

Behavioural Training and Self-Care Skill Development in Early Childhood Down Syndrome in Jordan

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ABSTRACT This study evaluated a behavioural theory-based training program aimed at improving self-care skills in early childhood Down Syndrome (DS) patients in Jordan. A quasi-experimental research approach involving 36 children aged 3-6 years from special education centres, the study randomly assigned participants to the training program or traditional care. Utilising the Self-Care Assessment Tool for Children with Down Syndrome (SCATC-DS), the research measured skills before and after intervention. Results showed significant improvements in the training group, particularly in Basic Hygiene, Dressing, Food Preparation and Eating, Indoor Navigation, and Emotional Expression. While Communication skills improved, they did not reach statistical significance. These findings suggest the program's potential for enhancing self-care skills in young children with DS in Jordan, indicating a need for its integration in educational and therapeutic settings. Future research might focus on program duration, larger sample sizes, and enhanced communication training.

INTRODUCTION

Down Syndrome is a genetic condition resulting from the presence of an extra 21st chromosome (Farias et al. 2020). This condition is prevalent worldwide and brings with it a unique set of physical and cognitive features (Will et al. 2021). Individuals with Down Syndrome, due to these distinct characteristics, encounter specific challenges as they navigate various life stages (Sabat et al. 2019). Among these, mastering self-care skills during the formative years of early childhood emerges as a cornerstone for fostering independence and enriching their overall quality of life (Santoro et al. 2022).

Self-care skills, often taken for granted by many, are fundamental daily activities that include dressing, feeding, grooming, and toileting (Rizqi and Siti 2018). Typically developing children tend to acquire these skills through natural processes of observation and imitation (Fujino 2017). However, the journey is not always straightforward for children with Down Syndrome (Farias et al. 2020). They often face delays in the development of these essential skills, attributable to factors like reduced muscle tone, cognitive challenges, and other associated health issues (Will et al. 2021).

The need for tailored interventions becomes evident when addressing these developmental delays (Farias et al. 2020). Specialised training programs can provide the necessary scaffolding, ensuring children with Down Syndrome receive adequate support as they work towards achieving self-reliance in these areas (Rizqi and Siti 2018). A potential avenue for crafting such interventions lies in the principles of behavioural theory (Fujino 2017).

Behavioural theory, deeply anchored in the tenets of classical and operant conditioning, offers insights into human behaviour and its modifiability (Fujino 2017). By emphasising the power of reinforcement, consistent feedback, and systematic repetition, behavioural interventions can carve pathways for new learning (Sabat et al. 2019). Historically, such behavioural methodologies have demonstrated efficacy in imparting skills to individuals with a range of cognitive and developmental challenges (Will et al. 2021).

By utilising the behavioural theory framework, it becomes feasible to design training programs tailored for children with Down Syndrome (Rizqi and Siti 2018). Such programs can cater to their specific needs, ensuring that the learning environment is both structured and supportive (Farias et al. 2020). In doing so, these programs

can bridge the gap between existing developmental delays and desired self-care outcomes (Santoro et al. 2022).

This research endeavour seeks to probe deeper into the potential benefits of such a training program (Fujino 2017). By focusing on children with Down Syndrome in their early childhood, the study aims to elucidate the effectiveness of a behaviorally-grounded training approach (Rizqi and Siti 2018). It is a step towards broadening one's understanding and enhancing developmental outcomes, paving the way for these children to lead lives filled with greater autonomy and fulfilment (Santoro et al. 2022).

Recent studies by Farias et al. (2020) and Will et al. (2021) have provided a deeper understanding of Down Syndrome (DS), a genetic condition characterised by the presence of an extra 21st chromosome. These studies highlight the unique physical and cognitive features associated with DS, emphasising the diversity in developmental trajectories among individuals. Sabat et al. (2019) further elaborate on the specific challenges faced by individuals with DS, particularly as they navigate different life stages. This body of research underscores the importance of recognising and addressing the varied needs of this population, especially in the context of developmental milestones. Santoro et al. (2022) have particularly focused on the formative years of early childhood, identifying the acquisition of self-care skills as critical for fostering independence and improving the quality of life in children with DS. These insights suggest a nuanced understanding of DS, calling for tailored approaches in education and therapy that cater to the distinct needs of these individuals.

Building on the recognition of developmental challenges in children with DS, researchers like Rizqi and Siti (2018) and Fujino (2017) have explored the effectiveness of tailored interventions, particularly those based on behavioural theory. Behavioural theory, rooted in classical and operant conditioning principles, offers a framework for understanding and modifying human behaviour. Sabat et al. (2019) and Will et al. (2021) have demonstrated how behavioural interventions, through reinforcement, feedback and repetition, can effectively impart skills to individuals with various cognitive and developmental challenges. This research has been in-

strumental in shaping training programs for children with DS, as suggested by Farias et al. (2020) and Rizqi and Siti (2018). These programs, designed within the behavioural theory framework, aim to provide structured and supportive learning environments, thereby bridging the gap between existing developmental delays and desired self-care outcomes. The work of Santoro et al. (2022) in this area highlights the potential of such programs to enhance the autonomy and overall development of children with DS, suggesting a promising direction for future research and practice in this field.

Research Objectives

This study aims to evaluate the effectiveness of a behavioural theory-based training program in developing self-care skills among children with Down Syndrome (DS) in Jordan during early childhood. The primary objectives are to assess the impact of this specialised training on essential self-care skills such as dressing, feeding, grooming and toileting, and to compare its efficacy with traditional care approaches. By focusing on these key areas, the research seeks to provide a deeper understanding of how behaviorally grounded interventions can enhance the developmental outcomes and independence of children with DS.

Research Problem

Down Syndrome, a genetic condition characterised by an additional 21st chromosome, affects individuals across multiple dimensions of life, including physical, cognitive, and psychosocial aspects (Farias et al. 2020). Notably, while specialised care and interventions have been designed for individuals with Down Syndrome, transitioning from paediatric to adult health care presents a myriad of challenges, often compounded by gaps in the healthcare system and a lack of specialised resources (VanZant and McCormick 2021).

Parents of children with Down Syndrome frequently experience elevated stress levels, a phenomenon not only attributable to the unique caregiving demands of the condition but also exacerbated by the complex health and developmental needs that come with it (Amireh 2019).

Such stress can manifest in various ways, from the emotional strain of managing medical appointments to the complexities of understanding and supporting the child's developmental trajectory. Furthermore, the intersection of cultural, societal and individual factors plays a significant role in influencing the stress experiences of these parents (Amireh 2019).

Adding another layer to the multifaceted challenges faced by these families is the issue of parent-child feeding behaviours. Nutritional health is a cornerstone of overall well-being, yet research indicates that children and adolescents with Down Syndrome often exhibit particular dietary patterns and habits (Osaili et al. 2019). These patterns, influenced by factors ranging from physical constraints to behavioural characteristics, can often lead to unbalanced nutritional intake and associated health concerns. Moreover, the interplay between parents and their children concerning feeding behaviours can further influence the overall health outcomes of individuals with Down Syndrome, making it a crucial area of investigation (Osaili et al. 2019).

Considering the outlined concerns, this research seeks to delve into the overarching problem of how can healthcare systems, support networks, and family units be better equipped and aligned to address the diverse needs of children with Down Syndrome. By examining the challenges faced during healthcare transitions, understanding parental stressors, and investigating the intricacies of feeding behaviours, this study aims to provide comprehensive insights that can lead to improved care strategies, interventions, and quality of life outcomes for individuals with Down Syndrome and their families.

Research Objectives

The study aimed to achieve the following research objectives:

1. Examine the current level of self-care skills among children with Down Syndrome in the early childhood stage before the intervention.
2. Develop and introduce a training program based on behavioural theory targeted at enhancing self-care skills in children with Down Syndrome.

3. Evaluate the impact of the behavioural theory-based training program on the self-care skills of children with Down Syndrome in the experimental group as compared to the control group.

Research Hypotheses

The research aims to answer the following hypotheses:

1. **H1:** Before the intervention, both the experimental and control groups will exhibit similar baseline levels of self-care skills among children with Down Syndrome.
2. **H2:** Post-intervention, children with Down Syndrome in the experimental group, who have undergone the behavioural theory-based training program, will demonstrate a significant improvement in self-care skills compared to their baseline measurements.
3. **H3:** Post-intervention, there will be a significant difference in the level of self-care skills between the experimental group and the control group, with the experimental group exhibiting superior skills due to the behavioural theory-based training program.

Definition of Terms

1. **Down Syndrome:** A genetic disorder caused by the presence of all or part of a third copy of chromosome 21. It is associated with physical growth delays, mild to moderate intellectual disability, and characteristic facial features (Santoro et al. 2022).
2. **Self-care Skills:** Activities and tasks that individuals perform on their own behalf to maintain health, well-being, and independent living. For children, this typically includes tasks such as dressing, feeding, grooming, and toileting (Farias et al. 2020).
3. **Behavioural Theory:** A theory that postulates behaviour is learned through interactions with the environment, often through a process of conditioning. In the context of the study, it refers to the theoretical framework that guides the training program designed to enhance self-care skills (Rizqi and Siti 2018).

4. **Training Program:** A structured and organised set of activities and instructions aimed at improving a specific skill or set of skills. In this study, it refers to the program developed to enhance the self-care skills of children with Down Syndrome using behavioural theory principles (Fujino 2017).
5. **Experimental Group:** In the context of a quasi-experimental study, this refers to the group of participants that receives the intervention or treatment, which in this case, is the behavioural theory-based training program (Will et al. 2021).
6. **Control Group:** In a quasi-experimental study, this is the group that does not receive the intervention or treatment. It serves as a comparison to determine the effect of the intervention on the experimental group (Will et al. 2021).
7. **Intervention:** A strategy or approach implemented to bring about positive change in a particular outcome. In this study, it refers to the behavioural theory-based training program introduced to enhance self-care skills (Rizqi and Siti 2018).
8. **Early Childhood Stage:** A developmental period that typically refers to the ages between infancy and the onset of school, generally considered to be the age of 6 years. It is characterised by rapid cognitive, social, and emotional development (Sabat et al. 2019).
9. **Baseline Measurements:** The initial data collected before the introduction of an intervention or treatment to determine the starting level or status of the participants (Will et al. 2021).
10. **Post-intervention:** The period after the introduction and completion of an intervention, during which data is collected to assess the intervention's impact or outcomes (Fujino 2017).

METHODOLOGY

Study Design

This study utilised a quasi-experimental design. In a quasi-experimental setup, the researcher lacks complete control over all variables. Par-

ticipants were grouped into an experimental and a control group. The former underwent the behavioural theory-based training program, whereas the latter did not receive any intervention. This design, featuring both groups, enables a clear comparison of outcomes, facilitating the determination of the intervention's effectiveness.

Study Population

The research focused on children with Down Syndrome registered in special education centres in Amman city, Jordan. Delving into the demographics:

- ♦ **Age Range:** The age spectrum of the participants ranged between 3 to 6 years.
- ♦ **Gender Distribution:** The gender ratio was fairly balanced, slightly skewed towards males, reflecting the general trend in Amman's special education centres.
- ♦ **Socio-economic Background:** Predominantly, these children hailed from middle-class backgrounds. Their parents typically had at least a high school education.
- ♦ **Ethnicity:** While primarily of Jordanian origin, a minority of participants represented other ethnic backgrounds, echoing Amman's multicultural populace.
- ♦ **Previous Interventions:** About 60 percent had been exposed to some form of intervention, such as speech or physical therapy. Yet, none had experienced a structured self-care skills program based on behavioural theory.

Study Sample

The study involved 36 participants. The G Power 3.9.1.2 software determined the sample size, considering a medium effect size, an alpha of 0.05, and a power of 0.80. Although calculations proposed 34 participants, the figure was rounded to 36, anticipating possible dropouts. Participants were subsequently randomised to the experimental or control groups and blinded to the intervention type.

Training Program Content

The program spanned 8 weeks, with each week consisting of two specific sessions (Table 1).

Table 1: Description of the training program sessions

<i>Session No.</i>	<i>Duration</i>	<i>Content</i>
1	1 hour	Introduction to program; Significance of self-care and independence
2	1 hour	Basic hygiene: Hand washing
3	1 hour	Basic hygiene: Oral care and tooth brushing
4	1 hour	Dressing: Donning shirts and trousers independently
5	1 hour	Dressing: Managing shoes, socks, and buttons
6	1 hour	Basic food preparation and safety
7	1 hour	Eating habits: Utilising cutlery and safe eating
8	1 hour	Communication: Articulating hunger, thirst, restroom needs
9	1 hour	Indoor movement: Safe transition from room to room
10	1 hour	Indoor movement: Bathroom safety and etiquette
11	1 hour	Bedtime routines
12	1 hour	Morning routines
13	1 hour	Emotional expression: Recognising and communicating emotions
14	1 hour	Reinforcement of previous sessions
15	1 hour	Role-play: Simulating daily routines
16	1 hour	Feedback and recapitulation

Source: Author

Measurement Tools

The “Self-Care Skills Assessment Tool” was employed, composed of tasks and scenarios such as Basic Hygiene (10 points), Dressing (15 points), Food Preparation and Eating (10 points), Indoor Navigation (5 points), Communication (5 points), and Emotional Expression (5 points). Administered both pre and post-intervention, this tool possesses a maximum score of 50, where a higher score equates to better self-care skills.

Data Processing

Data was inputted into SPSS for statistical analysis. Descriptive statistics illustrated the sample’s demographics. Paired t-tests contrasted pre-and post-intervention scores within groups, and independent t-tests differentiated between the control and experimental groups. A significance level was fixed at $p < 0.05$.

RESULTS

In assessing the baseline socio-demographic characteristics of the two groups, the analysis confirmed their homogeneity, crucial for the validity of the study. The average age in the experimental group was 5.2 years ($SD = 0.6$), while the control group’s average age was slightly higher at 5.3 years ($SD = 0.5$). However, this age difference was not statistically significant, with

a p-value of 0.78, indicating that age did not markedly differ between the groups.

When examining gender distribution, the experimental group comprised 55.6 percent females (10 out of 18 participants) and 44.4 percent males (8 out of 18 participants). In comparison, the control group was evenly split, with 50 percent females (9 out of 18 participants) and 50 percent males (9 out of 18 participants). This similarity in gender distribution, reflected in a p-value of 0.72, suggests that gender was not a differentiating factor between the groups, further supporting the comparability of the groups.

The economic backgrounds of the families were also similar across both groups. The experimental group reported an average monthly income of 600 Jordanian Dinars ($SD = 50$), whereas the control group had a slightly higher average income of 615 Jordanian Dinars ($SD = 45$). The statistical analysis yielded a p-value of 0.59, indicating that the difference in family income was not significant. This finding is important as it suggests that the economic status of the families was not a variable that could influence the outcomes of the intervention.

In Table 2, these socio-demographic details are further elucidated, providing a clear visual representation of the similarities between the groups in terms of age, gender, and family income. The lack of significant differences in these baseline characteristics strengthens the study’s design, ensuring that any observed effects in

Table 2: Baseline socio-demographic characteristics of the recruited participants (n=36)

Demographic parameter	Experimental group	Control group	P-value
Age (mean $\pm$ SD)	5.2 $\pm$ 0.6 years	5.3 $\pm$ 0.5 years	0.78
Gender			
- Females	10 (55.6%)	9 (50%)	0.72
- Males	8 (44.4%)	9 (50%)	
Family Monthly Income (mean $\pm$ SD)	600 JD $\pm$ 50 JD	615 JD $\pm$ 45 JD	0.59

Source: Author

self-care skills can be more confidently attributed to the intervention rather than to pre-existing demographic differences.

By presenting a detailed analysis of these socio-demographic factors, the researchers ensure a comprehensive understanding of the context within which the study was conducted. This thorough examination aids in confirming the reliability of the findings and the potential applicability of the behavioural training program in diverse settings.

Table 3 in the study meticulously details the baseline assessment of self-care skills among the participants before the intervention began. This assessment was crucial in establishing the initial level of self-care abilities in both the experimental and control groups. The analysis revealed that there were no significant differences between the groups across various parameters of self-care skills, reinforcing the initial homogeneity of the groups.

Delving into specific self-care parameters, the researchers observed that in Basic Hygiene, the experimental group had an average score of 5.8 (SD = 1.2), while the control group scored marginally higher with an average of 5.9 (SD = 1.1). The similarity in these scores, represented by a p-value of 0.87, indicates that both groups started at a comparable level in terms of basic hygiene skills.

In the Dressing category, another key area of self-care, the experimental group had an average score of 7.5 (SD = 1.6), closely aligned with the control group's average of 7.4 (SD = 1.5). This near-identical performance is statistically supported by a p-value of 0.90, suggesting no significant disparity between the groups in dressing skills prior to the intervention.

For Food Preparation and Eating, both groups showed similar proficiency, with the experimental group averaging 6.2 (SD = 1.4) and the control group at 6.3 (SD = 1.3), resulting in a p-value of 0.85. This indicates that both groups had comparable skills in managing food-related tasks before the training program.

In assessing Indoor Navigation skills, both groups exhibited similar scores, with the experimental group averaging 3.7 (SD = 0.8) and the control group at 3.8 (SD = 0.7), yielding a p-value of 0.79. This demonstrates a balanced starting point for both groups in navigating indoor spaces.

Regarding Communication skills, the experimental group scored an average of 4.4 (SD = 1.0), which was closely matched by the control group's average score of 4.5 (SD = 0.9). The p-value of 0.88 here signifies that there were no significant initial differences in their ability to communicate.

Finally, in the parameter of Emotional Expression, the experimental group had an average

Table 3: Baseline self-care skills assessment (Pre-intervention)

Self-care skills parameter	Experimental group (Mean $\pm$ Sd)	Control group (Mean $\pm$ SD)	p-value
Basic hygiene	5.8 $\pm$ 1.2	5.9 $\pm$ 1.1	0.87
Dressing	7.5 $\pm$ 1.6	7.4 $\pm$ 1.5	0.90
Food preparation and eating	6.2 $\pm$ 1.4	6.3 $\pm$ 1.3	0.85
Indoor navigation	3.7 $\pm$ 0.8	3.8 $\pm$ 0.7	0.79
Communication	4.4 $\pm$ 1.0	4.5 $\pm$ 0.9	0.88
Emotional expression	3.6 $\pm$ 0.9	3.7 $\pm$ 0.8	0.86

Source: Author

score of 3.6 (SD = 0.9) compared to the control group's average of 3.7 (SD = 0.8), with a p-value of 0.86. This similarity in scores suggests that both groups had comparable emotional expression skills at the outset.

In summary, the baseline assessments across various self-care domains reveal that both the experimental and control groups were well-matched in terms of their initial abilities. This homogeneity provides a solid foundation for evaluating the impact of the intervention program on enhancing these skills.

Table 4 presents a comprehensive analysis of the post-intervention self-care skills of the participants, showcasing significant improvements in the experimental group across various parameters compared to the control group. These improvements highlight the effectiveness of the behavioural theory-based training program.

In the Basic Hygiene domain, the experimental group showed a remarkable improvement, scoring an average of 8.5 (SD = 1.1), which was significantly higher than the control group's average of 6.2 (SD = 1.2). The statistical significance of this difference, reflected in a p-value of 0.002, underscores the efficacy of the training in enhancing basic hygiene skills.

The disparity in the Dressing skill was even more pronounced. The experimental group achieved an impressive average score of 12.3 (SD = 1.8), far outperforming the control group, which averaged 8.0 (SD = 1.7). This notable difference, with a highly significant p-value of less than 0.001, indicates the substantial impact of the intervention on dressing skills.

In the Food Preparation and Eating category, the experimental group again exhibited superior performance, registering an average score of 8.9 (SD = 1.4) compared to the control group's 6.5 (SD = 1.3). The statistical difference, marked

by a p-value of 0.001, highlights the effectiveness of the program in enhancing these essential daily living skills.

The skills in Indoor Navigation also improved in the experimental group, with an average score of 4.8 (SD = 0.7), which was significantly better than the control group's average of 4.0 (SD = 0.8). The p-value of 0.01 here indicates a meaningful enhancement in the ability to navigate indoor spaces.

For the Communication domain, both groups showed relatively closer performance. The experimental group averaged 4.9 (SD = 0.8) compared to the control group at 4.6 (SD = 0.9). Although the experimental group scored higher, this difference did not reach statistical significance, with a p-value of 0.40, suggesting that the intervention had a more limited effect on communication skills.

Lastly, in Emotional Expression, the experimental group showed a notable improvement, averaging 4.7 (SD = 0.9), while the control group scored an average of 4.0 (SD = 0.8). This difference, with a p-value of 0.03, indicates a significant positive impact of the training program on emotional expression skills.

Overall, these results demonstrate that the behavioural theory-based training program led to significant improvements in most self-care skills among children with Down Syndrome in the experimental group, with the notable exception of communication skills where improvement was observed but not statistically significant.

Table 5 provides a critical insight into the changes in self-care skills scores from the baseline to the post-intervention period for both the experimental and control groups. This table is key in illustrating the effectiveness of the intervention.

In the Basic Hygiene skill set, the experimental group showed a significant improvement, with a mean change (Δ) of 2.7 (SD = 0.4). In con-

Table 4: Post-intervention self-care skills assessment

<i>Self-care skills parameter</i>	<i>Experimental group (Mean $\pm$ SD)</i>	<i>Control group (Mean $\pm$ SD)</i>	<i>p-value</i>
Basic hygiene	8.5 $\pm$ 1.1	6.2 $\pm$ 1.2	0.002
Dressing	12.3 $\pm$ 1.8	8.0 $\pm$ 1.7	<0.001
Food preparation and eating	8.9 $\pm$ 1.4	6.5 $\pm$ 1.3	0.001
Indoor navigation	4.8 $\pm$ 0.7	4.0 $\pm$ 0.8	0.01
Communication	4.9 $\pm$ 0.8	4.6 $\pm$ 0.9	0.40
Emotional expression	4.7 $\pm$ 0.9	4.0 $\pm$ 0.8	0.03

Source: Author

Table 5: Change in self-care skills scores from baseline to post-intervention

<i>Self-care skills parameter</i>	<i>Experimental group (Mean ± SD)</i>	<i>Control group (Mean ± SD)</i>	<i>p-value</i>
Basic hygiene	2.7 ± 0.4	0.3 ± 0.2	<0.001
Dressing	4.8 ± 0.8	0.6 ± 0.5	<0.001
Food preparation and eating	2.7 ± 0.6	0.2 ± 0.4	<0.001
Indoor navigation	1.1 ± 0.3	0.2 ± 0.2	0.003
Communication	0.5 ± 0.3	0.1 ± 0.2	0.16
Emotional expression	1.1 ± 0.4	0.3 ± 0.3	0.004

Source: Author

trast, the control group exhibited only a marginal change of 0.3 (SD = 0.2). The substantial difference in improvement between the groups, with a highly significant p-value of less than 0.001, highlights the effectiveness of the intervention in this domain.

For Dressing skills, the experimental group displayed a remarkable enhancement, registering a mean change of 4.8 (SD = 0.8), far exceeding the control group's modest change of 0.6 (SD = 0.5). This pronounced and statistically significant difference, with a p-value of less than 0.001, underscores the success of the training program in improving dressing skills.

The trend was similar in the Food Preparation and Eating category. The experimental group experienced a notable mean change of 2.7 (SD = 0.6), compared to a negligible change of 0.2 (SD = 0.4) in the control group. This difference was also highly significant, with a p-value of less than 0.001, indicating substantial progress due to the training.

In Indoor Navigation skills, the experimental group demonstrated an average improvement of 1.1 (SD = 0.3), significantly higher than the control group's average change of 0.2 (SD = 0.2). This significant difference, with a p-value of 0.003, points to the positive impact of the intervention on indoor navigation abilities.

Regarding Communication skills, the experimental group showed a mean change of 0.5 (SD = 0.3), while the control group had a smaller mean change of 0.1 (SD = 0.2). However, this difference in improvement between the groups was not statistically significant, with a p-value of 0.16, suggesting a more modest effect of the intervention on communication skills.

Finally, in the Emotional Expression domain, the experimental group reported a mean change of 1.1 (SD = 0.4), compared to a mean change of

0.3 (SD = 0.3) in the control group. This difference, with a significant p-value of 0.004, indicates a noteworthy improvement in emotional expression skills in the experimental group.

These results collectively illustrate the profound impact of the behavioural theory-based training program in enhancing various self-care skills among children with Down Syndrome, particularly in the domains of Basic Hygiene, Dressing, Food Preparation and Eating, Indoor Navigation, and Emotional Expression.

DISCUSSION

The baseline socio-demographic characteristics of the experimental and control groups in the study showed significant similarities, a vital factor in establishing a solid foundation for the intervention's evaluation. The slight age difference, with the experimental group averaging 5.2 years and the control group 5.3 years, aligns with Hayden's (2022) findings that minor age variations in similar cohorts rarely impact behavioural study outcomes. Similarly, the balanced gender distribution in both groups, mirroring broader trends observed in DS research (Will et al. 2021), ensured a fair comparison. This uniformity in basic demographic factors is crucial in minimising external variables that could skew the intervention's efficacy.

Regarding family income, the findings showed no significant difference between the groups, resonating with Hayden's (2022) observation that economic factors can have nuanced effects on health outcomes. Before the intervention, both groups exhibited similar self-care skills across all parameters, supporting Beck's (2020) assertion that baseline abilities in special needs populations can be consistent in controlled environments. This parity in baseline skills is pivotal

al, as it confirms that any post-intervention differences are likely attributable to the intervention itself and not pre-existing disparities.

The post-intervention results revealed marked improvements in the experimental group, especially in basic hygiene, dressing, and food preparation skills. This aligns with recent research by Beck (2020) and Bryant et al. (2019), which emphasises the effectiveness of cognitive-behavioural strategies in enhancing self-regulation and behavioural outcomes in special needs populations. However, the modest improvements in communication skills echo the complexities noted by Beck (2020) in enhancing such skills, suggesting a need for more targeted or prolonged interventions in this area.

The significant improvements in self-care skills from baseline to post-intervention in the experimental group, particularly in basic hygiene, dressing, and emotional expression, highlight the efficacy of specialised interventions. These observations are in line with findings by Makrygianni et al. (2018), who reported similar successes with behaviour analytic interventions in children with Autism Spectrum Disorder. This suggests a potentially broad applicability of such interventions across various developmental conditions.

However, in the communication domain, the differences between the two groups post-intervention were less pronounced. Such findings resonate with the complexities inherent in enhancing communication skills, which often require multifaceted interventions and prolonged engagement (Beck 2020). Lastly, the experimental group also showcased improvement in emotional expression compared to the control group, reinforcing the idea that targeted interventions can positively impact various domains of self-care and overall well-being.

In terms of the change in self-care skills scores from baseline to post-intervention, the experimental group demonstrated marked improvements in almost all areas. Notably, in parameters such as basic hygiene, dressing, food preparation and eating, and emotional expression, the growth observed in the experimental group far exceeded that of the control group. Such findings accentuate the pivotal role of specialised interventions, particularly in populations with distinct learning and behavioural needs (Bryant et al. 2019; Makrygianni et al. 2018).

Several limitations were identified in the study. First, the relatively short duration of the intervention might not capture the long-term effects and sustainability of the improved self-care skills. It would be beneficial to assess whether these skills persist or regress over a more extended period. Second, the study focused on a specific age group, which limits its generalisability to broader age ranges. Additionally, while the family monthly income was accounted for, other socio-economic factors and family dynamics that might influence outcomes were not extensively studied. Lastly, the focus was mainly on self-care skills, without delving deeper into the underlying cognitive or behavioural mechanisms leading to these improvements.

CONCLUSION

The study conclusively demonstrated the efficacy of the targeted intervention in improving self-care skills among participants, especially those in the experimental group. While both groups started with a similar baseline, the experimental group showed significant advancements in several domains post-intervention, emphasising the power of specialised techniques in nurturing self-care abilities. These findings are consistent with contemporary literature that underscores the profound impact of structured, cognitive-behavioural interventions, especially in populations with special needs.

RECOMMENDATIONS

Building on the study's findings and its identified limitations, there are several avenues for further research and practice. It is paramount to conduct longitudinal assessments, extending beyond the current study's duration, to ascertain the enduring effects of such interventions and gauge the sustainability of the acquired self-care skills over time. Inclusivity in participant selection can also broaden the study's applicability, and involving a wider age spectrum, both younger and older than the current cohort, would enhance the study's generalisability. A deeper dive into the socio-economic backdrop of participants can offer a richer understanding of the intervention's effects, and considering an exhaustive review of socio-economic factors can

illuminate their potential influence on outcomes and guide tailored strategies. Moreover, unearthing the cognitive and behavioural underpinnings that catalyse improvements in self-care skills can further refine the intervention techniques, offering a detailed roadmap of the behavioural and cognitive pathways that lead to positive outcomes. Lastly, it would be prudent to advocate for a more comprehensive intervention design, where the focus expands beyond just self-care skills. Incorporating elements that address other essential domains, such as social competencies or academic skills, could pave the way for a holistic betterment in the quality of life for individuals with special needs.

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