Neuropsychological Profiles of Children with Psychological Trauma

Submitted in partial fulfilment of the requirements for the degree of MPhil in Clinical Psychology awarded by University of Dhaka

Submitted by –

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Approval

This is to certify that I have supervised and scrutinized this research titled **"Neuropsychological Profiles of Children with Psychological Trauma"** submitted by **Marzia Al-Hakeem** as a partial fulfillment of her MPhil degree in Clinical Psychology. She has accomplished this work satisfactorily by herself under my close supervision and guidance. No part of this paper has been published elsewhere for requirement or fulfillment of any other degree. This paper is examined and recommended for approval and acceptance.

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Declaration

I am **Marzia Al-Hakeem**, declare hereby that this research work is my own work. I have acknowledged all materials and sources used in the preparation of this thesis paper whether they be books, articles, reports or any kind of documents, electronic and personal communication. I also certify that not any part of this paper has been copied in part or whole or is plagiarized from other student's work. I may have consulted with others for information, advice and suggestions and also quoted some of other author's important quotations with citation, but the whole paper is written by me.

I am also aware of the policy of plagiarism and can understand its implications.

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Abstract

The present study aimed to see whether the children experienced different types of psychological trauma have deficits in neuropsychological functioning. Data were collected from participants having experience of trauma (clinical sample) and from a comparison group (non-clinical sample). The clinical sample consisted of 34 participants (16 male; 18 female) recruited from psychiatric hospitals and the non-clinical sample consisted of 30 participants (10 male; 20 female) recruited from the community. All participants' age ranged from 8 to 17 years. Data were collected following a survey method using Children's Revised Impact of Events Scale (CRIES-8), Wechsler Abbreviated Scale of Intelligence (2-subtests WASI), Letter-number sequencing and Digit span subtests of Wechsler Intelligence Scale for Children, RCFT, trail making test of D-KEFS and Strength and Difficulties Questionnaire (SDQ). Descriptive statistics, Independent-samples *t*-test, One-way analysis of variance (ANOVA) and bivariate Pearson's product-moment correlation were used to analyze the data using IBM SPSS 22. The clinical sample demonstrated higher level of deficits in cognitive functioning and higher level of emotional and behavioral problems. Among the clinical sample, 88.2% were found to have borderline and/or impaired level of IQ. 55.9% clinical sample were found to have higher level of emotional and behavioral difficulties. Statistically significant differences between clinical and non-clinical sample were found in Intelligence [$t(61) = 3.835$; $p = .000$] and in other cognitive, emotional and behavioral variables which are connected with different types of psychopathology. The findings illustrate that psychological trauma may affect the developing brain and its impacts manifest in different neuropsychological functions in children such as IQ level, attention, memory, emotional and behavioural difficulties etc., and shed light on the significance of comprehensive trauma-informed assessment and management for the children coming with psychological problems.

Keywords: Trauma, Brain, Neuropsychological functions.

Dedication

I dedicate this thesis paper to all Trauma Survivors.

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Chapter 1

INTRODUCTION

Introduction

Trauma broadly refers to both physical and mental injury (Isobel, Goodyear and Foster, 2017). It can be physical trauma either by accidents or violence (physical, sexual). Trauma also can be emotional and/or psychological trauma due to any extraordinary stressful incident or experience. Many researchers found that it is confusing or problematic to define the term "trauma" due to its wide variety of definitions, interpretations and meanings used in literature (McNally 2010; Schein, Spitz, Burlingame et al, 2006). During the 18th century, the term "trauma" was used in psychiatry and clinical psychology to indicate an overwhelming effect of a stimulus on a person's usual coping ability (Giulio Perrotta, 2019). A big number of people experience trauma in their lifetime but a small portion of them develops full bloom post-traumatic stress disorder. According to WHO World Mental Health surveys, 70.4% of the respondents from 24 countries experienced one or more traumas in their life (Kessler, Aguilar-Gaxiola, Alonso, et al, 2017). Although what makes an event stressful to an individual varies from person to person depending on various factors, several events are found to be markedly distressing for almost everyone and those are called potentially traumatic event (PTE) (Cougle, Kelpetrick and Resnick, 2012). However, not all stressful events lead to trauma (Anushka Pai, Alina M. Suris and Carol S. North, 2017). According to Neal Krause (2004), "Traumatic events are differentiated from stressful life events by their imputed seriousness." Karen Saakvitne offered a definition of psychological trauma – "psychological trauma is an unique individual experience of an event or of enduring conditions in which the individual's ability to integrate his or her emotional experience is overwhelmed (i.e., his or her ability to stay present, understand what is happening, integrate the feelings and make sense of the experience), or the individual experiences (subjectively) a threat to life, bodily integrity, or sanity" (Pearlman and Saakvitne, 1995, p.60). According to

the USA's Substance Abuse and Mental Health Services Administration, (2014) – "Psychological Trauma results from an event, a series of events or a set of circumstances that is experienced by an individual as physically or emotionally harmful or life threatening and that has long-lasting adverse effects on the individual's functioning and mental, social, emotional or spiritual wellbeing" (Isobel, Goodyear and Foster, 2017). Through conceptual analysis of the definitions of trauma, Isobel et al, (2017) stated that there are three components within the concept of trauma – an event, the individual experience and the effects.

Among the numerous detrimental effects of trauma, one crucial one with recent research interest is the neurobiological impacts, especially impact in the developing brain of the children. Trauma is defined in the current study based on the definition proposed by Isobel et al (2017) as having experiences of potentially traumatic events (PTE) which is experienced as distressing by the child along with post-traumatic stress symptoms and/or observable behavioral and/or emotional changes after the event. Individuals aged under 18 years are generally considered as Children, both by the United Nation Convention on the Rights of the Child (Lansdown and Vaghri, 2022) and the Children Act, 2013 of Bangladesh. Although children aged between 0 and 18 can be categorized in different developmental phases, all children under the age of 18 can be broadly considered as Children. Neuropsychological functioning of the children is generally assessed to see the impact of trauma on the developing brain (Gabowitz, Zucker and Cook, 2008). Neuropsychology is the study of relation between the brain and behaviors. A neuropsychological profile (see Section 1.4) is consisted of the areas of functions such as intelligence, attention and concentration, memory and learning, language ability, visuospatial abilities and executive functions. These variables are usually evaluated by neuropsychological tests in trauma-informed assessment (Gabowitz et al, 2008).

1.1. Trauma among Children

Trauma in childhood is a serious psychosocial, medical and public policy problem, which has detrimental consequences for the victim and also for the society as a whole (Michael & Abigail, 2014). According to a survey, 60% of adults report experiencing abuse or other difficulties in family during childhood and 26% of children in United States witness or experience a traumatic event before they reach age four (National Centre for Mental Health Promotion and Youth Violence Prevention, 2012). Childhood trauma can result from an unstable environment, separation from parents, serious illness or surgery in childhood, sexual, physical or verbal abuse, witnessing violence, experiencing neglect (Bellis and Zisk, 2014; Widom et al, 2007; Copeland et al, 2007). According to the National Institute of Mental Health (US), childhood trauma is - "The experience of an event by a child that is emotionally painful or distressful, which often results in lasting mental and physical effects". Childhood trauma has several adverse effects on survivor's life. One crucial aspect is social functioning. Childhood trauma impacts people's social functioning and interpersonal relationships (Stain et al, 2014; Holmes, 2001). Abuse and other forms of adverse situations during childhood causes trauma and such trauma affects child brain by impeding healthy brain development (Stein and Kendall, 2004). Children and young people experiencing domestic violence have increased risk of experiencing physical, sexual or emotional abuse along with a risk of developing psychological and behavioral problems (Stephanie, Helen and Sadhbh, 2008). Research shows that people with a history of abuse have higher rates of general psychological distress than people without an abuse history (Polusny and Follette, 1995). A history of childhood sexual abuse or adult sexual assault has also been found to be associated with higher levels of depression and post-traumatic stress disorder (PTSD). Sexual assault may lead to consequences that can last longer and span generations. This can cause serious adverse effects on health, education, employment, crime, and the economic well-

being of individuals, families, communities and societies (WHO, 2010). Sexual abuse that occurs during a child's developmental period can have adverse effects on certain developmental processes, such as emotional regulation, cognitive style, and coping mechanisms, and other long-term consequences (Wolfe, 2007). This trauma can lead to other behavioral problems eventually. In general, research identified difficulties in emotion regulation and control, impaired judgment, difficulties in problem solving in people with childhood trauma experience. (Michael, Andrew, Boris et al 1999; Michael, De Bellis et al 2002; Ruth, Eric, Richard et al 2010).

Trauma experienced in childhood is found more likely to result in PTSD than trauma experienced in adulthood (Trauma-Informed Care in Behavioral Health Sciences, 2014). Numerous studies have been done on adults with PTSD and found deficits in concentration, learning and memory. Fewer studies have been done on cognitive functions of children with PTSD (Beers and De Bellis, 2002). Research has also shown that not all children experiencing trauma develop PTSD, they may exhibit other symptoms as a result of trauma which can be misdiagnosed as ADHD, ODD, anxiety or mood disorders (Gabowitz et al, 2008). Trauma have impact on academic performance of children (Rosalind, Ronald and Abbot, 2018). Research indicates that traumatic stress along with lower socioeconomic status predicts poor educational outcome (Rachel, Miller & Cirecie, 2012). Lower IQ in children due to trauma experiences has already been showed by research (Virginia, Chandice & Steven et al, 2002).

1.2. Types of trauma

Trauma can be classified in terms of different dimensions. Trauma can also mean an injury to the body by external force (Improving Trauma Care Act of 2014). When behavioral health professionals talk about trauma, it's psychological trauma (NREPP, 2016). The current

study focusing on psychological trauma and both the terms trauma and psychological trauma will be used interchangeably.

In 1991, Lenore C Terr broadly classified trauma into Type I and Type II trauma (Solomon and Heide, 1999). Type 1 or acute trauma occurs from any single or occasional event such as rape or witnessing murder or surviving any natural disaster (Giulio, 2020; Solomon and Heide, 1999; Terr, 1991). Type 2 or chronic trauma occurs from multiple traumatic experiences (Giulio, 2020; Terr, 1999). Solomon and Heide (1999) further divided type 2 trauma into type 2 and type 3 trauma. Type 3 or complex trauma generally includes repeated and chronic exposures to traumatic events such as ongoing sexual or physical abuse or growing up with abusive parents (Giulio, 2020; Kisiel, Fehrenbach, Small and Lyons, 2009).

Trauma can be classified based on the types of traumatic events. SAMHSA's Trauma-Informed Care in Behavioral Health Services (2014) provides an overview of forms and types of trauma. It distinguishes between natural traumas and human-caused traumas. Naturally caused traumas include catastrophic natural events: tornadoes, lightning strikes, wildfires, avalanches, physical ailments or diseases, fallen trees, earthquakes, dust storms, volcanic eruptions, blizzards, hurricanes, cyclones, typhoons, meteorites, floods, tsunamis, epidemics, famines, and landslides or fallen boulders (NREPP, 2016). Human-caused traumas on the other hand can take various forms. Human-caused traumas can further be divided into intentional and accidental traumas. Human-caused accidental traumas include train derailment, roof falling, structural collapse, mountaineering accident, aircraft crash, car accident due to malfunction, mine collapse or fire, radiation leak, crane collapse, gas explosion, electrocution, machinery-related accident, oil spill, maritime accident, accidental gun shooting, and sports-related death (NERPP, 2016). Human-caused intentional traumas include a range of interpersonal traumas but not limited to it. Direct or indirect emotional

abuse, emotional neglect, physical abuse, physical neglect, and/or sexual abuse perpetrated by another person, often someone known or trusted by the victim, are known as interpersonal trauma experiences (Baker, Hill, Chamberlain, Hurd, Karlsson, Zielinski, Calvart and Bridges, 2020). Moreover, physical abuse and neglect, sexual assault and abuse, domestic violence, interpersonal violence, school violence, harassment, street violence, bullying, arson, terrorism, homicides or suicides, mob violence or rioting, stabbing or shooting, warfare, poisoned water supply, human trafficking, home invasion, bank robbery, genocide, and medical or food tampering, etc all are human-caused intentional trauma types (NERPP, 2016; Bellis and Zisk, 2014; Widom et al, 2007; Copeland et al, 2007; The National Child Traumatic Stress Network, US).

Trauma can also be classified based on context. For example, in relational context trauma types include interpersonal trauma, relational trauma, betrayal trauma, attachment trauma, developmental trauma, complex trauma, cumulative trauma, intergenerational trauma etc (Isobel et al, 2017). All these types overlap in definitions. Complex trauma is a type of trauma which researchers defined as multiple or chronic traumatic experiences that are (a) interpersonal in nature, (b) repeated or chronic, (c) with onset early in a child's life and (d) occurring within a child's caregiving system (Kisiel, Fehrenbach, Small and Lyons, 2009). Interpersonal Trauma are caused by another human being or group of people which means human interaction is involved (Isobel et al, 2017; Finkelhor, 2008). A range of maltreatment, interpersonal violence, abuse, assault, and neglect experiences encountered by children and adolescents (D'Andrea, Ford et al, 2012) such as familial physical, sexual, emotional abuse and incest; severe physical, medical, and emotional neglect; community-, peer-, and school-based assault, molestation, bullying experience; witnessing domestic violence; disruptions in caregiving system etc – all of which can result in trauma in children.

1.3 Impact of trauma

People who survived any traumatic experience have various symptoms (Giulio P, 2020) and some of them might recover from the effects of trauma eventually (Kessler et al, 1995) whereas a significant portion of people develop several post-traumatic stress reactions (PTSR) such as post-traumatic stress disorder, anxiety, depression or any other forms of psychopathology. Trauma causing by several different events have some common impacts such as frequent a violation of the person's core assumptions about the world and their human rights, which put the person in a state of extreme confusion and insecurity. This occurs when people or institutes such as families or schools violate, humiliate or cause major losses in child's life, who are originally supposed to elicit positive self-worth, safety and empowerment (Anne P. DePrince & Jennifer J. Freyd, 2002).

1.3.1. Impact of trauma on the brain - Psychological trauma can have adverse effects on the victim's brain (McAllister & Stein, 2011). Both animal and human neuroimaging studies confirm brain's structural and functional changes due to trauma exposure (Bremner, 2006). It was long before identified how trauma can alter the stress response system of children's brain which in turn has long term impacts in adult life of those people (Michael, De Bellis et al 1994). However, majority of trauma research had focused on psychosocial impacts of trauma (Stein and Kendall, 2004), comparatively to the neuropsychological impacts of childhood trauma. Although there are fewer studies on impact of trauma on the child brain and more studies focused so far on adult brain, (Gabowitz et al, 2008; Flor & Karl, 2010; Brenner, 2011; Malarbi, Abu-Rayya, Muscara & Stargatt, 2017), there are empirical evidences of structural changes in the brain and neuropsychological consequences of traumatic experiences in children. Therefore, it can be said that trauma impacts the brain as well as the neuropsychological functioning in several ways. Comprehending the underlying neuropsychological impacts of trauma through

neuropsychological assessments is crucial for appropriate and timely management of these children and also for preventing any misdiagnosis and mistreatment as well (Gabowitz et al, 2008).

1.4. Neuropsychological Profile

Neuropsychology study the relationship between brain and behavior that is how brain produces and controls behaviors and mental processes. Neuropsychology studies both healthy and disordered brain. According to Lezak (1995), *Clinical Neuropsychology is "an applied science concerned with the behavioral expression of brain dysfunction"*. Conceptual framework of neuropsychological assessment is identifying the brain-based reason for functional impairment. It aims to study how an individual's cognitive competencies, such as - attention, memory, language etc. are affected or changed as a result of brain injury, disease or developmental process. Within this specialization, neuropsychological tests are used to evaluate an individual's number of functions and inferences are made regarding the functionality of parts of the brain, through comparing them with normal brain or/and a brain with dysfunctions. Standard trauma evaluation includes a comprehensive assessment which includes the traumatic events, the subjecting experience of the child, the consequences, caregivers' report and previous records and several psychometric test results (Cook, Blaustein, Spinazzola, & van der Kolk (Eds.) 2003). Within this comprehensive assessment, neuropsychological assessment is crucial one in achieving several clinical goals for traumatized individuals (Wolfe & Charney, 1991) such as identifying the strengths and deficits of the child to create appropriate treatment plan. Areas of functions which usually are evaluated in trauma-informed neuropsychological assessment by neuropsychological tests usually include intelligence, attention and concentration, memory and learning, executive functions, language, visuospatial abilities (Gabowitz et al, 2008). A complete neuropsychological profile is consisted of the functions of these areas. Attention is the ability

to receive and begin to process the internal and external stimuli (Gabowits et al, 2008). This is the ability that underlies and affects the efficiency of other cognitive processes (Lezak, 2012). Learning and Memory refer to the complex process by which an individual can encode, store and later retrieve information. Language usually comprises of verbal functions (Lezak, 2012) and these are measured usually by expressive language, verbal fluency and receptive language. Executive functions are the capacities of an individual to control their behavior and engage in activities in an independent, purposive, goal-directed manner (Cahlil, Dodzik, Pyykkonen & Flanagan, 2019). A variety of skills such as visual attention, visual discrimination, spatial reasoning, visual-motor integration, and constructional ability, related to perception and processing of visuospatial information are assessed in the domain of visuo-spatial abilities. Neuropsychological assessment in children includes neuropsychological tests and an evaluation of their current behavioral status as well as a contextual evaluation (Costa et al, 2004). Also, this leads to a complete profile of each individual. According to Costa, Azambuja, Portuguez and Costa (2004), neuropsychological assessment should not be limited to the administration of psychometric and neuropsychological tests rather it should also correlate test findings with the neurological or behavioral disorder and establish which part of the brain might be involved. Moreover, the careful interpretation of result must be linked with an evaluation of children's current status and of the context in which they live.

1.5. Theoretical Background of the study

Researchers and clinicians have been studying psychological trauma for long time and came up with several different theoretical explanations including biological theories, behaviorism and psychological theories, cognitive theories, developmental and neurobiological theories (Linda and Stephen, 2020). Biological theories of trauma highlight personal and environmental factors including their interactions and human development to explain the relationships between stress, individual vulnerable predispositions, environmental

factors and psychological problems. Genetic factors such as neurohormones, neurotransmitters and brain structures are believed to contribute to the individual experience of trauma and trauma-related disorders such as PTSD (Linda and Stephen, 2020). Not all children exposed to trauma develop a full criteria PTSD diagnosis but exhibit other symptoms of post-trauma and these partial symptomatic responses to stress can significantly impact children's functioning (Carrion, Haas, Garrett, Song and Reiss, 2015). Ryan, Chaudieu, Ancelin and Saffery (2016) mentioned that the explanation behind certain individual responding to trauma in a different way than others and some developing PTSD, while others don't is response to trauma and the risk of developing PTSD are influenced by genetic predisposition, characteristics of stressor and epigenetics mechanism as well. The exact contribution and mechanism of genes influencing trauma response need to be explored more. In recent decades, more and more research on trauma's effect is focused on brain structures and functions. As mentioned earlier, neuroimaging studies confirm brain's structural and functional changes due to trauma exposure (Bremner, 2006). Moreover, trauma in different stage of development of human life have different effects of brain development (Bremmer, 2006).

1.5.1. Neurobiology of Trauma - Stress in early life alters the brain's stress response system in a molecular level (Teicher, Andersen, Polcari, Anderson, & Navalta, 2002). According to Tiecher et al (2002) early stress programs and primes the mammalian brain to be more fearful and to have an increased activation of stress hormones. These elevated activation of stress hormones further lead to alternation in overall brain's structure and functions. Many researchers described our biological response pattern to traumatic stress (Ryan et al, 2016; Kendall-Tackett, 2009; Solomon and Heide, 2005) which include Hypothalamus-Pituitary-Adrenal (HPA) axis activation. When a stressor is present or threat is perceived, the hypothamalus signals the pituitary gland which triggers the adrenal glands to

release stress hormones – adrenalin, epinephrine and cortisols – these in turn elevate the glucose level and increase heart rate. Those who are previously exposed to prolonged stress are more sensitized to such usual biological stress response i.e., HPA response making release of stress hormones quicker to subsequent stressors. This becomes traumatic stress response (Wilson, Hansen & Li, 2011). According to Wilson et al (2011), traumatic stress response is conceptualized as the alteration of the biochemical stress response system in the brain that changes an individual's ability to respond efficiently and efficaciously to future stressors. Thus, stress can lead to acute and chronic changes in brain's neurochemical systems and specific brain regions, (Teicher et al, 2002; Gabowitz, Zucker & Cook, 2008) presumably the hippocampus, amygdale and the prefrontal cortex (Teicher et al., 2002), which in turn could result in long-term changes in stress related circuits in the brain (Bremmer, 2002; Vermetten and Bremmer, 2002). Reduced corpus callosum size has also been found in maltreated children (Teicher et al, YEAR; De Bellis, YEAR). According to Teicher et al. (2002), reduced size of the corpus callosum has been associated with diminished communication between the hemispheres. Moreover, it is hypothesized that brain regions which develop slowly after postnatal period and have high GC-receptors density are the most vulnerable to stress hormones and suggestive of affected by trauma more frequently (Teicher et al, 2002).

Developmental theories of trauma and traumatic response include infants' attachment styles, developmental tasks, brain development, impact on brain and behavior due to prolonged trauma, and mechanism of consequent changes. Bruce Perry (1993) illustrates how brain develops from lower to higher parts sequentially and Perry, Pollard, Blakley, Baker and Vigilante (1995) explained how repeated neuronal activations become pattern in child's brain. In the developing brain of the children, repeated traumatic events create a hyperarousal state which means HPA axis reaction being activated constantly, this in turn alter the brain

development in those children (Perry et al. 1995, Teicher, Andersen, Polcari, Anderson, & Navalta, 2002). Because brain develops in a use-dependent pattern, that is, the more a neural pattern is activated the more the brain develops in that pattern or template, maladaptive traits and impaired attachments in infants becomes usual for a child who endured ongoing stressful situation and it impacts future functional capabilities of that child. The latent vulnerability model described by McCrory and Viding (2015) indicates that the responses due to brain alteration associated with childhood trauma might be adaptive at the time of trauma experience. Those responses were survival responses at the time of traumatic experience and were effective for that situation. Later, when the traumatic event or experience is no longer present, those survival responses, created by brain alternation, serve no purpose or might not even be effective at all. But those responses become usual response due to persistent activation and also due to their proven effectiveness at the time of stressful situation. However, the latent vulnerability model suggests that those responses lose their adaptive value since the stressful situation is over and the same responses or behaviors become maladaptive for other situations. In such a way, according to this model, certain neurobiological alterations occurring in response to maltreatment may in turn lead to maladaptive behavior in the long run in other normative environments. This forms a latent vulnerability for developing psychopathology.

According to De Bellis, developmental traumatology investigates and gives theoretical framework on how childhood maltreatment is associated with psychopathology, brain differences and neuropsychological deficits and this model is based on psychobiological model of PTSD which explains how child maltreatment related fear and reminder activates brain structures like thalamus, amygdala, hippocampus, locus coeruleus and ultimately prefrontal cortex impairing the executive functions (De Bellis, Wooley & Hoopers, 2013). This model also suggests that developing stress system affects multiple brain

functions which lead to neuropsychological deficits other than PTSD symptoms. Chronic activation of HPA system of the brain has also been found to lead to damage some parts such as hippocampus, a crucial brain area involved in memory, cognition and arousal (De Bellis et al, 2013; Carrión, Haas, Garrett, Song, & Reiss, 2010).

1.5.2. Literature review – In a review study which focused on the neurobiological impacts of childhood trauma, both in adults and children, and found that childhood trauma has adverse effects on several cognitive functions, including emotion and behavior regulation (Michael & Abigail, 2014). Several other studies indicate that the developing LHPA axis is vulnerable to dysregulation due to childhood trauma. In one meta-analysis, adults retrospectively reporting trauma showed a flatter diurnal rhythm of cortisol level with greater daily cortisol output (Gregory, Edith & Eric, 2007), while another meta-analysis showed that individuals with adulthood trauma exposure and adults with PTSD showed no differences in cortisol level. (Ellen, Erik et al., 2012). These findings support the notion that developing LHPA axis in children is vulnerable to dysregulation. Researchers suggest more work is needed to understand neurobiological consequences of trauma on a developing brain and body of a child so that the medical and mental health outcomes can be treated as early as possible. Such understanding also will lead to effective and individually tailored treatment approaches.

According to Bremmer JD (2002), some studies, through measuring with magnetic resonance imaging (MRI), revealed that adults abused in childhood have smaller volume of hippocampus. Whereas another study in children with posttraumatic stress disorder (PTSD) did not find smaller hippocampal volume, but found the overall volume of the brain and the volume of the corpus callosum smaller. However, in Bremmer's study he mentioned that functional neuroimaging studies are consistent with alteration in function and structure of medial prefrontal cortex and hippocampus in people with childhood sexual trauma and

PTSD. These results suggest childhood abuse and PTSD as being associated with long-term structural and functional changes in the brain. However, there are contradictory results among neuroimaging studies (Kitayama, Vaccarino, Kutner, Weiss, Bremner, 2005). Therefore, these could be clarified through neuropsychological studies, for example assessing learning and memory, which are regulated by hippocampus, of such children and looking into the whole neuropsychological profiles. Another functional neuroimaging study of Bremmer (2007) pointed out that the brain regions get affected by PTSD, while studying on patients with PTSD. Brain areas involved in PTSD play an important role in traumatic stress response (TSR) including memory, and an interplay between memory and stress response was found in this functional neuroimaging study (Bremmer. 2007).

In one study Beers and De Bellis (2002) selected children with maltreatment related PTSD and socio-demographically matched healthy controls without maltreatment history for neuropsychological assessment and then their performances were compared. Neuropsychological assessment included assessment of language, attention, abstract reasoning/executive function, learning and memory, viso-spatial processing and psychomotor function. Children with PTSD diagnosis showed poorer performance on measures of attention and executive function. Although this study included a small sample but both groups were socio-demographically matched and indicated cognitive deficits in children with maltreatment related PTSD. Another study of Kristin, Casey, Christiane and Christina (2009) has pointed out the issue that studies revealed cognitive deficits or deficits in neuropsychological functions in children with PTSD by comparing those without trauma history. But this cannot reveal that whether the deficits are due to trauma exposure or due to PTSD symptomatology. In their study, two groups of trauma exposed children, with and without PTSD diagnosis were taken and children with PTSD showed poorer performance in a learning task (California Verbal Learning Test – children's version) though both groups

performed below average on measures of executive functioning, attention and intellectual ability. This indicates that trauma exposure itself can have detrimental effects on neuropsychological functions of children. Studies have also been done on adults with trauma history. Early life stress experience has been found to be correlated with cognitive deficits in adults and cognitive deficits are cardinal features of depression and PTSD. So, early life trauma remains as a risk factor for such psychopathology (Matthias, Urs, Jin-Mann, Lucile and William, 2010). In this study, the relationship between early life trauma and cognitive functions were investigated. Childhood Trauma Questionnaire (CTQ), CANTAB and WRAT-3 were used as measures of childhood trauma types, cognitive functions and individual achievements respectively. It was seen that emotional abuse was associated with impaired spatial working memory performances; physical abuse was associated with impaired performance on spatial working memory and pattern recognition memory tasks. Therefore, it is suggested from the study that physical neglect and emotional abuse might be associated with memory deficits in adulthood. There might be several confounding factors present in between trauma occurred in childhood and reaching adulthood. So, studies on children with trauma experience might give clearer picture of neuropsychological consequences of trauma exposure.

A meta-analysis on neuropsychological functioning of childhood trauma and posttraumatic stress disorder, done by Malarbi, Abu-Rayya, Muscara and Stargatt (2017) reviewed studies with evidences of cognitive impairments in trauma-exposed children, both among children with and without PTSD. The studies mostly investigated trauma from familial maltreatment. It was found that trauma-exposed children (PTSD unknown) performed more poorly overall than controls. Cognitive deficits were found in children with PTSD compared to controls, including effects in general intelligence, language/verbal ability, visuospatial ability, information processing, learning and memory, and executive functions.

Children with PTSD showed poorer general intelligence and visuospatial skills compared to children without PTSD, whereas the later group showed poorer executive function and learning and memory compared to controls. The meta-analysis included 27 studies and the results indicated that the children who experienced familial trauma displayed cognitive deficits regardless of PTSD diagnosis. Therefore, this can be stated that the deficits are attributable to the trauma itself. Moreover, the non-familial trauma exposure has not been found to directly impact cognitive functions unless there is a PTSD diagnosis. This meta-analysis concluded that trauma-exposed children showed cognitive deficits compared to controls and greatest deficits were associated with PTSD diagnosis. Again, the socio-demographical variables should be taken in consideration for further such studies. And culturally appropriate tools should be used in each culture. And those with trauma experiences may have other behavioral or functional impairments in practical life other than any diagnosis, which also may impact normal living. So, the behavioral outcomes related to the brains structural and functional impairments should also be investigated through whole neuropsychological profile for looking at the areas on prevention and early interventions to be taken.

Another review study, done by Cassiers, Sabbe, Schmaal et al (2018), suggests that perhaps specific subtypes of trauma lead to specific structural and functional changes in the brain which may then lead to differential cognitive-behavioral effects and associated psychopathology. For example, structural deficits in reward circuit and genitosensory cortex was found associated with sexual abuse. Also, hyperactivity in amygdala was seen in people while recalling sad autobiographical memory. Abnormalities in fronto-limbic socioemotional networks was also found correlated with emotional abuse. White matter integrity and connectivity were found disturbed in several brain regions serving different functions in people with experience of neglect. Again, abnormalities in frontal cortex were found common

to all trauma subtypes. This review study included 25 studies. But the comparability of the studies reviewed here was further limited by the heterogeneity of study populations in respect of age, gender and comorbid psychopathology. So, this review suggests that further neuroimaging studies should take this issue into account. However, most of the studies under this systematic review were done on adults in a retrospective manner. Also, the findings give somewhat incomplete evidence as few brain regions and selective neuroimaging modalities have been being investigated so far for all subtypes. Therefore, it is important to see the cognitive and behavior patterns of those children with trauma experiences to confirm such results and also to identify how different regions of their brains are functioning so that we can take appropriate interventions.

Although several studies have identified structural and functional abnormalities in brain of children with trauma history or PTSD diagnosis, there might be other confounding factors affecting such findings such age and duration of trauma experiences, socioeconomic condition (Malarbi, Abu-Rayya, Muscara and Stargatt, 2017) and cultural differences as well. These issues should be taken under consideration in further investigations for getting more concrete findings. One important study of De Bellis et al (2002) illustrated these issues through a socio-demographically matched study. In this study, the researchers wanted to focus on the sociodemographical variation in maltreated children's brain. They included children and adolescents with maltreatment related PTSD and sociodemographically matched healthy control group for whom comprehensive clinical assessment and MRI were administered. They found differences in several brain structures in children with maltreatment-related PTSD compared to healthy control group. Age of onset of PTSD, duration of abuse experience and gender are found to have different effects on brain volume and structures. This study matched sociodemographical variable but this cannot be given any impression whether there is any effects of socioeconomical conditions on brain development

of children with trauma experience. Research also showed that social relationships have effect on physiological stress response system and developing brain (Gunnar and Quevedo, 2007). This indicates social context and family environment also play important role in brain development and if these include traumatic experience, this may also alter such development. Familial trauma is more detrimental for neurodevelopment (Gunnar and Quevedo, 2007; Kira, 2001) than non-familial trauma because people affected by non-familial trauma at least can get emotional support and comfort from family or community which people experiencing familial trauma lack (Malarbi, Abu-Rayya, Muscara and Stargatt, 2017). Also, interpersonal trauma has been found to be more associated with risks for psychiatric symptoms (Baker et al, 2020). Again, these studies are conducted mostly on adult participants. Whether or not all types of trauma have similar effects on child brain is still incompletely known. So therefore, this is also important to identify whether the structures and functions of brain of children with trauma differs in different socioeconomic conditions, age and gender because most vulnerable ones need special attention. Also, the subjective experiences of each trauma type might lead different sets of consequences across different people.

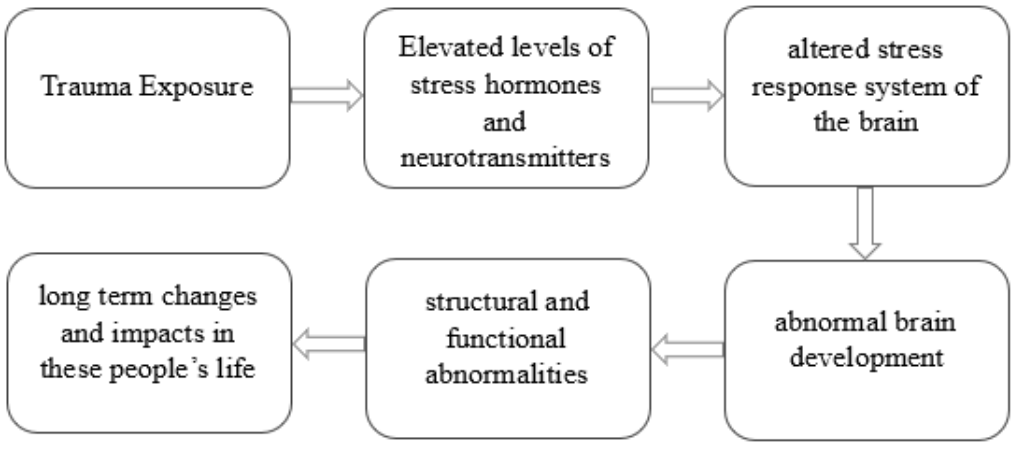

Figure 1 – Summary of how trauma affects the developing brain (Allen, 2016; Kavanaugh et al, 2016; Stein and Kendall, 2004; Michael, De Bellis et al 1994)

In summary, the contemporary definition of the wide-ranging concept, “Trauma” involves a stimulus e.g., an event or an experience causing overwhelming stressful experience in an individual which exceeds his or her usual coping capacity leading to long term consequences in that individual’s physiological, emotional, behavioral and social functioning (Guilio P, 2019; Gabowitz et al., 2008). Literature shows how different perspectives of traumatic experience and responding emerged and are added up throughout different stages of history (Linda and Stephen, 2020). Among different theoretical perspectives, the most recent and emerging perspective of trauma is the neurobiological one which demonstrates what happens within the brain during a stressful situation and how this physiological stress reactions remain perpetual when the stressful situation is a traumatic one (Teicher et al., 2002). Cognitive and behavioral perspectives of trauma shed lights on the outcome and maintaining factors of trauma. Numerous studies have been done recently on the impact of trauma on the brain, both neuroimaging and neuropsychological studies. Neuroimaging studies demonstrated impact of trauma on different brain regions such as amygdala, hippocampus, frontal cortex. Neuropsychological studies added up by showing how the functions of these brain regions i.e., memory and executive functions, are also impacted by trauma. Although these studies provided us with promising findings, there still remains inconclusive understanding. Among the various reasons for such findings, one plausible factor is most of the studies on trauma are conducted with adult population whereas theory indicates developing brain of children are more vulnerable to stressful experiences leading to alternations in the brain. Therefore, studying children’s brain functions as a result of trauma is more crucial. The alternations in the brain due to traumatic stress further leads to several cognitive, emotional, behavioral, social and interpersonal impairments. However, neuroimaging studies are not always convenient especially with children as there are ethical considerations for potential health hazards. Neuropsychological studies would be more

feasible option for inquiring and understanding the impact of trauma on brain's functions. Study with children having traumatic experiences is scarce which can give us promising evidence along with guiding us to conduct a proper assessment with each child for an effective and sustainable intervention plan. Again, socioeconomic variables, cultural background, developmental phase, onset and duration of the traumatic experience etc are all crucial factors and need to be considered while understanding the short-term and long-term impacts of trauma. However, in a developing country like Bangladesh there are multiple sources of stressors from natural disasters and economic crisis to psychosocial stressors and intentional man-made traumatic events in familial context. Since children are vulnerable to traumatic stress, demonstrated by previous research in other countries, children who go through different types of traumatic events in our country should also be taken into consideration for such studies. Also, a detailed account of the subjective experiences of the traumatic event and current difficulties of those children need to be taken for a more comprehensive understanding of their neuropsychological functions. Moreover, no such study has been done in Bangladesh till now. Seeing those children's neuropsychological profiles, who undergo different types of traumatic experiences, can give us an initial impression of the specific strengths and weaknesses of these children and can also indicate future clinical and research implication.

Since literature has shown marked impact and changes in the brain of those who undergo different traumatic experiences (Stein and Kendall, 2004), it can be hypothesized that children having trauma will have some level of neuropsychological deficits. Previous research also indicated that different types of traumas can have different types of impacts, interpersonal trauma occurring in familial context having the greatest impact (Baker et al, 2020; Malarbi et al, 2007). However, the most overlooked types of trauma are those involving interpersonal events and, in our country, the statistics of such events like physical,

sexual, emotional abuse, neglect etc are high. Neuropsychological functions such as attention, memory, executive functions, visuosptial abilities, processing speeds etc are crucial to be assessed because these have impacts on children's life, starting from academic performance through overall physical and mental health to interpersonal and social aspects. Therefore, assessing these areas, addressing each child's strengths and weaknesses and taking preventive measures along with comprehensive and individualized management are crucial for children's healthy functioning. The present study aims to see impacts of trauma on neuropsychological functioning of children.

1.6. Present condition of Trauma in Bangladesh

Majority of the studies on trauma reveals information about developed country whereas less is known about developing countries. In a less developed country like Bangladesh, there are several conditions such as abuse, violence, accidents, disasters etc which can cause severe trauma. But in Bangladesh, there is no prevalence study on child maltreatment and also there is no strong reporting system for abuse and trauma (Haque, 2019). According to the One-Stop Crisis Cell report on "Violence against Women and Children", in 2016 (January to October), there took place 6,282 physical assaults, 681 sexual assaults, 47 cases of burning, 59 acid throwing, 715 mental abuses and 238 other types of traumatic events – with a total of 8022 cases. This indicates how alarming the issue is currently in Bangladesh and how much trauma it may create among those children. In a study, among 1416 children, almost everyone reported experiencing physical and psychological abuse (Haque, 2019). Among other types of trauma, sexual abuse is quite prevalent in this country (Heisslar, 2001). In Bangladesh, this issue is less addressed while other source of trauma such as disaster, accident etc are more commonly discussed. Children are also oppressed in this country and unable to express their experiences, views and opinions

(EDUCO, 2016; Farzana and Gulshan, 2015; Mohajan, 2014). According to a report of Dhaka Tribune (2017), 13,012 children had been gone through some form of abuse during last five years. This report also mentioned the data from Bangladesh Shishu Adhikar Forum (BSAF) which revealed - 222 children were killed, 399 were raped, and 58 others were gang-raped during the first eight months of that year and in the year before 265 children were killed, 446 raped and 68 were gang-raped. These data are rising high day by day because violence against children is increasing (Farzana and Gulshan, 2015; ODHIKAR, 2015). A Study conducted by Ministry of Home Affairs, Government of Bangladesh (2005) revealed that 555 cases of child abuse were reported to police which was increased to 1,542 by 2010. This raising rate seems very fast which might be hazardous for the future of our country. Physical and psychological abuse, neglect, sexual abuse and exploitation, child labour, domestic violence etc (Farzana and Gulshan, 2015), which we know as the causes of trauma in children, are being so prevalent in our country along with physical and psychological consequences in children's life. Natural disasters and man-made disasters are another two important sources of trauma for children. Bangladesh is a highly disaster-prone country. These events have high potential for causing trauma in children in Bangladesh. Moreover, these disasters such as cyclone, floods etc create devastations in the community increasing vulnerability and risk for various forms of child abuse (Mohajan, 2014). Despite of the high prevalence of traumatic events in Bangladesh, there is no data regarding the neuropsychological impact of these trauma in children which is imperative to be illustrated for prevention and management of those impacts.

1.7. Rationale of the study

As mentioned above, majority of the studies worldwide done so far on the impact of trauma included adult participants or participants with diagnosed PTSD. Literature illustrates that studies on the impact of trauma on child brain is still scarce though this has important clinical implications. Extensive studies are required because significant association between traumatic experiences during childhood and later manifestations of psychopathology is seen both by research and clinical experiences. Although structural and functional changes due to trauma have been found by both neuroimaging and neuropsychological studies, there are several sociodemographic differences and cultural context to be considered in order to design appropriate interventions. Also, research has shown that not all children experiencing trauma develop PTSD or any full-fledged disorder, rather symptoms can manifest through impairments in cognitive and neuropsychological functions. Therefore, there remains high chances of misdiagnosis and mistreatment.

In a lower middle-income country like Bangladesh where the youth is the future of this nation, ensuring proper mental health care is an imperative. Unfortunately, children in such a developing country are more vulnerable to traumatic experiences, especially man-made trauma and risk for developing psychological problems (Deeba and Rapee, 2015). Since traumatic experiences in childhood affect their brain development and consequently emotional, cognitive, behavioral and academic outcomes, this issue needs to be addressed immediately in Bangladesh by such research. Also, there some beliefs held by majority of people that beating or yelling which are called abuse by definition, are helpful for child rearing in this country. Such beliefs posing child mental health in great danger. Shedding light on these issue that such abuses can create marked trauma in children and adolescents which lead to further mental health problems if remain unaddressed is crucial for this country.

Moreover, trauma and violence against children are considered as significant societal problems and public health concerns which cost the society a great deal through impairing children's overall functioning and extensive service needs later in life (Magruder, McLaughlin and Borbon, 2017; Kisiel, Fehrenbach, Small and Lyons, 2009). Addressing the wide-range impacts of trauma and providing appropriate treatment services are therefore very crucial to national mental health policy (Kisiel et al, 2009; Saunders and Meinig, 2000). Early detection through proper assessment and management is pivotal because by the time children and adolescents come to protective or treatment services, they develop complicated set of symptoms (Kisiel et al, 2009) which pose high chances of misdiagnosis. Therefore, the current study on the neuropsychological profiles of children who experienced different types of trauma will shed light on the issue that children with trauma experiences in Bangladesh need proper assessment and management for rewiring their brain's functions and also, they need to be protected from further trauma experiences.

1.8. Objectives of the study

The *general objective* of the study was to see whether there are neuropsychological deficits among children who experienced psychological trauma.

The *specific objectives* of the study were –

- To see the level of neuropsychological functioning of children who have psychological trauma
- To see the differences in neuropsychological functioning of children with and without psychological trauma through seeing the differences in cognitive, behavioral and emotional domains.

- To see whether neuropsychological functioning of children with psychological trauma varies with age of trauma
- To see whether neuropsychological functioning of the children with psychological trauma is associated with number of trauma exposure.
- To see whether neuropsychological functioning of the children with psychological trauma is associated with level of trauma.

Chapter 2

METHODOLOGY

Methodology

2.1. Research design

A cross-sectional survey design was followed in this study. There were two groups of participants in this study – one clinical group consisting of children having trauma and another comparison group consisting of children who reported not having trauma. Clinical sample was collected from psychiatric units of three major public hospitals in Dhaka city – Dhaka Shishu Hospital, National Institute of Mental Health and Hospital, and Dhaka Medical College Hospital. Patients from all over the country come or are referred to these hospitals. So, this population is considered as being representative of almost all places on Bangladesh. Comparison group were drawn from the community. The overall design of the study has been shown in the following flowchart -

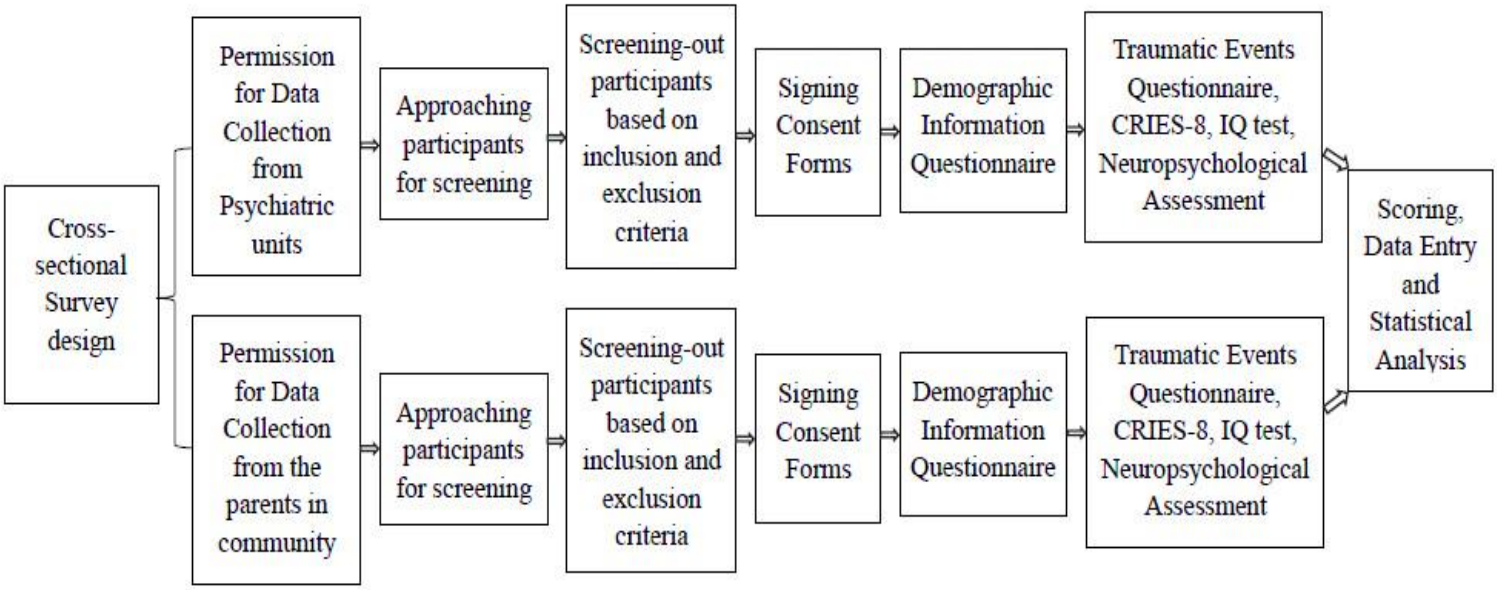

Figure 2 – Design of the Study

2.2. Study setting and duration

Data from the clinical group was collected in the counseling room of the psychiatric departments in the abovementioned settings. Considering the practical context of public hospitals in a lower-middle income country like Bangladesh, privacy was maintained in every possible way. Data of non-clinical group was collected in the homes of the participants since it was not possible to arrange any single place for data collection and the parents of the children preferred their home setting. Data were collected for five months from November 2021 to March 2022. Around three months were passed in getting data collection permission from the authority of the organizations due to their usual proceedings. It would have been useful if the data collection permission application was submitted earlier considering these issues. And, it was decided to stop the data collection because it seemed difficult to get appropriate participants for the study for several reasons such as very few parents or caregivers consented for giving information. A pilot study and awareness sessions should have been arranged before starting data collection so that more people get oriented with the research topic, purpose and implication of such study.

2.3. Sample

In this study, children identified as having trauma are denoted as clinical group and children with no mentionable trauma are denoted as non-clinical group. A purposive sampling technique was used in this study to draw the participants. The participants of both clinical and non-clinical groups were selected using purposive sampling technique because participants needed to meet specific criteria and to have certain characteristics for being recruited in this study. Around 90 children age ranged from 8 – 17 years were approached for clinical sample and among them 34 participants or the parents of the participants agreed to provide data in clinical sample. And around 40 children age ranged from 8 – 17 years were

approached and only 30 agreed to provide data for non-clinical sample. In the present study, the participants were matched based on age range and education level for both clinical and non-clinical groups.

Total number of participants were 64 (Clinical = 34; non-clinical = 30). The age range of participants of both clinical and non-clinical group was between 8 and 17 (M = 13.18, SD = 2.35 and M = 11.13, SD = 2.56 respectively). Both groups included child (8 – 11 years old) and adolescent (12 – 17 years old) participants. However, according to the definition of child given by UN convention for the rights of the child and also by domestic law of Bangladesh, individuals up to 18 years old are considered children for which all participants aged under 18 has been considered as children in this study. Since one of the inclusion criteria was participants need to be under formal education, all the participants were school going children ranging from class 1 to class 10. The detailed demographic descriptions of the participants are given in the result section in section 3.1 (see Table 3).

Children of clinical group came to the psychiatric units and screened out as having trauma and children of non-clinical group with no trauma were from the community. Children undergoing trauma at the time of hospital visits i.e. traumatic incident happened within last 1 month and still having severe symptoms for which medicines are required, were screened out and excluded from data collection. Both group of participants were selected based on some inclusion and exclusion criteria which were as below -

2.3.1. Inclusion Criterion:

For clinical group –

- School going children aged between 8 and 17 years.

- Children having traumatic experiences
- Children having post-traumatic stress symptoms or observable behavioral and/or emotional changes after traumatic experience.

For non-clinical group –

- School going children and adolescents aged between 8 and 17 years.
- Children having no mentionable/perceived traumatic experiences or, no observable behavioral and/or emotional changes after traumatic experience.

2.3.2. Exclusion Criterion:

For clinical group –

- Children with intellectual disability and other neurodevelopmental disorders;
- Children with history of Congenital or Acquired Brain Injury
- Children with any severe physical disability or mental disorder such as psychosis
- Children with ongoing traumatic experience (trauma occurring within last 1 month).

For non-clinical group –

- Children with intellectual disability and other neurodevelopmental disorders;
- Children with history of Congenital or Acquired Brain Injury
- Children with any severe physical disability or mental disorder such as psychosis

2.3.3. Parents' description -

Data were also collected from the parents of the children. Children's behaviors are highly contextual and contextual information are crucial for such kind of studies for comprehensive understanding of the problems. It is suggested to include parental information as part of larger context data in neuropsychological profiles of children. However, in this study observational data of participants' emotional and behavioral difficulties were taken from the parents.

Table 1

Sociodemographic characteristics of the parents of the participants

	Variables	Clinical Group		Non-clinical group	
		n (N=34)	*%*	*n (N=30)*	*%*
Mother	Age				
	20 – 40 y/o	21	61.8	24	80
	> 40 y/o	10	29.4	6	20
	Education				
	No formal education	1	2.9	1	3.3
	Primary	6	17.6	8	26.7
	Secondary	12	35.3	12	40
	Higher secondary	6	17.6	4	13.3
	Honors	3	8.8	5	16.7
	Masters	3	8.8	0	0
	Above	1	2.9	0	0
	Occupation				
	Homemaker	24	70.6	25	83.3
	Part-time job	3	8.8	2	6.7
	Full time job	4	11.8	2	6.7
	Business	0	0	1	3.3

	Others	1	2.9		
Father	Age				
	20 – 40 y/o	7	20.6	5	16.7
	> 40 y/o	24	70.6	22	73.3
	Education				
	No formal education	1	2.9	2	6.7
	Primary	1	2.9	8	26.7
	Secondary	12	35.3	2	6.7
	Higher secondary	11	32.4	5	16.7
	Honors	2	5.9	7	23.3
	Masters	4	11.8	2	6.7
	Above	1	2.9	0	0
	Occupation				
	Homemaker	0	0	0	0
	Part-time job	0	0	3	10
	Full time job	14	41.2	9	30
	Business	15	44.1	13	43.3
	Others	3	8.8	1	3.3

2.3.4. Trauma and distress level among the participants -

Trauma level was measured for both groups of children. An independent sample *t*-test was used to see the difference in trauma level between clinical and non-clinical group. Since there is no norm-referenced tool in this country to differentiate children with trauma from children without trauma, the difference in trauma score in this scale (CRIES-8) along with the assessment and verbal report of the parents and participants helped to select participants separately for two groups. Subjective rating of distress was also taken from participants where participants rated their level of distress after the traumatic experiences on a 10-point rating scale.

Table 2

Differences in trauma and distress level between clinical and non-clinical groups

Variable	Clinical Group		Non-clinical Group		*t*	*p*
	M	*SD*	*M*	*SD*		
Trauma level	24.56	9.33	8.7	9.3	6.73	< .001
SDR	8.3	1.49	4.17	1.29	11.784	< .001

Note. SDR = Subjective level of Distress; $p < .01$, the difference is statistically significant.

Table 2.3 shows that children in clinical group scored higher than children in the non-clinical group. Statistical significant difference [$t(62) = 6.733$; $p = .000$] had been found in trauma level between the two groups. Also, there is statistical significant difference [$t(62) = 11.784$; $p = .000$] had been found in subjective rating of distress level between the two groups. Clinical sample rated their distress feeling after trauma higher than non-clinical sample.

2.3.5. Time Gap between Traumatic experience and Data Collection -

Although it was decided to exclude the children undergoing trauma during the study period, the time gap between the most significant traumatic experience and data collection were not specified as an inclusion criterion. The time gap was calculated based on the time of the most significant traumatic experience reported by the participants in the traumatic event questionnaire (see Section 2.4.3) i.e. the time gap between the age of most significant trauma and the age during data collection. The time gap was found ranging from ≤1 to 11 years in clinical sample and ≤1 to 10 years in non-clinical sample. The average time gap among clinical sample was 3.2 years and for non-clinical sample 2.5 years. Children undergoing trauma were excluded from the study and it was specified as children having traumatic

experience within last 1 month and still having severe symptoms such as intrusions, avoidance and arousal for which medicines were necessary.

2.4. Instruments

Trauma evaluation in children is highly suggested to include a full assessment of the individual child's family, medical, psychiatric and academic history along with the traumatic incident, individual subjective experience and current conditions (Gabowitz et al, 2008). The following measures were used in this study to capture the participants' trauma experience in details -

2.4.1. Consent form –

Standard consent form was developed for the current study and was used as one of the instruments for data collection. Since the study participants were children (aged under 18), informed and understood consent were taken from participants and their parents or caregivers. There were two forms – consent form (for parents) and assent form (for child participants) attached with the appendices. The forms included explanatory statement of the study including aims and prospects. Also, it included the information on confidentiality of data and the participants' right to withdraw at any moment. The language of the consent and assent forms were articulated in an easily understandable way so that both the parents and participants can provide an understood consent by giving their signatures. A number of participants withdrew to give research data after understanding the content or duration of data collection at this point.

2.4.2. Demographic information questionnaire -

This questionnaire included information on the participants' age, gender, educational level, religion, history of physical and mental disorders and medication taken. This also included parents' age, education level and occupation. The demographic information questionnaire is attached in the appendices.

2.4.3. Traumatic Events Questionnaire -

This questionnaire included a list of different types of traumatic events which was used to identify the traumatic events experienced by each participant. This allowed to identify the nature and frequency of traumatic experiences. This questionnaire also includes the most traumatic experience each participant had, according to their subjective report and a subjective rating of distress in a 10-point rating scale. This questionnaire has been developed based on literature and relevant assessment tools available. Finally, it has been evaluated by 8 judges consisted of clinical psychologists and assistant clinical psychologists. Along with collecting data on number and type of trauma, this questionnaire asked question on whether children received support after their most traumatic experiences. This questionnaire is attached with this report in the appendices.

2.4.4. Children's Revised Impact of Event Scale – 8 (CRIES 8) –

CRIES 8 is a child-friendly measure, developed by Children and War Foundation (1998), used to screen children at risk for post-traumatic stress symptoms. It is a self-reported questionnaire which includes 8 items for two major constructs – Intrusion and Avoidance. It is appropriate for children aged 8 and above. It has been applied in different cultures and translated in several different languages. The Bangla version of this scale was translated by Deeba, Rapee, & Prvan in 2014. This scale has been found to demonstrate sound

psychometric properties (Cronbach alpha = .70, Convergent validity = .48 etc) for Bangladeshi children and adolescents. This scale was used here in this study to measure the post-traumatic symptoms of the children as a measurement of level of trauma present in the participants.

2.4.5. Neuropsychological Assessments –

Neuropsychological assessment in children includes neuropsychological tests and an evaluation of their current behavioral status as well as a contextual evaluation (Costa et al, 2004). Also, this leads to a complete profile of each individual. A process approach of neuropsychological evaluation was followed in this study which includes both qualitative account of behaviors and test scores (Gabowitz et al, 2008). The battery of tests we selected covered the following neuropsychological domains: Intelligence, attention, memory, language, visuospatial ability, and executive functions. All these tests are currently used in both clinical neuropsychology and research for measuring the abovementioned functions (see Baron, 2004; Lezak, 2004).

The following tests/subtests were used in this study are as follows –

2.4.5.1. Wechsler Abbreviated Scale of Intelligence (WASI-II) –

For measuring IQ levels of these children, *Wechsler Abbreviated Scale of Intelligence (WASI)* was used - Wechsler Intelligence Scales are used to assess intellectual functioning of people across the lifespan. These scales are individually administered and comprise standardized procedures. There are three versions of Wechsler IQ tests - (1) the Wechsler Adult Intelligence Scale (WAIS) for adults; (2) the Wechsler Intelligence Scale for Children (WISC) for children; and (3) the Wechsler Preschool and Primary Scale of Intelligence (WPSSI) for children; and an abbreviated version of WAIS and WISC, called Wechsler

Abbreviated Scale of Intelligence (WASI). WASI is used for quicker assessment of intellectual ability of people aged between 6 and 89. The WASI (Wechsler, 1999) has four sub tests - Vocabulary, Block design, Matrix reasoning and Similarities. In addition to assessing general, or full-scale IQ, the WASI is also designed to provide estimates of Verbal and Performance IQ, consistent with other Wechsler tests. The four subtests comprise the full scale and yield the full-scale IQ (FSIQ-4). The Vocabulary and Similarities subtests form the Verbal Scale combinedly and yield a Verbal IQ (VIQ) score and the Block Design and Matrix Reasoning subtests combinedly form the Performance Scale and yield a Performance IQ (PIQ) score. Administration is usually quicker and gives an estimate of an individual's level of intellectual functioning where higher scores indicate greater intellectual ability. The Wechsler scales are being used in a very large amount of neuropsychological research. All or some of the Wechsler subtests are commonly used as part of a neuropsychological assessment battery and this is a current major application of Wechsler scales. In a survey of neuropsychologists, the Wechsler scales had been found to be the most frequently used neuropsychological tests (Rabin, Barr, & Burton, 2005).

IQ has been assessed as an outcome measure in this study because controlling for IQ had been debatable in literature (De Bellis et al, 2013). 2 subtests WASI was used to measure IQ level of the participants in this study. Digit Span, a subtest of WISC, widely used in neuropsychological research studies of childhood trauma (Beers and De Bellis, 2002) was used in this study to measure attention. Letter-Number sequencing of WISC was used to measure verbal memory in this study. In this study only the expressive language ability was measured by Vocabulary subtest of WASI. Block-design of IQ test (WASI) was used as a measure of visuo-spatial abilities.

2.4.5.2. Rey-Osterreith Complex Figure test –

The Rey-Osterrieth Complex Figure Test (RCFT) is a popular measure of visuoconstructive skills and visual memory. This test is validated as a useful tool for measuring executive function (Shin et al, 2006). The Rey-Osterrieth Complex Figure Test (ROCF) was developed by Rey in 1941 for patients with traumatic brain injury and standardized by Osterrieth in 1944. Further, Shin et al (2006) proposed normative data for both children and adult population (Arango-Lasprilla, Rivera, Ertl et al, 2017). It is a widely used neuropsychological test for the evaluation of visuospatial constructional ability and visual memory. This test assesses several other functions such as attention, planning, working memory. The ROCF consists of three test conditions: Copy, Immediate Recall and Delayed Recall. At the first step, subjects are given the RCFT stimulus card, and then asked to draw the same figure. Subsequently, they are instructed to draw what they remembered. Then, after a delay of 30 min, they are required to draw the same figure once again. This test is also used to assess children's cognitive development (Arango-Lasprilla et al, 2017). In this study, the copy phase was used as a measurement of executive function and the recall and recognition phases was used for measuring non-verbal memory. The scoring system used may vary, but commonly scores are calculated considering location, accuracy and organization (Shin et al, 2006).

2.4.5.3. Delis-Kaplan Executive Function System (D-KEFS) –

This test was developed by Dean Delis, Edith Kaplan, and Joel Kramer and published first in 2001 and measures a broad range of executive functions both in adult and children population (Cahlil et al, 2019). This test includes 9 tests and applicable for age 8 and above. Each test of D-KEFS can be used as a stand-alone measure or can be used with the rest of the subtests. This assessment tool has demonstrated promising psychometric properties for both

clinical and nonclinical population. The tests are - Trail Making, Verbal Fluency, Design Fluency, Color-Word Interference, Card Sorting, Twenty Questions, Word Context, Tower, and Proverbs. In the current study, the Trail making test of D-KEFS was used which is frequently used to measure planning, organization and goal-directed activity of executive functions (Gabowitz et al, 2008). This test is used mainly for measuring visual attention and task switching. The trail making test was used as a measure of cognitive flexibility (executive function) for this study. This test has five conditions - visual scanning, number sequencing, letter sequencing, number-letter switching, and motor speed. Since the main purpose of using this test was to measure the cognitive flexibility, the number-letter switching sub-test was used in the current study.

2.4.5.4. Strength and Difficulty Questionnaire (Parent rating form; 4-17) –

Strength and Difficulty Questionnaire (SDQ) is a brief assessment tool for screening emotional and behavioral problems in children and adolescents. It was originally developed by Goodman R (1997) and validated and adapted in Bangladesh by Mullick and Goodman (2000). It is a 25 items scale with 5 subscales. The subscales include emotional problems scale, conduct problems scale, hyperactivity scale, peer problems scale and prosocial scale. The prosocial scale denotes the strength of the children. There are three versions of the scale – the parent version (for 2 – 4 years and 4 – 17 years), the teacher version (for 2 – 4 years and 4 – 17 years) and the self-reported version (for 11 to 17 years). The parent version was used in this study. SDQ is shown to be a scale with good psychometric properties. Test-retest reliability and kappa values of scores of all three versions were found highly significant ($p<0.01$). Predictive validity is also good. Multi informant prediction to rater assigned DAWBA DSM/ICD diagnoses in non-clinical sample (N=300) corresponds to an odds ratio of 52.5 (95%CI 20.6, 134.1), $p < .001$. The SDQ has a good sensitivity (90%) and specificity

(94%) and internal consistency among the subscales scores and total score are good (Mullick and Goodman, 2001).

2.5. Procedure

The present study employed a survey method of data collection for which all the data collection tools were collected and prepared after thorough literature reviewing and conceptualization of the phenomenon of trauma. The procedure of participants recruitment and data collection are summarized in the following flowchart –

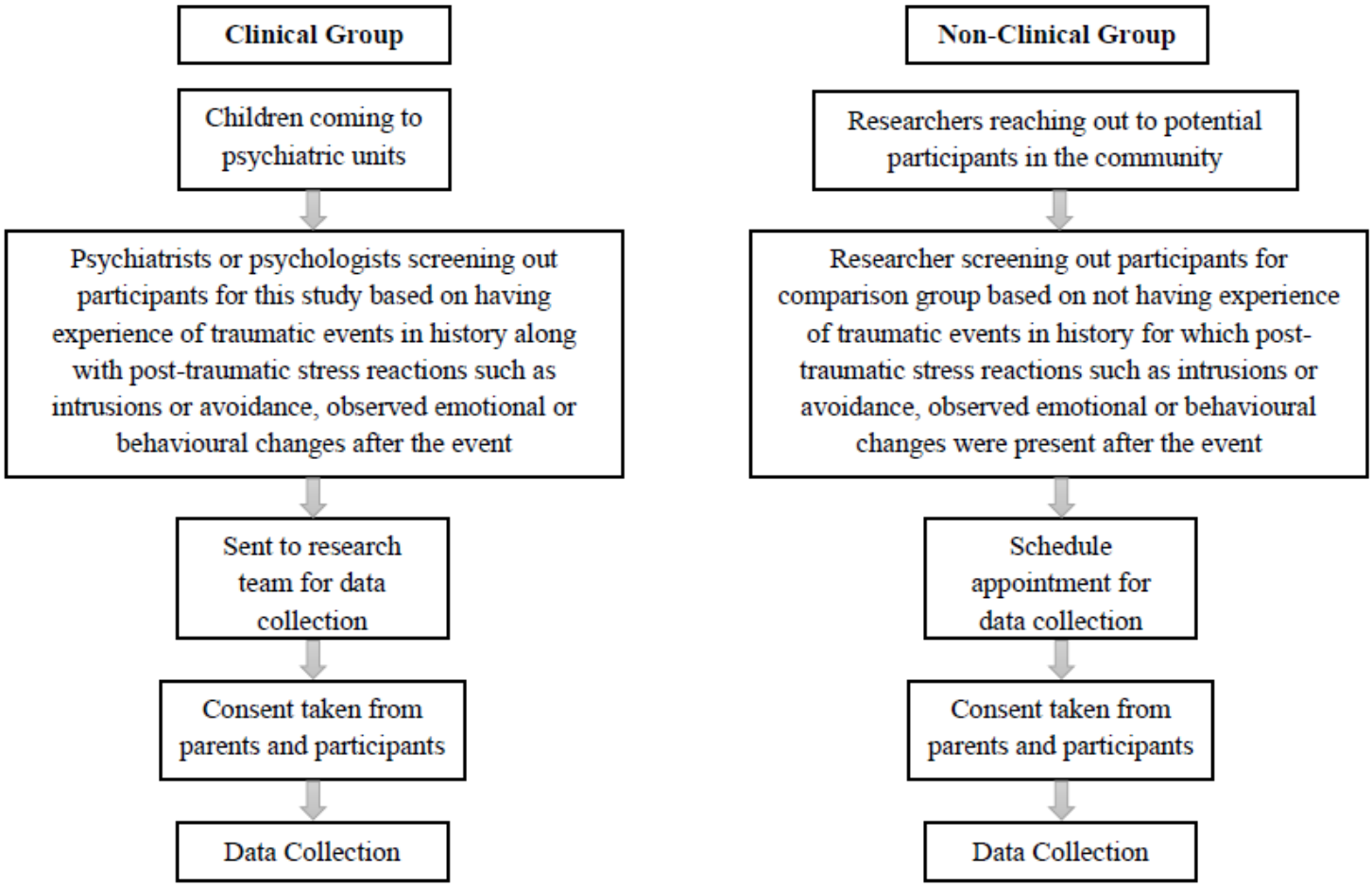

Figure 3 – Participants recruitment in both groups

Ethical permission was approved by Ethical Review committee of the department of Clinical Psychology, University of Dhaka (MP211001). Data collection permission was sought from Dhaka Medical College, One-stop Crisis Centre, Dhaka Shishu Hospital, Social Organizations working with relevant participants, Psychiatry Department of Hospitals and mental health clinics. Data collection permission was received only from and clinical data were collected from National Institute Mental Health, Dhaka Shishu Hospital and Psychiatry department of Dhaka Medical College Hospital. Before starting data collection service providers such as psychiatrists, psychologists were informed about the inclusion and exclusion criteria for identifying and referring the participants for this study. Four research assistants were recruited for clinical data collection and two research assistants were recruited for non-clinical data collection who were trainee and/or assistant clinical psychologists. The research assistants were trained in the data collection method used in this study i.e., the neuropsychological assessments as well as the phenomenological aspects of this study. Both the researcher and the research assistants collected the data.

Children who came to the psychiatric units with different emotional and behavioral complaints such as anger outbursts, decreased concentration and interest in academic work, depressed mood, social anxiety, sleep difficulties and physiological symptoms of anxiety etc were assessed by psychiatrists and clinical psychologists. After taking their history they were screened out for having trauma and referred to the research assistants for data collection. Participants were screened by the psychiatrists and psychologists based on trauma exposure history and intrusion and exclusion criteria or observed emotional and behavioral changes after the traumatic event. For non-clinical sample, research assistants reached out to the community for potential participants. Participants were screened out for this group as not having any trauma or post-traumatic stress symptoms.

Then after explaining the purpose of the study and procedure of the assessments, verbal and written consent of the parents and children's assent (see Appendix) were taken from both parents or caregivers and the child participants. The demographic information was taken from the parents and participants at first. Then the children were interviewed and assessed separately by using different measures. At first, the participants were administered the traumatic events assessment questionnaire, CRIES-8, 2 sub-tests WASI and neuropsychological tests. Then the Strength and Difficulties Questionnaire were administered to the parents.

Before administering the traumatic events assessments, the participants were explained what are some traumatic events children can experience, why these are called trauma and how they need to respond to the items in the questionnaire. They had to read each item and tick mark in the suitable response for them. They were also instructed to ask questions for clarifications if they find it difficult to understand any item. As explained in the consent forms, the participants were allowed to stop if they want or feel any distress while completing this questionnaire. Since all the participants were school going children, they could read the items on their own, some of them needed further clarifications for some items. Good rapport could be built during this part of data collection as the researchers ensured empathy and validation and also the participants seemed feeling free to ventilate regarding the traumatic experiences. The data collection settings were in public hospitals so the participants seemed not feeling fully safe or assured about the confidentiality and it might have affected the responses especially for the "sexual abuse" item. Sexual abuse is still a tabooed issue in this culture and people are not comfortable in talking about this issue, let alone disclosing information about own experience.

The CRIES-8 questionnaire was administered by using the given instruction in the scale i.e., indicating the appropriate response for each item if the participants had felt these within last 7 days. Vocabulary and Matrix reasoning subtests of WASI were administered by providing the given instructions in the WASI administration manual. The subtests of WISC-IV were also administered following instructions given in WISC-IV administration manual. Rey complex figure test was also administered by following given instruction for all three phases. Instructions for all 5 conditions of the D-KEFS trail making test was translated into Bangla at first for the research assistants and the RAs followed the Bangla instructions while administering the tests. Most of the participants seemed to enjoy the RCFT and the trail making test most.

2.6. Ethical considerations

This study received ethical clearance certificate (project number: MP211001) from Ethical Review Board of department of Clinical Psychology, University of Dhaka. It was ensured that the rights, dignity and welfare of each child participant are protected by maintaining ethical principles of research. The major ethical principles of clinical psychology research maintained in this study are discussed below.

2.6.1. Informed Consent and Assent:

Since the participants of this study were children and adolescents, both parental consent and children's assent were taken for the participation in the study. Both parents and children were given full information regarding the background and purpose of the study so that they can provide an understood consent. The consent and assent forms are attached in the appendices.

2.6.2. Voluntary participation and right to withdraw:

There was no reimbursement provided to the participants to ensure full voluntary participation with understood consent in the study. It was ensured that the participants do not feel pressured or bound to participate in the study in exchange of better treatment in the facility. The participants and their parents were given the liberty to withdraw from the study if they wanted at any stage of the data collection. Few parents even revoked from data collection for personal reasons.

2.6.3. Avoidance of Harm:

There remains the chance of stirring up any painful memory or feelings during the data collection procedure in such study. Data were collected from children in a non-threatening way so that no distress could be induced. Besides, to reduce potential harm, at first the parents and the participants were informed regarding this likely scenario. Also, data collection process was planned to be terminated or suspended for instant distress management, if required. There was opportunity of referring some participants to psychological help outside of the study, if needed. The researcher conducted few counseling sessions with the child participants before and after data collection for initial management of emotional reactions.

2.6.4. Privacy and Confidentiality:

The privacy and confidentiality of the participant's information were maintained strictly. The information of the participants was recorded by denoting a code number to each participant. Any identifiable information was kept confidential by the researcher. The researcher only has the access to the data since data were input and analyzed by the researcher alone.

2.6.5. Participant's right to know findings:

Although there was no contract of exchange of information, some participants, especially their parents were interested to know the tests results particularly the IQ score of the participants. They were provided the contact details of the researcher and the test results were shared with them later. Also, participants were provided with the email address and phone number of the researcher for knowing the findings of the study, if they feel interested.

2.7. Data entry and Analysis

Data entry was done by the researcher and data analysis was done using the IBM SPSS 22. Missing values were checked and they were missing completely at random for which this issue could be ignorable. Depending on the objectives, data analysis included descriptive statistics, group differences and association among variables. Frequency and percentages were calculated for seeing the levels of performances in different functional domains. The psychometric conversion table (Ann Arbor Publishers) was used to categorize the test scores of cognitive domains before calculating frequency and percentages. Ann Arbor publishers is a company which provides psychometric tools and relevant materials for psychological assessments. This conversion table includes converted scores from test scores to standard scores, percentile ranks, scaled scores, T scores and descriptions of scores. In this study, the converted standard scores were used for the raw scores of subtests of Wechsler scales. The descriptions of scores were modified in this study. The above average and average category were compiled into "Average" category, the low average and borderline category were compiled into "Borderline" category and the impaired level indicated "Impaired" category. The emotional and behavioral problems were categorized based on the scale's given classification and scoring system.

Independent-samples t-test and one-way analysis of variance were used to see differences of scores among groups. And bivariate Pearson's product-moment correlation coefficient (r) was used to see associations among variables. Assumptions were checked before running each analysis. All data for dependent variables were continuous data. This assumption was met for all the tests. For the independence of observation assumption, participants of one group need to be independent of another group. This assumption was also met for t-test and ANOVA. For normality assumption, data for dependent variables need to be normally distributed. Normality in data were maintained for most of the variables. Although, normality assumption was violated for some of the variables, t-test and ANOVA both are robust statistical tests which can be run even if the normality assumption is not met. Homogeneity of variance was checked while running the tests by Levene's test for equality of variance and this assumption was met for most of the variables. Linear relationship assumption was checked for correlation tests and this assumption was also met. The next chapter will include the results of these analysis.

Chapter 3

RESULTS

Results

For result, data of different variables including socio-demographic variables, trauma related variables and neuropsychological variables were analyzed using IBM SPSS 22 (2013) and descriptive statistics such as percentages, associations among variables, group differences using independent samples t-test, one-way ANOVA were undertaken. Results obtained by those analysis are presented in tabular forms and described in the following sections.

3.1 Demographic features of the participants:

The descriptions of the participants are given below -

Table 3

Sociodemographic characteristics of participants

Variable	Clinical Group		Non-clinical Group	
	n	*%*	*n*	*%*
Age				
8 – 11 y/o	10	29.4	17	56.7
12 – 17 y/o	24	70.6	13	43.3
Gender				
Male	16	*47.1*	10	*33.3*
Female	18	*52.9*	20	*66.7*
Religion				
Islam	34	*100*	30	*100*
Others	0	*0*	0	*0*
SES				
Low	2	*5.9*	11	*36.7*
Middle	26	*76.5*	18	*60*
High	6	*17.6*	1	*3.3*
Number of TE				
2-3	2	*5.9*	4	*13.3*

4-7	10	*29.4*	19	*63.3*
> 7	22	*64.7*	5	*16.7*
Type of TE				
Psychological abuse	6	*17.6*	8	*26.7*
Physical abuse	8	*23.5*	6	*20*
Sexual abuse	2	*5.9*	0	*0*
Neglect	1	*2.9*	1	*3.3*
Bullying	3	*8.8*	4	*13.3*
Domestic Violence	5	*14.7*	5	*16.7*
Traumatic loss	5	*14.7*	2	*6.7*
Separation	4	*11.8*	1	*3.3*
Natural disaster	0	*0*	1	*3.3*
Support received after trauma				
Yes	6	*17.6*	20	*66.7*
No	26	*76.5*	9	*30.7*
Single vs. multiple trauma				
Single	13	*38.2*	28	*93.3*
Multiple	21	*61.8*	0	*0*

Note. SES = Socio-economic Status; TE = Traumatic Events.

Table 3 demonstrates the distribution of participants' age, gender, religion, socio-economic status of the family and trauma related variables. Participants aged 12 – 17 years were considered as adolescents. In clinical group, 70.6% participants were adolescent. Although participants of both groups reported experiences of some form of potentially traumatic events, 76.5% clinical sample reported having received no kind of support after traumatic event exposure whereas 66.7% of non-clinical sample received support after such exposures. Also, 61.8% of clinical sample reported experiences of multiple traumas.

As per the objectives of the study the neuropsychological functions of children who experienced psychological trauma were assessed and their performances were compared to functioning of children with no mentionable trauma to see whether there are deficits in

neuropsychological functions among children having trauma. The research question was whether there are deficits in neuropsychological functioning of children who have different traumatic experiences. For investigating this, the common neuropsychological functions were clustered under cognitive, emotional and behavioural domains, and the level functioning in each domain were assessed and compared between clinical and non-clinical groups.

3.2. Cognitive functioning

The first objective was to see the level of neuropsychological functioning of children who have psychological trauma. To see the level of neuropsychological functioning, frequency and percentages were calculated in different cognitive, emotional and behavioural domains. The findings of cognitive functioning are given in the table below -

Table 4

Level of cognitive functioning among children of clinical and non-clinical groups

Cognitive Functioning	Levels	Groups			
		Clinical		Non-clinical	
		n	*%*	*n*	*%*
Intelligence	Average	3	*8.8*	15	*50*
	Borderline	22	*64.7*	12	*40*
	Impaired	8	*23.5*	3	*10*
Attention	Average	21	*61.8*	25	*83.3*
	Borderline	10	*29.4*	5	*16.7*
	Impaired	0	*0*	0	*0*
Memory	Average	15	*44.1*	24	*80*
	Borderline	11	*32.4*	5	*16.7*

	Impaired	5	*14.7*	1	*3.3*
Language	Average	7	*20.5*	16	*53.4*
	Borderline	13	*38.2*	12	*40*
	Impaired	13	*38.2*	2	*6.7*
Visuo-spatial ability	Average	8	*23.5*	14	*46.6*
	Borderline	18	*52.9*	11	*36.7*
	Impaired	4	*11.8*	5	*16.7*
Cognitive Flexibility	Average	4	*11.8*	5	*16.7*
	Borderline	8	*23.5*	4	*13.3*
	Impaired	19	*55.9*	18	*60*

Table 4 demonstrates that level of cognitive ability in impaired and borderline stage was found 88.2% among children in clinical group which was found 50% among children in non-clinical group regarding intelligence measured by WASI. In all cognitive domains, sample having history of psychological trauma scored lower than the sample without psychological trauma.

In attention domain, 29.4% of clinical sample is in borderline category and no participant showed impaired level of functioning. In memory domain, 47.1% of clinical sample were in borderline and impaired category collectively. In language domain, 76.4% of clinical sample were in borderline and impaired category. In visuo-spatial function domain, 64.7% clinical sample are in borderline and impaired category respectively. In cognitive flexibility domain, 79.4% clinical sample are in borderline and impaired category respectively.

3.3. Emotional and behavioural functioning

To assess the pattern and level of emotional and behavioural functioning among the participants, frequency and percentages were calculated which are presented in the table below -

Table 5

Level of Emotional and Behavioural Difficulties among children in clinical and non-clinical groups

Domains	Level of problems	Groups			
		Clinical		Non-clinical	
		n	*%*	*n*	*%*
Emotional problems	Non-problem	6	*17.6*	13	*43.3*
	Mild problem	2	*5.9*	9	*30*
	Higher problems	18	*42.9*	8	*26.7*
Conduct Problems	Non-problem	5	*14.7*	14	*46.7*
	Mild problem	1	*2.9*	9	*30*
	Higher problems	20	*58.8*	7	*23.4*
Hyperactivity	Non-problem	12	*35.3*	24	*80*
	Mild problem	7	*20.6*	5	*16.7*
	Higher problems	7	*20.6*	1	*3.3*
Peer Problems	Non-problem	5	*14.7*	11	*36.7*
	Mild problem	6	*17.6*	6	*20*
	Higher problems	15	*44.1*	13	*59.4*
Overall EB difficulties	Non-problem	2	*5.9*	13	*43.3*
	Mild problem	5	*14.7*	9	*30*
	Higher problems	19	*55.9*	8	*26.7*

Note: EB = Emotional and Behavioural.

Table 5 demonstrates that more participants in clinical group have higher (42.9%) level of emotional problems than non-clinical group in which 43.3% participants are in non-problem category which is close to average range. Also, more participants in clinical group have higher level of conduct problem (58.8%), hyperactivity (20.6%) and overall emotional and behavioural difficulties (55.9%) than that of non-clinical group in which greater number of participants are in non-problem category.

3.4. Differences in neuropsychological functioning

To see the differences in neuropsychological functioning of children with and without psychological trauma, an independent-samples *t*-test was used for different variables under cognitive, emotional and behavioral domains. Shapiro-Wilk statistics were not significant, indicating that assumption of normality was not violated. Levene's test was conducted to check homogeneity of variances. Equal variances were assumed for most of the variables except attention and cognitive flexibility domains.

3.4.1. Cognitive Functioning

Table 6

Differences in Intelligence between clinical and non-clinical groups

Variable	Clinical group		Non-clinical group		*t*	*p*	*Cohen's d*
	M	*SD*	*M*	*SD*			
Intelligence	78.3	9.9	90.47	14.5	3.835	< .001	1.624

$p < .05$, the difference is statistically significant.

Table 6 demonstrated that children in clinical group scored significantly lower in IQ testing compared to children in non-clinical group. The *t*-test result [*t*(50.6) = 3.83] was significant at < .001 level.

Table 7

Difference in Attention between clinical and non-clinical groups

Variable	Clinical group		Non-clinical group		*t*	*p*
	M (N)	*SD*	*M* (N)	*SD*		
Attention	97.09 (31)	14.7	102.17 (30)	16.17	1.28	.206

p > .05, the difference is not statistically significant.

Table 7 demonstrated that children in clinical group i.e., having trauma scored lower in Attention domain compared to children in non-clinical group. The *t*-test result [*t*(59)= 1.28] was not statistically significant.

Table 8

Differences in Memory between clinical and non-clinical groups

Variable	Clinical group		Non-clinical group		*t*	*p*	*Cohen's d*
	M (N)	*SD*	*M* (N)	*SD*			
Verbal memory	84.35 (31)	14.98	95.33 (30)	11.88	3.163	.002	.814
Working memory	44.15 (32)	11.37	54.86 (30)	13.34	3.408	.001	.864

Visual Memory	40.35 (31)	11.09	55.28 (28)	13.37	4.683	.000	1.215

$p < .05$, the difference is statistically significant.

Table 8 demonstrates that the children in clinical group i.e., having trauma scored significantly lower in verbal memory test, working memory test and long-term visual memory tests than the children in non-clinical group. The *t* tests are significant [$t(59) = 3.163$, $p = .002$], [$t(60) = 3.304$, $p = .001$] and [$t(57) = 4.683$, $p < .001$] at the level of < .05 respectively.

Table 9

Differences in Language ability between clinical and non-clinical groups

Variable	Clinical group		Non-clinical group		*t*	*p*	*Cohen's d*
	M (N)	*SD*	*M* (N)	*SD*			
Language	75.81 (33)	14.86	89.1 (30)	13.91	3.651	.001	.923

$p < .05$, the difference is statistically significant.

Table 9 demonstrates that the children in clinical group scored significantly lower than the children in non-clinical group in the measure of language ability. The *t* test is significant [$t(61) = 3.651$] at the level of < .05.

Table 10

Differences in Visuo-spatial ability between clinical and non-clinical groups

Variable	Clinical group	Non-clinical group	*t*	*p*	*Cohen's d*

	M (N)	*SD*	*M* (N)	*SD*			
Visuo-spatial ability	79.27 (30)	10.88	86.2 (30)	13.27	2.214	.031	.571

$p < .05$, the difference is statistically significant.

Table 10 showed the children of clinical group i.e., having trauma scored significantly lower than the children in non-clinical sample. The *t* test [$t(58) = 2.214$] is significant at the level of $< .05$.

Table 11

Differences in Executive functions between clinical and non-clinical groups

Variable	Clinical group		Non-clinical group		*t*	*p*
	M (N)	*SD*	*M* (N)	*SD*		
Planning and organizing skills	30.06 (32)	7.69	32.4 (30)	5.15	1.396	.168
Cognitive flexibility	67.58 (31)	14.77	66.67 (27)	16.81	0.220	.826

$p > .05$, the difference is not significant.

Table 11 shows that there have been found no statistically significant difference between scores of children in clinical and non-clinical samples in planning and organizing skills and cognitive flexibility. The *t* tests are not significant [$t(60) = 1.396$, $p = .168$], [$t(56) = 0.220$, $p = .826$].

3.4.2. Emotional and Behavioral Functioning

Table 12

Differences in Emotional and Behavioural Functioning between clinical and non-clinical groups

Variable	Clinical group		Non-clinical group		*t*	*p*	*Cohen's d*
	M	*SD*	*M*	*SD*			
Emotional problems	5.46	2.08	3.7	1.72	3.462	.001	.922
Conduct problems	4.80	1.07	2.66	1.56	4.392	< .001	1.167
Hyperactivity	5.88	2.23	4.13	1.67	3.345	.002	.888
Peer Problems	4.15	1.78	3.40	1.75	1.592	.117	
Overall EB difficulties	20.30	5.09	13.9	3.88	5.327	.000	1.412

Note. EB = emotional and behavioural difficulties

$p < .05$, the differences are statistically significant

Table 12 demonstrates that the children in clinical group scored significantly higher in emotional and behavioural problem domains than the children of non-clinical group, except for peer problem domain. The *t* tests are significant [$t(54) = 3.462$, $p = .001$], [$t(54) = 4.392$, $p < .001$], [$t(54) = 3.345$, $p = .002$], [$t(54) = 5.327$, $p < .001$] respectively for emotional functioning, conduct problem, hyperactivity, and overall emotional and behavioural difficulties.

3.5. Differences in neuropsychological functioning according to age of trauma experienced

To see whether neuropsychological functioning of the children with psychological trauma varies with age of trauma, a One-way between-groups analysis of variance (ANOVA) was used.

Table 13

Differences in neuropsychological functioning among different age of trauma groups

Variables	Age of trauma (y/o)	*N*	*M*	*SD*	*F* value	*p*	*η2*
Intelligence	5 – 8	9	74.33	8.69			
	9 – 12	18	80	10.89	.997	.381	.062
	13 – 16	6	79.33	8.29			
Attention	5 – 8	9	97.78	13.25			
	9 – 12	16	94.37	16.91	.813	.454	.054
	13 – 16	6	103.33	9.3			
Memory	5 – 8	9	83.89	10.54			
	9 – 12	16	82.81	19.23	.382	.686	.026
	13 – 16	6	89.17	4.91			
Language	5 – 8	9	70.22	14.44			
	9 – 12	18	79.61	16.32	1.375	.268	.083
	13 – 16	6	72.83	7.52			
Visuo-spatial	5 – 8	9	82.55	8.94			
	9 – 12	17	79.05	11.10	1.143	.334	.078
	13 – 16	4	72.75	13.54			
Cognitive Flexibility	5 – 8	7	66.42	12.14	.029	.972	.002
	9 – 12	18	68.05	17.24			

	13 – 16	6	67.5	10.83			
EB	5 – 8	7	20.14	5.92			
Difficulties	9 – 12	14	21	4.87	.393	.679	.033
	13 – 16	5	18.6	5.22			

Note. EF = Executive Function; EB = Emotional and Behavioural. $p < .05$, the difference is significant.

From table 13, it is demonstrated that age of trauma experienced was not an important factor for which cognitive, emotional and behavioural functioning might be significantly different.

3.6. Association between number of trauma exposure and neuropsychological functioning

To see whether number of trauma exposure is associated with neuropsychological functioning, a bivariate Pearson's product-moment correlation coefficient (r) was calculated.

Table 14

Correlations between number of trauma exposure and neuropsychological functioning of children with trauma

Variables	1	2	3	4	5	6	7	8	9
1. NoE	-								
2. Level of Trauma	.443**	-							
3. IQ	-.046	.007	-						
4. Attention	-.369*	-.071	.037	-					
5. Memory	.060	.013	.323	.241	-				
6. Language	-.330	-.120	.705**	.287	.175	-			
7. VS	.278	.338	.005	-.071	.415*	-.248*	-		

8. CF	.045	.090	.128	-.255	.411*	.050	.317	-	
9. EBD	.123	.212	-.296	-.044	-.280	-.309	.054	-.066	-

Note. NoE = Number of events. VS = Visuospatial. CF = Cognitive Flexibility. EBD = Emotional and behavioural difficulties. *the correlation is significant at the level of .05; **the correlation is significant at the level of .01

Table 14 shows that, there is significant positive correlation between number of traumatic event exposure and the level of trauma, r (34) = .443, p = .009. Also, there is found significant negative correlation between the number of traumatic events exposure and attention domain, r (31) = -.369, p = .041. Both correlations are in moderate level. Besides, there have been found no significant correlation between the number of traumatic event exposure and other cognitive, emotional and behavioural variables.

3.7. Association between level of trauma and neuropsychological functions

Level of trauma was measured by the CRIES-8 where higher score indicated greater impact of trauma manifested as post traumatic symptoms. To see whether level of trauma is associated with neuropsychological functioning, a bivariate Pearson's product-moment correlation coefficient (r) was calculated.

Table 15

Correlations between level of trauma and neuropsychological functioning of children with trauma

Variables	1	2	3	4	5	6	7	8
1. Level of Trauma	-							

2. IQ	.007	-						
3. Attention	-.071	.037	-					
4. Memory	.013	.323	.241	-				
5. Language	-.120	.705**	.287	.175	-			
6. VS	.338	.005	-.071	.415*	-.248	-		
7. CF	.090	.128	-.255	.411*	.050	.317	-	
8. EBD	.212	-.296	-.044	-.280	-.309	.054	-.066	-

Note. VS = Visuospatial. CF = Cognitive Flexibility. EBD = Emotional and behavioural difficulties. *the correlation is significant at the level of .05; **the correlation is significant at the level of .01

From Table 15 it is observed that there have been found no correlation between the level of trauma i.e., post-traumatic stress symptoms and the neuropsychological variables.

Chapter 4

DISCUSSION

Discussion

The aim of this study was to see whether there are neuropsychological deficits among children who experienced psychological trauma. Total 64 participants aging from 8 to 16 years were selected by using a purposive sampling technique, 34 having trauma were taken from clinical settings and 30 from the community as a comparison group. Data were collected using Children's Revised Impact of Event Scale (CRIES-8), Strength and Difficulties Questionnaire (SDQ), Wechsler Abbreviated Scale of Intelligence (WASI) and Neuropsychological assessment tools. Data were analysed using SPSS 22 and analysis included frequency, percentages, independent sample t-test, ANOVA and correlations. Results have demonstrated that participants with trauma have poorer level of functioning in different cognitive, emotional and behavioural domains than the participants in comparison group. This overall finding is consistent with previous literatures where both neuroimaging and neuropsychological studies have revealed the impact of trauma on the developing brain (Bremner, 2006). Many children get misdiagnosed as having ADHD or other emotional and behavioural disorders due to lack of intensive assessment and underreporting of trauma (Stephanie, 2015). Neuropsychological studies also separately looked at effects of trauma and PTSD (Malarbi, Abu-Rayya, Muscara & Stargatt, 2017) and revealed that trauma itself causes various cognitive, behavioural and emotional problems apart from PTSD diagnosis. This study included children with trauma without any diagnosis and compared their neuropsychological functioning with that of children without such trauma.

From demographic information of the participants (see Table 3), it's observed that both groups have exposures to traumatic events. But the clinical group had exposure to multiple traumatic events and fewer number of participants received any kind of support after the traumatic experience. Whereas, the participants of non-clinical group reported receiving

support after an exposure to traumatic event. This may have contributed to the significant difference in trauma level and subjective rating of distress (see Table 2) and also in several outcome measures between both groups. Previous literature illuminates the fact that complex trauma significantly impacts the developing brain both structurally and functionally (Gabowittz, Zucker and Cook, 2008). Previous study conducted on such population in this country also revealed similar findings that children experiencing more traumatic events show more psychological distress including PTSD symptoms (Deeba and Rapee, 2015).

The first specific objective was to see the level functioning in different cognitive, emotional and behavioural domains denoting neuropsychological functioning. Frequency and percentages of scores of children in clinical and non-clinical groups i.e., children with and without trauma were calculated to see the level of functioning in those domains. Among the participants in clinical group, greater percentage of sample showed borderline and impaired level of functioning (see Table 4) in cognitive domains and higher problems for emotional and behavioural domains (see Table 5). These findings are consistent with previous studies where it has been revealed that trauma alters the structures and functions of the developing brain and its evident in neuropsychological outcomes. (Gabowitz et al, 2008; Flor & Karl, 2010; Brenner, 2011; Malarbi, Abu-Rayya, Muscara & Stargatt, 2017). However, different findings have come in this study for visuo-spatial and cognitive flexibility domains where almost similar percentage of sample fall into the impaired category of functioning. One study conducted by Monaghan-Blout (2016) did not found deficits in visuospatial ability in trauma affected children and there are some inconsistent results for several neuropsychological variables in this population (Perna and kiefner, 2013). Alongside sample distribution being as issue, there might be other socio-cultural factors that contribute to such findings for these specific functions. Visuo-spatial ability and cognitive flexibility both are skills of executive

functions and it is well known that executive functions are still under the developing phase during childhood and adolescent period. For gathering a better explanation of these findings, there needs to be culturally adapted and age-appropriate measures to assess executive functions in this population.

Another specific objective was to see the differences in neuropsychological functioning of children with and without psychological trauma. An independent-samples t-test was used for each variable in cognitive, emotional and behavioural domains. From table 6 through 12, it is demonstrated that there are differences in neuropsychological functioning between children with trauma (clinical group) and without trauma (non-clinical group). There have been found statistically significant difference in most of the cognitive functional domains except for attention and cognitive flexibility. This indicate that children who have trauma have worsened cognitive functions than children in comparison group i.e., children with no mentionable trauma. Results also showed statistically significant differences in emotional and behavioural difficulties (see Table 12) between two groups indicating that children with trauma presenting higher problems in emotional and behavioural domains. Literature also showed that children with trauma exposure demonstrate higher level of emotional and behavioural problems (Michael & Abigail, 2014; Gabowitz et al, 2008; Miller, el-Masri and Quota, 1999) and children with abuse history are more likely to subsequently be diagnosed with a behavioural or emotional disorder (Perna and kiefner, 2013). Participants selected in this study had no diagnosis of any mental disorder but the clinical sample came to the hospital with complains of different emotional or behavioural difficulties.

Result indicates that children with psychological trauma had significantly lower level of IQ than children with no mentionable trauma (see Table 6) with a large effect size. Previous studies conducted on such population also provide evidence of impact of trauma on

intellectual development (De Bellis, Woolley, Hooper, 2013). DeBellis et al (2013) found that maltreated children with and without PTSD showed significantly lower IQ level, academic achievement and also lower performance in all other neurocognitive domains. Although majority of studies are done on maltreated children or children with adverse childhood experiences (ACE), maltreatment, violence or adverse experiences all are potentially traumatic events (PTE) for children (Cougle, Kelpetrick and Resnick, 2012). Children and adolescents in Bangladesh generally have to go through various kind of adverse experiences and maltreatment in home, school or community (Deeba and Rapee, 2015) which poses immense scope for developing trauma in these children. However, there can be additional factors acting as protective factors which reduces the risk of developing trauma or early healing of trauma such as healthy parenting, learning, family support or other emotional support sources etc (Matte-Landry, 2022).

Results also indicated that almost of half of the children from non-clinical group are in average range of intellectual ability. Rest of the children of this group are in borderline and impaired category. The IQ test and other neuropsychological measurements used in this study are not culturally adapted and not entirely culture-free. Test bias might have played a role in such findings. Delaney-Black, Covington, Ondersma et al (2002) found that exposure to violence is related to decreased IQ level and reading abilities. As it is already mentioned that Bangladesh is a developing country with low socio-economic status and high rates of violence and maltreatment toward children, every child here goes through some kind of traumatic experiences which can to some extent impact the intellectual functioning in general. So, specifically looking at the impact of trauma entirely is difficult to achieve in such studies. Same goes for the attention domain since there is no significant difference found in attention domain between children with and without psychological trauma (see Table 7)

though children without clinical group scored higher than children with trauma in this domain. This finding contradicts with several findings of previous studies though majority of studies done on adult population and study conducted on adult population indicated emotional responsiveness of trauma may interfere the cognitive control of attention (Blair et al. 2013). Sample distribution might be an issue for this study since there are a limited number of samples included in this study and random sampling was beyond the scope of this study. Although previous studies found lower performances in attention and executive functions in children with PTSD (De Belis, 2002), its inconclusive to separate the effect of trauma from the effect of PTSD (Malarabi et al 2017). It might have a cultural effect since children in this culture are not treated as children from an early age and they need to be more alert or in some case early mature. Therefore, it might act as a protective mechanism where the attention ability gets better, not impaired. Further studies in these domains are required for better understanding through longitudinal observations. There have been found statistically significant differences in language, memory and visuo-spatial ability between clinical and non-clinical samples suggesting children with trauma perform lower than the children without trauma. This supports previous findings from literature (Gabowittz, Zucker and Cook, 2008).

The third specific objective was to see whether neuropsychological functioning of the children with psychological trauma varies with age of trauma exposure, a One-way between-groups analysis of variance (ANOVA) was used. There have been found no significant differences in each domain of neuropsychological functions. However, there were seen a pattern (see Table 14) of low scores in Intelligence, Language, Visuo-spatial ability and Emotional and Behavioural difficulties among groups of younger children and older children. This may indicate that children having experienced trauma at an early age and in adolescent

period might have more impacts in their neuropsychological functioning. Previous studies and meta-analysis suggest that developmental stage of trauma exposure (age of trauma), frequency of trauma exposure and availability of support after trauma etc factors interfere with the impacts (Matte-Landry, 2022). Therefore, age at trauma exposure and age at investigations are to be considered as important factors in such studies (Malarbi et al., 2017) which were beyond the scope of this present study. A more conclusive funding could be gathered if the contribution of the above factors were analyzed separately.

The fourth objective was to see whether number of trauma exposure is associated with neuropsychological functioning. A bivariate Pearson's product-moment correlation coefficient (r) was used to see the association. A significant positive correlation was found between number of trauma exposures and level of trauma (see Table 15) and a significant negative correlation was found between number of trauma exposures and attention function. This suggests that the more the traumatic exposure the more the level of post traumatic symptoms and the lesser the attention ability though the correlations were found not to be so strong. These findings are well known from previous studies. However, number of traumatic events exposures has been found to have no correlation with any other neuropsychological variables whereas research suggests that multiple chronic traumas have more profound impacts (Gabowitz et al, 2008). Again, there are various factors such as age of trauma, support after trauma etc can contribute to the findings which could be evident if there was a larger sample in this study.

The fifth objective was to see whether level of trauma is associated with neuropsychological functioning and a bivariate Pearson's product-moment correlation coefficient (r) was calculated for this purpose. Level of trauma (trauma intensity) showed no significant correlation with any of the cognitive, emotional and behavioural variables. The

children's revised impact of event scale used to measure the level of trauma includes post-traumatic symptoms of intrusion and avoidance. This finding suggests that severity of post-traumatic stress symptoms might not be an important mediating factor for impairments in neuropsychological functioning. Trauma might impact the brain function internally regardless of the PTSS manifestations (Gedon O-Deak and Melodywiseheart, 2015).

It is also suggested that cognitive difficulties may arise quickly after trauma exposure, in case of complex trauma (Matte-Landry, Bolduc et al, 2022) which may decrease after long time passing or other protective factors contributing after the experience. Therefore, the time passed after the trauma exposure, the time assessment and all possible moderating factors need to be considered and controlled for acquiring a more conclusive finding in such studies.

4.1. Implications:

The findings of the current study pose several theoretical, clinical, social and policy implications.

4.1.1. Theoretical Implications –

The results of the study demonstrated lower level of neuropsychological functioning among children with psychological trauma which aligns with the theoretical perspective that trauma negatively impacts the developing brain. The different results for attention ability found in this study that there is no significant difference between children with and without trauma raises issues of sociocultural factors. Similar findings have been found in descriptive analysis for visuo-spatial ability and cognitive flexibility domains indicating the executive functions as one crucial variable to be carefully studied in this population. Further investigations can focus on sociocultural factors in cross-cultural studies to identify whether these factors function as moderating factors for neuropsychological outcomes in children who

undergo traumatic experiences. Findings from this study will lead to further rigorous studies in Bangladesh such as longitudinal study or outcome study.

4.1.2. Clinical Implications –

These findings will help clinicians in case conceptualization of child cases coming with different emotional, behavioral or neurodevelopmental problems. Clinicians will be able to look beyond specific diagnosis during the therapeutic process which helps children and their parents or caregivers feel motivated to work collaboratively and eventually lead to marked improvements. Clinicians will also be informed about using neuropsychological tests that enrich the assessment procedure and reports. Clinicians can be encouraged to conduct case studies with such clients with trauma which will lead to more distinctive understandings in this study area.

4.1.3. Social Implications –

Current study will be helpful to raise awareness among general population regarding the impact of different types of traumatic experiences on developing brain which can also enhance the child protection services of a country. Since there is lacking in knowledge and understanding about different types of abuse and distressing events that can produce trauma in children in this country, the specific categories of abuse, violence and accidents mentioned in this study and reported by the participants, can help the caregivers and educators realize from which type of experiences they need to protect the children and adolescents. It’s a social responsibility of the adults to protect children from abuse and violences and the findings of this study may help the population take this responsibility a bit more seriously, for their own children, and children of the community as well.

4.1.4. Policy Implications –

Since childhood trauma is currently viewed as a public health concern worldwide, and it poses greater challenge in the path of a nation's ongoing development, policy makers should take initiatives to promote prevention for all kinds of abuse and violence against children. Policy makers and relevant stakeholders need to undertake and fund appropriate management services and develop more facilities such as safe homes for children with trauma. Clinical programs of comprehensive trauma assessment including neuropsychological functioning and individually tailored management should be employed in such facilities. Findings of this study will be able to guide such initiatives. Description of the participants in this study indicated that most of the children reported experiencing physical abuse. Strict laws should be implemented in this regard and other stakeholders by whom children can be observed directly such as doctors or teachers should also be trained other than family caregivers, to identify and report such cases to appropriate services i.e., child protective services and clinical psychologists. Alongside mass awareness raising and preventive measures, strong laws need to be enforced and implemented to tackle violence against children i.e. to prevent trauma among children.

4.2. Strength and Limitations of the study

As mentioned above several times, there are some limitations in this study which are –

- *Sample size:* This study included a very limited number of samples. There were some practical considerations such as not all professionals and parents being acquainted with trauma-focused assessment, time constraint, data collection setting of public hospitals etc which limited the scope for including more samples.

- *Background of the study:* One crucial issue is that the literature is mainly based on western studies specially conducted on WEIRD cultures which guided the design of this study and against which the findings were explained.
- *Measures:* The tools used in the study especially the Wechsler scales and the neuropsychological assessment tools are not culturally adapted for this study population. Also, there is no cultural norm and the conversion table used for transforming raw scores to standard scores was also western tool. Although these measures are widely used in almost all cultures, the levels of functioning could be different for specific population.
- *Screening and assessment:* This kind of studies require comprehensive screening and assessment for participants to be selected for the study so that a more conclusive findings can be achieved. This study lacked in assessing and screening out a number of crucial factors such as parent's IQ level, caregiving system etc variable.

Despite the abovementioned limitations, there are several strengths of this study –

- *Scope of study:* This study is the first of this kind of study in this population which opens the scope of further investigations in this topic.
- *Comparison group:* This study included a comparison group denoted as non-clinical sample which posed greater confidence in the findings despite the lackings in culturally valid measures and normative data.
- *Clinical and policy implications:* This study can illuminate the issue of the detrimental effects of traumatic experiences on the developing brains of children and adolescents in the country so the preventive actions can be taken.

4.3. Recommendations:

Mental health professionals need to employ a trauma-informed approach in dealing with children coming with any neurodevelopmental or behavioural issues, not only post-traumatic stress symptoms. Children need to be assessed comprehensively for which professionals need appropriate training on trauma informed approach and trauma informed care. Awareness should be raised on violence against children and about the deleterious impacts of such violences both by professionals and policy makers. All sorts of abuse should be taken seriously for which families, school teachers and relevant stakeholders need to be trained for recognizing, identifying and taking proper action. Child protective services need to be more active including national child helpline, shelter homes and legal services as well. Further extensive studies need to be undertaken for the abovementioned purposes.

Prenatal and postnatal history should be taken in such studies in future for a better understanding and more conclusive findings as socio-economic deprivations i.e., nutritional deprivation or lack of proper stimulation etc also influence the structural and functional development of the brain (Carrion, Haas, Garret et al, 2009). Parenting or caregiving styles can also be included along with detailed family medical history. A larger sample need to be employed to find all plausible associations among important variables. Furthermore, a longitudinal design should be employed so that the impact of trauma and the changed over time can be seen more clearly. These strategies can reveal information about potential risks and protective factors so that effective management and preventive actions can be undertaken in timely manner.

Chapter 5

CONCLUSION

Conclusion

The present study was conducted based on the notion that trauma affects structures and functions of the developing brain in such a way that these children have deficits in neuropsychological functioning as outcome. Numerous studies have been done on this topic most of which are conducted on adult population in western society. The present study included 64 participants aged between 8 and 17 among which 34 children was in clinical group and 30 children in non-clinical group. A cross-sectional survey design was employed in this study and data were collected using demographic information questionnaire, traumatic events questionnaire, CRIES-8, 2 subtests WASI and several neuropsychological measures which are described in the methodology section. Data were analysed using descriptive analysis, independent samples t test, ANOVA and bivariate Pearson product-moment correlation.

The aim of this study was to see whether there are deficits in neuropsychological functioning of children with psychological trauma. The specific objectives were (1) To see the level of neuropsychological functioning of children who have psychological trauma; (2) To see the differences in neuropsychological functioning between children with and without psychological trauma through seeing the differences in cognitive, behavioral and emotional domains. (3) To see whether neuropsychological functioning of children with trauma varies with age of trauma; (4) To see whether neuropsychological functioning of the children with psychological trauma is associated with number of trauma exposure; (5) To see whether neuropsychological functioning of the children with psychological trauma is associated with level of trauma.

The findings indicated that there are deficits in different cognitive, emotional and behavioural domains which fall under neuropsychological functioning. The specific objective was partially met since majority of children with trauma showed lower level of functioning cognitive domains (intellectual ability, attention, memory, language ability) except for visuo-spatial ability and cognitive flexibility and higher level of emotional and behavioural difficulties. The beginning of discussion section explained these findings with plausible explanations. The second objective was also partially met as there have been found statistically significant differences in most of the variables except for attention and cognitive flexibility in cognitive domain and peer problems in behavioural domain. The discussion section explained how the findings relate back to the previous studies. Table 6 to 12 can be observed to see the results and the discussion section for the plausible explanation for those results which did not match with previous findings.

The third to fifth objectives did not meet as it was hypothesized the neuropsychological impacts vary with age of trauma exposure, the more the traumatic exposures, the greater the impact and level of trauma might be associated with neuropsychological impacts. All of this hypothesis were generated based on literature where it was observed that cognitive, behavioural impacts can be different along with age of trauma exposure and complex trauma poses greater impacts in children who suffer traumatic experiences. Very small sample size of this study might have played a crucial role in such findings this study. Therefore, further works are recommended with large sample along with comprehensive assessments to screen out the participants so that all possible associations among factors can be analysed. Some clinical and practical implications of the study findings are also discussed at the end of the discussion section. Alongside further rigorous studies, all stakeholders such as parents, caregivers, teachers, and other service providers need to be alert regarding the deleterious

effects of trauma in children and work together in prevention. Strong child protective measures need to be activated by policy makers and need to be obliged by the community for protecting the developing brains.

Chapter 6

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Chapter 7

APPENDICES

চিকিৎসা মনোবিজ্ঞান বিভাগ
ঢাকা বিশ্ববিদ্যালয়
কলা ভবন (৫ম তলা)
ঢাকা – ১০০০, বাংলাদেশ

DEPARTMENT OF CLINICAL PSYCHOLOGY
UNIVERSITY OF DHAKA
Arts Building (4th Floor)
Dhaka 1000, Bangladesh

Tel: 9661900-73, Ext. 7801, Fax: 880-2-9667222, E-mail: clinpsy@du.ac.bd

Date: November 05, 2023

Certificate of Amendment

Project Number : **MP211001**

Project Title : **Neuropsychological profiles of children with psychological trauma**

Investigators : **Marzia Al-Hakeem**, **Dr. Md. Shahnur Hossain** and **Professor (Rtd.) Dr. Mohammad Mahmudur Rahman**

Approval Period : **11 October 2021** to **10 October 2023**

Terms of Approval:

As per your Application, your project application has been modified to include a revised title and an additional investigation.

Please note that all the other condition in the original approval dated October 11, 2021 remain same.

. . . . . .

Chairperson
Ethics Committee
Department of Clinical Psychology
University of Dhaka

চিকিৎসা মনোবিজ্ঞান বিভাগ
ঢাকা বিশ্ববিদ্যালয়
কলা ভবন (৫ম তলা)
ঢাকা – ১০০০, বাংলাদেশ

DEPARTMENT OF CLINICAL PSYCHOLOGY
UNIVERSITY OF DHAKA
Arts Building (4th Floor)
Dhaka 1000, Bangladesh

Tel: 9661900-73, Ext. 7801, Fax: 880-2-9667222, E-mail: clinpsy@du.ac.bd

Date: October 11, 2021

Certificate of Ethical Approval

Project Number : **MP211001**

Project Title : **Differences in Neuropsychological Profile of Children who experienced different types of Trauma**

Investigators : **Marzia Al-Hakeem** and **Prof Dr. Mohammad Mahmudur Rahman**

Approval Period : **11 October 2021** to **10 October 2023**

Terms of Approval

1. Any changes made to the details submitted for ethical approval should be notified and sought approval by the investigator(s) to the Department of Clinical Psychology Ethics Committee before incorporating the change.
2. The investigator(s) should inform the committee immediately in case of occurrence of any adverse unexpected events that hampers wellbeing of the participants or affect the ethical acceptability of the research.
3. The research project is subject to monitoring or audit by the Department of Clinical Psychology Ethics Committee.
4. The committee can cancel approval if ethical conduction of the research is found to be compromised.
5. If the research cannot be completed within the approved period, the investigator must submit application for an extension.
6. The investigator must submit a research completion report.

. . . . . .

Chairperson
Ethics Committee
Department of Clinical Psychology
University of Dhaka

ঢাকা মেডিকেল কলেজ
DHAKA MEDICAL COLLEGE
Dhaka, Bangladesh

Ref:Memo No. ERC-DMC/ECC/2022/37

Date:17/02/2022

Ethical Clearance Certificate

The Ethical Committee of Dhaka Medical College has approved the following protocol.

Title of the Research Work	:	"Differences in Neuropsychological Profiles of Children Who Experienced Different types of Trauma."
Principal Investigator	:	**Marzia Al-Hakeem** MPhil (part-II) Department of Clinical Psychology University of Dhaka.
Supervisor	:	**Prof Dr. Mohammad Mahmadur Rahman** Department of Clinical Psychology University of Dhaka.
Place of Study	:	Department of Psychiatry Dhaka Medical College.
Duration	:	**6 months (After Acceptance Of Protocol).**

Prof. Dr. S.M Shamsuzzaman
Head, Department of Microbiology &
Chairman
Ethical Review Committee.
Dhaka Medical College, Dhaka.

To
The Director,
Dhaka Medical College and Hospital
Dhaka, Bangladesh

Subject: Request for permission for Mphil thesis data collection from the Department of Psychiatry.

Dear Sir,

I, Marzia Al-Hakeem, an Mphil researcher of Department of Clinical Psychology, University of Dhaka. My thesis title is "Differences in Neuropsychological Profiles of Children who Experienced Different Types of Trauma" and my thesis supervisor is Prof. Dr. Mohammad Mahmudur Rahman. In this regard, I would like to collect data from children and adolescents with trauma experience in indoor and outdoor departments of Psychiatry Department of your organization. I have received Ethical Clearance Certificate (ERC-DMC/ECC/2022/37) from Ethical Committee of Dhaka Medical College. In this regard, I am assuring that I will protect personal dignity of each research participants and will maintain all research ethical codes during data collection.

I, therefore, request you to kindly grant me the permission to collect data from Psychiatry department of your organization and oblige me thereby. Looking forward to having your kind cooperation in successfully conducting the study.

Sincerely,

Marzia Al-Hakeem
Mphil Student
Department of Clinical Psychology
University of Dhaka
Contact NO. +880 1923852813

Forwarded
23/02/2022

Dr. Abdullah al-Mamun
Professor & Head
Department of Psychiatry
Dhaka Medical College, Dhaka

Received
23-2-2022

Government of the People's Republic of Bangladesh
Office of the Director-cum-Professor
National Institute of Mental Health & Hospital
Sher-e-Bangla Nagar, Dhaka-1207

Memo No.NIMH/2021/ 1821 Date : 26.10.21

To

Prof. Dr. Mohammad Mahmudur Rahman
Department of Clinical Psychology
University of Dhaka.

Subject: Permission to collect research data.

Thank you for your letter. The Research Proposal **"Differences in Neuropsychological Profile of Children who experienced Different Types of Trauma"** has been reviewed and approved by the ethical committee of this institute.

I am happy to permit your student **Marzia Al-Hakeen** to collect data for her study from this institute.

(Prof. Dr. Bidhan Ranjan Roy Podder)
Director-cum-Professor
National Institute of Mental Health
Sher-e-Banga Nagar, Dhaka

Memo No. NIMH/2021/ 1821 / 1(2) Dated : 26.10.21

Copy forwarded for information and necessary action to :-

1. Marzia Al-Hakeem, Session: 2019-20, Reg. No. 127, Dept. of Clinical Psychology, University of Dhaka.
2. Office Copy.

(Prof. Dr. Bidhan Ranjan Roy Podder)
Director-cum-Professor
National Institute of Mental Health
Sher-e-Banga Nagar, Dhaka

Student/N/466

Bangladesh Shishu (Children) Hospital & Institute
Sher-E-Bangla Nagar, Dhaka-1207

Notification

No. Admin/ 141 /BSHI/2022 Date: 19.01.2022

To
Harizia Al-Hakeem
MPhil Researcher
Session: 2019-20, Reg. No. 127
Department of Clinical Psychology University of Dhaka

Subject: Ethical clearance for the protocol entitled **"Differences in Neuropsychological Profile of Children who experienced Different Types of Trauma."**

Your protocol entitled **"Differences in Neuropsychological Profile of Children who experienced Different Types of Trauma."** was reviewed and accepted by the Ethical Review Committee of Bangladesh Shishu (Children) Hospital & Institute. Deposit 1000/- (One thousand) taka in accounts department of this hospital for study purpose under the guidance of Dr. Md. Mustafa Mahabub, Associate Professor, Dept. of Paediatric Neuro-science, Bangladesh Shishu (Children) Hospital & Institute. Your data collection period should be 6 (Six) Months from issuing date of ethical clearance letter.

Thanking you,

Dr. Probir Kumar Sarkar
Director (Acting)
Bangladesh Shishu (Children) Hospital & Institute
Sher-E-Bangla Nagar, Dhaka-1207

Copy to:-

1. Prof. (Dr.) Reaz Mobarak, Head of department Epidemiology and Research & HD&I Unit, BSHI
2. Deputy Director (Hospital), BSHI
3. Deputy Director (Finance), BSHI
4. Epidemiologist, BSHI
5. Personal Secretary to Director, BSHI
6. Office copy

Differences in Neuropsychological Profiles of Children who have Experienced Different types of Trauma

সম্মতি পত্র (অভিভাবক এর)

প্রিয় অংশগ্রহণকারী,

আমি ঢাকা বিশ্ববিদ্যালয়ের ক্লিনিক্যাল সাইকোলজি বিভাগের একজন এম ফিল গবেষক, 'Differences in Neuropsychological Profiles of Children who have different types of Trauma Experiences' নামক গবেষণায় অংশগ্রহন করার জন্য আপনাকে অনুরোধ করছি।

গবেষণার বিষয়বস্ত ও উদ্দেশ্য

মানসিক আঘাত তৈরি করার মত বিভিন্ন ঘটনার ফলে মানুষের মস্তিষ্কে যথেষ্ঠ প্রভাব পরে। শিশু-কিশোরদের মস্তিষ্ক বিকাশ হওয়ার প্রক্রিয়ায় থাকে এবং তাদের সাথে মানসিক আঘাত সৃষ্টিকারী কোন ঘটনা ঘটলে তা মস্তিষ্ক বিকাশ প্রক্রিয়ার উপর প্রভাব ফেলে থাকে। এই প্রভাব এর ফলে এই শিশুদের মাঝে মস্তিষ্ক দ্বারা সৃষ্ট বুদ্ধিগত, আবেগিয়, আচরণগত ও সামাজিক ক্রিয়াকলাপও প্রভাবিত হয়ে থাকে। এই গবেষণার উদ্দেশ্য হল বিভিন্ন ধরণের মানসিক আঘাত সৃষ্টিকারী ঘটনার শিকার শিশুদের মাঝে বুদ্ধিগত, আবেগিয়, আচরণগত ও সামাজিক ক্রিয়াকলাপ এর ভিত্তিতে কোন পার্থক্য আছে কিনা তা খুজে বের করা। এখানে শিশুদের বুদ্ধি পরীক্ষা (আইকিউ টেস্ট) এবং মস্তিস্কের বিভিন্ন কাজের কিছু পরীক্ষা (নিউরো-সাইকোলজিক্যাল টেস্ট) করা হবে। এর থেকে আমরা জানতে পারবো কোন ধরণের ঘটনার শিকার শিশুরা বেশি ঝুকির মধ্যে আছে এবং তাদের দ্রুত ব্যাবস্থাপনা দরকার।

এখানে আপনাকে মানসিক আঘাত এর ঘটনার পরে আপনার শিশুর আবেগীয় ও আচরণগত কোন পরিবর্তন বা সমস্যা খেয়াল করেছেন কিনা তা নিয়ে একটি প্রশ্নমালা পূরণ করতে হবে।

গোপনীয়তা

এই গবেষণায় সংগৃহীত সকল তথ্য এবং আপনাদের পরিচয় সর্বোচ্চ গোপনীয়তার সাথে সংরক্ষণ করা হবে। সকল তথ্য শুধুমাত্র গবেষণার কাজে ব্যবহৃত হবে এবং আপনাদের সম্মতি ছাড়া কোন তথ্যই নেওয়া হবে না।

অংশগ্রহণকারী হিসেবে আপনার অধিকার

এই গবেষণায় অংশগ্রহণ করা সম্পূর্ণ স্বেচ্ছামূলক। আপানার এই গবেষণায় অংশগ্রহণ না করা অথবা গবেষণা থেকে কোন কারণে প্রত্যাহার করার সম্পূর্ণ অধিকার রয়েছে। আপনি যেকোন সময় অংশগ্রহণ করা বন্ধ করতে পারেন।

আমি _____ উপরে উল্লেখিত গবেষণার বিষয়বস্তু, সুবিধা অসুবিধা এবং অংশগ্রহণকারী হিসেবে আমার অধিকার জেনে বুঝে এই গবেষণায় অংশগ্রহনের জন্য সম্মতি প্রদান করছি।

_____

স্বাক্ষর ও তারিখ

এই গবেষণায় অংশগ্রহনের সম্মতি দেওয়ার জন্য আপনাকে ধন্যবাদ।

মারজিয়া আল-হাকীম

এম ফিল গবেষক

ক্লিনিক্যাল সাইকোলজি বিভাগ, ঢাকা বিশ্ববিদ্যালয়

_____

স্বাক্ষর ও তারিখ

Differences in Neuropsychological Profiles of Children who have Experienced Different types of Trauma

সম্মতি পত্র (শিশু)

প্রিয় অংশগ্রহণকারী,

আমি ঢাকা বিশ্ববিদ্যালয়ের ক্লিনিক্যাল সাইকোলজি বিভাগের একজন এম ফিল গবেষক, 'Differences in Neuropsychological Profiles of Children who have Experienced Different Types of Trauma' নামের গবেষণায় অংশগ্রহন করার জন্য আপনাকে অনুরোধ করছি।

গবেষণার বিষয়বস্ত ও উদ্দেশ্য

মানসিক আঘাত তৈরি করার মত বিভিন্ন ঘটনার ফলে মানুষের মস্তিষ্কে যথেষ্ঠ প্রভাব পরে। শিশু-কিশোরদের মস্তিষ্ক বিকাশ হওয়ার প্রক্রিয়ায় থাকে এবং তাদের সাথে মানসিক আঘাত সৃষ্টিকারী কোন ঘটনা ঘটলে তা মস্তিষ্ক বিকাশ প্রক্রিয়ার উপর প্রভাব ফেলে থাকে। এই প্রভাব এর ফলে এই শিশুদের বুদ্ধি তৈরি হওয়া এবং বিভিন্ন আচরণও প্রভাবিত হয়ে থাকে। এই গবেষণার উদ্দেশ্য হল বিভিন্ন ধরণের মানসিক আঘাত সৃষ্টিকারী ঘটনার শিকার শিশুদের মাঝে বুদ্ধি, মানসিক অবস্থা ও বিভিন্ন আচরণ এর ভিত্তিতে কোন পার্থক্য আছে কিনা তা খুজে বের করা। এর থেকে আমরা জানতে পারবো কোন ধরণের ঘটনার শিকার শিশুরা বেশি ঝুকির মধ্যে আছে এবং তাদের দ্রুত ব্যাবস্থাপনা দরকার।

এখানে আপনাকে কিছু প্রশ্নমালা পূরণ করতে হবে এবং বুদ্ধি পরীক্ষা (আইকিউ টেস্ট) ও মস্তিস্কের বিভিন্ন কাজের কিছু পরীক্ষা (নিউরো-সাইকোলজিক্যাল টেস্ট) এ অংশগ্রহণ করতে হবে।

গোপনীয়তা

এই গবেষণায় নেওয়া সকল তথ্য এবং আপনার পরিচয় সর্বোচ্চ গোপনীয়তার সাথে রাখা হবে। সকল তথ্য শুধুমাত্র গবেষণার কাজে ব্যবহৃত হবে এবং আপনাদের সম্মতি ছাড়া কোন তথ্যই নেওয়া হবে না।

অংশগ্রহণকারী হিসেবে আপনার অধিকার

এই গবেষণায় অংশগ্রহণ করা সম্পূর্ণ স্বেচ্ছামূলক। আপানার এই গবেষণায় অংশগ্রহণ না করা অথবা গবেষণা থেকে কোন কারণে প্রত্যাহার করার পূর্ণ অধিকার রয়েছে। আপনি যেকোন সময় অংশগ্রহণ করা বন্ধ করতে পারেন।

আমি _____ উপরে উল্লেখিত গবেষণার বিষয়বস্তু, সুবিধা অসুবিধা এবং অংশগ্রহণকারী হিসেবে আমার অধিকার জেনে বুঝে এই গবেষণায় অংশগ্রহনের জন্য সম্মতি প্রদান করছি।

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স্বাক্ষর ও তারিখ

এই গবেষণায় অংশগ্রহনের সম্মতি দেওয়ার জন্য আপনাকে ধন্যবাদ।

মারজিয়া আল-হাকীম
এম ফিল গবেষক
ক্লিনিক্যাল সাইকোলজি বিভাগ, ঢাকা বিশ্ববিদ্যালয়

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স্বাক্ষর ও তারিখ

Demographic Information Sheet

১। **ID:** _____ ২। **বয়সঃ**_____(বৎসর) ৩। **তারিখঃ** _____

৪। **পড়াশনাঃ** _____ (শ্রেণী) ২। **লিঙ্গঃ** নারী / পুরুষ / অন্যান্য

৫। **ধর্মঃ** ইসলাম / হিন্দু / বোদ্ধ / খ্রিষ্টান / অন্যান্য _____

৬। **জন্মক্রমঃ** _____ ৭। **বাসস্থানঃ** পরিবার এর সাথে থাকা / প্রতিষ্ঠান এ থাকা

৮। **জন্মের সময় কোন অসুবিধা ছিলো?** হ্যাঁ / না

হ্যাঁ হলে তা কি? _____

৯। **কোন মানসিক রোগ আছে?** হ্যাঁ / না

হ্যাঁ হলে তা কি? _____

১০। **মানসিক সমস্যার জন্য চিকিৎসা নেওয়া হয়েছে / চলছে?** _____

১১। **কোন শারীরিক রোগ আছে?** হ্যাঁ / না

হ্যাঁ হলে তা কি? _____

১২। **কোন প্রকার ঔষধ চলছে?** হ্যাঁ / না

হ্যাঁ হলে কিসের জন্য? _____

(মা-বাবার তথ্য)

১৩। **মা-বাবা** উভয়ই আছেন? হ্যাঁ / না _____

১৪। মা এর **বয়সঃ** _____ ১৪। বাবার **বয়সঃ** _____

১৫। মা এর **শিক্ষাগত যোগ্যতাঃ** ক) নিরক্ষর; খ) প্রাথমিক; গ) মাধ্যমিক; ঘ) উচ্চ মাধ্যমিক; ঙ) স্নাতক; চ) স্নাতকোত্তর; ছ) অন্যান্য _____

১৬। মা এর **পেশাঃ** ক) গৃহের দায়িত্ব পালন; খ) খন্ডকালীন চাকুরী; গ) পুর্নকালীন চাকুরী; ঘ) ব্যবসা; ঙ) অন্যান্য _____

১৭। বাবার **শিক্ষাগত যোগ্যতাঃ** ক) নিরক্ষর; খ) প্রাথমিক; গ) মাধ্যমিক; ঘ) উচ্চ মাধ্যমিক; ঙ) স্নাতক; চ) স্নাতকোত্তর; ছ) অন্যান্য _____

১৮। বাবার **পেশাঃ** ক) গৃহের দায়িত্ব পালন; খ) খন্ডকালীন চাকুরী; গ) পুর্নকালীন চাকুরী; ঘ) ব্যবসা; ঙ) অন্যান্য _____

১৯। পরিবারের **আর্থ-সামাজিক অবস্থাঃ** নিম্নবিত্ত / নিম্ন মধ্যবিত্ত / মধ্যবিত্ত / উচ্চ মধ্যবিত্ত / উচ্চবিত্ত

২০। **পরিবার** এ অন্য কারও কোন **মানসিক সমস্যা আছে?** হ্যাঁ / না

হ্যাঁ হলে তা কি? _____

(অভিবাবক/তথ্যদাতা যদি মা-বাবা ব্যতীত অন্য কেউ হয়ে থাকে)

২১। **তথ্যদাতার পরিচয়ঃ** _____; ২২। **বয়সঃ** _____; ২৩। **শিক্ষাঃ** _____

২৪। **পেশাঃ** _____; ২৫। **কতদিন যাবত দেখাশুনা করছেন?** _____

Traumatic Event Assessment Questionnaire for Children and Adolescents

প্রিয় অংশগ্রহণকারী,

নিচে বিভিন্ন ধরণের ঘটনা উল্লেখ করা আছে। এইধরনের ঘটনা সাধারণত আমাদের সাথে হয়ে থাকলে আমাদের অনেক মানসিক কষ্ট হয়। আপনার জীবনে নিচের কোন ঘটনাটি বা ঘটনাগুলো ঘটেছে সেটি আমরা জানতে চাই। কোন ঘটনাটি কত ঘন ঘন হয়েছে যেমন – একবার, একের অধিকবার ইত্যাদি ঘরে টিক চিহ্ন (v) দিবেন।

এর মধ্যে কোন ঘটনাটি সব চেয়ে বেশি কষ্ট বা মানসিক চাপ তৈরি করেছিলো তা সম্পর্কে অনুগ্রহপুর্বক বিস্তারিত তথ্য দিবেন। আপনার সহযোগীতার জন্য ধন্যবাদ।

	একবারও না (০)	*একবার (১)*	*একের অধিকবার (২)*	*প্রায়ই হয় (৩)*	*বেশ কয়েকবার (৪)*
আপনাকে আপনার মা-বাবা বা পরিবারের কোন সদস্য হাত দিয়ে অথবা অন্যভাবে (যেমনঃ চড়, থাপ্পর, লাথি, ঘুষি ইত্যাদি) কখনও মেরেছেন?					
আপনাকে আপনার মা-বাবা বা পরিবারের কোন সদস্য কখনও কোন জিনিস দিয়ে (যেমনঃ বেত, লাঠি, বোতল, ছুরি ইত্যাদি) মেরেছেন?					
আপনাকে আপনার শিক্ষক অথবা পরিবারের বাইরের কেউ কখনও মেরেছেন?					
আপনার ইচ্ছার বিরুদ্ধে কেউ কি কখনও আপনার শরীরে খারাপভাবে স্পর্শ করেছেন অথবা তার শরীরে আপনাকে দিয়ে খারাপভাবে স্পর্শ করিয়েছেন?					
আপনার ইচ্ছার বিরুদ্ধে কেউ কি কখনও আপনার সাথে যৌনসঙ্গম করেছেন? (যোনি, পায়ুপথে অথবা মুখমৌথুন)?					
কেউ কখনও আপনার সাথে চিৎকার-চেঁচামেচি, ছোট করে, খারাপ ভাষায় বা ভয় দেখিয়ে কথা বলেছেন বা কোন কাজে প্ররোচিত করার চেষ্টা করেছেন?					
কেউ কি কখনও আপনাকে বাসা থেকে বের করে দেওয়া					

বা পরিত্যাগ করার হুমকি দিয়েছিলেন অথবা বাস্তবেই এমনটি করেছেন?					
এমন কি কখনও হয়েছে যে আপনার বাবা-মা আপনাকে খাবার দেননি অথবা আপনার শারীরিক অসুবিধার (যেমনঃ অসুস্থ্যতা) দিকে খেয়াল করেননি?					
এমন কি হয়েছে যে আপনার বাবা-মা আপনার মনের অবস্থা বুঝতে চান নি বা আপনি যখন কষ্ট পেয়েছেন তখন সান্ত্বনা দিতে বা শান্ত করতে আসেন নি?					
কোন ব্যক্তি বা কয়েকজন ব্যক্তি মিলে কখনো কি আপনাকে উত্ত্যক্ত করেছেন বা খারাপ কথা বলে ব্যঙ্গ করেছেন যার ফলে আপনি অপমানিতবোধ করেছেন?					
আপনি কি কখনও নিজের চোখে আপনার পরিবারে ঝগড়াঝাটি, মারামারি বা চিৎকার চেঁচামেচি ইত্যাদি দেখেছেন?					
আপনাকে কি কখনও মা-বাবা বা পরিবার থেকে দুরে/অন্য কোথাও থাকতে বাধ্য হতে হয়েছিল?					
আপনাকে, আপনার পরিবারের কাউকে অথবা কাছের কোন মানুষকে কখনও অপহরণ করা হয়েছিল?					
আপনার মা বা বাবা অথবা পরিবারের কোন সদস্য কি মারা গিয়েছেন?					
আপনি কি কখনও নিজের চোখে আপনার এলাকায় বা কোথাও অন্যদের মাঝে ঝগড়াঝাটি, মারামারি বা চিৎকার-চেঁচামেচি হতে দেখেছেন অথবা এর মধ্যে					

পড়েছেন?					
আপনি কি কখনও কোন ধরণের চুরি বা ডাকাতির শিকার হয়েছেন অথবা আপনি কি কখনও কোন ধরণের চুরি বা ডাকাতি হতে দেখেছেন?					
আপনি কি কখনো কোন দুর্ঘটনার শিকার হয়েছেন বা কাওকে হতে দেখেছেন? যেমনঃ বিভিন্ন ধরণের যানবাহন দুর্ঘটনা, আগুন লাগা, ভবন ধসে পরা ইত্যাদি।					
আপনার কি কখনও অসুস্থতার কারণে হাসপাতালে চিকিৎসা নিতে গিয়ে খারাপ অভিজ্ঞতা হয়েছে, যেমনঃ হাতে ক্যানুলা পরানো বা অস্ত্রপাচার ইত্যাদি)?					
আপনি কি কখনও কোন প্রাকৃতিক দুর্যোগ এর মধ্যে পড়েছেন? যেমনঃ ভূমিকম্প, টর্নেডো, বন্যা, নদীভাঙ্গন, সুনামি ইত্যাদি।					
উপরের ঘটনাগুলোর বাইরে অন্য কোন ঘটনা (যেমনঃ কোন ঘটনার সংবাদ শুনে…)					

১। সবচেয়ে কষ্টের ও মানসিক চাপ তৈরি করার মত ঘটনা কোনটি ছিল?

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২। ওই ঘটনাটি কত মাত্রায় কষ্ট বা মানসিক চাপ তৈরি করেছিলো তা ০ থেকে ১০ এর মধ্যে উল্লেখ করবেন। ০ = কোন কষ্ট হয় নি, ৫ = মাঝামাঝি কষ্ট, ১০ = সবচেয়ে বেশি কষ্ট হয়েছিলো।

0 ১ ২ ৩ ৪ ৫ ৬ ৭ (৮) ৯ ১০

৩। তখন আপনার বয়স কত ছিল? _____

৪। ঘটনার পরে, কেও কি (কোন সংস্থা বা প্রতিষ্ঠানও হতে পারে) আপনাকে কোন ধরণের সহায়তা করেন? _____

(Deeba, Rapee, & Prvan, 2014)
Deeba, F., Rapee, R. M., & Prvan, T. (2014). Psychometric properties of the Children's Revised Impact of Events Scale (CRIES) with Bangladeshi children and adolescents. PeerJ, 2, e536. doi: 10.7717/peerj.536

THE CHILDREN'S IMPACT OF EVENT SCALE- 8-BANGLA
(CRIES-8-Bangla)

জীবনে খুব দু:খজনক ঘটনা ঘটে থাকলে অনেকসময় নীচের তালিকার কথাগুলো মানুষের মনে আসে। অনুগ্রহ করে তোমার নিজের ক্ষেত্রে এই কথাগুলো গত সাতদিনের জন্য কতখানি সত্য মনে হয় তা ডান পাশের ঘরে টিক (√) চিহ্ন দিয়ে নির্দেশ করো। যদি এগুলো গত সাতদিনে তোমার মনে না এসে থাকে তাহলে "একদম না" ঘরে টিক (√) দাও।

		একদম না	খুব কম	মাঝে মাঝে	প্রায়ই
১	তুমি যখন চাও না তখনও কি তোমার ঘটনাটি মনে পড়ে?	[ ]	[ ]	[ ]	[ ]
২	তুমি কি তোমার স্মৃতি থেকে ঘটনাটি মুছে ফেলার চেষ্টা করো?	[ ]	[ ]	[ ]	[ ]
৩	তোমার কি থেকে থেকে ঘটনাটি নিয়ে খুব কষ্ট হয়?	[ ]	[ ]	[ ]	[ ]
৪	তুমি কি ঘটনাটি মনে করিয়ে দেয় এমন বিষয়গুলো (যেমন- একটি জায়গা বা পরিস্থিতি, কোন মানুষ) এড়িয়ে চলো?	[ ]	[ ]	[ ]	[ ]
৫	তুমি কি ঘটনাটি নিয়ে কথা না বলার চেষ্টা করো?	[ ]	[ ]	[ ]	[ ]
৬	তোমার মনে কি হঠাৎ ঐ ঘটনার ছবি ভেসে ওঠে?	[ ]	[ ]	[ ]	[ ]
৭	অন্যান্য সবকিছু কি তোমাকে ঐ ঘটনাটি নিয়ে ভাবিয়ে তোলে?	[ ]	[ ]	[ ]	[ ]
৮	তুমি কি সেই ঘটনাটি না ভাবার চেষ্টা করো?	[ ]	[ ]	[ ]	[ ]

(Translated by, Farah Deeba)

শব্দভান্ডার (Vocabulary)

START			STOP	
Start Point Ages 6-8: Item 5 Ages 9-89 Item 9	**Reverse Rule** All Ages: Administer Items 1-4 in forward sequence if score of 0 or 1 on Item 5 or 6. Ages 9-89: Administer Items 5 -8 in reverse sequence if score of 0 or 1 on Item 9 or 10	**Discontinue Rule** After **5** consecutive scores of 0	**Stop point** **Ages 6-8:** After Item 30 **Ages 9-11:** After Item 34 **Ages 12-16:** After item 38 **Ages 17-89:** No stop point	**Scoring Rule** **Items 1-4:** 0 or 1 **Items 5-42:** 0, 1, or 2

শব্দ ভান্ডার (Vocabulary)

Item	Response	Score
১. মাছ		0 or 1
২. কোদাল		0 or 1
৩. মানচিত্র		0 or 1
৪. ঝিনুক		0 or 1
৫. শার্ট		0,1or2
৬. জুতা		0,1or2
৭. টর্চলাইট		0,1or2
৮. গাড়ী		0,1or2
৯. নাস্তা		0,1or2
১০. পাখি		0,1or2
১১. ক্যালেন্ডার		0,1or2
১২. গৃহপালিত		0,1or2
১৩. বেলুন		0,1or2
১৪. পুলিশ		0,1or2
১৫. কুমির		0,1or2
১৬. ঘন্টি		0,1or2
১৭. ঠেলাগাড়ী		0,1or2
১৮. সংখ্যা		0,1or2
১৯. ছুটি		0,1or2
২০. নৃত্য		0,1or2
২১. দোষারোপ		0,1or2

Item	Response	Score
২২. আপ্যায়ন		0,1or2
২৩. খ্যাতিমান		0,1or2
২৪. তাড়াহুড়ো		0,1or2
২৫. উদ্দেশ্য		0,1or2
২৬. রুপান্তর		0,1or2
২৭. দুঃসাহসী		0,1or2
২৮. আগ্রহান্বিত		0,1or2
২৯. অপ্রাসঙ্গিক		0,1or2
৩০. উন্মোচন		0,1or2
৩১. প্রথা		0,1or2
৩২. দশক		0,1or2
৩৩. সমৃদ্ধকরণ		0,1or2
৩৪. একনিষ্ঠ		0,1or2
৩৫. তাড়না		0,1or2
৩৬. উদ্বেলিত		0,1or2
৩৭. প্রবনতা		0,1or2
৩৮. রোমন্থন		0,1or2
৩৯. উদ্ধত		0,1or2
৪০. সবিরাম		0,1or2
৪১. কুলঙ্গী		0,1or2
৪২. ধনন্তরী		0,1or2
	Total raw score	

4. Matrix Reasoning

Start Point
Administer Sample Items
A and B first
Ages 6-8: Item 1
Ages 9-11: Item 5
Ages 12-44: Item 7
Ages 45-79: Item 5
Ages 80-89: Item 1

Reverse Rule
Ages 9-11 and Ages 45-79: Administer Items 1-4 in reverse sequence if score of 0 on Item 5 or 6.
Ages 12-44: Administer Items 1-6 in reverse sequence if score of 0 on Item 7 or 8.

Discontinue Rule
After 4 consecutive scores of 0 or after 4 scores of 0 on 5 consecutive items

Stop point
Ages 6-8: After Item 28
Ages 9-11: After Item 32
Ages 12-44: No stop point
Ages 45-79: After Item 32
Ages 80-89: After Item 28

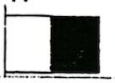
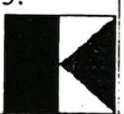
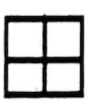
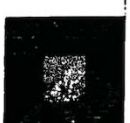
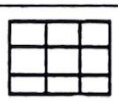
Scoring Rule
Items 1-35: 0 or 1

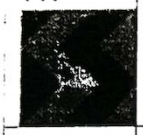
Item	Response Options (Circle One)						Score (0 or 1)		Item	Response Options (Circle One)						Score (0 or 1)
A.	1	**2**	3	4	5	DK			18	**1**	2	3	4	5	DK	
B.	1	2	3	4	**5**	DK			19	**1**	2	3	4	5	DK	
1	1	**2**	3	4	5	DK			20	1	2	3	**4**	5	DK	
2	1	2	3	**4**	5	DK			21	1	2	3	4	**5**	DK	
3	1	**2**	3	4	5	DK			22	1	2	3	4	**5**	DK	
4	1	2	3	**4**	5	DK			23	1	**2**	3	4	5	DK	
5	1	2	**3**	4	5	DK			24	1	**2**	3	4	5	DK	
6	**1**	2	3	4	5	DK			25	**1**	2	3	4	5	DK	
7	**1**	2	3	4	5	DK			26	1	2	3	4	**5**	DK	
8	1	2	**3**	4	5	DK			27	1	2	3	**4**	5	DK	
9	1	2	3	4	**5**	DK			28	1	2	**3**	4	5	DK	
10	1	2	3	4	**5**	DK			29	1	2	**3**	4	5	DK	
11	1	2	3	4	**5**	DK			30	1	2	3	**4**	5	DK	
12	1	**2**	3	4	5	DK			31	**1**	2	3	4	5	DK	
13	1	2	**3**	4	5	DK			32	1	2	3	**4**	5	DK	
14	**1**	2	3	4	5	DK			33	1	**2**	3	4	5	DK	
15	1	**2**	3	4	5	DK			34	1	2	**3**	4	5	DK	
16	1	2	3	**4**	5	DK			35	1	2	3	4	**5**	DK	
17	1	2	**3**	4	5	DK										
													Total	raw	score	

Maximum Raw Score: Ages 6-8: 28, Ages 9-11:32, Ages 12-44: 35, Ages 45-79: 32, Ages 80-89: 28

ব্লক ডিজাইন (Block design)

START **Start Point** Ages 6-8: Design 1 Ages 9-89: Design 3	**Reverse Rule** Ages 9-89: Administer Items 1-2 in reverse sequence if score of 0 or 1 on Item 3 or 4	**Discontinue Rule** After 3 consecutive scores of 0	**Scoring Rule** **Items 1-4:** 2 for a correct design on Trial 1 1 for a correct design on Trial 2 0 for incorrect designs on Trials 1 & 2 **Items 5-13:** 0-7

Design	Time limit	Incorrect design	Completion time in seconds	Correct Design	Score (Circle the appropriate score for each design.)
1. 	30"	Trial 1  Trial 2 		Y N	0 1 2
2. 	60"	Trial 1  Trial 2 		Y N	0 1 2
3. 	60"	Trial 1  Trial 2 		Y N	0 1 2
4. 	60"	Trial 1  Trial 2 		Y N	0 1 2
5. 	60"			Y N	21"-60" 16"-20" 11"-15" 1"-10" 0 4 5 6 7
6. 	60"			Y N	21"-60" 16"-20" 11"-15" 1"-10" 0 4 5 6 7
7. 	60"			Y N	21"-60" 16"-20" 11"-15" 1"-10" 0 4 5 6 7
8. 	60"			Y N	21"-60" 16"-20" 11"-15" 1"-10" 0 4 5 6 7
9. 	60"			Y N	21"-60" 16"-20" 11"-15" 1"-10" 0 4 5 6 7
10 	120"			Y N	66"-120" 46"-65" 31"-45" 1"-30" 0 4 5 6 7

Design	Time limit	Incorrect design	Completion time in seconds	Correct Design	Score (Circle the appropriate score for each design.)
11. 	120"			Y N	76"- 120" 56"- 75" 41"- 55" 1"- 40" 0 4 5 6 7
12. 	120"			Y N	76"- 120" 56"- 75" 41"- 55" 1"- 40" 0 4 5 6 7
13. 	120"			Y N	76"- 120" 56"- 75" 41"- 55" 1"- 40" 0 4 5 6 7
			Total raw	Score	

mv`„k¨ (Similarities)

3. Digit Span

Start
Ages 6–16:
Forwards: Item 1
Backwards: Sample, then Item 1

Discontinue
Forwards: After scores of 0 on *both trials* of an item
Backwards: After scores of 0 on *both trials* of an item

Score
Score 0 or 1 point for each trial
DSF & DSB
Total Raw Score for DS Forwards and Backwards, respectively
LDSF & LDSB
Number of digits recalled on last trial scored 1 point for DS Forwards and Backwards, respectively

Forwards – Trial	Response	Trial Score	Item Score
6–16 1.	2 – 9	0 1	0 1 2
	4 – 6	0 1	
2.	3 – 8 – 6	0 1	0 1 2
	6 – 1 – 2	0 1	
3.	3 – 4 – 1 – 7	0 1	0 1 2
	6 – 1 – 5 – 8	0 1	
4.	8 – 4 – 2 – 3 – 9	0 1	0 1 2
	5 – 2 – 1 – 8 – 6	0 1	
5.	3 – 8 – 9 – 1 – 7 – 4	0 1	0 1 2
	7 – 9 – 6 – 4 – 8 – 3	0 1	
6.	5 – 1 – 7 – 4 – 2 – 3 – 8	0 1	0 1 2
	9 – 8 – 5 – 2 – 1 – 6 – 3	0 1	
7.	1 – 8 – 4 – 5 – 9 – 7 – 6 – 3	0 1	0 1 2
	2 – 9 – 7 – 6 – 3 – 1 – 5 – 4	0 1	
8.	5 – 3 – 8 – 7 – 1 – 2 – 4 – 6 – 9	0 1	0 1 2
	4 – 2 – 6 – 9 – 1 – 7 – 8 – 3 – 5	0 1	

Backwards – Trial	Response	Trial Score	Item Score
6–16	8 – 2		
	5 – 6		
1.	2 – 1	0 1	0 1 2
	1 – 3	0 1	
2.	3 – 5	0 1	0 1 2
	6 – 4	0 1	
3.	5 – 7 – 4	0 1	0 1 2
	2 – 5 – 9	0 1	
4.	7 – 2 – 9 – 6	0 1	0 1 2
	8 – 4 – 9 – 3	0 1	
5.	4 – 1 – 3 – 5 – 7	0 1	0 1 2
	9 – 7 – 8 – 5 – 2	0 1	
6.	1 – 6 – 5 – 2 – 9 – 8	0 1	0 1 2
	3 – 6 – 7 – 1 – 9 – 4	0 1	
7.	8 – 5 – 9 – 2 – 3 – 4 – 6	0 1	0 1 2
	4 – 5 – 7 – 9 – 2 – 8 – 1	0 1	
8.	6 – 9 – 1 – 7 – 3 – 2 – 5 – 8	0 1	0 1 2
	3 – 1 – 7 – 9 – 5 – 4 – 8 – 2	0 1	

LDSF
Max = 9

Digit Span Forwards (DSF)
Total Raw Score
(Maximum = 16)

LDSB
Max = 8

Digit Span Backwards (DSB)
Total Raw Score
(Maximum = 16)

Total Raw Score
(Maximum = 32)

7. Letter-Number Sequencing

Start
Ages 6–7: Qualifying Items, Sample Item, then Item 1
Ages 8–16: Sample Item, then Item 1

Discontinue
If child is unable to respond correctly to either Qualifying Item or after scores of 0 on *all three trials* of an item.

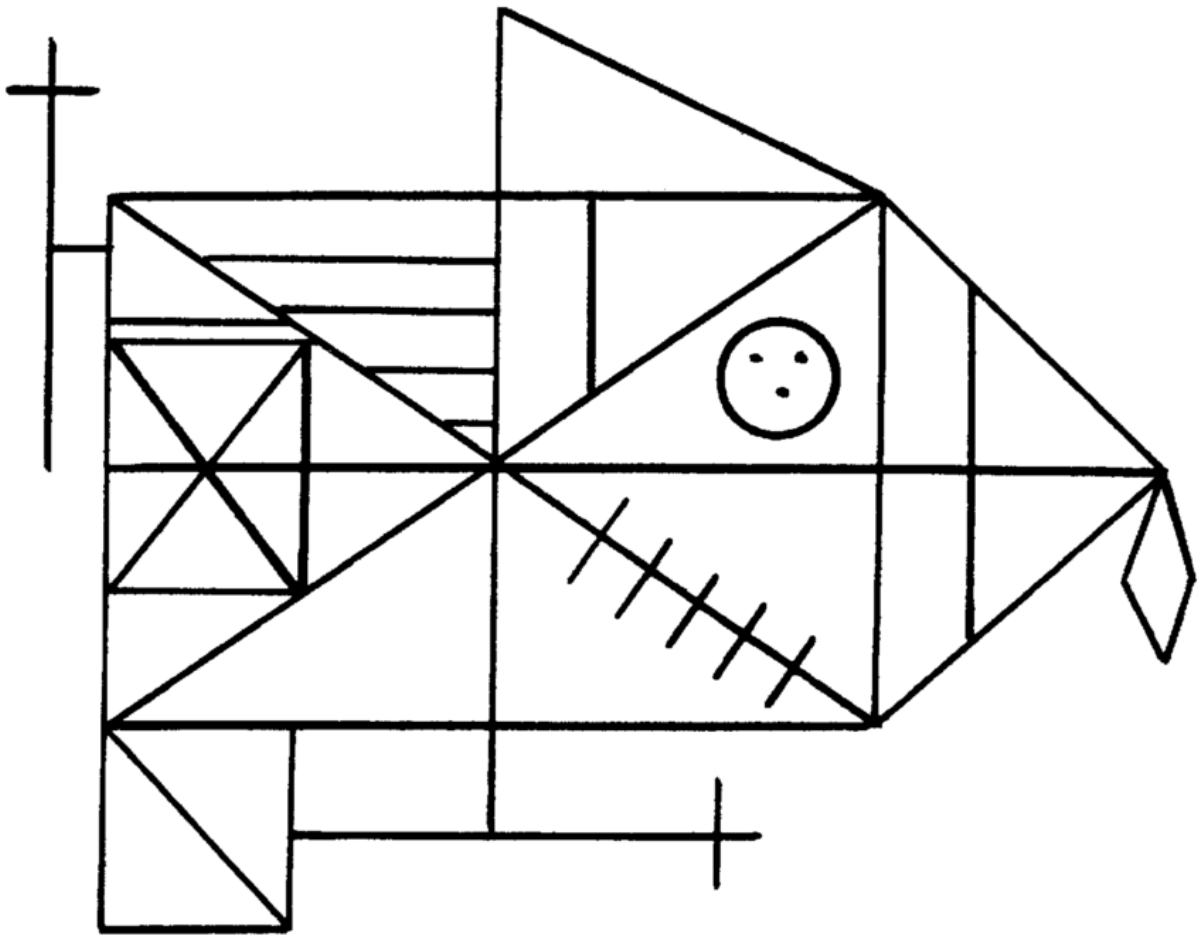
Score
Score 0 or 1 point for each trial

	Qualifying Item	Correct Response	Correct?
6–7	Counting	Child counts to three.	Y N
	Alphabet	Child recites alphabet to the letter C.	Y N

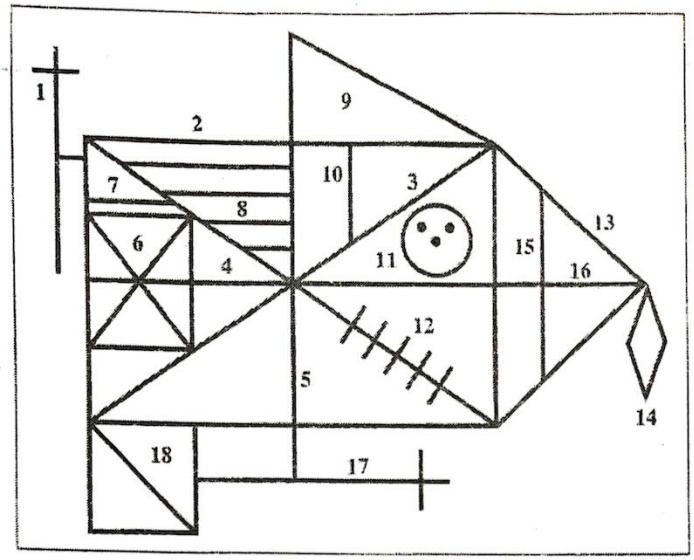
	Item	Trial	Correct Responses		Verbatim Response	Trial Score	Item Score
8–16		1. A - 2	2 - A	A - 2			
		2. B - 3	3 - B	B - 3			
	1.	1. A - 3	3 - A	A - 3		0 1	0 1 2 3
		If the child responds A–3 immediately correct the child as instructed in the manual.					
		2. B - 1	1 - B	B - 1		0 1	
		3. 2 - C	2 - C	C - 2		0 1	
	2.	1. C - 4	4 - C	C - 4		0 1	0 1 2 3
		2. 5 - E	5 - E	E - 5		0 1	
		3. D - 3	3 - D	D - 3		0 1	
	3.	1. B - 1 - 2	1 - 2 - B	B - 1 - 2		0 1	0 1 2 3
		2. 1 - 3 - C	1 - 3 - C	C - 1 - 3		0 1	
		3. 2 - A - 3	2 - 3 - A	A - 2 - 3		0 1	
	4.	1. D - 2 - 9	2 - 9 - D	D - 2 - 9		0 1	0 1 2 3
		2. R - 5 - B	5 - B - R	B - R - 5		0 1	
		If the child responds 5–R–B or R–B–5, say **Remember to say the letters in order.**					
		3. H - 9 - K	9 - H - K	H - K - 9		0 1	
	5.	1. 3 - E - 2	2 - 3 - E	E - 2 - 3		0 1	0 1 2 3
		If the child responds 3–2–E or E–3–2, say **Remember to say the numbers in order.**					
		2. 9 - J - 4	4 - 9 - J	J - 4 - 9		0 1	
		3. B - 5 - F	5 - B - F	B - F - 5		0 1	
	6.	1. 1 - C - 3 - J	1 - 3 - C - J	C - J - 1 - 3		0 1	0 1 2 3
		2. 5 - A - 2 - B	2 - 5 - A - B	A - B - 2 - 5		0 1	
		3. D - 8 - M - 1	1 - 8 - D - M	D - M - 1 - 8		0 1	
	7.	1. 1 - B - 3 - G - 7	1 - 3 - 7 - B - G	B - G - 1 - 3 - 7		0 1	0 1 2 3
		2. 9 - V - 1 - T - 7	1 - 7 - 9 - T - V	T - V - 1 - 7 - 9		0 1	
		3. P - 3 - J - 1 - M	1 - 3 - J - M - P	J - M - P - 1 - 3		0 1	
	8.	1. 1 - D - 4 - E - 9 - G	1 - 4 - 9 - D - E - G	D - E - G - 1 - 4 - 9		0 1	0 1 2 3
		2. H - 3 - B - 4 - F - 8	3 - 4 - 8 - B - F - H	B - F - H - 3 - 4 - 8		0 1	
		3. 7 - Q - 6 - M - 3 - Z	3 - 6 - 7 - M - Q - Z	M - Q - Z - 3 - 6 - 7		0 1	
	9.	1. S - 3 - K - 4 - Y - 1 - G	1 - 3 - 4 - G - K - S - Y	G - K - S - Y - 1 - 3 - 4		0 1	0 1 2 3
		2. 7 - S - 9 - K - 1 - T - 6	1 - 6 - 7 - 9 - K - S - T	K - S - T - 1 - 6 - 7 - 9		0 1	
		3. L - 2 - J - 6 - Q - 3 - G	2 - 3 - 6 - G - J - L - Q	G - J - L - Q - 2 - 3 - 6		0 1	
	10.	1. 4 - B - 8 - R - 1 - M - 7 - H	1 - 4 - 7 - 8 - B - H - M - R	B - H - M - R - 1 - 4 - 7 - 8		0 1	0 1 2 3
		2. J - 2 - U - 8 - A - 5 - C - 4	2 - 4 - 5 - 8 - A - C - J - U	A - C - J - U - 2 - 4 - 5 - 8		0 1	
		3. 6 - L - 1 - Z - 5 - H - 2 - W	1 - 2 - 5 - 6 - H - L - W - Z	H - L - W - Z - 1 - 2 - 5 - 6		0 1	

Total Raw Score
(Maximum = 30)

Rey-Osterreith Complex Figure



Scoring Sheet



Scoring Criteria for RCFT Drawings

Score	Accuracy	Placement
2	Accurately drawn	Correctly placed
1	Accurately drawn	Incorrectly placed
1	Inaccurately drawn	Correctly placed
0.5	Inaccurately drawn, but recognizable	Incorrectly placed
0	Inaccurately drawn and unrecognizable, or omitted	Incorrectly placed

Scoring Element	Copy	Immediate Recall	Delayed Recall
1. Vertical Cross	2 1 0.5 0	2 1 0.5 0	2 1 0.5
2. Large Rectangle	2 1 0.5 0	2 1 0.5 0	2 1 0.5
3. Diagonal Cross	2 1 0.5 0	2 1 0.5 0	2 1 0.5
4. Horizontal Midline of Large Rectangle (2)	2 1 0.5 0	2 1 0.5 0	2 1 0.5
5. Vertical Midline of Large Rectangle (2)	2 1 0.5 0	2 1 0.5 0	2 1 0.5
6. Small Rectangle	2 1 0.5 0	2 1 0.5 0	2 1 0.5
7. Small Horizontal Line above Small Rectangle (6)	2 1 0.5 0	2 1 0.5 0	2 1 0.5
8. Four Parallel Lines	2 1 0.5 0	2 1 0.5 0	2 1 0.5
9. Small Triangle above Large Rectangle (2)	2 1 0.5 0	2 1 0.5 0	2 1 0.5
10. Small Vertical Line within Large Rectangle (2)	2 1 0.5 0	2 1 0.5 0	2 1 0.5
11. Circle with Three Dots	2 1 0.5 0	2 1 0.5 0	2 1 0.5
12. Five Parallel Lines	2 1 0.5 0	2 1 0.5 0	2 1 0.5
13. Sides of Large Triangle attached to Large Rectangle (2)	2 1 0.5 0	2 1 0.5 0	2 1 0.5
14. Diamond	2 1 0.5 0	2 1 0.5 0	2 1 0.5
15. Vertical Line within Sides of Large Triangle (13)	2 1 0.5 0	2 1 0.5 0	2 1 0.5
16. Horizontal Line within Sides of Large Triangle (13)	2 1 0.5 0	2 1 0.5 0	2 1 0.5
17. Horizontal Cross	2 1 0.5 0	2 1 0.5 0	2 1 0.5
18. Square attached to Large Rectangle (2)	2 1 0.5 0	2 1 0.5 0	2 1 0.5
	_____	_____	_____
	Raw score	**Raw score**	**Raw sco**

Recognition Trial Worksheet

_____ Recognition True Positives = Sum of items 2, 5, 7, 8, 9, 12, 13, 15, 19, 20, 22, and 24 that were circled.

_____ Recognition False Positives = Sum of items 1, 3, 4, 6, 10, 11, 14, 16, 17, 18, 21, and 23 that were circled.

_____ Recognition True Negatives = 12 minus Recognition False Positives.

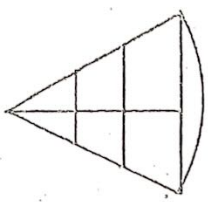
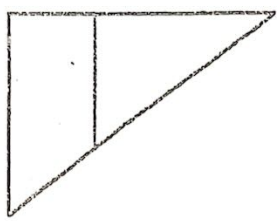
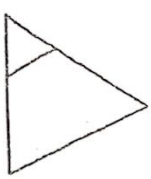
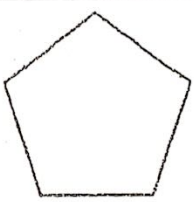
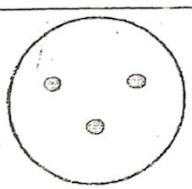
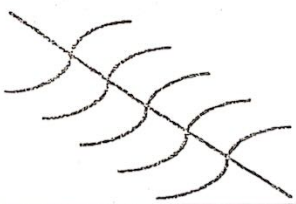
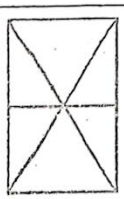
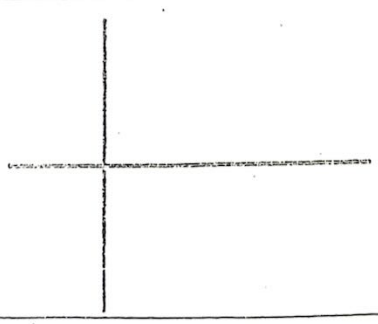
_____ Recognition False Negatives = 12 minus Recognition True Positives.

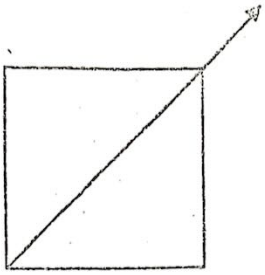
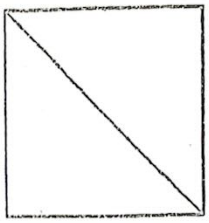
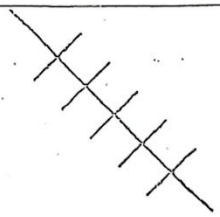
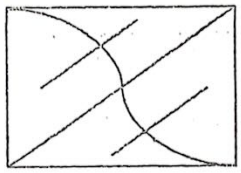
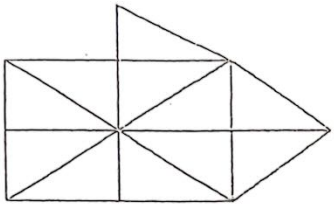
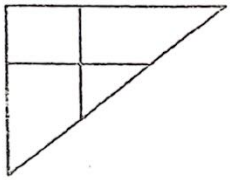
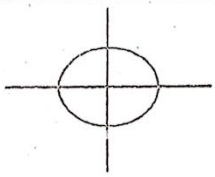
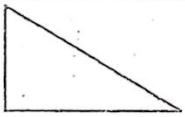
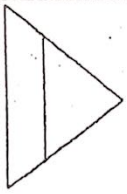
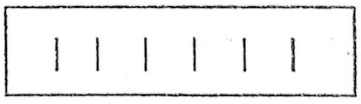
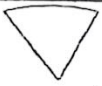
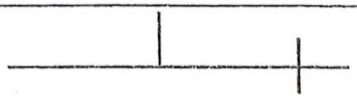
_____ Recognition Total Correct = Recognition True Positives plus Recognition True Negatives.

Complex Figure Recognition Test, Bangladesh version- 2016

Shahanur Hossain and Zayeed Bin Alam
Dept. of Clinical Psychology, University of Dhaka, Bangladesh.

Name of Client: Date of Testing:
Diagnosis if any: Handedness: L/R

SL	Item		Item	
1		T/F		T/F
2		T/F		T/F
3		T/F		T/F
4		T/F		T/F
5		T/F		T/F

6		T/F		T/F
7		T/F		T/F
8		T/F		T/F
9		T/F		T/F
10		T/F		T/F
11		T/F		T/F
12		T/F		T/F

DELIS • KAPLAN
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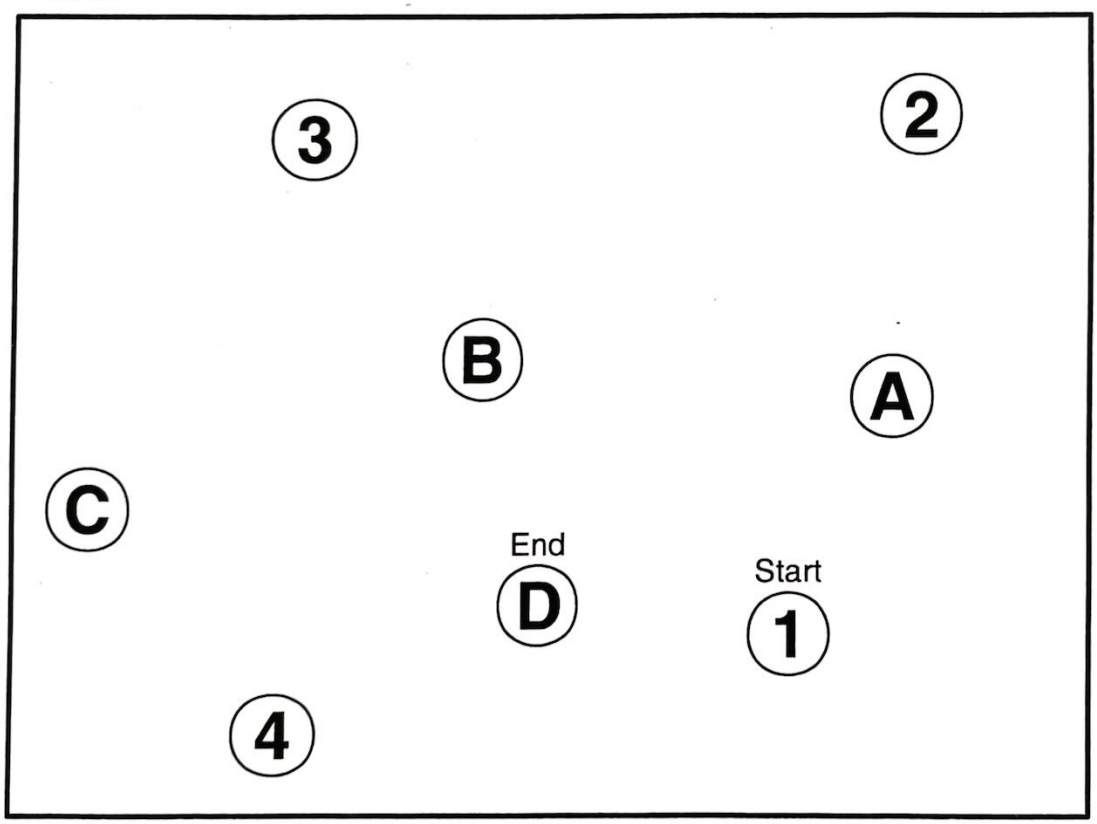
Executive Function System™

Trail Making Test

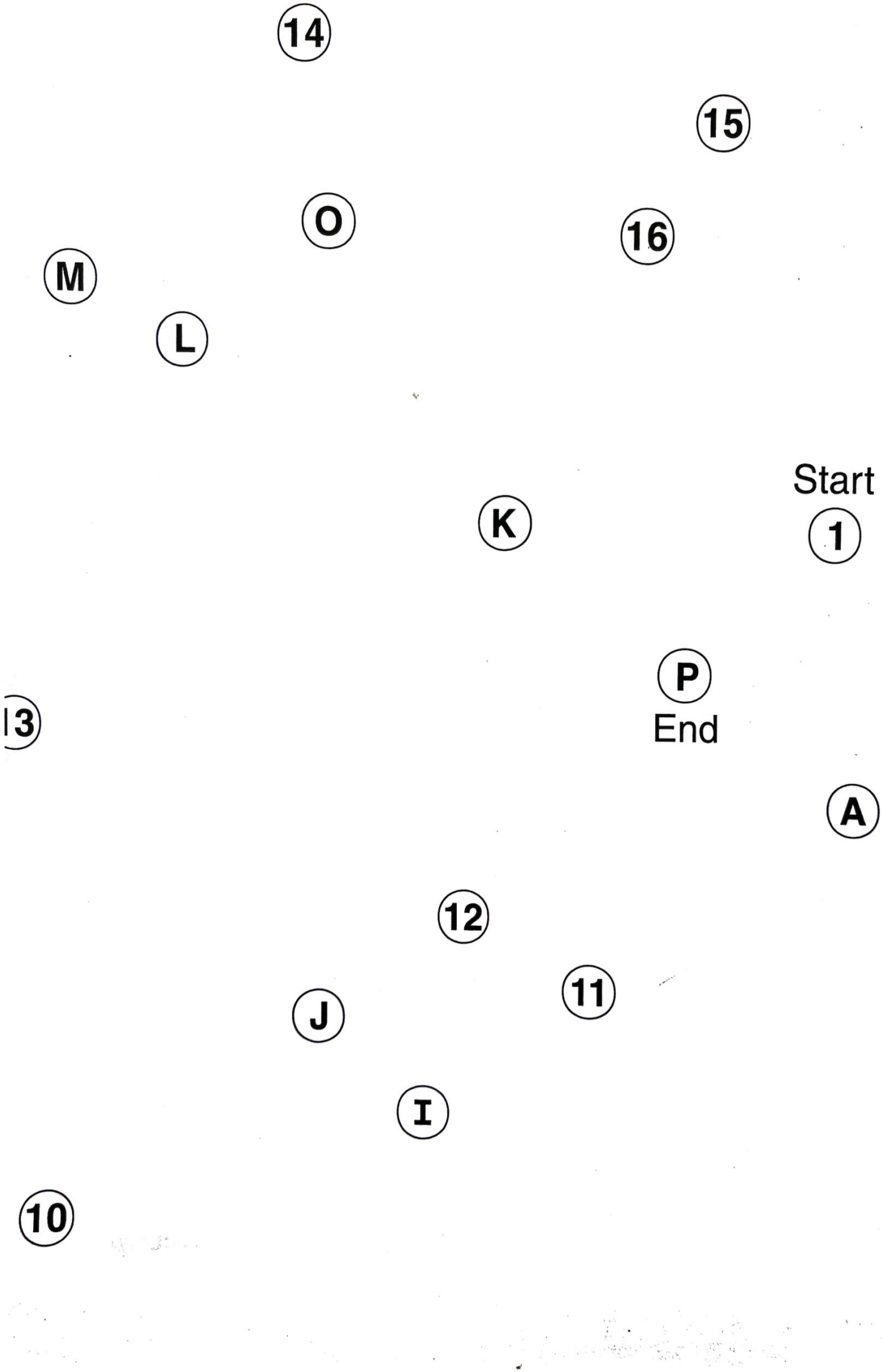
Name _____ Age _____
ID _____ Date _____
Examiner _____
Notes _____

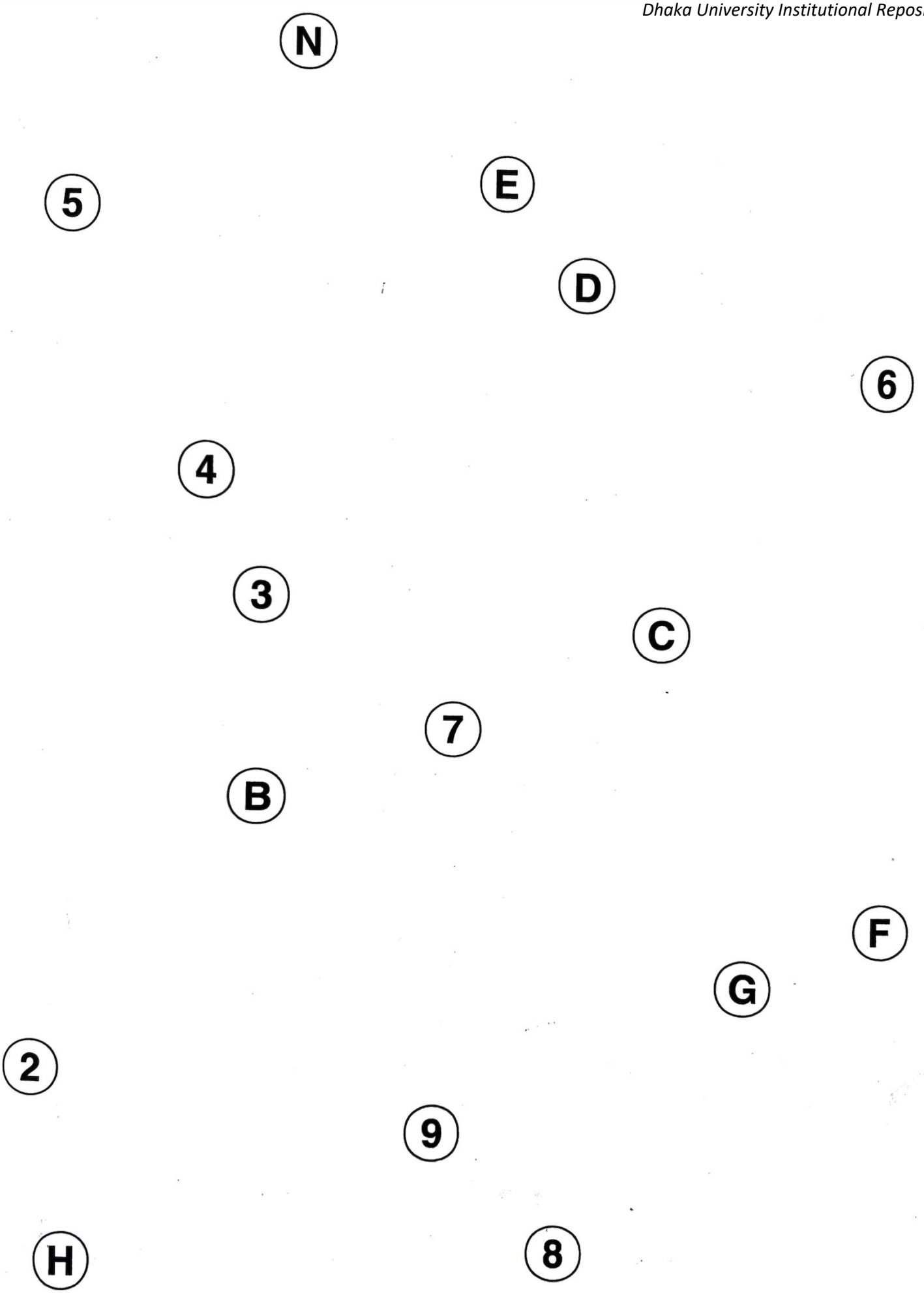
Condition 4
Number–Letter Switching

Practice



35 36 37 38 39 40 A B C D E





সবলতা বা অসুবিধা নির্ণয়ক প্রশ্নমালা

(৪-১৭ বছরের শিশুর পিতামাতা ও শিক্ষকের জন্য)

প্রত্যেকটি প্রশ্নের জন্য সত্য নয়, কিছুটা সত্য বা নিশ্চিতভাবে সত্য ঘরে টিক চিহ্ন দিন। সবকটি প্রশ্নের উত্তর দিলে আমাদের যাচাই করতে সুবিধে হবে। দয়া করে বিগত ছয় মাসে অথবা চলতি শিক্ষা বছরে শিশুর আচরণের ওপর ভিত্তি করে উত্তর দিন।

শিশুর নাম..... ছেলে/মেয়ে

জন্মতারিখ.....

	সত্য নয়	কিছুটা সত্য	নিশ্চিতভাবে সত্য
অন্যদের অনুভূতিকে মূল্য দেয়	☐	☐	☐
অস্থির, ছটফটে, বেশিক্ষণ চুপ করে থাকতে পারে না	☐	☐	☐
প্রায়ই মাথাধরা, পেটব্যথা বা বমি বমি ভাবের কথা বলে	☐	☐	☐
অন্য ছেলেমেয়েদের সাথে খাবার, খেলনা, পেন্সিল ইত্যাদি সহজেই ভাগাভাগি করে নেয়	☐	☐	☐
প্রায়ই জেদী আচরণ করে বা গরম মেজাজ দেখায়	☐	☐	☐
অনেকটা একা থাকে, একা একা খেলতে ভালোবাসে	☐	☐	☐
বেশ বাধ্য, সাধারণতঃ বড়দের কথা শোনে	☐	☐	☐
অনেক দুশ্চিন্তা করে, প্রায়ই চিন্তিত দেখায়	☐	☐	☐
কেউ ব্যথা পেলে, মন খারাপ করলে বা অসুস্থবোধ করলে সাহায্য করে	☐	☐	☐
সারাক্ষণ উসখুস করে বা গা-হাত মোড়ামুড়ি করে	☐	☐	☐
অন্ততঃ একজন ভালো বন্ধু আছে	☐	☐	☐
প্রায়ই অন্য ছেলেমেয়েদের সাথে মারামারি করে বা গায়ের জোর দেখায়	☐	☐	☐
প্রায়ই বিষণ্ন, মনমরা ও কাঁদো কাঁদো থাকে	☐	☐	☐
সাধারণভাবে অন্য ছেলেমেয়েরা তাকে পছন্দ করে	☐	☐	☐
সহজেই অন্যমনস্ক হয়ে পড়ে, মনোযোগ ধরে রাখতে পারে না	☐	☐	☐
অচেনা পরিবেশে ঘাবড়ে যায় বা আড়ষ্ট থাকে, সহজেই সাহস হারায়	☐	☐	☐
ছোটদের প্রতি মায়া মমতা আছে	☐	☐	☐
প্রায়ই মিথ্যে বলে বা ধাপ্পা দেয়	☐	☐	☐
অন্য ছেলেমেয়েরা তার পেছনে লাগে বা তার ওপর গায়ের জোর দেখায়	☐	☐	☐
অপরকে সাহায্য করতে প্রায়ই এগিয়ে যায় (বাবা-মা, শিক্ষক, অন্য ছেলেমেয়েদের)	☐	☐	☐
ভেবে চিন্তে কাজ করে	☐	☐	☐
বাড়ি, স্কুল বা অন্য জায়গা থেকে চুরি করে	☐	☐	☐
ছোটদের চেয়ে বড়দের সাথে ভালো মিশতে পারে	☐	☐	☐
অনেক ভয়, একটুতেই চমকে যায়	☐	☐	☐
কাজ ধরলে শেষ করে, মনোযোগের পরিমাণ ভালো	☐	☐	☐

স্বাক্ষর ..... তারিখ .....

পিতামাতা/শিক্ষক/অন্য কেউ (উল্লেখ করুন):

আপনার সাহায্যের জন্য অনেক ধন্যবাদ