individuals using standardized instruments.

No significant worsening in the areas explored emerged after the lockdown. Within the older participants, a clinical stability was found concerning both adaptive skills and behavioral aspects. Whereas, within preschoolers a significant improvement in adaptive skills emerged and was related to the subsistence of web delivered intervention, parental work persistency and online support during lockdown.

Introduction

The 2019 coronavirus disease (COVID-19) spread around the world from December 2019 determining a pandemic still ongoing. It affected 28,285,700 people, causing more than 900,000 deaths (World Health Organization, Health Emergency Dashboard updated to September 12, 2020).

COVID-19 severely impacted worldwide not only on the health and wellbeing of citizens and countries, but also determined a correlative impairment of finances and economics with a derangement of everyday life scheduling. Amongst European countries, at the beginning of the pandemic, Italy represented one of the most affected by the COVID-19. In order to reduce the spreading of the infection, the Italian Government imposed home-confinement for all residents from March 9th 2020 to May 4th 2020. Schools, restaurants, shops, museums, gyms were compulsorily closed. Most of the work activities were interrupted except for those considered as essential (i.e. doctors, nurses, employed in supermarkets). Home exiting was permitted only for indispensable and critical needs (i.e. going to: hospital, supermarket, shops for personal care and hygiene). After May 4th 2020, citizens were allowed to leave their homes, but they had to observe social distancing and wear safety devices to reduce the risk of infection.

If the condition of lockdown represented a rather challenging experience for all citizens, due to the impact on social and economic aspects, home confinement constituted a double dare for individuals with Autism Spectrum Disorder (ASD), and their families. In fact, under these extreme circumstances, people with ASD faced additional difficulties related to their condition which is already characterized by impairment in social communication, restricted interests and repetitive behaviors associated with reduced tolerance of changes (APA 2013): difficulty in understanding the situation, routine disruption, interruption of all in-person interventions (Eshragi et al. 2020). Caregivers of autistic children had to face not only the challenges strictly related to the COVID-19 outbreak but also those related to the management of their children. Therefore, within ASD individuals, a worsening of clinical features, especially behavioral, was expected after the lockdown (Eshragi et al. 2020).

Greater sleep problems have been reported and associated to more severe autism symptoms during home confinement (Türkoğlu et al. 2020). Asbury et al (2020) qualitatively measured, with a free response question, the effect of the COVID-19 outbreak on mental health of children with Special Educational Needs and Disabilities (SENDs), including ASD, and on their caregivers. The results of this study showed that, most of SENDs parents described themselves as overwhelmed, and only few of them reported no impact or improvement in their children (Asbury et al 2020).

Furthermore, Colizzi et al (2020) conducted a parent-survey on 527 ASD individuals (mean age 13 years), reporting a behavioral problem increase in one out of three after COVID-19 outbreak. Moreover, they found that the presence of disruptive behaviors preceding pandemic was related to a worst outcome.

However, neither study employed standardized quantitative tools—administered both before and after the lockdown—in order to measure the actual behavioral outcome of the children with ASD

To our knowledge, no previous study evaluated with standardized quantitative instruments the impact of COVID-19 on the behavioral and functional outcome of children and adolescents with ASD.

Therefore, the aim of this study was to investigate, in a sample of Italian individuals with autism, any change in adaptive functioning, problematic and repetitive problems, which arose after the compulsory home confinement by comparing data collected during the pandemic with evaluations performed before the COVID-19 outbreak. We aimed also to evaluate if the outcome after the compulsory lockdown, was associated with some child and parental variables, namely, subsistence of the child intervention in a remote way, online parental support, and parental work persistency during home confinement.

Methods

Participants and Procedure

All ASD participants were recruited during March-April 2020 by a multidisciplinary team (child psychiatrists, psychologists) of the Child Psychiatry Unit of the Tor Vergata University Hospital of Rome. This study included mainly individuals originating from the Centre-South of Italy (regions, at that time, less affected by COVID-19).

Overall, 335 individuals were assessed for eligibility. Finally, 119 participants were considered eligible for the research, but 34 dropped out the study. Therefore the final sample consisted in 85 participants (**Fig.1**).

To be eligible, participants were required to have a diagnosis of ASD according to the Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (DSM-5) (APA 2013), (supported by the assessment of the Autism Diagnostic Observation Schedule–Second Edition (ADOS–2) (Lord et al. 2012) by a licensed clinician), an age range of 2-18 years, and a baseline clinical evaluation performed in the Child Psychiatry Unit of the University Hospital Tor Vergata of Rome in 2019. The baseline evaluation (T0) included an assessment of autistic symptoms, Intelligence Quotient (IQ) and adaptive functioning, problematic behaviors, and repetitive interests and behaviors.

After the compulsory home-confinement (T1), from May to July 2020, within a mean distance of 9.5 months from baseline, participants underwent the same evaluation performed at T0, except for the IQ and autistic symptoms' assessment, as the restrictions did not allow to perform an in person clinical evaluation. Whereas, the other measures (adaptive functioning, problematic and repetitive behaviors), being parental questionnaires, could be administered at distance. Before the COVID-19 pandemic, all participants underwent a behavioral intervention and they had at least one parent with a stable job.

In order to characterize our sample and to investigate the possible role of environmental changes and disrupted routines due to the emergency situation, we took in consideration the following variables: *online child intervention* and *online parental support*. In particular, for *online child intervention* we intend the remote continuation during the lockdown, of the child's behavioral therapeutical intervention with a frequency of at least once a week. For *online parental support* we intend the condition for parents to receive at least a weekly online psychological support in order to face the main and overall difficulties of their child during such emergency situation.

Finally, we evaluated if parental *work persistency* during lockdown, could influence the behavioral and adaptive outcome of their children. In particular, for *work persistency* we mean to state if the parent with a stable job, continued to be employed during the lockdown, whether in-person or remotely.

Materials

Cognitive and Adaptive Functioning Measures

The Intelligence Quotient (IQ) of participants was evaluated at baseline through the Leiter International Performance Scale-Revised (Roid and Miller 1997), the Wechsler Preschool and Primary Scale of Intelligence-third edition (Wechsler et al 2002), or the Wechsler Intelligence Scale for Children-fourth Edition (WISC-IV) (Wechsler et al 2003). The cognitive measure was chosen on the basis of age, expressive language level, and cooperation of each participant. All of these measures used the same standard scores (SS = 100) and standard deviations (SD = 15).

On the basis of the IQ value, we dichotomized the sample in “Intellectual Disability” (ID) ($IQ \leq 70$) and “No Intellectual Disability” (NO ID) ($IQ > 70$) (Table 1).

In order to evaluate the participants’ adaptive functioning, the Adaptive Behavior Assessment System-Second Edition (ABAS-II) (Oakland 2011), a parent-report checklist, was employed. According to the age, participants’ parents were administered the “0-5 years” or the “5-21 years” form. The child’s ability to implement an activity is rated (from 0 = “not able to” to 3 = “able to do it and always performs it when needed”) in relation to ten adaptive skills areas (communication, use of environment, preschool competences, domestic behavior, health and safety, play, self-care, self-control, social abilities, motility). These functioning areas are grouped in three main adaptive domain scores: 1) conceptual (CAD); 2) practical (PAD); 3) social (SAD). In addition, a General Adaptive Composite (GAC) score, a comprehensive domain, is computed by the sum of scaled scores from the 10 skill areas. Raw scores are converted in scaled and finally in a standardized composite score, with a population mean of 100 and a standard deviation of 15.

For the statistical analyses, the composite scores of the three adaptive domains (CAD, PAD, SAD) plus GAC, were used.

ASD diagnostic measure

The ADOS-2 (Lord et al, 2012), performed by a licensed clinician, was employed in order to confirm participants’ ASD diagnosis. The ADOS-2 is a semi-structured observational assessment measuring current autistic symptoms, including socio-communicative difficulties and repetitive and restricted behavior. The ADOS-2 is divided into different modules. Each module is aimed at a specific level of expressive language ability (ranging from pre-verbal to fluent speech). The choice of modules is based on the participant’s age and expressive language level. In the present study, participants were administered different modules (Module 1 to 4) according to their age and expressive language level.

In order to compare scores across different modules, the ADOS-2 Calibrated Severity Score (CSS) was calculated for each participant. The CSS, ranging from 1 to 10, identifies 4 different categories (none, mild, moderate, high) and provides a measure for the level of autism severity.

Repetitive Behavior and Restricted Interests assessment

Participants’ repetitive behaviors and restricted interests were assessed by a self-reported scale completed by caregivers, the Repetitive Behavior Scale Revised (RBS-R) (Bodfish et al. 2000). In our study we employed the Italian version of RBS-R (Fulceri et al 2016). The RBS-R questionnaire consists in 43-items, grouped in six subscales (*Stereotypic Behavior; Self-injurious Behavior; Compulsive Behavior; Ritualistic Behavior; Sameness Behavior; Restricted Interests Behaviors*) rating repetitive behaviors on 4-point Likert scale (ranging from 0 to 3) depending on the frequency and severity of the behavior.

The five-factor solution was used for the scoring (Lam and Aman 2007). The five-factor solution implies that the Ritualistic Behavior and Sameness Behavior subscales are integrated in one subscale named the Ritualistic/Sameness Behavior. The raw score of each subscale was calculated adding all the items provided for the scoring. Finally, the sum of all five subscales scores (RBS Total) was calculated.

Problematic Behavior Measure

Emotional symptoms and behavioral problems of ASD children and youth were assessed using the questionnaire Achenbach Child Behavior Checklist (CBCL) (Achenbach and Rescorla 2000). According to the age participants, parents were administered the “18 months-5 years” or the “6-18 years” form. Caregivers were asked to rate their child adverse behavior on a 3 point Likert Scale (0 = not true, 1 = sometimes true, 2 = often true) depending on the frequency of the behavior, with higher score showing more problematic behavior. According to the T-scores the behavior is considered as typical ($T < 65$), borderline ($T = 65-69$), and clinically significant ($T \geq 70$).

The “18 months-5 years” form consists in 110 items organized in 7 Syndrome Scales (*Emotionally Reactive, Anxious/Depressed, Somatic Complaints, Withdrawn, Sleep Problems, Attention Problems, Aggressive Behavior*). Each scale is organized in 2 main domains: *Internalizing* and *Externalizing Symptoms*. Moreover, a *Total Behavior* score can be calculated.

The “6-18 years” form consists in 113 items grouped in 8 Syndrome Scales (*Anxious/Depressed, Withdrawn/ Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Rule-Breaking Behavior, and Aggressive Behavior*). Also in this case, two main domains, *Internalizing* and *Externalizing Symptoms*, and a *Total Score* are provided.

Statistical Analyses

Changes in ABAS-II, RBS-R, and CBCL scores between T0 and T1 (pre- and post home confinement due to COVID-19 pandemic) were evaluated with the Related Samples Wilcoxon Signed Rank Test. Non-parametric statistics was chosen because of the characteristics of the score distributions and of the limited sample-size. An alpha level of 0.05 was used for all statistical analyses. Results, if not otherwise specified, are given as means \pm SD. All statistical analyses were performed using SPSS v.23.0 (IBM Corp., Armonk, NY, USA).

Results

A total of 85 participants (age range 2-18 years; mean age 7 years; 68 (80.0%) males; 17 (20.0%) females) were included in the study (**Fig.1**). Depending on age, we divided the sample in two groups: “preschooler” (n= 33; age range 2-5 years) and “schooler” (n= 52; age range 6-18 years).

The T1 evaluation (after the compulsory lockdown, within a period range May-July 2020) was performed at a mean age difference (T0-T1) of 8.3 months for the preschoolers and of 10.3 months for the older participants (Table 1).

Clinical Summary

Preschooler Group

At baseline (in 2019, before COVID-19), the preschooler group was characterized by: a mean age of 4 years; 25 males, 8 females; 24 No ID and 4 ID (5 participants did not complete the cognitive evaluation); a median ADOS-CSS of 6.50 (indicating a moderate level of autistic symptoms severity) (Table 1).

During the lockdown, within preschooler individuals, 14 underwent an online intervention; concerning their parents, 10 received an online support and 15 preserved their job (either in-person or remotely) (Table1).

Schooler Group

The schooler group presented: a mean age of 9 years; 43 males, 9 females; 29 No ID, 22 ID (1 participant did not complete the cognitive evaluation), a median ADOS-CSS of 7 (indicating a moderate level of autistic symptoms severity). During the lockdown, within this older group, 24 ASD participants underwent an online intervention; 19 parents were supported online and work persistency was referred in 30 parents (Table1).

Paired differences between T0 (before COVID-19) and T1 (after the end of lockdown)

Paired differences in Adaptive Functioning

Within the Preschooler group, after the lockdown, a significant improvement emerged in almost all the ABAS-II domains (GAC $M \pm SD = -11.07 \pm 21.78$ $p = .014$; CAD $M \pm SD = -9.07 \pm 20.68$ $p = .031$; PAD $M \pm SD = -9.29 \pm 23.20$ $p = .047$), except for the SAD ($M \pm SD = -5.92 \pm 18.90$ $p = .115$), where no significant results were found.

Whereas, in the Schooler group, no significant result was found between baseline and T1, in all the adaptive domains investigated (GAC $M \pm SD = -7.83 \pm 9.02$ $p = .559$; CAD $M \pm SD = -1.22 \pm 8.54$, $p = .343$; PAD $M \pm SD = -0.37 \pm 13.47$ $p = .853$; SAD $M \pm SD = -0.522 \pm 8.46$ $p = .678$).

Improvement in Adaptive Skills: relation to child and parental variables within the preschooler group.

Thus, given the finding of significant adaptive skills' improvement within the preschooler participants, we evaluated—only in this group—if child variables (presence or lack of *Intellectual Disability*, *online intervention* during COVID-19) and parental variables (*work persistency* and *online parental support* during COVID-19) were related to the improvement emerged at T1 (Table 2).

Child Variables

The improvement in GAC domain emerged within the preschooler group was not related to the sex. Instead, it was significantly related to the lack of ID ($M \pm SD = 13.73 \pm 5.59$ $p = .023$). In fact, individuals with ASD without ID presented a GAC score improvement of 16.74 in comparison to their peers with ID who reported a score increase of 3.

In regards to the *online child intervention* during lockdown, we found a significant improvement in the GAC ($M \pm SD = -14.72 \pm 21.21$ $p = .044$) within individuals with ASD who received an online intervention (Table 3).

Among the ASD participants not undergoing treatment during the lockdown, no significant improvement emerged in adaptive functioning (GAC $M \pm SD = -8.56 \pm 22.50$ $p = .149$).

Parental Variables

We found that participants whose parents underwent an *online parental support* during lockdown, had a significant improvement in the Practical Adaptive Domain (PAD $M \pm SD = -5.37 \pm 5.44$ $p = .027$) (Table 3) in comparison to the individuals with ASD whose parents did not receive such support.

Considering the *parental work persistency* during lockdown, a significant improvement in the GAC ($M \pm SD = -15.00 \pm 25.77$ $p = .034$), in the CAD ($M \pm SD = -13.62 \pm 25.24$ $p = .047$) emerged within the ASD individuals with parents not

continuing their usual job (Table 3). Whereas the Social Domain (SAD) did not report any significant results ($M \pm SD = -7.75 \pm 22.78$ $p = .194$) (Table 3).

Instead, parents who continued working (either in-person or remotely) did not report a significant improvement in their child functioning (GAC $M \pm SD = -5.36 \pm 13.29$ $p = .211$).

Paired differences in Repetitive and Problematic Behavior

Concerning repetitive and problematic behaviors, measured by RBS-R and CBCL, no significant results emerged between baseline and after the lockdown in both younger and older participants. Therefore, no improvement or worsening was reported by parents in these behavioral domains.

Discussion

In this study, we investigated the possible impact of the lockdown due to COVID-19 pandemic on the adaptive functioning, problematic and repetitive behaviors of a sample of ASD Italian preschoolers and schoolers. Specifically, we evaluated whether after the compulsory home confinement, in comparison to a baseline evaluation performed during the months preceding COVID-19, any worsening or improvement was reported by parents of individuals with ASD.

Interestingly, after the lockdown, we did not find any worsening in the areas explored within both younger and older participants. A significant improvement emerged regarding adaptive functioning only within preschoolers, and a substantial clinical stability in behavioral aspects (repetitive and problematic) was reported by parents belonging to both age groups.

Specifically, after the end of home confinement, within the preschooler group, all the adaptive domains were reported as enhanced by parents, except for the Social Domain (SAD), which did not result as improved. Given the fact that, during the lockdown in Italy, home exiting was forbidden and consequently social relationships were precluded, this result is not surprising. Whereas, within the schooler group, a clinical stability was reported by their parents concerning adaptive skills. The lack of significant improvement within the schoolers could be due to the fact that, in this older group, there was a major representation of individuals with ID in comparison to the preschooler sample. As a matter of fact, when investigating within ASD preschoolers group, the possible variables related to a better outcome after the lockdown, we found a greater improvement in ASD participants without ID compared to their autistic peers with ID. This is consistent with the literature reporting a worse outcome in individuals with ASD with cognitive impairment, although not in home confinement (Howlin et al. 2013; Steinhausen et al. 2016).

Furthermore, within ASD preschoolers, amongst the variables that may have influenced the positive impact emerged on the adaptive functioning, we investigated the role of the therapeutical intervention. In fact, even if the intervention delivered in person was interrupted during the lockdown, some individuals with autism received a temporary replacement by an online intervention. In particular, children who continued during the lockdown the behavioral therapeutical intervention with a frequency of at least once a week, reported a significant amelioration in the GAC (a comprehensive domain of the adaptive skills) and a trend in all other adaptive domains (except for the SAD) in comparison to the ASD participants who did not receive web delivered therapeutical intervention.

What's more, given the essential role of parents in the intervention and care of an autistic person (Burrell and Borrego 2012), we explored, within preschoolers, the possible effect of parental variables (*online parental intervention; work persistency*), during this period of lockdown, on the adaptive functioning improvement that emerged.

Specifically, we found that ASD children whose parents received an *online support* during the lockdown, showed a significant improvement in the Practical Domain (PAD) which evaluates self-care, safety, home life, care of the

environment. This result may be explained by the possible role of the online training in implementing parental strategies to improve practical skills at home during this period of lockdown.

The web delivered psychoeducational programs addressed to both ASD youths and their parents has proven effectiveness in improving skills during transition age (Hatfield et al. 2017; White et al. 2017; White et al. 2019).

In fact, nowadays, tele-health interventions (tele-therapy, tele-support) represent promising models for individuals with ASD, providing easy access to services otherwise not available in extreme circumstances, such as the lockdown (Ferguson et al. 2019; Ameis et al. 2020).

Of particular interest, our study highlights the positive and beneficial effects of the parental presence at home and, in particular, of the time spent with their children. In fact, parents who persisted working (either in-person or remotely) during lockdown did not report any improvement in their son and daughters functioning. Whereas, in the group of autistic children whose parents did not continue their usual job (*no work persistency*), a significant amelioration in the adaptive skills was found (GAC, CAD and a trend in the PAD). We suppose that the parents who did not persist working in that period of lockdown, being required to stay at home for State's regulation, spent more time with their children in comparison to the months preceding COVID-19, with a subsequent positive impact on the children's functioning. Instead, we suppose that the parents who maintained their usual job (either in-person or remotely) did not significantly implement the time spent with their children, with a lack of positive effect on their children's skills.

These findings suggest and underline the importance of parent care in ASD treatment, pertaining to involvement in the intervention and time spent at home with children (Burrell and Borrego 2012).

Moreover, the results of this study yield the recommendations of supporting parents through specific services which can be helpful in improving skills learned in a therapeutical context. Therefore, National Health Systems should provide education, to all families of individuals with ASD not only in emergency circumstances but also in everyday life.

Finally, we found a substantial clinical stability in the level of repetitive and problematic behaviors emerged within both age groups. Our results of clinical stability in these behavioral features are not concordant with the behavioral problem increase reported during COVID-19 by Colizzi et al (2020) in a study on an Italian ASD pediatric sample. However, in order to measure these behavioral features, the authors did not use reliable standardized tools as we did, but a general survey, and, above all, they did not make a comparison with an equal evaluation performed before COVID-19 pandemic. Therefore, in Colizzi et al study, the behavioral worsening reported by parents doesn't constitute a reliable measurement of the after COVID-19 outcome, but a general parental estimate of the actual clinical picture. Moreover, demographic characteristics of the samples (mean age, region) could explain the non-concordant results between our (mean age 7 years; Center-South Italy) and Colizzi's study (mean age 13 years; North of Italy).

In fact, the lack of worsening in repetitive and problematic behavior that emerged in our study, on one hand, could be explained by the fact that the population of this study originated from the Centre-South of Italy, which represented, at the time of the study, the least COVID-19 affected area of the Country, with restriction rules applied subsequently in comparison to the North of Italy. Therefore, we hypothesize that for the individuals with autism of our study, the compulsory lockdown could have represented a less challenging period (shorter duration, less restriction, less stressed family environment) with a consequently non significant enhancement of these dysfunctional behaviors.

On the other hand, the lack of improvement in repetitive and problematic behaviors that emerged in our study, could be explained by the fact that these types of behaviors necessitate of intensive intervention in order to be improved because of their being pervasive and hard to modify (Harrop 2015; Lin et al. 2018; Mazza et al. 2020). Intensive intervention that was not possible during the lockdown.

Main strengths of our study are represented by the longitudinal evaluation of ASD participants with standardized tools, which permits to measure the possible impact of the lockdown. However, our research is characterized by several limitations: the reduced sample size, in particular of the preschooler group with a scarce representation of ASD individuals with ID; the employment of parental report measures which do not offer an objective evaluation; moreover, being an observational study, there is no homogeneity in the modality (duration, frequency) and contents of the web delivered behavioral intervention and online parental support.

Finally, our research leaves open questions. In fact, we investigated the short-term impact of lockdown on behavior and adaptive functioning but not the long-term effects. However, having used standardized instruments allows us to replicate our findings even at a greater distance. Future studies on the topic are necessary in order to better understand and delineate the possible impact that the COVID-19 pandemic may have on the functioning of individuals with ASD and their families.

Declarations

Authors contributions

MS, ES and AR enrolled the participants and performed the clinical evaluation.

MS and LM wrote the manuscript.

LEG performed the statistical analysis.

LM, PC and MS designed the study, contributed to theoretical interpretation read and final proof reading.

Each author read and approved the final version of the manuscript.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Informed Consent. Informed consent was obtained from all parents/guardians of participants included in this study.

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Tables

Table 1. Main characteristics of the age groups.

Shown in table the main clinical characteristics (age, cognitive ability, autism severity), child and parental variables of the two age groups: Preschooler and Schooler.

	<i>Age at baseline (M±SD)</i>	<i>Age difference T0- T1 (M±SD)</i>	<i>No ID- ID</i>	<i>ADOS- CSS (Median)</i>	<i>Online Child Intervention</i>	<i>Parental Support</i>	<i>Work Persistency</i>
PRESCHOOLER (n= 33; 25 males; 8 females)	52.3 ± 11.5 months	8.3 ± 4 months	24 (No ID) -4 (ID)*	6.5	14	10	15
SCHOOLER (n= 52; 43 males; 9 females)	110.1 ± 42.2 months	10.3 ± 4.8 months	29 (No ID)- 22 (ID) *	7	24	19	30

ADOS 2-CSS = Autism Diagnostic Observation Schedule-2nd Edition Calibrated Severity Score

ID = Intellectual Disability

No ID = No Intellectual Disability

*5 children did not complete the IQ evaluation at baseline in the Preschooler group; 1 child in the Schooler group.

Table 2. Paired Differences between T0 (before COVID-19) and T1 (after the end of lockdown)

	Mean Difference T0-T1 (M±SD)	t	p value
<u>PRESCHOOLER:</u>			
ABAS-II_GAC T0-T1	-11.07 ± 21.78	2.64	.014*
ABAS-II_CAD T0-T1	-9.07 ± 20.68	2.27	.031*
ABAS-II_SAD T0-T1	-5.92 ± 18.90	1.62	.115
ABAS-II_PAD T0-T1	-9.29 ± 23.20	2.08	.047*
<u>SCHOOLER:</u>			
ABAS-II_GAC T0-T1	-7.83 ± 9.02	0.58	.559
ABAS-II_CAD T0-T1	-1.22 ± 8.54	0.95	.343
ABAS-II_SAD T0-T1	-0.522 ± 8.46	0.41	.678
ABAS-II_PAD T0-T1	-0.37 ± 13.47	0.18	.853

ABAS-II = Adaptive Behavior Assessment System, Second Edition; GAC = General Adaptive Composite score; CAD = Conceptual Adaptive Domain;; SAD = Social Adaptive Domain; PAD = Practical Adaptive Domain;

* = significant value

Table 3. Improvement in Adaptive Skills: relation to parental and child variables within the preschooler group

Shown in the Table the impact of Child (children receiving Online Intervention) and Parental Variables (parents receiving Online Parental Support; parents not continuing their usual job during lockdown either in person or remotely) on the improvement in adaptive skills.

	Mean Difference T0-T1 (M±SD)	t	p value
CHILD VARIABLES:			
<i>Online Child Intervention</i>			
ABAS-II_GAC T0-T1	-14.72 ± 21.21	2.30	.044*
ABAS-II_CAD T0-T1	-13.18 ± 22.12	1.9	.076
ABAS-II_SAD T0-T1	-8.00 ± 19.63	1.3	.206
ABAS-II_PAD T0-T1	-12.27 ± 22.00	1.85	.094
PARENTAL VARIABLES:			
<i>Online Parental Support</i>			
ABAS-II_GAC T0-T1	-7.2 ± 10.23	2.00	.085
ABAS-II_CAD T0-T1	-5.1 ± 9.92	1.46	.187
ABAS-II_SAD T0-T1	-3.50 ± 12.41	0.79	.451
ABAS-II_PAD T0-T1	-5.3 ± 5.44	2.79	.027*
<i>No Work Persistency</i>			
ABAS-II_GAC T0-T1	-15.00 ± 25.77	2.3	.034*
ABAS-II_CAD T0-T1	-13.62 ± 25.24	2.1	.047*
ABAS-II_SAD T0-T1	-7.75 ± 22.78	1.3	.194
ABAS-II_PAD T0-T1	-12.43 ± 27.27	1.8	.088

ABAS-II = Adaptive Behavior Assessment System, Second Edition; GAC = General Adaptive Composite score; CAD = Conceptual Adaptive Domain;; SAD = Social Adaptive Domain; PAD = Practical Adaptive Domain;

* = significant value

Figures



Fig. 1. Flowchart of the study. Illustrated in the Figure the main methods of the study (participants, procedure, materials).

Figure 1

Flowchart of the study. Illustrated in the Figure the main methods of the study (participants, procedure, materials).