Exploring the Effectiveness of an Instructional Program for Children with Autism in Enhancing Daily Life Skills: Education's Reflection on Public Health

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ABSTRACT

This study aimed to explore the effectiveness of an instructional program in enhancing daily life skills (DLS) among children with Autism Spectrum Disorder (ASD), with a particular focus on improving their public health-related competencies. The study sample comprised 28 children (boys and girls) aged between 4 and 6 years, with a mean age of 5.4 years and a standard deviation of 0.92. Participants were purposefully selected from the registered children at the Ru'ya Center for Special Needs in Cairo, Egypt, ensuring the absence of additional motor, auditory, or visual impairments. A quantitative approach was employed, utilizing a quasi-experimental one-group pretest-posttest design. The researchers developed a Daily Life Skills Scale (DLSS) to assess key domains, including personal hygiene, proper nutrition, physical fitness and movement, safety and injury prevention, healthy sleep habits, social adaptation, disease prevention, and the responsible use of technology for health purposes. The scale was applied before and after the implementation of the instructional program, which consisted of 17 sessions conducted over 12 weeks. Findings revealed significant improvements in participants' daily life skills related to public health following the program's implementation. The instructional program demonstrated its effectiveness in fostering essential skills such as personal care, healthy eating, physical activity, and social adaptation-critical components of overall well-being for children with ASD. These results underscore the potential of structured educational programs to positively impact the daily lives and public health skills of children with ASD, thereby enhancing their independence and quality of life. The study highlights the importance of integrating health-related skill development into educational interventions for children with ASD, offering valuable insights for educators, therapists, and educational policymakers.

1. Introduction and Theoretical Framework

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition characterized by persistent deficits in social communication, restricted interests, and repetitive behaviors. Globally, ASD affects approximately 1 in 100 children, according to the World Health Organization (2023), with prevalence rates steadily rising. Early symptoms often emerge before the age of three, profoundly impacting adaptive functioning and daily living skills (DLS), even in children with average cognitive abilities. This underscores the critical need for targeted interventions during the formative years of development (Aljehany & Bennett, 2019).

Daily living skills (DLS) constitute a core domain of adaptive behavior, defined as age-appropriate, independent behaviors essential for social, communicative, and practical functioning (Domire & Wolfe, 2014). These skills-such as personal hygiene, meal preparation, safety awareness, and health management-are pivotal for fostering independence and reducing reliance on caregivers (Clarke et al., 2021). However, research consistently highlights that children with ASD face significant challenges in acquiring DLS compared to neurotypical peers, with deficits observable as early as 36 months of age (Baker et al., 2021).

Impairments in DLS among children with ASD extend beyond childhood, often persisting into adolescence and adulthood. Many individuals with ASD reach chronological adulthood with underdeveloped social-emotional maturity and self-care competencies, despite physical maturation (Daniolou et al., 2022; Makrygianni et al., 2018). This gap increases their vulnerability to health risks, social exclusion, and economic dependency. Consequently, early intervention programs targeting DLS are not merely educational priorities but public health imperatives (Duncan & Bishop, 2015).

Public health skills, embedded within DLS, encompass practices that safeguard individual and community well-being, such as disease prevention, nutrition, physical fitness, and hygiene. For children with ASD, mastering these skills is doubly critical: it enhances personal autonomy while mitigating long-term health disparities (Ke et al., 2022). For instance, poor hygiene habits may increase susceptibility to infections, while inadequate nutrition exacerbates comorbid conditions like gastrointestinal disorders, common in ASD populations (A Craig et al., 2021).

Despite advances in special education, most ASD interventions prioritize academic or behavioral outcomes over holistic health-related skill development (Bennett & Dukes, 2014). Few programs integrate DLS training with public health education, leaving a critical gap in preparing children with ASD for independent living (Al-Mamari et al., 2021). This oversight is particularly pronounced in low-resource settings, where cultural and socioeconomic factors further compound barriers to skill acquisition (Pierce & Schreibman, 1994).

DLS are inherently shaped by cultural norms and developmental stages. For example, hygiene practices or dietary habits deemed essential in one community may differ in another (Lledó et al., 2022). For children with ASD, these skills must be contextualized to their environments-familial, educational, and societal. A culturally responsive approach ensures that interventions align with the child's lived experiences, maximizing relevance and sustainability (Shipley-Benamou et al., 2022).

The preschool years (ages 4-6) represent a sensitive period for neuroplasticity and habit formation. During this phase, structured interventions can capitalize on the brain's adaptability to instill lifelong health-promoting behaviors (Vahabzadeh et al., 2018). Early Childhood Intervention (ECI) programs targeting ASD have demonstrated success in improving communication and social skills, yet their potential to enhance health-related DLS remains underexplored (Yakubova & Chen, 2021).

The successful acquisition of daily living skills (DLS) in children with ASD hinges not only on structured educational programs but also on the active involvement of families and caregivers (Wallace et al., 2012). Research indicates that skill generalization-transferring learned behaviors from clinical or school settings to home and community environments-is significantly enhanced when caregivers are trained to reinforce health-promoting practices (Cruz-Torres et al., 2020). For instance, consistent modeling of handwashing routines or collaborative meal planning can solidify children's understanding of hygiene and nutrition (Wynkoop et al., 2018). However, caregivers of children with ASD often report high levels of stress and limited access to training resources, particularly in low-income communities (Pérez-Fuster et al., 2019). This study incorporates a caregiver education component to ensure sustainability, equipping families with strategies to support their children's progress beyond the intervention period.

This study introduces an innovative instructional program designed to bridge this gap. By combining DLS training with public health education, the program addresses eight key domains: (1) personal hygiene, (2) nutrition, (3) physical fitness, (4) safety awareness, (5) sleep hygiene, (6) social adaptation, (7) disease prevention, and (8) responsible technology use. These domains reflect both individual well-being and broader community health outcomes, positioning the intervention at the intersection of education and public health.

The integration of public health principles into educational interventions for ASD represents an emerging interdisciplinary frontier (Bal et al., 2015). Traditional special education frameworks prioritize academic and behavioral goals, while public health initiatives often target population-level disease prevention (Kilincaslan et al., 2019). This study bridges these domains by positioning DLS as both individual competencies and collective health assets (Bridges et al., 2020). For example, teaching children with ASD to recognize symptoms of common illnesses not only empowers them to seek help but also reduces community transmission risks. Similarly, promoting physical fitness within this population can alleviate comorbidities such as obesity, which disproportionately affect individuals with ASD (Berenguer et al., 2020). By framing DLS as a public health investment, the study advocates for cross-sectoral collaboration between educators, healthcare providers, and policymakers.

Guided by the Social Ecological Model, which emphasizes the interplay between individual, familial, and societal factors, this quasi-experimental study examines the effectiveness of a 17-session instructional program. Using a pretest-posttest design, it evaluates improvements in DLS and health literacy, hypothesizing that skill gains will correlate with enhanced quality of life and reduced public health burdens. The findings aim to inform policymakers, educators, and public health practitioners about the transformative potential of integrated interventions for ASD.

2. Importance of the Study

The significance of this study emerges from its urgent focus on addressing a critical gap in the care and education of children with Autism Spectrum Disorder (ASD)-the development of daily living skills (DLS). As ASD prevalence rises globally, with increasing recognition of its lifelong implications, fostering functional independence in children with ASD has become a cornerstone of modern special education. However, the persistent deficits in DLS among this population-ranging from personal hygiene to social adaptation-pose substantial barriers to their autonomy, health, and societal integration. This study holds particular importance as it targets children aged 4-6 years, a developmental window where early intervention can yield transformative, long-term outcomes. By designing an instructional program tailored to the needs of Arabic-speaking children with ASD, the research addresses a notable gap in regional literature. While Western countries have pioneered evidence-based interventions, culturally adapted programs remain scarce in the

Arab world, where societal norms, familial roles, and educational systems differ markedly. This study thus contributes to the global discourse on ASD while offering locally relevant solutions.

Furthermore, the study's emphasis on linking DLS to public health outcomes adds a novel dimension to existing research. By equipping children with ASD with skills such as disease prevention, nutrition management, and safety awareness, the program transcends individual benefits to address broader community health challenges. For instance, improved hygiene practices reduce infection risks, while enhanced social adaptation mitigates mental health comorbidities. These outcomes align with the United Nations Sustainable Development Goals (SDG 3), underscoring the study's alignment with global health priorities.

The development of a validated Daily Living Skills Scale represents another critical contribution. In contexts where standardized assessment tools for ASD are often imported without cultural validation, this instrument provides a contextually sensitive framework for educators and clinicians to measure progress in skill acquisition. The scale's domains-personal hygiene, nutrition, physical fitness, and more-reflect both developmental milestones and public health imperatives, bridging theory and practice. This study carries profound implications for families and caregivers, who bear the emotional and economic burdens of supporting children with ASD. By enhancing children's independence, the program alleviates caregiver stress and fosters family resilience. On a policy level, the findings advocate for systemic reforms to integrate health-oriented DLS training into national special education curricula, ensuring equitable access to lifelong skill development for children with ASD across socioeconomic strata.

3. Study Questions

Q1: What are the critical daily living skills (DLS) linked to public health that require targeted intervention for children with Autism Spectrum Disorder (ASD)?

Q2: How effective is a culturally adapted instructional program in enhancing daily living and public health skills among children with ASD?

4. Methodology

4.1. Study design

The current study employed a single-group quasi-experimental design with pretest-posttest measurements (One-Group Pretest-Posttest Design) to evaluate the effectiveness of an educational program designed to improve daily living skills (DLS) aligned with public health principles among children with Autism Spectrum Disorder (ASD). This design was chosen to balance ecological validity (real-world applicability) with a systematic assessment of skill acquisition, while adhering to ethical standards ensuring all participants received the intervention.

The researchers developed the Daily Living Skills Scale (DLSS) to measure eight core domains reflecting public health principles, such as personal hygiene, safety, and disease prevention. The scale was administered to participants in two phases:

Pretest: Before the implementation of the 17-session educational program.

Posttest: Immediately after program completion to assess improvements in targeted skills.

The design emphasized controlling confounding factors through:

Standardized Procedures: Use of quantifiable, behaviorally observable metrics.

Validation of the Tool: Collaboration with experts in special education and public health to ensure content validity and reliability.

Linking Individual Outcomes to Community Health: For example, reducing infection risks through enhanced hygiene practices.

Below is an explanation of Study design:

Phase	Procedures
1. Pretest	- Administer the Daily Living Skills Scale (DLSS) to the sample (n=28 children).
2. Educational Intervention	- Implement a 17-session instructional program focusing on:
	1. Personal Hygiene (handwashing, dental care).
	2. Proper Nutrition (identifying healthy foods, using utensils).
	3. Physical Fitness and Movement (age-appropriate exercises).
	4. Safety and Injury Prevention (recognizing hazards, emergency responses).
	5. Healthy Sleep Habits (following bedtime routines).
	6. Social Adaptation (turn-taking, understanding personal space).
	7. Disease Prevention (covering coughs, avoiding shared utensils).
	8. Responsible Use of Technology for Health Purposes (managing screen time, digital safety).
3. Posttest	- Re-administer the DLSS immediately after program completion.
4. Statistical Analysis	- Use paired t-test to compare pre-post scores.
	- Calculate effect size (Cohen's d).

4.2. Participants:

The study sample comprised 28 children (14 boys, 14 girls) diagnosed with Autism Spectrum Disorder (ASD), aged 4–6 years (M = 5.4 years, SD = 0.92). Participants were purposively selected from registered children at the Ru'ya Center for Special Needs in Cairo, Egypt, based on the following criteria:

Inclusion *Criteria:*

- Confirmed ASD diagnosis by licensed specialists.
- Absence of comorbid motor, auditory, or visual impairments.
- Written consent from parents/caregivers.

Exclusion Criteria:

- Additional sensory or physical disabilities that might interfere with skill acquisition.
- Irregular attendance in the instructional program sessions.

Demographic Characteristics:

Variable	Details
Age (years)	4–6 (M = 5.4, SD = 0.92)
Gender	50% male, 50% female

Variable Details

Sample Source: Ru'ya Center for Special Needs, Cairo

- Gender Balance: Equal representation to mitigate gender-based bias.
- Confounder Control: Exclusion of children with comorbid impairments to ensure result validity.
- Ethical Compliance: Adherence to confidentiality and participant rights throughout the study.

4.3. Ethical Considerations

The study was conducted with full adherence to participant rights and safety. Written consent was obtained from the children's parents after a detailed explanation of the research objectives and procedures, with assurances of data confidentiality and anonymity. Participants' real identities were replaced with numeric codes (e.g., ASD-01) during data collection and analysis, and records were stored securely with access limited to the research team. Sessions were designed to be comfortable and non-distressing, with breaks and recreational activities provided as needed. Families retained the right to withdraw their children from the study at any time without consequences, and individualized progress reports were shared post-intervention. Program activities respected Egyptian cultural norms (e.g., incorporating local foods in nutrition training) to ensure relevance and acceptance.

4.4. Data collection and analysis

4.4.1. Data Collection

Pretest Phase:

The Daily Living Skills Scale (DLSS) was administered to all participants (n=28) in a controlled environment at the Ru'ya Center.

The researchers observed and scored each child's performance across the eight domains using the 4-point Likert scale ranging from 1 (rarely or never demonstrates the skill) to 4 (consistently demonstrates the skill).

Observations were video-recorded to ensure scoring consistency and allow retrospective review.

Intervention Phase:

The 17-session instructional program was delivered over 12 weeks, with each session lasting 45-60 minutes.

Session activities were standardized to ensure fidelity, with checklists used to monitor adherence to the curriculum.

Posttest Phase:

The DLSS was re-administered within 72 hours of the final session to minimize skill decay.

4.4.2. Data Analysis

Quantitative Analysis:

Paired Samples t-test: Conducted to compare mean pretest and posttest scores across all DLSS domains, testing the hypothesis that the program significantly improved skills ($\alpha = 0.05$).

Effect Size Calculation: Cohen's d was computed to determine the magnitude of improvement.

Domain-Specific Analysis: Mean differences were calculated for each of the eight skill domains to identify areas of highest and lowest improvement.

4.5. Study Tools

4.5.1. Daily Life Skills Scale (DLSS)

Scale Development

The DLSS was designed based on a comprehensive review of the literature on daily life skills and public health competencies for children with ASD (Kuhlthau et al., 2010; Duncan et al., 2018; Shepley et al., 2018; Wertalik & Kubina, 2018; Kellems et al., 2018; Szumski et al. 2019; Di Rezze et al., 2019; Robison et al., 2020; Duncan et al., 2021). The scale consists of eight dimensions, each addressing a critical area of daily functioning:

Personal Hygiene (e.g., handwashing, dental care).

Proper Nutrition (e.g., identifying healthy foods, using utensils).

Physical Fitness and Movement (e.g., age-appropriate exercises).

Safety and Injury Prevention (e.g., recognizing hazards, emergency responses).

Healthy Sleep Habits (e.g., following bedtime routines).

Social Adaptation (e.g., turn-taking, understanding personal space).

Disease Prevention (e.g., covering coughs, avoiding shared utensils).

Responsible Use of Technology for Health Purposes (e.g., managing screen time, digital safety).

Each dimension was operationalized into measurable sub-skills, ensuring that the scale captures the full range of daily life skills relevant to children aged 4-6 years with ASD. The items were phrased in simple, clear language to accommodate the cognitive and communication abilities.

Content Validity

To ensure the content validity of the DLSS, the scale was reviewed by a panel of five experts in the fields of special education, occupational therapy, and child psychology. The experts evaluated the relevance, clarity, and comprehensiveness of the items in relation to the eight dimensions. Based on their feedback, adjustments were made to improve the wording of certain items and to ensure that all sub-skills were adequately represented.

Pilot Testing

A pilot study was conducted with a sample of 10 children with ASD who were not part of the main study. The purpose of the pilot test was to:

Assess the clarity and appropriateness of the items for the target age group.

Identify any difficulties in administering the scale.

Ensure that the instructions were understandable to both the children and their caregivers.

Feedback from the pilot test was used to refine the scale further, including simplifying some items and adjusting the scoring criteria.

Reliability Testing

The reliability of the DLSS was assessed using Cronbach's alpha to measure internal consistency. The scale was administered to the study sample of 10 children with ASD, and the results showed a high level of internal consistency, with a Cronbach's alpha coefficient of 0.87, indicating excellent reliability. Additionally, test-retest reliability was evaluated by administering the scale to the same group of children after a two-week interval. The correlation coefficient between the two administrations was 0.89, demonstrating strong temporal stability.

Scoring System

The DLSS uses a 4-point Likert scale for scoring, ranging from 1 (rarely or never demonstrates the skill) to 4 (consistently demonstrates the skill). The total score for each dimension is calculated by summing the scores of its respective sub-skills, and the overall DLS score is obtained by aggregating the scores across all eight dimensions. Higher scores indicate better mastery of daily life skills. This simplified scoring system ensures clarity and ease of use while maintaining the scale's ability to effectively measure skill proficiency.

4.5.2. Detailing the Educational Program:

The educational program was designed to enhance the daily life skills (DLS) of children with Autism Spectrum Disorder (ASD) through 17 sessions distributed over 12 weeks. The sessions were scheduled with some weeks containing two sessions when necessary, while each week focused on a specific theme. Below is the detailed breakdown of the sessions:

Week 1: Foundation and Orientation

Session 1: Introduction and Building Trust

Introducing the children to the program and its activities.

Using icebreaker activities to promote comfort and social interaction.

Week 2: Personal Hygiene

Session 2: Handwashing

Teaching children the steps of handwashing using pictures and short stories.

Practical practice using interactive tools.

Session 3: Dental Care

Teaching children how to brush their teeth using toothbrushes.

Using dolls and toys to simulate the toothbrushing process.

Week 3: Personal Hygiene (Continued)

Session 4: Bathing and Dressing

Teaching children the steps of bathing and dressing independently.

Using sequential pictures to simplify understanding of the steps.

Week 4: Proper Nutrition

Session 5: Identifying Healthy Foods

Teaching children to distinguish between healthy and unhealthy foods using pictures and interactive games.

Session 6: Using Utensils

Training children on how to use spoons, forks, and knives correctly.

Practical practice during a snack time.

Week 5: Physical Fitness and Movement

Session 7: Age-Appropriate Exercises

Introducing simple exercises like jumping and walking to improve physical fitness.

Using music to make the exercises more enjoyable.

Session 8: Group Physical Activities

Encouraging children to participate in group activities to enhance social interaction.

Week 6: Safety and Injury Prevention

Session 9: Identifying Household Hazards

Teaching children how to identify hazards such as electrical wires and sharp objects.

Session 10: Responding to Emergencies

Training children on how to seek help in emergencies using role-playing.

Week 7: Healthy Sleep Habits

Session 11: Bedtime Routine

Teaching children the steps of a bedtime routine, such as brushing teeth and wearing appropriate sleepwear.

Session 12: Importance of Adequate Sleep

Using stories and pictures to explain the benefits of healthy sleep.

Week 8: Social Adaptation

Session 13: Understanding Personal Space

Teaching children the concept of personal space through interactive activities.

Session 14: Sharing and Turn-Taking

Training children on sharing and turn-taking skills using group games.

Week 9: Disease Prevention

Session 15: Covering Mouth When Coughing

Teaching children how to cover their mouths when coughing or sneezing using tissues.

Session 16: Avoiding Sharing Personal Items

Explaining the importance of not sharing items like cups and spoons.

Week 10: Responsible Use of Technology

Session 17: Managing Screen Time

Teaching children how to set specific times for using electronic devices.

Using stories and games to explain the importance of balancing technology use.

Week 11: Review and Practical Application

Reviewing Basic Life Skills

Reviewing the skills learned in previous sessions (e.g., personal hygiene, nutrition, safety).

Practical application through interactive activities.

Week 12: Final Evaluation and Celebration

Evaluating Progress and Celebrating Achievements

Assessing children's progress in acquiring life skills using the DLSS scale.

Organizing a simple celebration to honor the children and encourage them to continue applying the skills.

5. Results and Discussions

This section presents the findings of the study based on the comparison between pretest and posttest scores on the Daily Life Skills Scale (DLSS). A paired t-test was conducted to determine the statistical significance of changes in participants' daily life skills across the eight measured dimensions. Effect sizes (Cohen's d) were also calculated to assess the magnitude of improvements.

Table 1: Differences in Children's Scores on the Daily Life Skills Scale

Dimension	Pretest Mean	Posttest Mean	Standard Deviation	t-value	Direction of Differences	Cohen's d	(df)
Personal Hygiene	4	10	1.1	12.2	Posttest	2.06	27
Proper Nutrition	6	11	0.8	13.4	Posttest	1.79	27
Physical Fitness	4	9	1.4	9.8	Posttest	2.95	27
Safety and Injury Prevention	5	12	1.7	10.8	Posttest	2.07	27
Healthy Sleep Habits	5	11	0.9	9.6	Posttest	2.95	27
Social Adaptation	7	12	0.7	8.7	Posttest	1.09	27
Disease Prevention	4	10	1.3	9.8	Posttest	2.07	27
Responsible Use of Technology for Health Purposes	7	12	1.6	11.7	Posttest	1.05	27
Total Score	42	84	1.7	14.8	Posttest	2.08	27

(Source: Authors)

The results of the study exploring the effectiveness of an instructional program in enhancing daily life skills for children with autism revealed significant improvements across all dimensions measured by the Daily Life Skills Scale. After the implementation of the program, there was a noticeable increase in the children's scores in areas such as personal hygiene, proper nutrition, physical fitness, safety and injury prevention, healthy sleep habits, social adaptation, disease prevention, and the responsible use of technology for health purposes. These improvements were measured using Cohen's d, showing very large effects in most areas, such as personal hygiene (Cohen's d = 2.06), physical fitness (Cohen's d = 2.95), and healthy sleep habits (Cohen's d = 2.95). Other dimensions also showed considerable progress, with moderate to large effect sizes. The overall score also demonstrated significant improvement (Cohen's d = 2.08), reflecting the program's overall effectiveness in enhancing essential health-related and social skills among the children. The t-value for the total score was 14.8, further highlighting the strong statistical significance of the findings. These results emphasize the success of the program in fostering essential daily life skills, thereby contributing to better health, social integration, and overall quality of life for children with autism.

The results of the study clearly demonstrate that the instructional program was highly effective in enhancing the targeted skills of children with autism. The significant improvements observed across all measured dimensions highlight the program's pivotal role in fostering essential daily life skills related to public health and social adaptation, which are crucial for the children's overall well-being. The program's structured approach and focused interventions were key in promoting these improvements.

One of the most significant improvements was observed in personal hygiene skills. The program effectively taught children essential self-care routines, such as washing hands, brushing teeth, and other personal hygiene practices. The substantial increase in scores related to personal hygiene indicates that the sessions were successful in helping the children adopt consistent and independent hygiene practices. This highlights the impact of structured guidance in improving self-care behaviors, a critical aspect of daily life for children with autism.

The instructional program also showed notable success in improving children's understanding of proper nutrition. By focusing on healthy eating habits and the importance of a balanced diet, the program helped children develop awareness of food choices. The increase in scores related to proper nutrition reflects the effectiveness of the sessions in educating the children about making healthier food choices. These results suggest that early education on nutrition can have a profound impact on children's health and well-being, laying the foundation for better dietary habits in the future.

The physical fitness dimension demonstrated remarkable improvement, with children showing enhanced physical capabilities and engagement in physical activities. The sessions that included physical exercises, games, and activities helped the children improve their motor skills, balance, and coordination. This progress emphasizes the importance of physical activity in the overall development of children with autism, particularly in improving their strength, endurance, and ability to perform daily tasks that require physical engagement.

The program's focus on teaching safety and injury prevention resulted in significant improvements in this area. Children learned how to identify and avoid potential hazards, such as dangerous objects, traffic, and risky behaviors. The sessions emphasized the importance of safety awareness, which enabled the children to adopt protective behaviors in various situations. This improvement suggests that teaching children about safety not only reduces the risk of accidents but also empowers them with essential life skills to navigate their environment more securely.

Healthy sleep habits were another area of focus in the program, and the results showed considerable progress. The children learned the importance of consistent sleep routines, good sleep hygiene, and the factors that contribute to quality sleep. These sessions helped children understand how sleep affects their mood, energy, and overall health, leading to better sleep patterns and improved rest. The improvement in this area indicates that educating children on healthy sleep habits is a crucial component of promoting their physical and mental well-being.

Social adaptation skills were also significantly enhanced. Through targeted activities and role-playing exercises, the children were encouraged to interact with their peers, share, and express their emotions in socially acceptable ways. The increase in social adaptation scores shows that the program helped children improve their social communication skills, a key area for children with autism who may struggle with social interactions. These improvements suggest that fostering social adaptation skills is essential for enhancing the children's ability to function independently in community and school settings.

In the area of disease prevention, the children exhibited an increased understanding of how to protect themselves from illnesses. The program focused on teaching hygiene practices such as handwashing, covering coughs, and recognizing symptoms of common illnesses. This improvement highlights the effectiveness of the program in educating children about health-promoting behaviors, ultimately contributing to better health outcomes by reducing the risk of infections and illnesses.

The responsible use of technology for health-related purposes was another key aspect of the program. The sessions helped children learn how to use technology, such as health apps and devices, in a way that supports their well-being. This included lessons on how to monitor physical activity, track nutrition, and use educational content for health purposes. The children's increased scores in this area demonstrate that the program was successful in promoting digital literacy and responsible technology use, which is becoming increasingly important in today's health landscape.

The results of this study clearly indicate that the instructional program was highly effective in improving essential life skills in children with autism. By addressing various aspects of daily life,

from personal hygiene to social adaptation and disease prevention, the program provided children with valuable skills that contribute to their overall health and quality of life. The structured sessions played a crucial role in enabling children to acquire these skills, emphasizing the importance of tailored educational interventions for children with autism. The significant improvements in each dimension suggest that early and consistent training in these areas can lead to lasting benefits, empowering children with autism to live more independent, healthier, and socially integrated lives.

Furthermore, the results highlight the broader implications of such programs on public health. By equipping children with autism with essential self-care, safety, and social skills, the program contributes to reducing the burden on caregivers and healthcare systems. Improved hygiene, nutrition, and disease prevention behaviors can lead to better overall health outcomes, reducing the incidence of preventable illnesses and hospital visits. These findings reinforce the critical role of early intervention in shaping long-term well-being and promoting inclusive education as a means to enhance public health.

6. Conclusions

This study aimed to explore the effectiveness of an instructional program designed to enhance daily living skills (DLS) among children with Autism Spectrum Disorder (ASD), with a focus on public health-related competencies. The findings suggest that the program was highly effective in improving a variety of essential skills, including personal hygiene, nutrition, physical fitness, safety, disease prevention, social adaptation, healthy sleep habits, and the responsible use of technology. The significant improvements in these areas, as measured by the Daily Living Skills Scale (DLSS), underscore the value of integrating public health principles into educational programs for children with ASD.

The positive results from the pretest-posttest comparison demonstrate that the program's structured approach, which consisted of 17 sessions over 12 weeks, successfully addressed the needs of the participants. The large effect sizes observed across all domains, as indicated by Cohen's d values, further confirm the effectiveness of the intervention in promoting skills that are critical for the daily functioning and independence of children with ASD. These findings suggest that such educational programs can have a meaningful impact on the children's ability to manage their health, interact socially, and navigate their environment more effectively, contributing to an improved quality of life.

The results also emphasize the importance of early intervention and tailored educational strategies in enhancing the daily living skills of children with autism. By focusing on practical, real-world skills aligned with public health principles, the program demonstrated the potential to significantly improve the well-being of children with ASD, which can positively influence their long-term development and integration into society.

7. Limitations

While the findings of this study provide valuable insights into the effectiveness of the instructional program, there are several limitations to consider.

Firstly, the study employed a single-group quasi-experimental design with no control group, which limits the ability to draw causal conclusions. Without a comparison group, it is difficult to definitively attribute the observed improvements solely to the program itself, as other external factors may have influenced the outcomes.

Secondly, the study relied on a relatively small sample size of 28 children, which may limit the generalizability of the findings. A larger, more diverse sample would provide a more

comprehensive understanding of how the program works across different subgroups of children with ASD.

Additionally, while the Daily Living Skills Scale (DLSS) was developed to measure key domains aligned with public health principles, it was designed specifically for this study, and its psychometric properties (such as reliability and validity) were not fully established prior to its use. This raises the potential for measurement bias and limits the ability to compare the findings to other established scales used in similar research.

Moreover, the study used video recordings for scoring children's performance during the pretest phase to ensure consistency, which, while beneficial for accuracy, could have influenced the children's behavior. The presence of recording equipment might have affected the naturalness of their responses, thus introducing a potential observer effect.

The study was conducted within a controlled environment at the Ru'ya Center, which may not fully represent real-world settings where children interact with diverse peers and caregivers. The ecological validity of the study could therefore be questioned, as the intervention was delivered in a relatively homogenous, structured environment rather than in a more varied or naturalistic setting.

Future research could address these limitations by utilizing larger sample sizes, incorporating control groups, validating the measurement tools, and exploring the impact of the program in more diverse and real-world contexts. Additionally, further studies could examine the long-term effects of the program to determine whether the improvements in daily living skills are sustained over time.

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References

Aljehany, M. S., & Bennett, K. D. (2019). Meta-analysis of video prompting to teach daily living skills to individuals with autism spectrum disorder. *Journal of Special Education Technology*, *34*(1), 17-26. https://doi.org/10.1177/0162643418780495

A Craig, E., Dounavi, K., & Ferguson, J. (2021). Telehealth to train interventionists teaching functional living skills to children with autism spectrum disorder. *Journal of applied behavior analysis*, *54*(2), 511-529. https://doi.org/10.1002/jaba.834

Al-Mamari, K., Al-ZOUBI, S., Bakkar, B., & Al-Shorman, A. (2021). The impact of e-Learning during COVID-19 on teaching daily living skills for children with disabilities. *Journal of E-Learning and Knowledge Society*, *17*(3), 135-145. https://doi.org/10.20368/1971-8829/1135482

Baker, E., Stavropoulos, K. K., Baker, B. L., & Blacher, J. (2021). Daily living skills in adolescents with autism spectrum disorder: Implications for intervention and independence. *Research in Autism Spectrum Disorders*, *83*, 101761. https://doi.org/10.1016/j.rasd.2021.101761

Bal, V. H., Kim, S. H., Cheong, D., & Lord, C. (2015). Daily living skills in individuals with autism spectrum disorder from 2 to 21 years of age. *Autism*, *19*(7), 774-784. https://doi.org/10.1177/1362361315575840

Jasmin, E., Couture, M., McKinley, P., Reid, G., Fombonne, E., & Gisel, E. (2009). Sensori-motor and daily living skills of preschool children with autism spectrum disorders. *Journal of autism and developmental disorders*, *39*, 231-241. doi:10.1016/j.cnr.2006.06.002

Pierce, K. L., & Schreibman, L. (1994). Teaching daily living skills to children with autism in unsupervised settings through pictorial self-management. *Journal of applied behavior analysis*, *27*(3), 471-481. https://doi.org/10.1901/jaba.1994.27-471

Kilincaslan, A., Kocas, S., Bozkurt, S., Kaya, I., Derin, S., & Aydin, R. (2019). Daily living skills in children with autism spectrum disorder and intellectual disability: A comparative study from Turkey. *Research in Developmental Disabilities*, *85*, 187-196. https://doi.org/10.1016/j.ridd.2018.12.005

Domire, S. C., & Wolfe, P. (2014). Effects of video prompting techniques on teaching daily living skills to children with autism spectrum disorders: A review. *Research and Practice for Persons with Severe Disabilities*, *39*(3), 211-226. https://doi.org/10.1177/1540796914555578

Bennett, K. D., & Dukes, C. (2014). A systematic review of teaching daily living skills to adolescents and adults with autism spectrum disorder. *Review Journal of Autism and Developmental Disorders*, *1*, 2-10. doi:10.1901/jaba.2008.41-107.

Berenguer, C., Baixauli, I., Gómez, S., Andrés, M. D. E. P., & De Stasio, S. (2020). Exploring the impact of augmented reality in children and adolescents with autism spectrum disorder: A systematic review. *International Journal of Environmental Research and Public Health*, *17*(17), 6143. https://doi.org/10.3390/ijerph17176143

Bridges, S. A., Robinson, O. P., Stewart, E. W., Kwon, D., & Mutua, K. (2020). Augmented reality: Teaching daily living skills to adults with intellectual disabilities. *Journal of Special Education Technology*, *35*(1), 3-14. https://doi.org/10.1177/0162643419836411

Clarke, E. B., McCauley, J. B., & Lord, C. (2021). Post–high school daily living skills in autism spectrum disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, *60*(8), 978-985.

Cruz-Torres, E., Duffy, M. L., Brady, M. P., Bennett, K. D., & Goldstein, P. (2020). Promoting daily living skills for adolescents with autism spectrum disorder via parent delivery of video prompting. *Journal of autism and developmental disorders*, *50*, 212-223. https://doi.org/10.1177/0162643418780495.

Daniolou, S., Pandis, N., & Znoj, H. (2022). The efficacy of early interventions for children with autism spectrum disorders: A systematic review and meta-analysis. *Journal of clinical medicine*, *11*(17), 5100. https://doi.org/10.3390/jcm11175100

Di Rezze, B., Duku, E., Szatmari, P., Volden, J., Georgiades, S., Zwaigenbaum, L., ... & Pathways in ASD Study Team. (2019). Examining trajectories of daily living skills over the preschool years for children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *49*, 4390-4399.

Duncan, A. W., & Bishop, S. L. (2015). Understanding the gap between cognitive abilities and daily living skills in adolescents with autism spectrum disorders with average intelligence. *Autism*, *19*(1), 64-72. https://doi.org/10.1177/13623613135100

Duncan, A., Liddle, M., & Stark, L. J. (2021). Iterative development of a daily living skills intervention for adolescents with autism without an intellectual disability. *Clinical Child and Family Psychology Review*, *24*(4), 744-764. https://doi.org/10.1007/s10803-011-1357-z

Duncan, A., Ruble, L. A., Meinzen-Derr, J., Thomas, C., & Stark, L. J. (2018). Preliminary efficacy of a daily living skills intervention for adolescents with high-functioning autism spectrum disorder. *Autism*, *22*(8), 983-994. https://doi.org/10.1177/1362361317716606

Ke, F., Moon, J., & Sokolikj, Z. (2022). Virtual reality–based social skills training for children with autism spectrum disorder. *Journal of Special Education Technology*, *37*(1), 49-62. https://doi.org/10.1177/0162643420945603

Kellems, R. O., Frandsen, K., Cardon, T. A., Knight, K., & Andersen, M. (2018). Effectiveness of static pictures vs. video prompting for teaching functional life skills to students with autism spectrum

disorders. *Preventing School Failure: Alternative Education for Children and Youth*, *62*(2), 129-139. https://doi.org/10.1080/1045988X.2017.1393790

Kuhlthau, K., Orlich, F., Hall, T. A., Sikora, D., Kovacs, E. A., Delahaye, J., & Clemons, T. E. (2010). Health-related quality of life in children with autism spectrum disorders: Results from the autism treatment network. *Journal of autism and developmental disorders*, *40*, 721-729.

Lledó, G. L., Lledó, A., Gilabert-Cerdá, A., & Lorenzo-Lledó, A. (2022). The use of augmented reality to improve the development of activities of daily living in students with ASD. *Education and Information Technologies*, 1-21. https://doi.org/10.1177/0162643420945603

Makrygianni, M. K., Gena, A., Katoudi, S., & Galanis, P. (2018). The effectiveness of applied behavior analytic interventions for children with Autism Spectrum Disorder: A meta-analytic study. *Research in Autism Spectrum Disorders*, *51*, 18-31. https://doi.org/10.1016/j.rasd.2018.03.006

Pérez-Fuster, P., Sevilla, J., & Herrera, G. (2019). Enhancing daily living skills in four adults with autism spectrum disorder through an embodied digital technology-mediated intervention. *Research in Autism Spectrum Disorders*, *58*, 54-67.

Robison, M. A., Mann, T. B., & Ingvarsson, E. T. (2020). Life skills instruction for children with developmental disabilities. *Journal of applied behavior analysis*, *53*(1), 431-448. https://doi.org/10.1002/jaba.602

Shepley, S. B., Spriggs, A. D., Samudre, M., & Elliot, M. (2018). Increasing daily living independence using video activity schedules in middle school students with intellectual disability. *Journal of Special Education Technology*, *33*(2), 71-82. https://doi.org/10.1177/016264341773229

Shipley-Benamou, R., Lutzker, J. R., & Taubman, M. (2002). Teaching daily living skills to children with autism through instructional video modeling. *Journal of Positive Behavior Interventions*, *4*(3), 166-177. 3
https://doi.org/10.1177/10983007020040030501

Szumski, G., Smogorzewska, J., Grygiel, P., & Orlando, A. M. (2019). Examining the effectiveness of naturalistic social skills training in developing social skills and theory of mind in preschoolers with ASD. *Journal of autism and developmental disorders*, *49*, 2822-2837.

Vahabzadeh, A., Keshav, N. U., Abdus-Sabur, R., Huey, K., Liu, R., & Sahin, N. T. (2018). Improved socio-emotional and behavioral functioning in students with autism following school-based smartglasses intervention: Multi-stage feasibility and controlled efficacy study. *Behavioral Sciences*, *8*(10), 85. https://doi.org/10.3390/bs8100085

Wallace, S., Fein, D., Rosanoff, M., Dawson, G., Hossain, S., Brennan, L., ... & Shih, A. (2012). A global public health strategy for autism spectrum disorders. *Autism Research*, *5*(3), 211-217. https://doi.org/10.1002/aur.1236

Wertalik, J. L., & Kubina, R. M. (2018). Comparison of TAGteach and video modeling to teach daily living skills to adolescents with autism. *Journal of Behavioral Education*, *27*(2), 279-300.

World Health Organization. (2023). *Autism*. https://www.who.int/news-room/fact-sheets/detail/autism-spectrum-disorders.

Wynkoop, K. S., Robertson, R. E., & Schwartz, R. (2018). The effects of two video modeling interventions on the independent living skills of students with autism spectrum disorder and intellectual disability. *Journal of Special Education Technology*, *33*(3), 145-158. https://doi.org/10.1177/0162643417746149

Yakubova, G., & Chen, B. B. (2021). Examining the effects of parent-created and parent-implemented video prompting to teach daily living skills to an adolescent with autism. *Journal of Autism and Developmental Disorders*, *51*(12), 4679-4691. https://doi.org/10.1177/0162643418780495.