

Card Board Game Intervention; Aid Executive Function in a Child with Epilepsy and Development Delay

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Abstract—Epilepsy is a condition of the brain leads to seizure that is distributed by electrical communications signal in nervous system. Epilepsy in children is most common found at age between 0- 6 years old. Several studies has reported that epilepsy effect to executive function observed by impair of routine function, diary life and learning. Thus an increment of appropriate activities to promote rehabilitation should be considered. Therefore this current study aimed to evaluate the impact of card board game and executive function enhancement as in particularly on working memory, and inhibitory control including development assessment is particular on social skill. Task of executive control (TEC) test were applied to evaluate working memory and inhibition task for pre- posttest of intervention program. Vineland Adaptive Behavior Scale measure adaptive behavior of individuals was applied for pre- posttest in social skill. The result showed better score of posttest after intervention in both task of executive control (TEC) and Vineland Adaptive Behavior Scale.

Keywords— Epilepsy, Executive function, card board game.

I. INTRODUCTION

EPILEPSY is one of the most common a chronic neurological disorder in childhood (1). Prevalence of seizure is approximately 2-5% in children that have at more one seizure in their lifetime (2). However, approximately 25% of children who have seizure found formal diagnosis criteria for epilepsy (3). As the brain contains billion of neurons that create and receive electrical impulse allowing neurons to communicate with one another, abnormal and excessive electrical activity in the brain lead to seizure (5,6). This causes change in awareness behavior and abnormal movement including language and motor delay development that are usually happening after seizure (5,10). Moreover, epilepsy is leaded to a risk for neuropsychological deficits including deficit in overall memory, attention, executive function and intellectual function, developmental delay (el et. Language and motor developmental delay) (1,7). As the typical age of onset epilepsy is between 3-13 years, children with epilepsy are difficulty in academic learning due to deficit in attention (7, 8, 9, 10).

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Working memory problem common in patient with epilepsy and may be differently affected by the cause treatment of epilepsy (11). Working memory is important factor in a children's social development as ability hold information in mind while simultaneously manipulate that information every day (12). In normally term working memory, which ability to keep information in mind for short time while focusing on a task, then remember what to do next(13). Deficit working memory result in difficult stay focus, ignoring distractions, planning next step, remembering directions, and starting /finish tasks. This direct impacts a child's ability to perform well in activities as interesting, funny and talented (14). According with working memory affective to self- regulation. It is process the central deficiency in children with is one of poor behavioral inhibition (15). Inhibitory control is important in model behavioral inhibition, refers to interrelate process, inhibition of the component response to situation/event , stopping of an ongoing response ,which there are permits a delay in decision to respond and protection of the period delay refers form disruption by competing situation (15) However a few data have been published about behavioral outcomes of epilepsy, which are very important for social prognosis and sometimes are most relevant determinants of the quality of life in children (16).

Previous study children onset epilepsy to early life may have affected memory, cognitive impair, flexible, conceptual level respond and learning by measurements neuropsychological test report effective executive function impair(8,17). That is having brain function of prefrontal cortex effective attention or learning in academic (8). Early treatment for promoting fundamental learning activities daily life, academic (18). How to play for funny from start hobbit, learning activities for children development childhood to element to younger ready to fully learn, activities with families and learning together in family. Activities how to play and shifting of activities for child interest and consistent with deficit in children play change in game (19).This activities for promoting executive function in children. Therefor academic study at investigate the role of game in learn improvement in selected lesion (20), academic education use games in the learning of exam in childhood for study learned, number, science, and geography(20). Card board game this one choice for promoting executive function in children, can be help children practice attention, inhibitory control, working memory and flexibility have work together to support plan-

base effective playing(19) . Card board game can be used later to help children recall the traits and analyst symbol, color, naming, number remember sort information then look at connections between category practice on executive function (21,22). However, research had not found cardboard game promoting executive function in a child with epilepsy and development delay. This study on their inhibitory control and working memory, including improve activities daily life. which used the task of executive control (TEC)to monitor performance of inhibitory control and working memory , observe performance behavior while play card board game ,and used Vineland Adaptive Behavior scale II follow adaptive skills.

II. METHODOLOGY

A. Participant

The present study was performed subject age 6 years old history background seizure diagnoses epilepsy, non-handicap study from general appearance, history treatment. This study has been describe in detail before participant base line data collection recruitments after intervention assessment with children and parent including questionnaire, task of executive control score, Vineland adaptive Behavior scale score. Written informed consent was obtained from all parents.

B. Instrument

a. The questionnaire

The questionnaire is developed to get background information. Questionnaire consist general information, family background and study activity variable such as age gender.

b. Task of executive control (TEC)

Task of executive control (TEC) is standard computer-administered measure of two essential executive functions of inhibitory control and working memory base on how to neuroscience methods. Use for children age 5- 18 years .There are divided 2 part factor structure for 5-7 years must complete 1 thought 4 , 4 factors child and adolescents age 8-18 years must complete task 1 thought 6 factors , 6 factors sample complete the recommended number of task for age group in sequential order. The duration of the test 20 – 45 minute

c. Vineland adaptive Behavior scale

The Vineland adaptive Behavior scale or VABS on of various assessment tools than can be use help diagnose and evaluated the special needs of patient the focus particular test the measurement of adaptive behavior including the ability cope with environment change to learn new everyday skill and demon state independent.

III. RESULT

A. Task of executive control report

Task of executive control is a computerized measure that manipulates working memory and inhibitory control. The working memory competent is assessed thought the use of an N-Back, a commonly used procedure in children to evaluate working neuroimaging studies. Working memory is increased over by fist asking a child to respond to single target (0-back) that matches the preceding target (1-back), then to a target that matches the one. The TEC was present t-score and interpretation to 3 level 1) below t-score 0-40 2)typical and t-score 40-61 3) elevated this result show t- score 61-100 followed by variable of TEC (table.1).

TABLE 1: COMPLETE SUMMARY SCORE TABLE FROM THE CLIENT REPORT FOR A CHILD BASE LINE TEST (RT=RESPONSE TIME, RTSD=STANDARD DEVIATION OF THE RESPONSE TIME; ICV; INTRA INDIVIDUAL

Variable	Baseline 1	Interpretation	Baseline 2	Interpretation	Post-test	Interpretation
Accuracy						
Target correct	31	Typical	31	Typical	44	Typical
Standard correct	100	Evaluated	100	Evaluated	36	Typical
Response time						
Target RT	45	Typical	98	Evaluated	100	Evaluated
Standard RT	76	Evaluated	94	Evaluated	93	Evaluated
Standard RTSD	57	Typical	98	Evaluated	93	Evaluated
Standard ICV	44	Typical	58	Typical	61	Typical

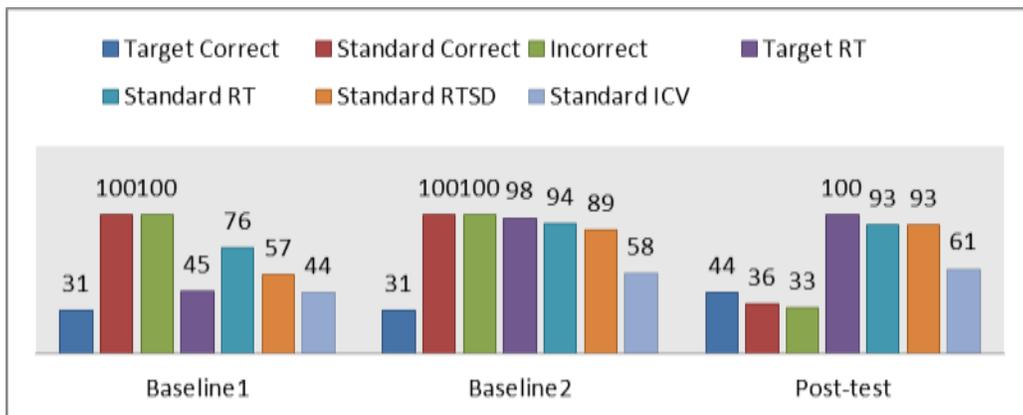


Fig. 1: Summary score graph from the TEC Client report (RT= Response time ;RTSD=Standard Deviation of the Response time ; ICV: Intra-Individual Coefficient of Variation)

According to figure 1 indicates the mastery level of TEC client report target correct Baseline 1 T-score 31 , baseline 2 t-score 31 , post- test increase t- score 44, comparire standard correct report baseline1 t-score 100,standard correct baseline 2 t-score 100, standard correct post-test t-score 36 found that client increase correct typical level in task of executive control after intervention card board game. TEC client report target

respond time of Baseline 1 t-score 45,baseline 2 t-score 98, post – test 100. Target repond time of client increase t- score in the part baseline 2, post-test both level evaluated. Standard response time baseline 1 t- score 76, baseline2 t-score 94 ,post –test 93 found that client decrease t-score targetrespond time evaluated level.

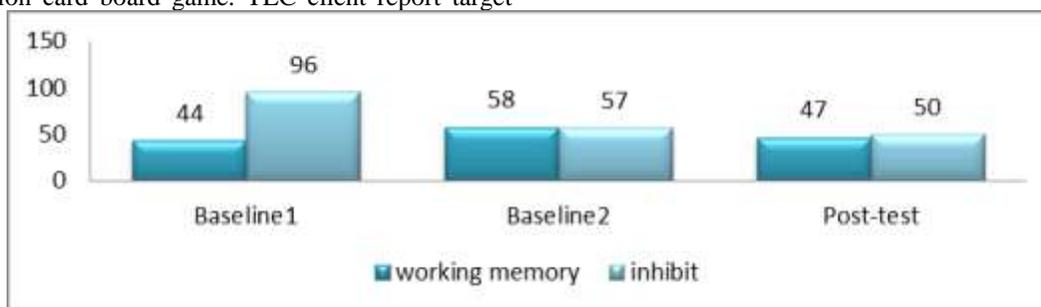


Fig. 2: summary t-score Standard ICV (Intra –Individual Coefficient of Variation)compare T-score working memory and t-score inhibitory load

According to figure 2 indicates the mastery level of TEC client report working memory compare inhibitory load to found baseline1 working memory t –score 44, baseline2 inhibitory t-score 96, baseline2 working memory t-score 58, baseline2 inhibitory t-score 57, post-test working memory t-score 47, inhibitory load t-score 50

B. Vineland Adaptive Behavior scale II (VABS-II) result

Vineland Adaptive Behavior scale (VABS) to find out more about a child’s adaptive skills, pre- test and post –test form while play card game intervention were asked to complete the Vineland Adaptive Behavior Scales. Resulting scores indicate she exhibits low to adequate in the areas assessed.

In the of Communication, parent rating indicate pre-test card board game intervention in a child with epilepsy and development delay’s expressive are age low average and written language skills are age moderate low average. Parent rating also indicate post-test card board game intervention in a child with epilepsy and development delay’s skills are low average with relative weakness in her receptive language, written and expressive skills

In the area of Daily living skills pre-test and post-test ratings are in adequate rang for a child’s age. She able feed and dress by herself adequately. Her application of academic skills appears age- appropriate, in that she knows simple instructions or regular rules or routines at school.

In the area of Socialization mother pre-test rating moderate low rang for a child’s while post-test parent ratings are adequate. Her exhibit weaknesses in play and leisure time pre-test, but post-test are up to age moderate high average. When playing, she playing alone doesn’t communicate with friends group. She does not always share her possessions and she still tends to need to be supervised. She does not play make-believe, and needs reminders to follow rules and take turns when playing game. In the of Play and Leisure time post-test parent rating are age moderating high, when playing she can share and joint possessions with friends group ,she able remainders to follow rules and take turns when play game.

Rating of a child Motor Skills pre-test indicate that her exhibits weakness gross and fine motor skill development. Parent rating of her gross motor skills are age – moderately low average. A child is able to walk, jump and climb. She is also able run but lack the coordination to run not smoothly without falling. A child cannot yet ride a 2 wheeled bicycle

training wheels. Rating of her fine motor skills indicate that a child is able to hold pencil properly, color sample but she not knows shapes and use scissors. She does not consistently copy simple shapes with accuracy or cut out complex shapes. She does not yet consistently tie a secure bow. Rating of child motor skills post-test indicate that her gross – fine motor developing skills. Parent rating of her gross motor skills are age adequate. She is also able run like the coordination to run smoothly without falling. A child can ride a 2 wheeled bicycle training wheels. Rating of her fine motor skills indicate that a child is able to use scissors, she knows shapes and she does copy simple shapes with accuracy. She able to consistently tie a secure bow.

IV. DISCUSSION

The purpose of this review was to examine studies which focussed on performance of children with epilepsy and development delay on measurement task of executive control and Vineland Adaptive Behavior scale (VABS). The majority of study report history case, seizure age onset, frequency, and timing while seizure affective to developmental and executive function divide working memory, inhibitory control. A child increase score post-test intervention and can be able inhibitory control, working memory present from increase cross score of standard ICV (Intra – Individual Coefficient of Variation). Previous research show responds time on TEC is relate to parent rating of inattention, hyperactivities, and executive functioning (23,24). This study found responding to standard stimuli working memory, inhibitory was show explain significant variance in score task of executive control, and report individual performance of a child by parent in measurement Vineland adaptive behavior scales.

The finding report Vineland Adaptive Behavior scale present capacity of a child low peers age in area communication, socialization, and motor skills. Parent rating others behavior concerns are evaluate. Rating indicate that a child often intention when take a home work, use long time while take a homework most not finish work. She was playing near friend group not joint group. Parent obsessed with specific topics such as art paint, drawing. A child's mother also rated her exhibiting poor eyes contact and having difficulty maintaining focused attention. Teacher comment indicates that a child learns easily and interested something. She tries hard on work and kind to remember all alphabets. A child appeared disorganized and distracted at school. Often had difficulty getting her possessions unpacked at the beginning of the day and packed up again at the end of the day.

In conclusion, the present study provide card board game intervention can be improve working memory, inhibitory control and promoting developmental in a child with epilepsy and development delay but this single case study non compared to other case. Future research is needed study in children with epilepsy group or other group children.

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