

# A cross-sectional study to assess levels of Activities of daily living (ADLs) among adolescents with disabilities in district Dehradun

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## ARTICLE CYCLE

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## ABSTRACT

**Background:** Adolescent disability conditions encompass a variety of physical, cognitive, or sensory impairments that affect individuals between ages 10 and 19 years. These conditions can significantly impact educational, social, and emotional development during a critical phase of life. Adequate support, accessibility, and awareness are essential to ensure that adolescents with disabilities can thrive and fulfill their potential. **Objective:** To assess the Activities of Daily Living (ADLs) in adolescents with disabilities **Methodology:** A School-based cross-sectional descriptive study was done among adolescents with disabilities attending special schools in district Dehradun. Simple random sampling was used as sampling technique. The study measured Activities of Daily Living (ADLs) through Barthel Index. The data was entered in MS Excel and imported to SPSS software version 22 for analysis. **Result:** A total of 142 study participants were selected for the study, with a mean (standard deviation) age of 14.32 years ( $\pm 0.20$ ). 93% of the study subjects had a disability since birth (congenital). 42.3% of study participants had a Moderate dependence level. **Conclusion:** In conclusion, in this study of 142 participants, the prevalence of congenital disabilities among adolescents was high, and a substantial number demonstrated a moderate level of dependence, emphasizing the importance of tailored interventions for this population.

## KEYWORDS

Activities of Daily Living; Barthel Index; Adolescents; Differently abled; Disability

## INTRODUCTION

According to the World Health Organization (WHO), disability affects more than one billion people globally, making up around 15% of the world's population (1). The National Sample Survey (NSS) conducted in 2018-2019 provides more recent data on disability prevalence in India, including among adolescents. According to this survey, the overall prevalence of disability among persons aged 5 years and above was 2.2% (2). The burden of disability is not evenly distributed, with a higher prevalence observed in low- and middle-income countries due to various factors, including inadequate healthcare, poverty, malnutrition, limited access to education and employment opportunities, and higher rates of injuries and infectious diseases (3).

The daily living activities of adolescents with disabilities represent a critical aspect of their overall well-being and development. These activities, often referred to as "Activities of Daily Living" (ADLs), encompass essential self-care tasks such as dressing, grooming, eating, and mobility. Understanding the level of independence or dependence in performing these activities among adolescents with disabilities is crucial for tailoring appropriate support and interventions (4,5,6). This study aims to fill this gap by providing valuable insights into their nutritional status and activity of daily living levels. With this background in mind, this study was being planned and conducted in district Dehradun.

**Aim & Objective:** To assess the Activities of Daily Living (ADLs) among disabled adolescent using Barthel Index.

**MATERIAL & METHODS**

**Study Type:** School-based descriptive cross-sectional study

**Study population:** Special Cohort of Disabled adolescents or attending special schools of district Dehradun

**Study area:** The present study was conducted among the selected schools of sampled community blocks of district Dehradun by using simple random sampling.

**Sample size:** Minimum sample size for the study was calculated by using formula  $n = Z^2 P \times (1-P) / d^2$  where, p is prevalence (19), Z=1.96 (at two-sided interval), and d is absolute error. We enrolled 142 adolescents with disability.

**Inclusion Criteria for Adolescents with Disabilities:** Age between 10 to 19 years.

Diagnosis of a disability (e.g. cerebral palsy, Down syndrome, intellectual disability, hearing impairment, visual impairment, etc.)

**Exclusion Criteria:**

Lack of cooperation and an inability to comprehend or communicate effectively in the language utilized within the research

**Study Measures:** This study measured activities of daily living through Barthel Index. The Barthel Index, widely used in healthcare, rehabilitation, and research, assesses an individual's functional status and tracks changes over time, aiding care planning and decision-making (7). It comprises 10 items measuring basic ADLs (e.g., feeding, grooming) and complex activities (e.g., walking, using the toilet). Each item is rated from 0 to 10, with higher scores indicating more independence. The total score

ranges from 0 to 100, reflecting overall functional independence. (Table 1)

**Consent:** Informed consent was obtained from both Special Schools and parents of the study participants, and assent was obtained from study participants.

**Statistical Analysis:** Data entry and statistical analysis were performed using Microsoft Excel and SPSS version 22.0 software. Chi-square and Fisher's Exact test were used to assess the association between the categorical & continuous outcome variables and the demographic variables, respectively. Statistical significance was taken (p value<0.05).

**Table 1: Level of Functional Independence of Activities of Daily Living (ADLs)**

S. No.	Level of Functional Independence	Score
1	Dependence	0-20
2	Severe Dependence	21-60
3	Moderate Dependence	61-90
4	Mild Dependence	91-99
5	Independence	100

**RESULTS**

The present study was conducted amongst 142 adolescents with disabilities, who resided in the district Dehradun and attended special schools. The following observations were obtained.

In terms of age, the mean age of the participants was 14.32 years (± 0.20 years). The majority of the participants belonged to the 14-17 years (middle adolescent) age group (54.9%). More than half of the respondents (69.7%) resided in nuclear families, regardless of gender. Regarding the presence of disability, 93% of the study subjects had a disability since birth (congenital), while 7% acquired their disability after birth. The difference between these groups was not statistically significant (p=0.720) (Table 2).

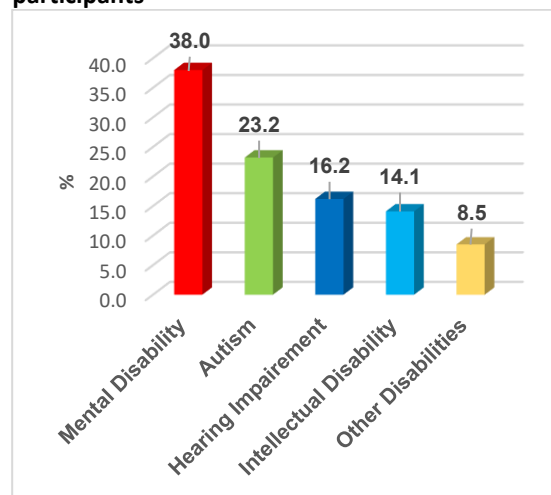
**Table 2: Gender-wise distribution of Socio demographic details of the study participants**

SN	Biosocial character		Total	Gender		p- value
			(N= 142) (%)	Male (n=105) (%)	Female (n= 37) (%)	
1	Age (in completed years)	Oct-13	49 (34.5)	37 (35.2)	12 (32.4)	0.786
		14-17	78 (54.9)	58 (55.2)	20 (54.1)	
		18-19	15 (10.6)	10 (9.5)	5 (13.5)	
2	Religion	Hindu	130 (91.5)	97 (92.4)	33 (89.2)	0.062
		Muslim	7 (4.9)	3 (2.9)	4 (10.8)	
		Sikh	5 (3.5)	5 (4.8)	0 (0)	
3	Type of Family	Nuclear	99 (69.7)	72 (68.6)	27 (73)	0.616
		Joint	43 (30.3)	33 (31.4)	10 (27)	
4	Marital Status of Parents	Married	130 (91.5)	96 (91.4)	34 (91.5)	0.835
		Separated/Divorced	1 (0.7)	1 (1)	0 (0)	
		Widow/Widower	11 (7.7)	8 (7.6)	3 (8.1)	
5	Number of Family Members	<6	133 (93.7)	98 (93.3)	35 (94.6)	0.787
		>6	9 (6.3)	7 (6.7)	2 (5.4)	
6	Disability present	Since Birth (congenital)	132 (93)	98 (93.3)	34 (91.9)	0.72
		After Birth	10 (7)	7(6.7)	3 (98.1)	

Figure 1 regarding the type of disability. In the present study, the maximum number of adolescents with disability had mental disability (38%) followed by 23.2% who were Autistic, Hearing Impairment (16.2%), and Intellectual disability (14.1%). Nearly, 8.5% of study participants were classified as having other disabilities.

Table 3 presents the assessment of ADLs in study participants using the Barthel Index. Among the "Fully Dependent" adolescents, the highest percentage (50.7%) required assistance from others for grooming. None of them were dependent on others for mobility activities. For the "Partially Dependent" adolescents, the highest percentage (39.4%) required assistance with dressing, while no participants in this category were dependent on others for bathing and grooming activities.

**Figure 1: Type of Disabilities among study participants**



**Table 3: Assessment of Activities of Daily Living (ADLs) among study participants**

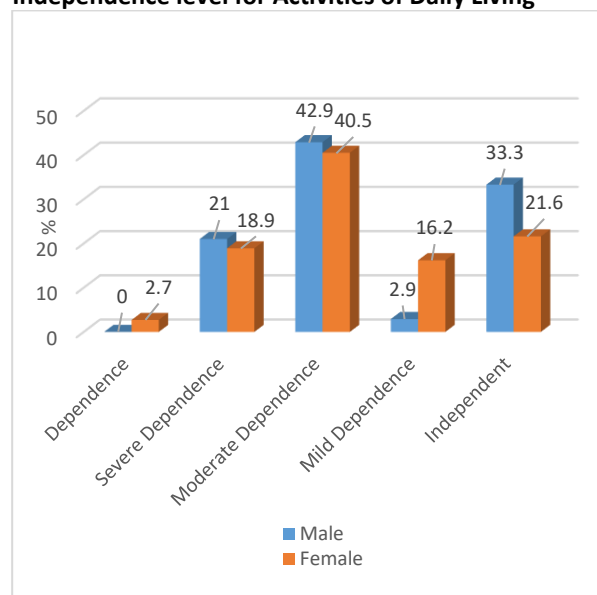
S. No.	Activity	Fully Dependent	Partially Dependent	Fully Independent
1	Feeding	4 (2.8)	42 (29.6)	96 (67.6)
2	Bathing	55 (38.7)	0 (0)	87 (61.3)
3	Grooming	72 (50.7)	0 (0)	70 (49.3)
4	Dressing	26 (18.3)	56 (39.4)	60 (42.3)
5	Bowels	15 (10.6)	29 (20.4)	98 (69)
6	Bladder	14 (9.9)	24 (16.9)	104 (73.2)
7	Toilet Use	10 (7)	35 (24.6)	97 (68.4)
8	Transfers	4 (2.8)	44 (31)	94 (66.2)
9	Mobility	0 (0)	40 (28.2)	102 (71.8)
10	Stairs	1 (0.7)	46 (32.4)	95 (66.9)

Figure 2 depicts the Gender-wise distribution of the Level of Independence for Activities of Daily Living. It shows the pattern of different levels of dependence in males and females. The figure reveals that a higher prevalence of moderate dependence in ADL activities was reported in males, accounting for 42.9%, while in females it was 40.5%. Among those assessed as having an independent level of ADL, 33.3% were males and 21.6% were females.

Table 4 depicts the association between Type of Disabilities and ADLs. Among the Autism 42.4% of study participants had an Independence level followed by 30.3% had Moderate Dependence. Among the Hearing Impairment 78.3% study participants had Moderate dependence followed by 8.7% had Severe Dependence and Independence. Among the Intellectual Disability, 45% study participants had Independence followed by 40% had Moderated Dependence. Among the Mental Disability, 38.9% study participants had Moderate Dependence followed by 25.9% had Independence, 24.1% had Severe Dependence. Among Other Disability, 33.3% study participants had Independence and Severe Dependence

followed by 25% had Moderate. The difference observed was however not statistically significant ( $p=0.100$ ).

**Figure 2: Gender-wise distribution of Level of Independence level for Activities of Daily Living**



**Table 4: Association between Type of Disability and Activities of Daily living (ADLs)**

SN	Level of Independence	Type Of Disabilities					p-value
		Autism (n=33) (%)	Hearing Impairment (n=23) (%)	Intellectual Disability (n=20) (%)	Mental Disability (n=54) (%)	Other Disabilities (n=12) (%) @	
1	Dependence	0 (0)	0 (0)	0 (0)	1 (1.9)	0 (0)	0.10
2	Severe Dependence	8 (24.2)	2 (8.7)	2 (10)	13 (24.1)	4 (33.3)	
3	Moderate Dependence	10 (30.3)	18 (78.3)	8 (40)	21 (38.9)	3 (25)	
4	Mild Dependence	1 (3)	1 (4.3)	1 (5)	5 (9.3)	1 (8.3)	
5	Independence	14 (42.4)	2(8.7)	9 (45)	14 (25.9)	4 (33.3)	

@: Cerebral palsy, Down syndrome, Learning disability, Locomotors disability

Table 5. presents the relationship between the Level of Independence in daily living activities and the bio-social characteristics of the study participants. Severe Dependence was more prevalent in the 10-13 age group, while Moderate Dependence was higher in the 14-17 age group, and Independence was predominant (66.7%) among 18-

19-year-olds. These differences were statistically significant (p=0.001). Moderate Dependence was more common among males (42.9%) and females (40.5%), followed by Independence, with males at 33.3% and females at 21.6%. This contrast was also statistically significant (p=0.022).

**Table 5: Association of Level of Independence for Activities of Daily Living with Bio-social Characteristics of Study Participants**

Variable	Level of Independence					p-value #
	Dependence (n=1) (%)	Severe Dependence (n=28) (%)	Moderate Dependence (n=60) (%)	Mild Dependence (n=9) (%)	Independence (n=43) (%)	
<b>Age</b>						
10-13 (Early)	1 (2)	19 (38.8)	18 (36.7)	1 (2)	10 (20.4)	0.000
14-17 (Middle)	0 (0)	7 (9)	40 (51.3)	8 (10.3)	23 (29.5)	*
18-19 (Late)	0 (0)	3 (20)	2 (13.3)	0 (0)	10 (66.7)	
<b>Gender</b>						
Male	0 (0)	22 (21)	45 (42.9)	3 (2.9)	35 (33.3)	0.018
Female	1(2.7)	7 (18.9)	15 (40.5)	6 (16.2)	8 (21.6)	*
<b>Disability</b>						
Since Birth (congenital)	1 (0.8)	29 (22)	57 (43.2)	6 (4.5)	39 (29.5)	0.026
After Birth	0 (0)	0 (0)	3 (30)	3 (30)	4 (40)	*
<b>BMI</b>						
Underweight	1 (2.4)	16 (39)	12 (29.3)	4 (9.8)	8 (19.5)	0.002
Normal	0 (0)	9 (12.2)	41 (55.4)	3 (4.1)	21 (28.4)	*
Overweight	0 (0)	2 (11.1)	5 (27.8)	2 (11.1)	9 (50)	
Obese	0 (0)	1 (12.5)	2 (25)	0 (0)	5 (62.5)	

# Fischer exact test; \* Statistically Significant at p<0.05

Moreover, Moderate Dependence was more frequent in those with disabilities since birth (43.2%), with the lowest percentage in the Dependence group (0.8%), and this difference was statistically significant (p=0.026). Regarding BMI, 39% of adolescents with Severe Dependence were underweight, 55.4% of those with Moderate Dependence had a normal BMI, 50% of independent adolescents were overweight, and 62.5% were obese, with a statistically significant difference (p=0.002).

Table 6 shows a higher percentage of bed wetting (34.8%) among autistic and mentally disabled study participants while the minimum was reported at 4.3% among other disabilities. The observed

difference observed was statistically insignificant (p = 0.594). History of thumb sucking was higher among mentally disabled adolescents (30.3%) followed by autism disabled (27.3%). The difference observed was found to be statistically insignificant (p= 0.757). Speech Disorder was higher among the mentally disabled (43.1%) followed by autism disabled (23.1%). The observed difference was statistically insignificant (p = 0.760). A higher percentage of anxiety/ blue mood (37.8%) among mentally disabled adolescents while the minimum was reported at 4.4% among other disability. The difference observed was found to be statistically insignificant (p= 0.184).

**Table 6: Association between Behavioral history and Type of Disabilities among study Participants**

S N	Variables	Type of Disabilities					Total (N=142) (%)	p- valu e
		Autism (n=33) (%)	Hearing Impairmen t (n=23) (%)	Intellectua l Disability (n=20) (%)	Mental Disabilit y (n=54) (%)	Other Disabilitie s (n=12) (%) @		
1	History of Bed Wetting	8 (34.8)	4 (17.4)	2 (8.7)	8 (34.8)	1 (4.3)	23 (16.2)	0.59 4
2	Thumb Sucking	9 (27.3)	6 (18.2)	6 (18.2)	10 (30.3)	2 (6.1)	33 (23.2)	0.75 7
3	Speech Disorder	15 (23.1)	10 (15.4)	7 (10.8)	28 (43.1)	5 (7.7)	65 (45.8)	0.76 0
4	Anxiety/ Blue Mood	13 (28.9)	10 (22.2)	3 (6.7)	17 (37.8)	2 (4.4)	45 (31.7)	0.18 4

@: Cerebral palsy, Down syndrome, Learning disability, Locomotors disability

### DISCUSSION

In our study, the gender distribution among the study participants showed that 74% were male and the remaining were females 26%. The age distribution of the study participants revealed that the majority fell within the 14-17 age group (54.9%). This finding aligns with studies conducted in other regions that have also identified a higher proportion of adolescents with disabilities within this age range (8,9,10). Regarding the timing of disability onset, the present study found that the majority of participants had disabilities since birth (93%), while a smaller proportion acquired disabilities after birth (7%). A higher prevalence was also reported in previous studies (89%), (76%) of disabilities since birth among individuals with disabilities (11).

The finding that mental disability was the most prevalent type of disability among both males and females was consistent with previous research conducted on adolescents with disabilities. A higher prevalence of disabilities among males has been reported in previous studies (10,12,13).

Among the "Fully Dependent" adolescents, the highest percentage (50.7%) required assistance from others for grooming. None of them were dependent on others for mobility activities. Similar findings were observed in previous studies (14,15,16).

In the present study, the majority of participants (42.3%) had a moderate level of dependence, followed by independence (30.3%), severe dependence (20.4%), and mild dependence (6.3%). In contrast 0.7% of participants had a level of dependence. A higher proportion of moderate dependence was also noticed in the study (17.18).

A study aimed to assess the level of dependence in activities of daily living among adolescents and adults with intellectual disabilities. The study found that the majority of participants had a moderate level of dependence, which is consistent with the

findings of our study (19). Similarly, studies in different populations and disability groups have also reported a high prevalence of moderate dependence in activities of daily living among adolescents with disabilities (20,21).

In terms of age, the study found that severe dependence level was higher in the 10-13 years age group, while moderate dependence level was higher in the 14-17 years age group. In contrast, the independence level was higher among the 18-19 age group. This finding suggests that as adolescents grow older, there is an increased likelihood of developing higher levels of independence in ADL. This aligns with previous research indicating a positive correlation between age and functional independence among individuals with disabilities (22). Moderate dependence level was found to be higher among adolescents with disabilities since birth. This suggests that individuals who have had their disabilities since birth may experience greater challenges in achieving higher levels of functional independence. These findings are consistent with previous research that has shown a positive correlation between the onset of disability and functional limitations in ADL (23).

The study findings indicated distinct patterns of BMI classification among adolescents with different levels of dependence in Activities of Daily Living (ADL). Among those with severe dependence, a higher percentage (39%) were found to be underweight. Similar findings have been reported in previous research, highlighting the higher prevalence of underweight among individuals with severe dependence (24,25).

Conversely, among adolescents with moderate dependence on ADL, a majority (55.4%) had a normal BMI classification. However, among adolescents with any level of dependence on ADL, 50% were found to be overweight. Similar findings have been reported in previous studies highlighting

the higher prevalence of overweight and obesity among individuals with disabilities (24).

Remarkably, among adolescents with independence in ADL, a substantial proportion (62.5%) were found to be obese, raising concerns about the relationship between functional independence and obesity in this population. These findings align with previous studies documenting a higher prevalence of obesity among individuals with disabilities (26,27). There is a higher percentage of bed wetting among adolescents with autism and mental disabilities (34.8%). This finding is consistent with a study showing a higher prevalence of bed wetting among individuals with developmental disabilities (28). Regarding thumb sucking, the study found a higher prevalence among adolescents with mental disabilities (30.3%), followed by those with autism disabilities (27.3%). Another study has also reported that thumb sucking is a common behavior observed in childhood, and its persistence into adolescence may be related to developmental or emotional factors (29).

#### CONCLUSION

In conclusion, the study found that 42.3% of study participants had moderate Dependence followed by 30.3% had Total Independence. Moderate dependence in ADLs was higher in males (42.9%) than in females (40.5%). The study found that mentally disabled adolescents had a slightly higher prevalence of thumb sucking, speech disorder, and anxiety/ blue mood compared to autism-disabled individuals.

#### RECOMMENDATION

Based on the findings, it is recommended to provide targeted interventions to improve the functional independence of adolescents with disabilities, especially in areas of grooming, dressing, and mobility. Additionally, addressing nutritional concerns, particularly among adolescents with severe dependence, is crucial.

#### LIMITATION OF THE STUDY

The study was conducted in a specific district, limiting generalizability. The cross-sectional design prevents causal inferences. Additionally, the reliance on self-reported data may introduce potential biases.

#### RELEVANCE OF THE STUDY

This study contributes to the understanding of the functional abilities and nutritional status of adolescents with disabilities in the region. The findings can inform the development of targeted

interventions and support services to enhance their quality of life and promote their inclusion in society.

#### AUTHORS CONTRIBUTION

AK: Participated in data collection, data cleaning, statistical analysis, and interpretation, and drafted the initial manuscript. AS, SV, & NS: Conceptualized the study design, supervised data collection, contributed to data analysis and interpretation, and assisted in manuscript preparation.

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Nil

#### CONFLICT OF INTEREST

There are no conflicts of interest.

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#### DECLARATION OF GENERATIVE AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors haven't used any generative AI/AI assisted technologies in the writing process.

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