High Risk for Obesity in Children With Developmental Coordination Disorder

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ABSTRACT
Developmental Coordination Disorder (DCD) is characterized by marked impairment in the acquisition of motor skill. The poor performance of movement skills marks developmental coordination disorder (DCD), and this defect affects the child’s activities of daily living in innumerous ways. The ability of the child in the execution of the motor task is substantially below that expected for a child’s chronological age and intelligence. DCD affects the child’s ability in performing both gross and fine motor skills. Performing the Variety of motor tasks is impaired, and the child is isolated socially and emotionally. These children experience frequent academic failure because of their poor handwriting skill. Despite having IQ more significant than 70, these children experience academic failure. As because of their motor coordination difficulty, these children avoid peer group interaction. They were termed as clumsy and awkward, by their teachers and often by their peer group. Thus they were avoided by their peer group children. This recurrent isolation becomes permanent for children with DCD, and they tend to isolate themselves from everybody. As they become isolated, these children are more prone to psychological distress. As because of poor social interaction and participation in green land play along with peer group children, they were at high risk for obesity and other related disorders. Awareness of the importance of participation in a physical activity needs to be delivered for all the parents of children with and without DCD. Benefits of green land play need to be understood by the parents for further facilitation of children’s engagement in physical activity sessions.

INTRODUCTION
The poor performance of movement skills characterizes developmental coordination disorder (DCD), and this defect affects the child’s activities of daily living in innumerous ways. The ability of the child in the execution of a motor task is substantially below that expected for a child’s chronological age and intelligence. DCD affects the child’s ability in performing both gross and fine motor skills (Cairney et al., 2010). Performing the Variety of motor tasks is impaired, and the child is isolated socially and emotionally. They experience a fear to perform a small motor activity which will not require much effort. As due to their frequent failures in every activity of daily living skills they perform, like dressing, eating, bathing and playing. These children consider themselves less adequate to participate in any activities (Cole et al., 2000).

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feedback whenever they try to engage in a wide variety of motor tasks. After training for specific motor activity, children with DCD shows to gain proficiency but later after the detraining effects overtake and children consequently met with difficulty in task execution. But the reasons for failure in executing specific task even after practice is due to factors like change in environment and also lag in positive reinforcement by the therapist (D’Hondt et al., 2008).

However, few children with DCD exhibits proficiency over a particular motor task organization and execution after regular practice attempts and training with the help of occupational therapists. Difficulty in learning a new skill at inception is common among every child, and it is the characteristic feature of children who exhibits motor coordination difficulties (Graf et al., 2004). Indian mothers of children with DCD fails to understand their difficulties and consequences related to their defects if not adequately examined at the earlier stages of development or their primary schooling (Hue et al., 2007).

METHODOLOGY

We mailed the private occupational therapy centres in and around Mudichur village. Eighteen children were randomly selected from the list of children with DCD mailed back by the therapists. All the children enrolled were of age group 5-10 years. Parents or guardians of the children provided a written signed informed consent for their participation, and they can leave any time from participating in the study as there are no restrictions placed for their engagement. All parents received an information sheet that contains the purpose and procedures of this study. Children with medical conditions or with the presence of intellectual disabilities were excluded from this study. This study included participants with DCD and typically developing children for analysis. This study was initiated after a proposal presented in SRM College of Occupational therapy. The DSM-V criteria of selection and Developmental coordination disorder questionnaire were used to screen participants. As there is a problem in identifying children as DCD in the Indian context, requires the clinical reasoning of the therapist to conclude the findings on DCD. Research assistant measured the height and weight of the children involved in the study. Portable stadiometer was used to measure the body height and body weight was calculated with an electronic scale, and waist and hip circumferences were measured using a tape measure. Bodyweight and height were analyzed to get an interpretation on body mass index (BMI) (kg/m2) for each participant. In the current study, we used BMI to identify overweight, and obesity and the International Obesity Task Force (IOTF) values and guidelines were used to define overweight and obesity in children.

Data Analysis

Statistical analyses were performed using the SPSS version 17.0 for Windows, and the descriptive data was provided for the anthropometric parameters and the level of motor coordination.

RESULTS

(Table 1) Majority of the anthropometric data like weight; hip and waist circumference were higher in the DCD children as compared to their typically developing children. These children suffer from obesity, and there is a high risk of associated problems. Low balance and poor locomotor agility were reported as a consequence of obesity. Table 2 shows poor walking performance in the 6minute walk test and poor motor coordination skill in performing five sit to stand test.

DISCUSSION

This study suggests that children with DCD were at risk for obesity. Physical activity is necessary to mobilize bones and joints, and it helps in strengthening muscles. The bodily movement that engages skeletal muscles requires high energy expenditure. Majority of the physical activities as well as green land play that engages large muscle groups such as walking, running, jumping, cycling, or participating in sports, require adequate balance abilities and children with DCD fails to perform it adequately without assistance. Their difficulty in motor coordination ability makes the children less engage in physical activities.

Children as due to their frequent failures in learning or participating in an academic activity with peer group children started to feel frustrated and frequent failure make them likely to avoid activities that provide failure for them (Mickle et al., 2011). Every child will prefer isolation with DCD in the classroom as well as the in-home environment. They are less physically active, and they choose sedentary life.

As parents of children with DCD wants to focus on academic tasks to get a passing grade in primary schooling as a typically developing peer group child. Thus parents were concerned more towards the handwriting skill and reading skill of child (Riddiford-Harland et al., 2011). They don’t
Table 1: Difference in the Mean Value of Anthropometric Characteristics and Motor Coordination Ability of Children With and Without DCD

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Typically developing children</th>
<th>Children With DCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>140.23</td>
<td>141.12</td>
</tr>
<tr>
<td>Weight</td>
<td>40.21</td>
<td>47.21</td>
</tr>
<tr>
<td>BMI</td>
<td>19.34</td>
<td>22.38</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>55.34</td>
<td>76.23</td>
</tr>
<tr>
<td>Hip circumference</td>
<td>70.23</td>
<td>88.12</td>
</tr>
</tbody>
</table>

Table 2: Scoring in Functional Performance Test for Children With and Without DCD

<table>
<thead>
<tr>
<th>Test</th>
<th>Typically Developing Children (Meters)</th>
<th>Children With DCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>6MWT- Six Minute Walk Test (Distance)</td>
<td>120.65</td>
<td>60.12</td>
</tr>
<tr>
<td>5STS- Five Sit to Stand Test (Time)- Minutes</td>
<td>3.34</td>
<td>6.56</td>
</tr>
</tbody>
</table>

want their child to go out of home and play along with peer group children, as previous researchers had stated that parents and caregivers of children with DCD fear that when their children were allowed to play out of their house and in green land or park, they tend to hit over the objects in their way as they fear of the new environment and things they encounter in their way and parents reported that they tend to hit and fall frequently when exposed to unfamiliar environment (Dowling et al., 2001).

Sedentary lifestyle pressures the children mentally as well as physically. As children with DCD have poor peripheral muscle strength, they have poor hand grip thus experiences difficulty in writing task too. These children need to be assessed and treated as early as possible to avoid the negative consequences of sedentary lifestyle (Foo et al., 2013).

Increased risk of obesity and poor physical fitness, which, in turn, lead to cardiac illness and affects the respiratory muscles. The overload placed over the respiratory muscles will affect the breathing pattern of obese children. At present, the precise correlation between DCD and obesity is not known. Some researchers report that DCD children were at risk of cardiovascular consequences, and their life is at risk (Wu et al., 2007, 2010). If these children were left without consideration over their body weight, there would be severe adverse health outcomes later in life.

Some studies report that stress placed over the children by their parents, teachers and peer group children will influence their bodyweight. Prevalence estimate reported that 3% of children with DCD were obese. Whether obesity results in clumsiness and poor motor coordination? Is not examined in detail and further researches were needed to conclude the debates and hypothesis laid by the researchers (Wu et al., 2007). Overweight and obesity will have an impact over the fine motor skill, gross motor skill as well as it affects the locomotion skill. It affects the speed of the walk, jumping, kicking, and children with DCD scored lower on the cardiac wellness test. Obesity was also having direct influence over static and dynamic balance tasks among boys and girls. Many researchers documented poor performance in cardiac endurance tests like in the shuttle run and 30-m sprint when compared to their age-matched peers (Sankar et al., 2020).

CONCLUSION

This study identified that children with DCD were at significantly increased risk for obesity compared to typically developing children, and there is a need to educate their parents to facilitate their children’s play skill. Engagement in physical activity is the key to prevention of obesity.

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Conflict of Interest

The authors declare that there is no conflict of interest for this study.
REFERENCES


