

The Effect of Equine-Assisted Therapy on Visual-Motor Integration in Adolescent Autism Spectrum Disorders

Paranan Chorachit, Mahidol University, Thailand
Panadda Thanasetkorn, Mahidol University, Thailand
Nootchanart Ruksi, Mahidol University, Thailand
Kannika Permpoonputtana, Mahidol University, Thailand
Vasunun Chumchua, Mahidol University, Thailand

The Asian Conference on Psychology & the Behavioral Sciences 2015
Official Conference Proceedings

Abstract

The goal of the present study was to examine the effect of equine-assisted therapy (EAT) on visual-motor integration (VMI) in adolescent autism spectrum disorders (ASD). EAT was applied to eleven-year-old boy with ASD. The boy was attending in Cognitive Neuroscience Research unit of Human Development Academic Research, Mahidol University. The EAT sessions took place for twice a week in a period of four weeks. The boy's assessments were conducted in the baseline, middle, and end of four weeks' treatment and in a follow-up session one month after. Data at fourth week demonstrated positive changes, with improvements continuing one month after the session's completion, as measured by Test of Visual-Motor Integration (Beery VMI). The improvement reported was in visual perception, motor coordination and visual-motor coordination. Interestingly, The EAT is not only be an efficient therapeutic method of improving visual-motor integration, but also promote a positive effect on perceived communication, planning, memory, and reducing self-stimulatory behaviours, all of which may lead to elevate attention in classroom in children with ASD. Therefore, the beneficial of EAT showed the positive effect promising trend and suggest that to be considered as an alternative implement therapeutic for ASD.

Keywords: Adolescent, Autism spectrum disorders, equine assisted therapy, visual-motor integration

iafor

The International Academic Forum
www.iafor.org

Introduction

Presently, number of autistic people is rising across the entire world. Recent surveys in the United States show the number of this phenomenon is up markedly in five years ago from 1:110 to 1 : 68 ratio US children in 2014 (Karen Weintraub,2011). As well as report in Asia demonstrated the number of children with autism has also increased significantly in countries Singapore, China, Japan including Thailand (Sun, X., & Allison, C. A., 2009). The classic feature of Autism Spectrum Disorders (ASD) is defined by deficits in three major areas of development: Speech and language, social interaction include repetitive and stereotyped behaviours that present in the first three years of life (Volker, M. A., & Lopata, C., 2008; American Psychiatric Association, 2013).

Interestingly, children and adolescents with ASD have been identified by many researchers as neurological disorders that affect aspects of an individual's sensory perceptions processes: tactile, vestibular, and proprioceptive (Akshoomoff, N., Pierce, K., & Courchesne, E., 2002; Brasic, J. R., & Gianutsos, J.G., 2000). Individuals with an ASD appear to have one or more abilities, or lack thereof, in the area of visual perception, fine-motor and visual-motor integration that are related. In addition, Beverdorf indicated that individuals with ASD showed impairment in copying tasks compare with normal children (Beverdorf, D. Q., 2001a).

Unfortunately there is currently no treatment for autism spectrum disorders. However, many different types of treatment have been developed and focused on symptom management; for example, medical therapy, applied behavior analysis (ABA), occupational therapy (OT), sensory integration (SI), as well as animal assisted therapy (AAT). Equine Assisted Therapy (EAT) is a subtype of AAT that utilizes a horse as a treatment. EAT also involves creating a connection between the patient and horse through grooming and being around each other. The literature contains evidences that EAT can be an effective intervention for improving self-esteem, directed attention, social functioning, motor skill, expressive language, cognitive, tolerance of change and sensory integration in autism (Bass et al. 2009; Gabriel et al.2012; Ward et al.2011; Pauw, J.,2000; Sandra et al. 2013; Burgon, H. L.,2011; Shoffner & Gabriels,2011).

Since the publication of those reviews, there have been limited study of EAT and individuals with autism spectrum disorders. To support EAT, it is the purpose of this study to investigate the effect of equine-assisted therapy on visual-motor integration in adolescent autism spectrum disorders.

Methodology

Subject

A single case study of an eleven-year-old boy with ASD who enrolled in EAT treatment in Cognitive Neuroscience Research unit of Human Development Academic Research, Mahidol University.

Inclusion and Exclusion Criteria

Inclusion Criteria

- The child had a chronological age (CA) between 10-13 years old
- The child was diagnosed with ASD, IQ scores >70
- The child was able to read, write and communicate with language.
- The child did not have severe physical disabilities, blindness, Down's syndrome, deafness, and/ or cerebral palsy.
- The child did not have epilepsy or seizure.

Exclusion Criteria

- The child had a chronological age (CA) under 10- year-old or over 13 –year-old
- The child was not diagnosed with ASD, IQ <70
- The child was unable to read, write and communicate with language.
- The child had severe physical disability, blindness, Down's syndrome, deafness, or cerebral palsy.
- The child with epilepsy or seizure.

Research Design

This study was conducted as a quasi-experimental, time series design.

O ₁	X O ₂	XO ₃	XO ₄	O ₅	O ₆
	O ₁	=			The first baseline assessment
	O ₂	=			The second baseline assessment
	X	=			Equine- Assisted Therapy (EAT)
	O ₃	=			The assessment during intervention
	O ₄	=			The assessment after intervention
	O ₅	=			The first assessment follow up
	O ₆	=			The second assessment follow up

Procedure

The total time duration for completing the EAT lessons was 45 minutes took place for twice a week in a period of four weeks. EAT sessions under direction of a veterinarian and a psychologist who had intensive training in EAT. The 45-minutes timeframe of EAT consisted of 3 parts as follows;

Part 1: VMI activity (Calm down with table task before EAT sessions) for 15 minutes

Part 2: Horsemanship activities for 5 minutes, including mounting and dismounting.

Part 3: VMI activities for 25 minutes, including games of four buckets (see in figure 1)

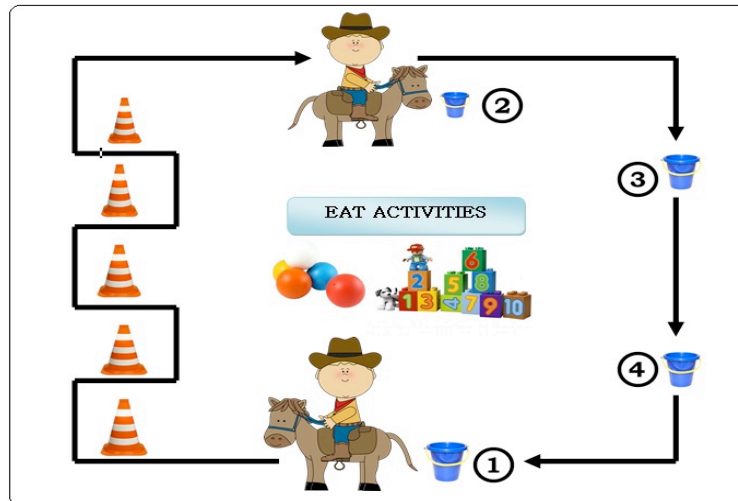


Figure 1: Equine-Assisted Therapy Sessions

Parents or guardians were present in the horse arena during all EAT sessions in a viewing area. During the therapy session was accompanied by horse leader (responsible for leading the horse), two side walkers (responsible for monitoring child during the horse riding) and one therapist was maintained throughout the course of sessions.

Instrument

The Questionnaire

The questionnaires were developed to control confounding variables were completed by the child's parents for general information about family background (i.e., marital status, education degree, income, family's activities, progress reported) and child's clinical profile. (i.e., medical history and developmental problem).

The Beery VMI

The Beery-Buktenica Development Test of Visual-Motor Integration (BEERY VMI) 6th edition. VMI is a developmental sequence of geometric forms to be copied with paper and pencil without eraser. The study subject was given instructions how to perform the test and the time required to complete this test was about 10-15 minutes. The first set is visual-motor integration involves 30 items with 30 scores. The second is visual perception set comprised of 30 items with 30 scores. The last set is motor coordination including 30 items with 30 scores. The test scores were the children's raw scores, which will be compared as standard scores (Beery, K., & Beery, N., 2010).

Data Collection

- The consent forms and questionnaires were sent to parents of the child
- The BEERY VMI was administered at baseline, mid program, after complete program and follow-up one month after.
- The BEERY VMI scores were analyzed by using descriptive statistics.

Results

Clinical Profile

This subject of this study was a Thai adolescent male aged eleven-year-old with ASD. He lived in a single family with parents and his older brother. The study subject was diagnosed of high-functioning autism (HFA) at three of ages. When he was a kid he was not progressing at the same level compared with other children in the same age (i.e., gross and fine motor, speech and social interaction). His parent's reason for seeking EAT included the desire to have their son (1) increase attention and visual-motor integration as it relate to help him in classroom at school. (2) Increase social ability and communication it relates to his ability to participate and keep up with his peers. Prior to the intervention he couldn't imitate well and had self-stimulatory behaviours on visual (i.e., gazing at nothing in particular and repetitive blinking), auditory (i.e., vocalizing in the form of humming, making vocal sounds, and repeating vocal sequences or portions of songs at inappropriate times.), tactile (i.e., repetitive stab fingers to his body) that may interfered to participate in functional activities and learning tasks. Additionally, during the EAT intervention parents reported that he was receiving supplements vitamins, music, art, and occupational therapy.

The participant BEERY VMI scores of the six times point is shown in figure 2. Visual analysis of the data shows that the participant demonstrated improved all three domain of BEERY VMI; visual-motor integration, visual perception and motor coordination. The participant scores increased from baseline to after intervention and follow-up EAT sessions as well. (See in Figure 2)

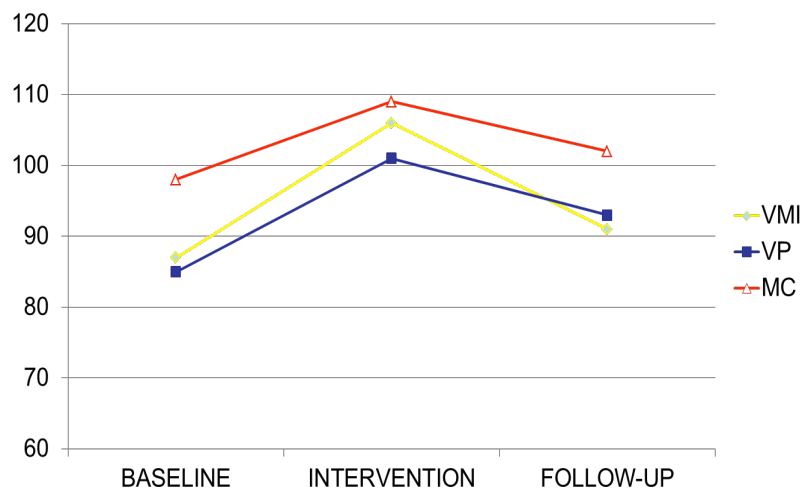


Figure 2 Displays the trends in VMI standard scores during baseline, middle, after and follow-up EAT sessions

Discussion

The present study was conducted to examine the effect of equine-assisted therapy on visual-motor integration in adolescent autism spectrum disorders. The eleven-year-old boy who had ASD was attended in Cognitive Neuroscience unit of Human Development Academic Research, Mahidol University. The EAT sessions took place for twice a week in a period of four weeks and the boy's assessments were conducted in the baseline, middle, end of four weeks and in a follow-up session one month after.

Result of currently study support the proposed hypothesis that after EAT sessions, the child performance improvement in visual-motor integration which comprise of visual perception and motor coordination as measured by Beery VMI. It is possible that the activities sessions designed for improvement on visual-motor integration that can help child to allow his vision and movement to work together in an efficient way (i.e., peg board, dot to dot, egg collection, and copy me games). Moreover, therapist's observed and parents of the child participating in this study also reported marked improvement in the area of communication, attention, planning, memory, as well as reducing challenging behaviours.

The reported improvement in communication maybe attributed to a variety of factors. Interestingly, it possible the child experienced physical and verbal communication with the horse. He touched them, brushed them, hugged them talk to them and rather than that he learned to take care of them. Furthermore he associated his emotional and feelings to them. This bounding may take lead to social and communication skills with other people as well. The participant also demonstrated in attention it is possible that the activities sessions design captivated his attention. He followed directions through fun activities that make taking direction easier to sustained level of focus and concentrate. In addition during EAT intervention his cognitive concepts was naturally improved. For example, child threw the different of sized and coloured balls in to baskets or more difficult by imitated therapist's posture at the centre while riding. This finding also found that child reduced challenging behaviour. It is possible that the entire therapy session participant spending time with a friendly animals for 4-week. Therefore, horse can help him feel stress relief, away from aggressive behaviour and calmer. Interestingly, these results were also have been noted in previous studied by Bass where the researchers reported that improvement in social motivation, attention and sensory sensitivity (Bass et al. 2009). Horseback riding has been indicated that participation improvement on expressive language, motor planning, and stereotype behaviour (Gabriels et al.2012). The equine assisted activities reported positive changes in physical, emotional and social functioning (Lanning et al.2014).

Limitations

In this study, there are a few limitations that should be addressed in future study. First, the subject that participated in this study also received other services that may have an influenced to the outcomes. Further study should establish in control extraneous variables and second, this study was short period of intervention. Further study should take a longer intervention in order that the intensive EAT sessions would have a greater improvement on VMI.

Acknowledgements

This research could not have been completed without the dedication of The National Institute for Child and Family Development and The Faculty of Veterinary Science, Mahidol University. I am extremely grateful to my advisor, Dr. Vasunun Chumchua, for each of the moments that she shares with me a piece of wisdom. I would like to include a special note of thanks to Brownie, the pretty horse and all the members' staffs, the subject and family who participated in this study.

References

- Akshoomoff, N., Pierce, K., & Courchesne, E. (2002). The neurobiological basis of autism from a developmental perspective. *Development And Psychopathology*, 14 (3), 613-634.
- American Psychiatric Association. (2013). Cautionary statement for forensic use of DSM-5. In *Diagnostic and statistical manual of mental disorders* (5th ed). doi:10.1176/appi.books.9780890425596.744053
- Bass, M. B., Duchowny, C. A., & Llabre, M. M. (2009). The effect of therapeutic horseback riding on social functioning of children with autism. *Journal of Autism and Developmental Disorders*, 39, 1261–1267. doi:10.1007/s10803-009-0734-3.
- Beery, K., & Beery, N. (2010). *The Beery-Buktenica Developmental Test of Visual Motor Integration Sixth Edition*. Bloomington, MN: Pearson.
- Beversdorf, D. Q. (2001a). Macrographia in High-Functioning Adults with Autism Spectrum Disorder, 31, 97-101.
- Brasic, J. R., & Gianutsos, J. G. (2000). Neuromotor assessment and autistic disorder. *Autism*, 4(3), 287-298. doi: 10.1177/1362361300004003005.
- Burton, H. L. (2011). 'Queen of the world': Experiences of 'at-risk young people participating in equine-assisted learning/therapy. *Journal of Social Work Practice*, 25, 165–183. doi:10.1080/02650533.2011.561304.
- Gabriels, R. L., Agnew, J. A., Holt, K. D., Shoffner, A., Zhaozing, P., Ruzzano, S., et al. (2012). Pilot study measuring the effects of therapeutic horseback riding on school-age children and adolescents with autism spectrum disorders. *Research in Autism Spectrum Disorders*, 6, 578–588.
- Karen Weintraub. (2011). The prevalence puzzle: autism counts. *Nature*, 479, 22-24.
- Lanning, B. A., Matyastik Baier, M.E., Ivey-Hatz, J., Krenek, N., Tubbs, J.D. (2014). Effect of equine Assisted Activities on Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders*, 44, 1897-1907. doi:10.1007/s10803-014-2062-5.
- Pauw, J. (2000). Therapeutic horseback riding studies: Problems experienced by researchers. *Physiotherapy*, 86, 523–527. doi:10.1016/S0031-9406(05) 60986-8. Professional Association of Therapeutic Horsemanship.
- Sandra C. Ward, Kelly Whalon, Katrina Rusnak, Kimberly Wendell & Nancy Paschall. (2013). The Association Between Therapeutic Horseback Riding and the Social Communication and Sensory Reactions of Children with Autism *Journal of Autism and Developmental Disorders*, 43, 2190–219.
- Shoffner, A., & Gabriels, R. (2011). Autism and therapeutic riding: A pilot study. *Strides*, 18(2), 11–15.

Sun, X., & Allison, C. A. (2009). Review of the prevalence of Autism Spectrum Disorder in Asia. *Research in Autism Spectrum Disorders*
doi:10.1016/j.rasd.2009.10.003.

Volker, M. A., & Lopata, C. (2008). Autism: A review of biological bases, assessment and intervention. *School Psychology Quarterly*, 23, 258–270.
doi:10.1037/1045-3830.23.2.258.

Ward, S. C., Whalon, K., Stiles, K., & Smith, A. (2011). The effects of therapeutic horseback riding on children with autism. San Francisco, CA: Poster presented at the annual meeting of the National Association of School Psychologists

Contact email: vasunun_c@yahoo.co.uk