



Original Research Article

Indication or Suspect of Developmental Coordination Disorder in 5-15 Years of School Going Children in India (Dharwad, Karnataka)

Komal K B¹, Parmar Sanjay²

¹MPT in Pediatric Physiotherapy (Post graduate student),

²PhD in Physiotherapy, Associate Professor, SDM college of Physiotherapy, Dharwad, Karnataka, India.

Corresponding Author: Komal K B

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ABSTRACT

Background and objectives: Developmental coordination disorder (DCD) is the most common disorder in the school-aged children. In various countries its prevalence is studied. This part has not been explored for the prevalence of DCD. Hence this study had been done to know the prevalence (indication of DCD or suspect DCD) of DCD in 5-15 years of normal children in Dharwad on DCDQ'07. **Design:** Cross sectional study. **Methods:** A sample size of 300 was chosen. Children were evaluated by the primary investigator and screened by the pediatrician. The parents of the children who met the inclusion criteria were given DCDQ'07. The filled questionnaires were scored according to the summary score sheets, which interpret indication of DCD or suspect DCD, probably no DCD. The data was evaluated statistically using SPSS 20.0 version, and results were obtained. **Results and conclusion:** Totally 300 children (male 48.3% and female 51.6%) were evaluated. The overall prevalence (indication of DCD or suspect DCD) of the boys was 19.31% and the girls 23.23%. Therefore the total prevalence (indication of DCD or suspect DCD) of DCD is 21.33%. A multicenter study and associated factors need to be studied to explore the preventive measures and appropriate treatment strategies. **Limitation:** The screening by the pediatrician was informal. No other test has been used for categorization as indication of DCD.

Keywords: DCD, Prevalence, DCDQ'07, Dharwad (urban).

INTRODUCTION

Developmental coordination disorder (DCD) is defined by using the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV), as a condition marked by a significant impairment in the development of motor coordination, which interferes with academic achievement and/or activities of daily living (ADL). These difficulties are not due to a general medical condition (e.g., cerebral palsy) and are in

excess of any learning difficulties if present. [1]

Before the Diagnostic and Statistical Manual of Mental Disorders era, children with DCD were described as 'motor impairment', 'motor delayed', 'physically awkward', 'perceptuomotor dysfunction'/'motorperceptual dysfunction (MPD)', 'developmentally agnostic/apractic', or as 'clumsy child syndrome'. [2]

DSM-IV provides four criteria to classify a child as having DCD: A.

Performance in daily activities that require motor coordination is substantially below given the person's chronologic age and measured intelligence. This may be manifested by marked delays in achieving motor milestones (e.g., walking, crawling, sitting) dropping things, "clumsiness," poor performance in sports, or poor handwriting. B. In criterion A there is a disturbance which disturbs the school performance or daily living. In C and D, the disturbance is not due to a general medical condition (e.g., cerebral palsy, hemiplegic or muscular dystrophy) and does not meet criteria for a Pervasive Developmental Disorder. If mental retardation is present, the motor difficulties are in excess of those usually associated with it. [3]

Motor impairment compromises success in everyday activities and school progress. The condition is idiopathic and the child has no identifiable medical, cognitive, psychological, social, or other obvious condition or reason for the difficulty at movement. Some studies have demonstrated that the children with DCD do not simply 'grow out of' their difficulties. [4]

Developmental Coordination Disorder (DCD) is one of the most common disorders amongst the school-aged children. Developmental coordination disorder appears to be a fairly common disorder of childhood and is usually identified in children between 6 and 12 years of age. Ten years ago, researchers estimated that DCD occurred in 10% to 19%, [5, 6] of school aged children. With a more precise definition of DCD, the prevalence currently estimated to be between 5% and 8%, [7-10] of all school-aged children, with more boys than girls being diagnosed with DCD (2:1). [11] This difference may reflect higher referral rates for boys, because the behavior of boys with motor incoordination may be more difficult to manage at home and in the classroom. In addition, a higher incidence of DCD may be

found among children with a history of prenatal or perinatal difficulties. [12]

A number of tools have been developed which focus on identifying the presence, and extent, of a movement skill deficit tested under clinical and standardized conditions, in order to meet requirements for a motor impairment as stipulated under Criterion A of the DSM-IV:

"Performance in daily activities that require motor coordination is substantially below the given person's chronologic age and measured intelligence. This may be manifested by marked delays in achieving motor milestones (e.g., walking, crawling, sitting) dropping things, "clumsiness," poor performance in sports, or poor handwriting. [12]

The children with DCD tend to avoid normal physical activity. This compromises fitness directly and in turn could make some children vulnerable to future disease including osteoporosis, cardiovascular conditions, obesity, musculoskeletal disorders, accidents, and mental health problems etc. A child who has attained all the normal developmental milestones at the correct age may also have certain motor deficit which may be asymptomatic at early stage of life, due to which the child slowly starts adapting to these deficits. This adaptive behavior may show neuromotor disturbances in later stages. Parents, teachers and therapists are unaware of these integration deficits and neglect it. Without intervention difficulties persists into adulthood and are frequently accompanied by other problems, both at home and at school, so assessment program should be done to evaluate children having motor deficit and early intervention should be given to avoid the risk of any neuromotor disturbance later. The early diagnosis of DCD can be helpful to prevent the future secondary complications by using DCD'Q 07. The revised questionnaire includes 15

items. There is a cut-off score for “Indication of DCD or suspect DCD”, “Probable not DCD”. The questionnaire has strong internal consistency, construct validity and concurrent validity. DCDQ’07 has reliability of 0.89; sensitivity is 84.6% and specificity of 70.8% and can be administered from age group of 5 to 15 years.

The prevalence of DCD was found in various countries. In India 1.37% (kattankulathur), [13] 19% (Greek), [14] 8% (Canada), [14] 6% (American Psychiatry Association). [15] As per the literature there are no studies found on the prevalence of DCD using DCDQ’07 in 5-15 years of age group in Karnataka. Early the diagnosis better will be the intervention and the overall quality of life of children. Hence, there is a need to conduct the study among children residing in Dharwad, Karnataka, India on prevalence (indication of DCD or suspect DCD) of DCD in 5 to 15 years of children using DCDQ’07. As this part of Karnataka studies are lacking.

MATERIALS AND METHODS

Ethical Clearance was obtained from SDM college of Medical Science And Hospital. All the subjects from 5 to 15 years of age children were included in the study.

Source of the data collection:

A sample size calculation was based on the prevalence of DCD estimated to be 8%. Hence, the sample size needed to determine the prevalence with a bilateral confidence interval of 95% and a precision of 4% was 246 subjects. Score sheets which interpret indication of DCD or suspect DCD, probably not DCD. Assuming that 15% of the subjects included may not complete all the questionnaires, this required an addition of 37 subjects to be included in the study. 283 is the sample size established. So approximately, 300 subjects are taken for the study, from age group of 5 to 15 years.

Developmental Disorder Questionnaire 2007 (DCDQ’07) was converted into kannada by taking help of the expert and reliability was found to be 0.89. The children were selected on the basis of multistage sampling method. In the first stage, the total number of schools in Dharwad was taken. There are total numbers of 50 government schools in Dharwad. In the second stage, 8 schools from the total number of schools in Dharwad were selected randomly by using sealed & opaque envelopes. The Date of birth of the each child was taken from the office record with the same chronological age. The pediatrician visiting to the school was requested for screening of the children. After the declaration by the pediatrician that the child is typically developing, from each school on the basis of inclusion criteria, 38 children were randomly taken. Randomization was done on the basis of their roll number. In the final stage on the basis of chronological age children were categorized into 11 groups from 5-5.11 years to 15-15.01 years.

Parents of the children included in the study were called to the school on prefixed date and the study was briefly explained to them and written informed consent was taken. Prenatal, natal and postnatal history was taken from the parents. Following this, a brief assessment was also done by the primary investigator. Height and weight of the children was also taken. The height and weight was then calculated into body mass index (BMI). After finding their suitability as per their inclusion criteria and exclusion criteria, subjects who are willing to participate were handed an envelope, which contains a valid and reliable DCDQ’07(English and kannada). DCDQ’07 questionnaire consists of 15 items which includes control during movement, fine motor/handwriting and general coordination. The subject’s parents responded to each behavioral statement, using a 5-point Likert

scale in which 1=not at all like your child; 2=bit like your child; 3=moderately like your child; 4=quite like your child; 5=extremely like your child. If the parents had any query regarding filling of the questionnaire, at any point of time they were requested to contact the investigator either by phone call or personal meeting. The parents were assured that their participation and non-participation would not affect their child's education and that their responses were anonymous. Parents were instructed to return completed material in a sealed envelope within a prefixed date by hand delivery to school principal. Therapist then collected the filled questionnaire from the principal. The therapist scored it according to summary score sheet which interpreted whether the child has indication of DCD or suspect DCD, probably not DCD.

Inclusion criteria:

- 1) Normal children between age group of 5 to 15 years.
- 2) Both boys and girls.
- 3) Co operative children during examination.

- 4) Parents who are able to understand questionnaire (English and kannada).
- 5) Child declared developing typically by pediatrician.

Exclusion criteria:

- 1) Any known psychological disorder
- 2) Any general medical condition (according to DSM 4th edition): CP: muscular dystrophy, muscular impairments, mental retardation.)
- 3) Unwilling parents after inclusion.

RESULTS

Table 1: Distribution of children according to gender and BMI in age groups

Age group	No of		BMI	
	Boys	Girls	Underweight	Normal
5-5.11	10	21	28	3
6-6.11	13	15	28	0
7-7.11	12	13	23	2
8-8.11	12	15	20	7
9-9.11	14	14	24	4
10-10.11	15	11	26	0
11-11.11	14	15	26	3
12-12.11	12	14	22	4
13-13.11	14	12	22	4
14-14.11	15	12	3	24
15-15.01	14	13	12	15
Total	145	155	234	66

Table 2: Prevalence of DCD (indication of DCD or suspect DCD) according to age groups

Age groups	Probably not DCD	%	Indication of DCD or suspect DCD	%	Total	%
5.00-5.11	24	77.42	7	22.58	31	10.33
6.00-6.11	23	82.14	5	17.86	28	9.33
7.00-7.11	17	68.00	8	32.00	25	8.33
8.00-8.11	22	81.48	5	18.52	27	9.00
9.00-9.11	15	53.57	13	46.43	28	9.33
10.00-10.11	18	69.23	8	30.77	26	8.67
11.00-11.11	24	82.76	5	17.24	29	9.67
12.00-12.11	21	80.77	5	19.23	26	8.67
13.00-13.11	25	96.15	1	3.85	26	8.67
14.00-14.11	23	85.19	4	14.81	27	9.00
15.00-15.01	24	88.89	3	11.11	27	9.00
Total	236	78.67	64	21.33	300	100.00

Chi-square=21.4001, df=10, p=0.0185*

*p<0.05

Table shows the prevalence (indication of DCD or suspect DCD) of DCD according to age groups in percentage using chi square test.

DISCUSSION

Table 1 shows the Distribution of children according to their gender and BMI in age groups. There were 145 boys and 155 females included in the study from age

group of 5-15 years. BMI of children ranged from 11.11%- 100% being underweight and 0% -88.89% being normal weight.

Parents of children from 5-15 years who were below SSLC were 41, SSLC 98,

PUC 46, graduate 85, postgraduate 27 and Ph.D 3.

The table 2 shows the prevalence of DCD according to age group of 5-15 years using Chi-square test. Indication of DCD or suspect DCD ranged from 3.85% to 46.43% in the age group of 5-15 years.

Our study explores the prevalence at each age and in the boys and girls which earlier studies have not been studied. In our study girls showed 23.23% and boys showed 19.31%. As seen in the earlier study done by Georgia, (2006) which has higher prevalence which nearly correlates with our study. As in their study they have considered anthropometry, BOTMP-SF and cardio respiratory fitness. In our study since, the objective was prevalence; we have not considered these factors.

As the questions were developed in western countries along with questions addition in which we asked the parents regarding the relevance of the questionnaire and the comments by the parents was asked. Only one parent commented on question number 14.

1. "My son is not having that much conscious about delicate things and how to maintain because now, he is 7 years old. In 14th question child having very funny and childish behavior. They are not thinking about; which is valuable thing and how to maintain so better you change or manipulate this question according to my knowledge". Since only one parent has commented statistical analysis was not carried out. So the question can be used in the original format translated into other language, in this part of the country.

CONCLUSION

We conclude that of the total 300 children (male 145 and female 155) after

finding their suitability, the prevalence (indication of DCD or suspect DCD) was 21.33%, boys 19.31% and girls 23.23% was found. Children were evaluated by pediatrician and DCD questionnaire was filled by the parents. Further the study can be carried out on multicenter to study over all prevalence to rule out and following of the DCD children. DCD (indication of DCD or suspect DCD) was found to be 21.33% in children. Indication of DCD or suspect DCD was more among girls (23.23%) than boys (19.31%).

Limitations of the study:

1. Screening by pediatrician was informal.
2. No other test has been used as categorization indication of DCD (as they were indication or suspected DCD, probably not DCD).
3. No associated problems related to academic activities of daily living (ADL) were considered.

Further scope of study:

1. Large sample- that is multicenter study can be carried out.
2. Follow up of the DCD children on long-term to be studied.
3. Individual strategies and then outcome on DCDQ'07 can be studied.
4. Study can be carried out on rural population.

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