

Original Article

Social interaction changes in people with intellectual disabilities through the application of equine-assisted intervention in Korea

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Abstract: This study aims to provide basic information about the social interaction changes in people with intellectual disabilities through the application of equine-assisted intervention (EAI) in Korea. The subjects were 12 people with intellectual disabilities residing in a residential care facility in Korea. EAI was applied and consisted of communal activities and horseback riding. The intervention was conducted for 60 minutes each session, two sessions a week for 12 weeks. To determine the psychological aspects of the social interaction changes after the study cohort participated in the EAI, their social interaction anxiety, social phobia, and social avoidance and distress were measured. Their social interaction anxiety was measured using the Korean-Social Interaction Anxiety Scale (K-SIAS), and their social phobia was measured using the Korean-Social Phobia Scale (K-SPS). To measure their social avoidance and distress, the Korean-Social Avoidance and Distress scale (K-SADS) was used. The social interaction anxiety, social phobia, and social avoidance and distress results showed a continuous decrease after the application of EAI. Thus, the application of EAI, including communal activities and horseback riding, should be considered for people with intellectual disabilities in order to decrease their social interaction anxieties, phobias, and social avoidance and distress.

Keywords: Equine-assisted intervention, intellectual disabilities, social interaction anxiety, social phobia, social avoidance and distress

Introduction

As a social process integrated with a person's intentional actions and reactions towards other people, social interaction refers to a process of interchanges which involves the delivery of information [1]. In the process of interactions, negative psychological reactions can be caused by receiving attention, making eye contact with someone, having contacts with others, and so on [2]. Also, ethological consequences, such as avoiding or being wary of interactions, can occur, as well as physiological changes, for example, increased heart rates and tremors, etc. [3]. Past studies have presented social interaction anxiety and social phobia as negative psychological reactions that are caused during the process of social interaction [1, 4-6].

Social interaction anxiety, which occurs during the process of someone having social interactions, is defined as the fear arising from encountering others or having interactions with others

[4]. While social phobia means anxiety arising from social interaction situations, specifically the fear arising from the situations being watched by others in which someone attracts attention or is exposed to others, social phobia is different from social interaction anxiety [3]. While social interaction anxiety and social phobia are very closely related to each other, social interaction anxiety can lead to social fear, which means being wary of social interactions [5], and it causes serious damage to social functions [7].

Social avoidance and distress can be defined as a tendency to avoid social situations in which the instability and distress in the course of social interactions are to be expected [8]. This social avoidance and distress are caused by social interaction anxiety and social fear. Fear grows while having social interactions with someone, which makes people wary of social interactions, thus causing anxiety and phobias [5]. With the development of psychological with-

Equine-assisted intervention induces changes in social interaction

ering and a low tendency towards extroversion, an ethological tendency of avoidance is displayed when any topic related to social interaction comes up or when one has an interaction with people [3].

People with intellectual disabilities are generally considered to have defects in their social interactions. They have considerable difficulties in establishing and developing social relationships due to a lack of experience involving contact with others [9]. In particular, due to the impacts of social interaction anxiety, social phobia, social avoidance, and distress arise from social interactions, so they have psychological and emotional problems such as decreased confidence, anxiety, and withdrawal, as they are used to experiencing continuous failures in the process of social interactions [10]. Implementing EAI and making use of horses is strongly recommended as an effective method to reduce their difficulties, as they suffer in the course of social interactions and the establishment of relationships, to enhance their socialization, and also to make them learn and promote their communication abilities and social interaction skills [11].

The EAI is a comprehensive method of intervention that involves horses as a part of the therapeutic process, together with therapists using horses as helpers. It is organized of communal activities, including being able to be in direct contact with horses and riding activities conducting a variety of tasks and movements on horseback [12]. EAI is valuable as a therapeutic intervention to induce proper reactions by providing immediate feedback from the interactions and various activities conducted by the subjects. It utilizes the features of horses as a social animal protecting each other by instinct and its responsiveness to environmental stimulation [13]. Through these processes, it is applied as an effective method to develop the socialization of people with intellectual disabilities and promote their social interactions. And it also helps them to achieve their rehabilitation goals such as psychological and emotional stability [14].

Using EAI, engaging in communal activities through direct contact with horses is effective in helping people acquire social interaction skills. It contributes to providing pleasure to the subjects and to enhancing their psychological satisfaction [11]. It also reduces their aggres-

sion towards others, effectively increases positive interactions among their peers, and allows them to develop bonds with horses, bonds to be extended in their relationships with their peers and others [12]. In addition, amid dynamic circumstances from their interactions with horses, people with intellectual disabilities will be able to increase their understanding of the actions and reactions from the process of interaction as they focus on the objects. The EAI allows them to control their impulsive behaviors, which are to be induced to proper adjustment reactions [15].

The EAI's distinguishing feature is that it is conducted within a collective natural environment [16]. Within this environment, the subjects are able to have more opportunities to interact not only with horses but also with the therapists, the medical staff, the volunteers, the horseback riding workers, their peers, their parents, and so on [17]. It is effective for them to learn and promote social interaction skills as positive interactions can be induced. These influence and effects on their social interactions have been continuously reported in various past studies of EAI, and its value and usefulness are continuously demonstrated by its application to a variety of subjects, such as intellectual disabilities and ADHD [15].

However, most of those studies focused on the changes in social awareness and social motivation that can affect ethological variables and behaviors [18, 19]. Also, most studies about social interaction only report on the changes in behaviors and skills in social interaction situations [20, 21]. In addition, there are no published studies on social interaction anxiety, social phobia, social avoidance, and distress that may arise in the course of social interactions. Thus, the purpose of this study is to provide basic information about the changes in the social interaction of the people with intellectual disabilities through the application of EAI in Korea.

Materials and methods

Subjects

The subjects in this study were 12 people with intellectual disabilities residing in the H residential care facility for the people with the intellectual disabilities in the Y city, Gyeonggi-province in Korea. The inclusion criteria were:

Equine-assisted intervention induces changes in social interaction

Table 1. Equine assisted intervention

Activities	Contents	Time
Communal activities	Greeting, touching, patting, hugging Grooming, feeding, Side walking	30 min
Horseback riding	Mount and dismount Walk, rising trot, canter Up and down activity on the saddle	30 min

Study procedure

In this study, to confirm the subjects' social interaction changes through the application of EAI, a group analysis was performed once a month. To verify the study procedures and methods, the Content Validity Index (CVI) was administered by 11 experts, including 2 occupational therapy professors, 5 occupational therapists, and 2 social workers with over 5 years of experience, and 2 speechlanguage pathologists. The results of the CVI showed 0.90 points in the study procedures and the 0.91 points in the study methods. The CVI results could be validated to obtain the more than 0.59 points on the basis of the 11 experts [22]. Following this, this study's procedure and methods were applied to the subjects.

Only individuals who 1) were diagnosed with intellectual disabilities based on the DSM-V, 2) want to participate in the EAI, 3) had no visual or auditory impairments that interfered with their performance, 4) had no neurological or orthopedical problems in their physical function and structure, and 5) were not taking any antipsychotic medication.

After the selection of the subjects, to determine whether their participation in this study was appropriate, the Mini Mental State Examination-Korean version (MMSE-K) was used. The results of the MMSE-K indicated that the subjects' average score was more than 20 points, which meant that they had a mild cognitive dysfunction level that enabled them to follow instructions, perform activities, comprehend language, and pay attention. Based on the results of the MMSE-K, they participated in this study as the subjects.

This study conformed to the Declaration of Helsinki and was approved by the Kangwon National University Institutional Review Board in Korea (no. KWNUIRB-2020-02-009-001). The consent process was conducted. Before the consent process, sufficient instruction about the purpose and methods of this study was provided to the subjects. Considering the nature of their intellectual disabilities, visual materials were used to enable them to understand the instruction fully. After these processes, they consented to participate in this study voluntarily. The consent form was provided in writing and also, considering the characteristics of their intellectual disabilities, the consent form was provided in writing by the life rehabilitation teacher in charge of the subjects. In the process of obtaining consent for their participation in this study, a life rehabilitation teacher cooperated.

The study period was from the May 1 to July 31 2017.

The assessment of the subjects' social interactions through the application of EAI was performed in the occupational therapy room after arranging the distracted environment and creating a stable and comfortable environment in the facility. This was performed individually by the life rehabilitation teachers in charge of the subjects. Before the assessment, sufficient instruction about the assessment was provided to them by an occupational therapist in this study and then, they could be understood the instruction fully. The EAI was performed at the Y horse-riding course in Y city, Gyeonggi-province in Korea and performed by the therapeutic horsemanship therapist qualified by PATH International (Professional Association of Therapeutic Horsemanship International) and an occupational therapist in this study. Also, a life rehabilitation teacher cooperated.

The equine assisted intervention

The equine assisted intervention (EAI) was divided into communal and horseback riding activities based on the PATH International intervention program (Table 1). The communal activities were divided into greeting, touching, patting, hugging, grooming, feeding, and side walking. The horseback riding included the activities of mounting and dismounting, walking, rising trot, canter, and up and down activities on the horse [23].

In horseback riding, walking is the slowest step of the 110 m/min of the horse walking, and this

Equine-assisted intervention induces changes in social interaction

means 4 beats of the steps, and moving the legs in sequence. The rising trot is a step of 220 m/min of horse walking and this means 2 beats of the step, moving the two legs on a diagonal line. Also, to minimize the burden of the horse, this means the step that lifts the rider's waist and reacts to the rhythm of the horse. The canter is the fast step of the 340 m/1 min of the horse walking, and this means 3 beats of the light and rhythmic steps.

EAI was performed individually to use the therapeutic and safely domesticated horses in the indoor horse-riding course. For the safety of the subjects, a safety vest and helmet were worn. At the beginning of the EAI, they performed a 5-minute warm-up by stretching. Also, after mounting the horses, they were allowed to sit in the saddle to maintain the proper position and posture and for their safety, a side walker helped to draw and assist with the reins [11]. In this study, the application of the EAI was conducted for 60 minutes each session, twice a week for 12 weeks.

Korean-social interaction anxiety scale (K-SIAS)

To measure their social interaction anxiety, the K-SIAS was used. This was developed by Mattick and Clarke [24], and Kim's [25] study was performed to adapt this to Korea. This is an effective assessment to measure the degree of the social interaction anxiety experienced in social interactions. This was divided into 19 items, and the degree of the social interaction anxiety was measured using a 5 point scale. The total possible scores ranged from 0 to 76 points. The higher the score, the higher the degree of the social interaction anxiety experienced in the social interaction process. In items 8 and 10, inverse coding was performed and then analyzed [26]. The Cronbach's α was the .92 at the study of the Kim's study [25].

Korean-social phobia scale (K-SPS)

To measure the social phobia, the K-SPS was used. This was developed by Mattick and Clarke [24] and Kim's [25] study was performed to adapt this to Korea. This is an effective assessment to measure the degree of the social fear experienced in social interactions. This was divided into 20 items, and the degree of the

social phobia was measured using a 5 point scale. The total possible score ranged from 0 to 80 points. The higher the score, the higher the degree of the social phobia experienced in the social interaction process [27]. The Cronbach's α was the .92 at the study of the Kim's [25] study.

Korean-social avoidance and distress scale (K-SADS)

To measure the social avoidance and distress, the K-SADS was used. This was developed by Watson and Friend [28], and Lee and Choi's [29] study was performed to adapt this to Korea, and it applied the 5 points scale. This is an effective assessment to measure the degree of the anxiety experienced in social interactions and the tendency to avoid social conditions that are expected to be offensive. This was divided into 28 items, and the degree of social avoidance and distress was measured using a 5 point scale. The total possible scores ranged from 5 points to 140 points. The higher the score, the higher the degree of the social avoidance and distress experienced in the social interaction process [29]. The Cronbach's α was the .92 at the study of the Lee and Choi's [29] study.

Data analysis

The collected data were encoded and analyzed using SPSS 23.0. Descriptive statistics were used in the analysis of the general characteristics. Repeated ANOVA was used in the analysis of the changes in the subjects' social interactions through the application of the EAI. The measurement data were expressed as (mean \pm S.D), and the count data were expressed as cases/percentage (n, %). A value of $P < 0.05$ indicated a significant difference.

Results

General characteristics of the subjects

The subjects were people with intellectual disabilities residing in a residential care facility. The average ages of the subjects were 23.50 years old (males) and 23.83 years old (females). There were 6 males (50%) and 6 females (50%) in the study cohort (**Table 2**).

Equine-assisted intervention induces changes in social interaction

Table 2. Characteristics of the study subjects

Age (years)		Sex (n, %)		Disability rating	
Male	Female	Male	Female	Grade	N (%)
23.50±2.58	23.83±2.69	6 (50%)	6 (50%)	2	6 (50%)
				3	6 (50%)

The results of the social interaction anxiety tests

Regarding the social interaction anxiety results, they showed a statistically significant decrease at 19.55 points after the EAI. They had 50.13 points before the application of the EAI. They had 44.83 points on average at 1 month after the EAI, 39.33 points on average at 2 months after the EAI, and 30.58 points on average at 3 months after the EAI, and the results showed a continuous decrease. Regarding the results of the statistical verification on these data, a statistically significant difference indicated a 99% confidence level (**Table 3, Figure 1**). Thus, the equine-assisted intervention was applied to decrease the social interaction anxiety of the subjects during their social interactions.

The results of the social phobia scale

Regarding the results of the social phobia tests, the results showed a statistically significant decrease at 17.58 points after the EAI. The tests showed 64.50 average points before the application of the EAI. The tests showed 59.25 average points at 1 month after the EAI, 52.67 average points at 2 months after the EAI, and 46.92 average points at 3 months after the EAI, and the results showed a continuous decrease. Regarding the results of the statistical verification on these data, a statistically significant difference indicated a 95% confidence level (**Table 3, Figure 1**). Thus, the equine-assisted intervention was applied to decrease the social phobia of the subjects during the social interaction.

The results of the social avoidance and distress scale

Regarding the results of the social avoidance and distress tests, the results showed a statistically significant decrease at 26.01 points. Before the application of the EAI, the average points were 114.42. The average points were 108.92 at 1 month after the EAI, 98.92

average points at 2 months after the EAI, and 88.41 average points at 3 months after the EAI, and the results showed a continuous decrease. Regarding the results of the statistical verification on these data,

a statistically significant difference was found at the 99% confidence level (**Table 3, Figure 1**). Thus, equine-assisted intervention was applied to decrease the social avoidance and distress of the subjects during the social interaction.

Discussion

This study adopted the EAI consisting of communal activities and horseback riding activities for people with intellectual disabilities, and tried to identify the changes in the social interaction anxiety, social phobia, social avoidance, and distress of the subjects in Korea accordingly. As the result, the social interaction anxiety, social phobia, social avoidance, and distress resulting from social interactions decreased continuously after adopting the EAI.

Among the various types of animals used for animal-assisted interventions, horses are effective at inducing proper reactions and learning movements and task function as they provide a vestibular sense and proprioception through their three-dimensional steps [19]. Also, horses are social animals that protect each other by instinct and have the characteristics of being responsive to environmental stimulation [13]. This provides immediate feedback on the subjects' behaviors, induces proper responses from the subjects, and allows them to control and adjust their behaviors [14]. Through these activities of communal activities and horseback riding, we are able to promote the subjects' social interactions, allowing them to learn how to establish bonds and appropriate relationships [19].

In addition, because it involves large animals that are not easy to approach, EAI enhances the confidence of the subjects and arouses their interests to motivate them. It also allows them to experience the world from the position of a power holder while riding, and to look down on the world from a higher position through the horseback riding activities [13]. Accordingly, it should be regarded that the application of EAI

Equine-assisted intervention induces changes in social interaction

Table 3. The social interaction anxiety, phobia, and avoidance and distress test results

	Pre (Mean ± S.D)	1 month after (Mean ± S.D)	2 months after (Mean ± S.D)	3 months after (Mean ± S.D)	F
SIA (points)	50.13±6.19	44.83±8.05	39.33±7.38	30.58±6.32	13.929**
SP (points)	64.50±7.01	59.25±8.08	52.67±8.07	46.92±8.11	9.625*
SAD (points)	114.42±9.97	108.92±10.77	98.92±9.47	88.41±10.10	13.995**

** $P < 0.01$, * $P < 0.05$. SIA: Social interaction anxiety; SP: Social phobia; SAD: Social avoidance and distress.

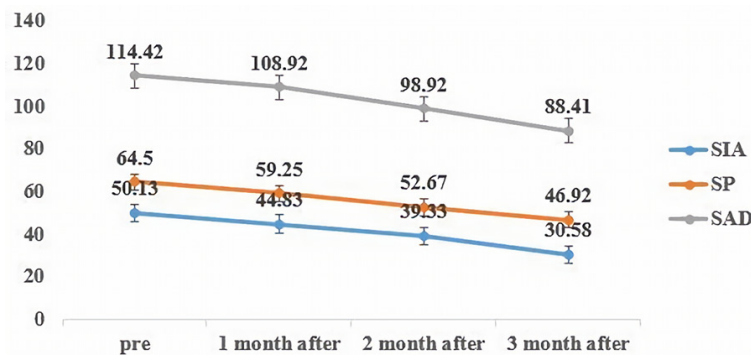


Figure 1. The social interaction results.

in this study is meaningful in terms of its clinical aspects. Communal activities and horseback riding activities should be considered as a treatment in residential care facilities for people with intellectual disabilities.

People with intellectual disabilities are generally considered to have defects in their social interactions. They have considerable difficulties in establishing and developing social relationships due to a lack of experience in contact with others. In particular, due to the impacts of social interaction anxiety, social phobia, social avoidance, and distress arising from social interactions, they have psychological and emotional problems such as decreased confidence, anxiety, and withdrawal as they are used to experiencing continuous failures in the process of social interactions [10]. This study showed a high level of instability in their social interactions and also their social phobia. In various past studies of EAI, researchers have reported that EAI is effective at reducing the social interaction anxiety and social phobia of the people with intellectual disabilities. This study was supported by the fact that past studies confirmed that social interactions were promoted through EAI.

Harris and Joanne [10] reported that application of EAI is highly appropriate for reducing the

anxiety of children with intellectual disabilities, and McCormick and McCormick [13] also reported that the EAI is effective at inducing interactions by reducing the degree of the interaction anxiety and social phobia of the subjects as horses are responsive to the interactions of the subjects. They also said that the anxiety and phobia of the subjects were reduced as horses induced the psychological stability of the subjects through

direct contact and horseback riding activities. Hession, Eastwood, Watterson, Lehane, Oxley, and Murphy [30] also reported that improved confidence and decreased instability are the major results of their study. Thus, it is regarded that social interaction anxiety and social phobia were reduced among those subjects by EAI including communal activities and horseback riding, so it should be considered as a method of reducing the social interaction anxiety and social phobia of autistic disabled persons.

It has been said that the effects of social interaction anxiety and social phobia increase the chances of causing ethological problems, which include trying to avoid interactions involving high concentrations and repetitive stereotyped behaviors. Those interactions also restricted interactions from starting to become proper interactions [31]. Accordingly, Harris and Joanne [10] reported that people with intellectual disabilities were suffering from continuous failures in their social interactions and interpersonal relationships, which leads to serious impairment in social functions and an increased frequency of depression. Thus, it was said that the application of proper intervention would be necessarily required, and EAI was the one to be proposed as an effective method of intervention [14].

Equine-assisted intervention induces changes in social interaction

Bass, Duchowny, and Llabre [19] reported that EAI was effective at enforcing sensory registration and the process of the people with intellectual disabilities, inducing proper responses in their interactions. It adjusted and controlled their behaviors by tactual stimulation through communal activities and also by proprioceptive sensibility and vestibular senses through horseback riding activities. Thus, it was reported that their level of participation in the interactions was increased and proper interactions were induced, resulting in decreased distress and avoidance reactions [14]. In addition, McCormick and McCormick [13] reported that their participations in communal activities and horseback riding activities using EAI were effective in enhancing the confidence of the people with intellectual disabilities and also effective at adjusting their negative behaviors in social interactions, as it increased their interests to motivate them.

In the studies by Moriello, Terpstra, and Earl [20], they also said that the subjects would be able to experience a sense of accomplishment from EAI, and EAI is able to enhance their motives for social interaction activities by improving their confidence, then it leads them to participate actively in the process of interaction and communication. Ajzenman, Standeven, and Shurtleff [31] reported that the application of the EAI is effective at increasing the adaptive behavior responses of children with intellectual disabilities and that their social interactions were promoted. On the basis of this, it is regarded that the degree of social avoidance and distress was decreased due to the adoption of EAI. Therefore, EAI should be considered a way of reducing the social avoidance and distress of autistic disabled persons.

The social interaction anxiety and social phobia in the study was caused by anxiety from the social interaction process. There was a high correlation between the variables and also a high concurrent validity [24]. Also, it was said that the higher correlation with social avoidance and distress, the more social interaction anxiety and social phobia they had, and the more wary of social interactions they were. They came to avoid it in the case of conducting it [4]. Accordingly, it is regarded that this study, in which social interaction anxiety and social phobia, social avoidance, and distress were analyzed in the psychological and emotional aspects that may arise from the process of

social interactions, has an academic significance and suggests an analysis of the social interaction anxiety and social phobia, social avoidance, and distress of people with intellectual disabilities in applications not only with EAI but also with various intervention methods.

As for the limitations of this study, it is regarded that the number of the subjects in this study was limited to people with intellectual disabilities from residential care facilities for people with the intellectual disabilities only. Therefore, it results in a limitation of the study's generalizability. Therefore, further studies are needed with larger study cohorts. In addition, there were difficulties in identifying the durability of the effects according to the application of the interventions with the 12-week period of the study. Thus, future studies should have an extended study period, and they also will need to analyze the changes in the practical social interaction skills and in the establishment of interpersonal relationships, along with changes in social interaction anxieties, social phobia, social avoidance, and distress.

Finally, the degree of intellectual disability has a great variety in the characteristic aspects of the people with intellectual disabilities. The differences in psychological and emotional aspects, emotional control, sensory types and reactions may come in various ways, as well as the impacts on these matters. In addition, the ethological problems may occur in many ways. Accordingly, it is considered that studies should be applied to take into account various aspects of autistic disabled persons, such as classifying them by their degree of intellectual disability and the types of senses.

Conclusion

This study was conducted to identify the changes in social interaction anxiety, social phobia, and social avoidance and distress of people with intellectual disabilities in Korea after they underwent EAI. The results indicated that their social interaction anxiety, social phobia, social avoidance and distress levels were statistically significantly decreased continuously. The EAI included communal activities and horseback riding effects on the decrease in anxiety, phobia, avoidance and distress which occur during the social interaction process of people with intellectual disabilities. Thus, EAI should be considered application with people with intellectual disabilities to decrease their social

Equine-assisted intervention induces changes in social interaction

interaction anxiety, phobia, and avoidance and distress.

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Disclosure of conflict of interest

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Equine-assisted intervention induces changes in social interaction

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