Fine Motor Skills Development Using DKEFS

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***Abstract*— This study examined the contribution and multiple aspects of fine motor skills of both tribal & nontribal children. The purpose of this study is to determine if the tribal children who participated in fine motor activities increased their fine motor skills as compared to non-tribal children .The intervention included fine motor activities such as cutting, writing/drawing, and manipulation of small objects. The study consisted of two groups of students with delayed fine motor skills. The students in each group were identified as having fine motor delays by their examiners using Delis-Kaplan Executive Function System. DKEFS used to examine the effects of the intervention program on the students' fine motor development. The research supports a directed intervention program for developing fine motor skills which make a significant impact in students' motor development..**

Keywords: Academic achievement, DKEFS, executive function, fine motor skills, Learning disabilities

I. INTRODUCTION

Learning Disability is a major issue in the present days. A learning disability is not a problem with intelligence or motivation. Kids with learning disabilities aren't lazy or dumb. In fact, most are just as smart as everyone else. Their brains are simply wired differently. This difference affects how they receive and process information. It has been observed that many tribal children struggle to master the foundational behaviors that enable them to successfully engage in classroom learning. This was reflected in skill gaps at school entry between children from tribal and non tribal children. Tribal children in general lack from fine motor skills due to mal nutrition, injury, illness and other developmental disabilities. Problems with the brain, spinal cord, peripheral nerves, muscles, or joints can also have an effect on fine motor skills, and decrease control. Many tribal children suffers from Dyslexia (Difficulty in reading), Dyscalculia (Learning disabilities), Dysgraphia (Writing disabilities) and Dyspraxia (Sensory integration disorders) due to lack of knowledge on above area of work. Learning disabilities are often grouped by school-area skill set. If your child is in school, the types of learning disorders that are most conspicuous usually revolve around reading, writing, or math.There are two types of learning disabilities in reading. Basic reading problems occur when there is difficulty understanding the relationship between sounds, letters and words. Reading comprehension problems occur when there is an inability to grasp the meaning of words, phrases, and paragraphs. Signs of reading difficulty include problems with: letter and word recognition, understanding words and ideas, reading speed and fluency & general vocabulary skills.Learning disabilities in math vary greatly depending on the child's other strengths and weaknesses. A child's ability to do math will be affected differently by a language learning disability, or a visual disorder or a difficulty with sequencing, memory or organization.

Learning disabilities in writing can involve the physical act of writing or the mental activity of comprehending and synthesizing information. Basic writing disorder refers to physical difficulty forming words and letters. Expressive writing disability indicates a struggle to organize thoughts on paper.They include problems with: neatness and consistency of writing, accurately copying letters and words, spelling consistency & writing organization and coherence.

The purpose of the current study is to compare fine motor skills among the tribal and non-tribal children and to study the disabilities among tribal and non-tribal children, using Delis-Kaplan Executive Function System.

II. LITERATURE SURVEY

There are number of research done in the field of learning disabilities and fine motor skills which prompted a striking shape in the present days. It is identified a pattern of behavior and abilities that called “autistic psychopathy,” meaning autism (self) and psychopathy (personality). The pattern included “a lack of empathy, little ability to form friendships, one-sided conversation, intense absorption in a special interest, and clumsy movements.” Asperger called children with AS “little professors,” because of their ability to talk about their favourite subject in great detail.[2] The diagnosis was made by a pediatrician when parents or teachers reported a child, usually a young boy, to be disruptive, with extraordinarily hyperactive and impulsive behavior. Such children were usually placed on a regimen of stimulant medication, to be continued until puberty, at which time it was expected that the disorder would naturally remit. [3]

DSM-IV disorder and condition terms are organized into 18 classes, and most terms are linked to International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes. For more information about ICD-9-CM. DSM-IV uses a five-axis model for the development of treatment options and prognoses. The axes are:

a. Clinical Disorders/Other Conditions That May Be a Focus of Clinical Attention
b. Personality Disorders/Mental Retardation
c. General Medical Conditions
d. Psychosocial and Environmental Problems
e. Global Assessment of Functioning [1]

“Inattention” impairments of ADHD encompass not just chronic difficulties in listening to a speaker but also significant problems in a wide variety of cognitive functions, including ability to activate and organize for work, ability to sustain alertness and effort for work, and ability to utilize short-term “working memory” effectively.[5,4]This work provides a shift of perspective on attention deficit hyperactivity disorder (ADHD), arguing that the disorder is fundamentally a developmental problem of self-control, and that a deficit of attention is a secondary, and not universal, characteristic. The volume synthesizes neuropsychological research and theory on the executive functions, illuminating how normally functioning individuals are able to bring behavior under the control of time and orient their actions toward the future. Applying this model to an examination of the cognitive and social impairments manifested by ADHD, Barkley offers new directions for thinking about and treating this disorder.[6,7,8]Operationally defined measures of motor control were designated by (1) the stage of the game completed (ie, the number of obstacles successfully passed) before losing the figure’s ‘life’, (2) the level of complexity that the stage

represented and (3) the time taken to get to that point during the video game play. These measures were assessed under contrasting conditions of flow or high working memory and distracter loads.[9] A depletion of central line was induced with the neurotoxin N-(2-chloroethyl)-N-ethyl-2-bromobenzylamine (DSP4). This neurotoxin is known to selectively destroy the terminals of the LC and to reduce the noradrenergic activity in a dose-dependent manner .[11]This study adds to the growing literature linking children's experiences in the environment to individual differences in their developing skills in attention, memory, and planning. The authors asked about the extent to which stimulating and sensitive care in the family and in the child-care or school environments would predict these cognitive outcomes. [12]Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common childhood-onset psychiatric conditions, with an estimated worldwide-pooled prevalence exceeding 5% in children . Impairing ADHD symptoms persist into adulthood in as many as 65% of cases . Despite a voluminous literature , ADHD pathophysiology remains incompletely understood. They found evidence suggesting significant neuronal hypoactivation in ADHD *vs* .comparisons mostly in frontostriatal and parietal regions. A substantial number of studies included in Dickstein et al. assessed response inhibition, reflecting the influence of a neuropsychological theory positing inhibitory dysfunction as the core deficit in ADHD and potentially contributing to the particular dysfunctional regions identified in ADHD.[13] Prevalence rates of autism-spectrum disorders are uncertain, and speculation that their incidence is increasing continues to cause concern. To estimate the prevalence of pervasive developmental disorders (PDDs) in a geographically defined population of preschool children.[14,15]

III. METHODOLOGY

A. DKEFS

The Delis-Kaplan Executive Function System (D-KEFS) defined as a set of standardized tests for comprehensively assessing higher-level cognitive functions, referred to as *executive functions*, in both children and adults (aged 8 to 89). Executive functions draw on the individual's more fundamental or primary cognitive skills (i.e., attention, language, and perception) to generate higher levels of creative and abstract thought.

The D-KEFS is made up of nine tests that measure a wide range of verbal and nonverbal executive functions. Each test was designed to be a stand-alone instrument that can be administered individually or along with other D-KEFS tests, depending on the assessment needs of the specific examinee and/or the time constraints on the examiner.

The D-KEFS consists of :

1. The D-KEFS Trail Making Test,
2. The D-KEFS Verbal Fluency Test,
3. The D-KEFS Design Fluency Test,
4. The D-KEFS Color-Word Interference Test,
5. The D-KEFS Sorting Test,
6. The D-KEFS Twenty Questions Test,
7. The D-KEFS Word Context Test,
8. The D-KEFS Tower Test and
9. The D-KEFS Proverb Test.

The nine D-KEFS tests embrace a cognitive-process approach to assess the component functions of higher-level cognitive tasks. Two general types of component processes are isolated and measured by the D-KEFS tests. These processes include more fundamental cognitive skills on which the higher-level executive

functions of a particular task depend, as well as multiple higher-level cognitive functions that may contribute to successful performance on a particular test. The D-KEFS was designed to be used in a flexible manner. The examiner can be flexible in terms of administering only some of the D-KEFS tests and in administering only some of the conditions of each D-KEFS test.

The D-KEFS was designed to be used in clinical settings to assess mild brain damage in general and mild frontal-lobe involvement in particular. As well, it was designed for use by school psychologists in school settings.

In school settings, one of the goals of the authors of the D-KEFS was to introduce the importance of complementing the assessment of those abilities measured by traditional tests of intelligence and other basic achievement skills with those of higher-level cognitive abilities. Therefore, the D-KEFS tests can be administered and performance interpreted by school psychologists to address questions about a child's capacity for higher-level abstract and creative thinking

The D-KEFS represents an important development in the measurement of executive functions for a number of reasons.

It provides a rigorous empirical means for determining whether poor performance on a test is because of deficits in more fundamental cognitive skills or deficits in higher-level executive functions. The results of the D-KEFS may indicate that strong executive functioning has a positive impact on traditional intelligence scores, which is also reflected in that individual's behavior. Several new switching conditions were designed and added to some of the D-KEFS tests, including the Color-Word Interference Test, the D-KEFS Verbal Fluency Test, and the D-KEFS Design Fluency Test. The classic switching procedure was retained in the D-KEFS Trail Making Test. These switching conditions require switching from one cognitive set of conditions to another. The processing demands of the D-KEFS tests were increased over those of similar traditional clinical tests to maximize the detection of subtle executive-function deficits. Higher ceilings and lower floors were designed for the D-KEFS so that clinically relevant results are provided regardless of whether the examinee is an exceptionally bright individual with subtle cognitive deficits or a person with significant brain damage and functional impairment. Several of the D-KEFS tests were designed to appear like games that are fun to play and appealing to both children and adults. The following tests are listed below :

1. **D-KEFS Trail Making Test :**

Trail Making Test Requires a student to create a trail with their pencil by connecting numbers, letters, and then alternating numbers and letters. A measure of connecting dots (motor speed) is also included.

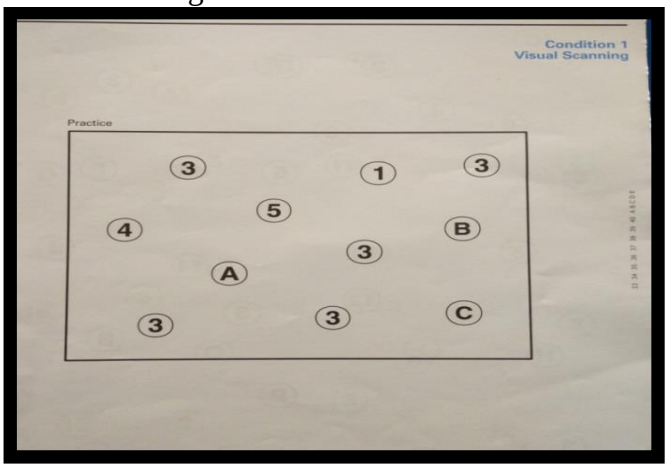

Fig.1.Visual Scanning

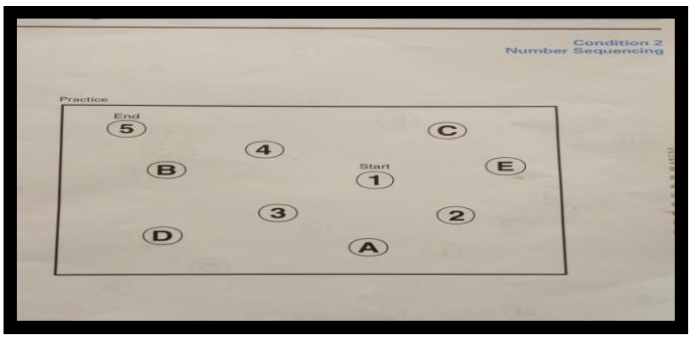

Fig.2.Number Sequencing

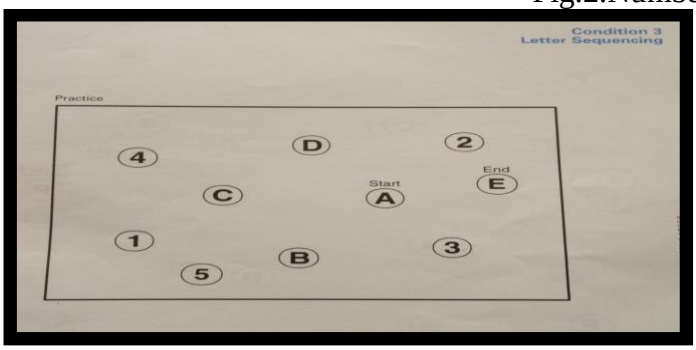

Fig.3.Letter Sequencing

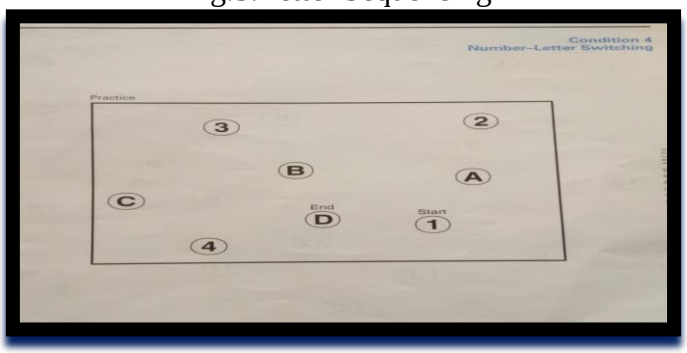

Fig.4.Number Letter Sequencing

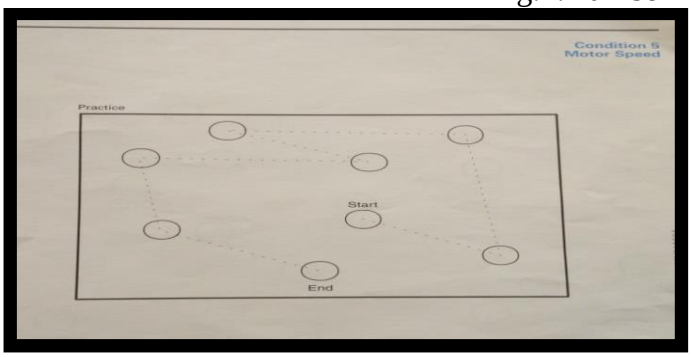

Fig.5.Motor Spped

2. D-KEFS Verbal Fluency Test :

The D-KEFS Verbal Fluency Test measures the examinee's ability to generate words under various task demands: phonemically (Letter Fluency), according to overlearned concepts (Category Fluency), and while alternating between overlearned concepts (Category Switching). Both Letter and Category Fluency require

adequate fundamental verbal skills (e.g., vocabulary knowledge) and higher level abilities (e.g., rapid retrieval of lexical items).). Internal consistency rates for the Letter Fluency measure were in the range of 0.76 to 0.80 for adolescents who were in the age11, 13-14, and 16-19 years.

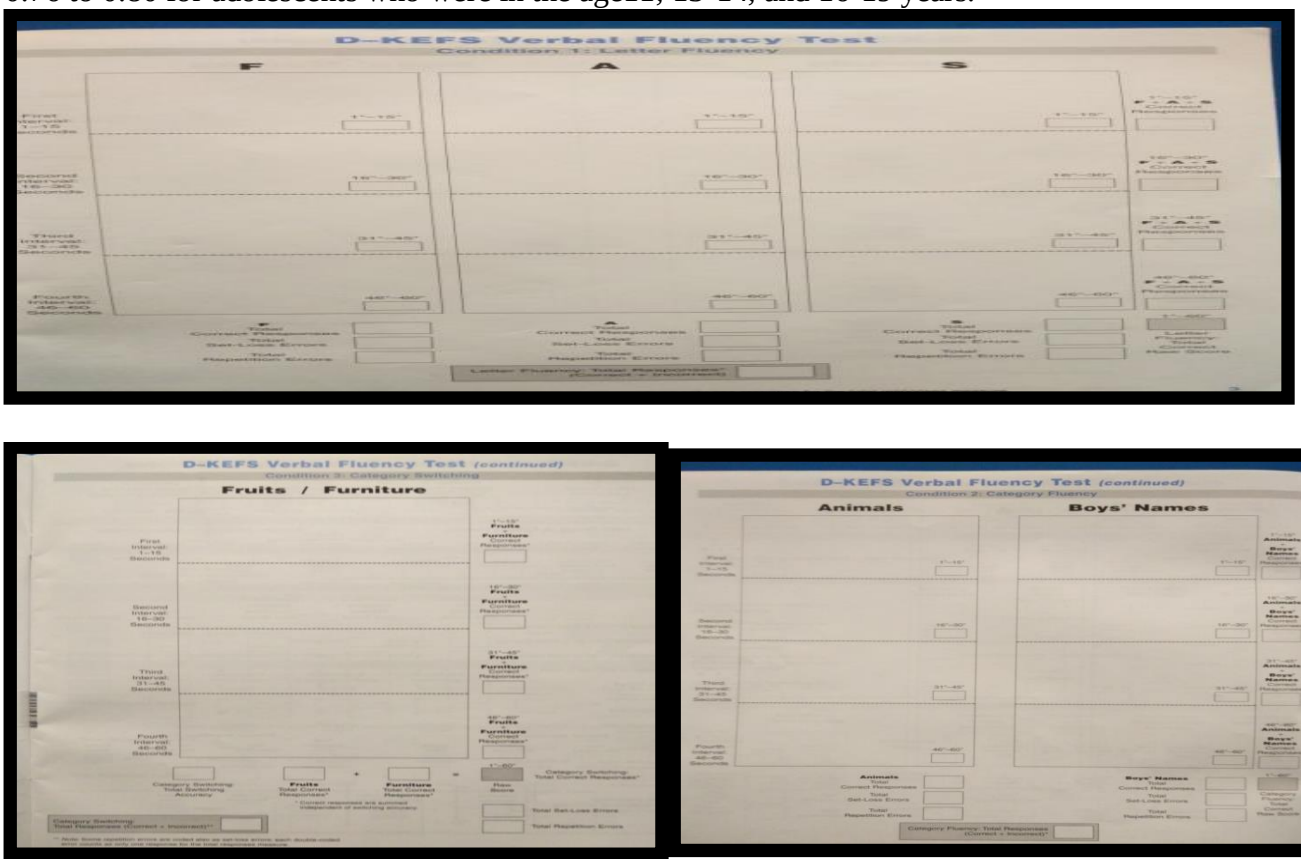

Fig.6.DKEFS Verbal Fluency Test

3.D-KEFS Design Fluency Test:

The D-KEFS Design Fluency Test is the nonverbal counterpart to the Verbal Fluency Test. This test measures the examinee's ability to generate as many different designs utilizing grids of dots (some filled, some empty) within 60 seconds. There are three testing conditions: Filled Dots, Utilize Empty Dots only while ignoring filled dots, and Switching.

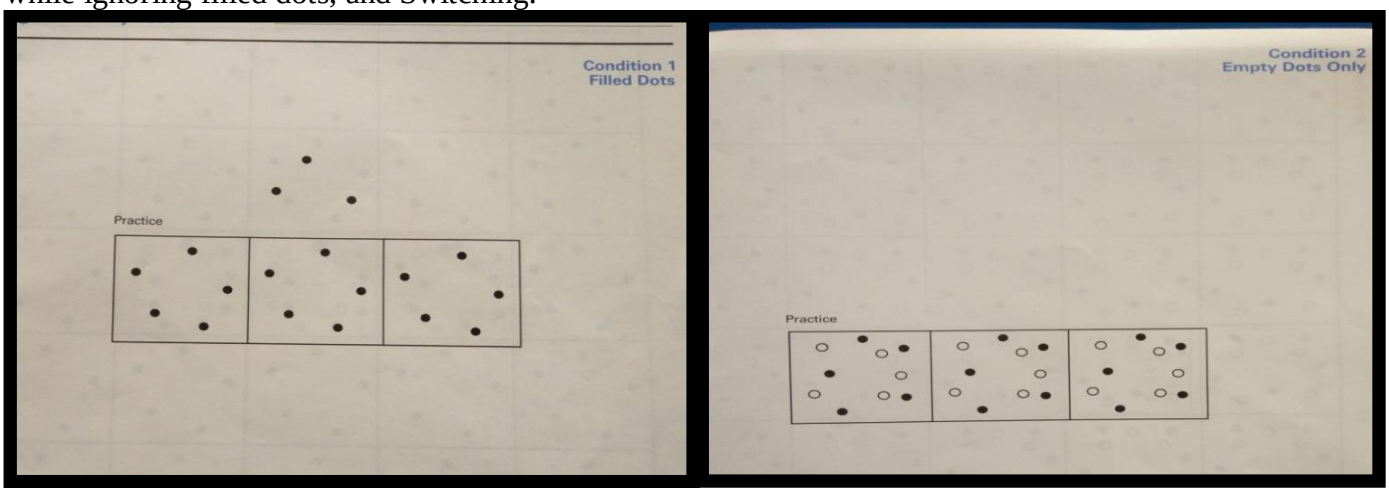

Fig.7.DKEFS Design Fluency Test

4. **D-KEFS Color-Word Interference Test:**

The D-KEFS Color-Word Interference Test is an adaptation of the Stroop Color Word Test developed by Hans Stroop in 1935.The first version of this test dates back to 1886, when it was developed as a doctoral thesis by Cattell (Jensen & Rohwer, 1966). In this original version two experimental conditions were included, color-naming and color word reading. It was noted that participants took longer to complete the color-naming condition color-word reading trial (Cattell, 1886 &Stroop, 1935). This has proven to be true for most people, as we read familiar words automatically, where naming colors require greater effort. Naming the color of the ink a word is printed in when the ink color and the color the word refers to are discrepant (e.g., the word red printed in blue ink) is even more difficult, and hence it takes longer.

Fig.8.DKEFS Color-word Interference Test

***5. D-KEFS Word Context Test* :** The D-KEFS Word Context is a means evaluating executive functions in the verbal modality and assessing such skills as deductive reasoning, integration of multiple bits of information, hypothesis testing, and flexibility of thinking. At the fundamental level of processing, this test requires the examinee to use basic receptive and expressive language skills to understand the clue sentences and to generate verbal answers. For the school psychologist, this test is valuable as a supplemental assessment of receptive and expressive language as well as a measure of inductive reasoning abilities and flexibility of thinking at the level of executive functioning.

6. ***D-KEFS Sorting Test***: The D-KEFS Sorting Test measures a number of important component processes of executive functions, including initiation of problem-solving behavior, concept-formation skills, modality-specific problem-solving skills (verbal versus nonverbal), the ability to explain sorting concepts abstractly,

the ability to transfer sorting concepts into action, the ability to inhibit previous sorting responses to engage in flexibility of behavior, and the ability to inhibit previous description responses to engage in flexibility of thinking.

7.***D-KEFS Twenty Questions Test*:** This test measures the ability to perceive various categories and subcategories, the ability to formulate abstract, yes/no questions that eliminate the maximum number of objects regardless of the examiner's answer, and the ability to incorporate the examiner's feedback to formulate more efficient yes/no questions. It requires visual attention and perception, object recognition, and object naming.

8. *D-KEFS Tower Test*.: The D-KEFS Tower Test is a means of assessing several key executive functions, including spatial planning, rule learning, inhibition of impulsive and perseverative responding, and the ability to establish and maintain instructional set. Key fundamental abilities assessed by this task include visual attention and visual-spatial skills. Executive functions tapped by the D-KEFS Tower Test include spatial planning, rule learning, inhibition, and establishing and maintaining cognitive set.

9. *D-KEFS Proverb Test* :The D-KEFS Proverb Test consists of eight sayings that are presented in two conditions, free inquiry and multiple choice. The test consists of both common and uncommon proverbs, the latter of which tend to place greater demands on novel abstraction skills. Multiple process and contrast measures are provided for the two conditions of the test, which can be useful for identifying the neuro cognitive mechanisms underlying poor performance on this verbal abstraction task. The D-KEFS Proverb Test was designed for adolescents and adults aged 16 to 89 year.

B. Procedure

Total N= 100 in each group i.e, both from boys and girls of tribal and nontribal children were participated. All the children were at school entry level . The data analysis was so far collected and standardized with different assessments. We divided the children into two different groups for easy assessment of tribal and non tribal people. The assessment is evaluated using DKEFs .The dependent variables were measures of executive functioning from the DKEFs. Executive Function System (Letter fluency, nonverbal fluency, inhibition and cognitive flexibility). Selected subtests from the Delis-Kaplan Executive Function System (D-KEFS) were used to assess executive functioning. The D-KEFS assesses various aspects of executive functions such as attention, language, perception, creativity, cognitive flexibility, inhibition, planning, concept formation, abstract thinking, memory and learning. The D-KEFS was designed to test individuals who range from those of very limited cognitive ability and very low performance levels, to very bright people who may display only subtle cognitive deficits. From each age group a subtest raw score is obtained and are converted into scaled scores. The scaled scores range from 1 through19. These scaled scores have a mean value of 10, and a standard deviation value of 3. The scale extends from +3.0 standard deviations through -3.0 standard deviations. The descriptive breakdown of scores is as follows: 1-3 (extremely low), 4-5 (borderline), 6-7(low average), 8-11 (average), 12-13 (high average), 14-15 (superior), 16-19 (very superior).

IV. RESULTS

The assessment of tribal and nontribal children were evaluated using DKEFs .The dependent variables were measures of executive functioning from the DKEFs. Executive Function System (Letter fluency, nonverbal fluency, inhibition and cognitive flexibility).The following result is listed below :

Table 1.Overall comparison result

Overall result	Tribal	Non-tribal
DKEFS TEST	6-7	14-15

V. CONCLUSION

A comparative analysis was made after evaluations of school going tribal and nontribal children. The rating scale of tribal is less as compared to nontribal. Further research needs to be conducted to see if the results of this study are long lasting.

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