The Effect of Contact with a Horse on Positive and Negative Emotions of Polish Physiotherapy Students Within 6 Years from the First Time Hippotherapy Session

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Introduction: Activities with horses cause many emotional reactions in their recipients, the measurement and analysis of which can provide information about positive or negative attitudes toward hippotherapy activities.

Purpose: To explore how horse contact affects the emotions of students experiencing horseback riding for the first time during hippotherapy classes.

Methods: The 6-year study included 252 physiotherapy students from the Medical University of Wrocław who participated in hippotherapy classes during a three-day didactic and scientific course implemented in the years (2014–2019). The duration of a single session on horseback was 60 minutes. The Scale of Positive and Negative Experience (SPANE) and the Sanoquell automatic 766 pulse measuring device were used for the study. Pulse was measured daily before and after hippotherapy (6 times). The SPANE survey took place twice: at the beginning (Survey I) and at the end (Survey II) of the camp. Results were statistically analyzed using Statistica 13.3 software. The study was analyzed by Wilcoxon test, Whitney U-Mann test, ANOVA test.

Results: Analysis of variance proved the existence of statistically significant difference between the intensity of pleasant feelings SPANE-P (positive), (p=0.000) and unpleasant feelings SPANE-N (negative) (p=0.000) in I and II examination in the group of women. In women, a statistically significant difference was noted in the outcome of overall satisfaction with the contact with the horse during the hippotherapy course (aka. happiness balance) SPANE-B (balance) in Study I and II; they moved from the moderately happy group to the happy group (p=0.000). No such difference was noted for the men; the happiness balance was at a constant level (happy group) on both the first and third days of the study. The difference in happiness balance (SPANE-B) between men and women on the third day of hippotherapy was statistically significant at p=0.0446. The pulse in women measured on the third day of hippotherapy was statistically significantly higher than in men (p=0.0345). The mean pulse over the three days in women was also at a statistically higher level than in men before and after hippotherapy and was p=0.0154. The increase in SPANE-B and SPANE-P was accompanied by an increase in heart rate, especially in women.

Conclusion: Hippotherapy exercises bring physiotherapy students an increase in positive feelings and a decrease in negative feelings, which promotes a good attitude towards the therapy itself as well as life. Personal experience is the best way to understand and consciously use hippotherapy, as a therapeutic method.

Keywords: hippotherapy, SPANE, the positive and negative experience, pulse, emotions

Introduction

Hippotherapy (HPT) is a term that comes from the Greek words “hippos” (horse), “hippike” (the art of riding) and therapy. According to the canons of Polish hippotherapy developed by the Polish Hippotherapeutic Association, hippotherapy is...
defined as a targeted therapeutic activity aimed at improving human functioning in physical, emotional, cognitive and/or social spheres, during which a specially prepared horse is an integral part of the therapeutic process.¹

The another purpose of hippotherapy is to transmit the three-dimensional movements of a horse to the patient on horseback through rhythmic impulses. The movement of the patient’s pelvis is repetitive, it follows a certain pattern and rhythm and involves rocking (elevation and decrease), rotational (anteversion and retroversion) and lateral motions that are similar to those of a person walking. This three-dimensional movement in all planes of the pelvis, which is transmitted to the entire body through the patient’s spine, stimulates proprioception reactions and thus improves postural balance and back straightening.² Another effect of the sensory input involved in HPT is the improvement of postural control and motor responses.³

The primary activity of hippotherapy sessions consists in a patient sitting on horseback performing specific tasks assigned by a qualified therapist. At the same time, a second person (instructor/tutor) who knows the horse, guides the horse and controls its behavior while performing each exercise. During exercise, the horse is in motion and the therapist determines its gait pace and direction.² Equally important in hippotherapy is the patient’s work with the horse from the ground - cleaning, leading the horse in hand, feeding, stroking, cuddling to the horse, and messages conveyed verbally and nonverbally - body language through which the patient expresses his/her emotions.⁴ The effects of hippotherapy result from the patient’s contact with a live animal in a natural environment. The special influence of hippotherapy on the human psyche is connected to the unique sensitivity of horses developed in the course of evolution. Horses have the ability to read subtle signals that come from the environment, which is fundamental in human-horse nonverbal communication. Horses enjoy interacting with humans.⁵

Horses can also read human emotions, as showed in the study by Smith et al. Smith et al were the first to provide evidence of horses’ ability to actively read human facial expressions in photographs and differentiate between positive (happy) and negative (angry) expressions.⁶

In this study, we attempted to answer the question of how contact with a horse during a practical hippotherapy class affects the positive and negative emotions of physiotherapy students, during university classes. In our opinion, confronting one’s own emotions before and after horseback riding gives students, as future potential therapists, a chance to get closer to the patient’s emotional situation during hippotherapy. In other words, the goal of the 3-day course is for students to experience this type of therapy before they start recommending it to patients.

The presented study is the result of a six-year research project (from 2014 to 2019) carried out in cooperation with the Department of Physiotherapy of the Faculty of Health Sciences of the Medical University of Wroclaw and the Institute of Psychology of the University of Wroclaw. This study was conducted in accordance with the Declaration of Helsinki. The work was approved by the Bioethics Committee of the Medical University in Wroclaw (KB- 796/2017).

Objective
To explore how horse contact affects the emotions of students experiencing it for the first time during hippotherapy classes.

Materials and Methods
Participants
A total of 252 students (191 females and 61 males) participated in the study, with a mean age of 23 years. Detailed information about the number of students participating in the course in subsequent years of the project is provided in Table 1. The study was conducted over the next 6 years from 2014 to 2019. All course participants consented to participate in the study. They were briefed on the measurement methods prior to the study.

Hippotherapy Course Description
Physiotherapy students of the Medical University of Wroclaw stayed at a three-day scientific and didactic camp organized as part of the course “Special methods in hippotherapy” and as part of the activities of the Student
Scientific Group SKN15 Child and Adolescent Development Disorders, of which the first author is a supervisor. (Figure 1, SKN 15 logo).

The course was 30 hours long, delivered over three days, with students participating in lecture and hands-on activities on each day. During the course, students performed such activities: as the horse from the pasture and the stables to the horse cleaning station, caring for the course- preparing the horse for riding (putting on a vaulting belt or saddle and bridle), exercising with it while standing on the ground and while riding on horseback at a trot as well as watering and feeding it and cleaning the stables.

Classes were held in Dąbrówka Łubniańska in the stable “Kalinówka” where there is a predominance of Silesian horses. Exercises with students were led by a riding instructor and Dr. Anna Maria Choińska (hippotherapist). The aim of the course was substantive and practical (through active horse riding) familiarization of the student with the essence of hippotherapy, as one of the methods supporting physiotherapy. The classes included balance, vestibular system, coordination, deep sensation, body schema, lateralization, and superficial sensation exercises. The duration of a single session on horseback was 60 minutes.

Measurement Methods

Emotional Reactions

The Scale of Positive and Negative Experience (SPANE), in a Polish adaptation based on the Polish version of the SPANE. Diener & Biswas-Diener (2010). It is a short 12-adjective scale that describes human feelings, including 6 UP pleasant feelings and 6 UN unpleasant feelings. Because the scale includes general positive and negative feelings, it assesses the full range of positive and negative experiences, including specific feelings that may have unique labels in specific cultures. Because of the general items included in the scale, the score may reflect not only pleasant and unpleasant emotional feelings, but also other states such as interest, flow, positive engagement, and physical pleasure. Each SPANE item is rated on a scale of 1 to 5, where 1 means “very rarely or never” and 5 means “very often or always.” The scales in the positive and negative parts are scored separately due to the partial independence or separability of these two types of feelings. The total score for both SPANE-P and SPANE-N can range from 6 to 30 points. These two scores can be combined by subtracting the SPANE-N score from the SPANE-P score, and the resulting SPANE-B (happiness balance) scores can range from −24 to 24. SPANE-B is shown in Table 2. Finally,
determining the “happiness balance” involves translating the score into a 7-point scale (the higher the value, the better the student performed on the happiness balance). Emotional response surveys took place twice, on the first day of camp before the start of practical activities (Study I) and on the third day of camp after the end of practical activities (Study II).

**Physiological Responses**

Students’ heart rates were measured with a Sanoquell automatic 766 immediately before riding the horse and immediately after dismounting each day - A total of 6 times over three days. The class was held in the morning. Pulse testing was done 6 times, before getting on and after getting off the horse, each day.

**Statistical Analyses**

Statistical analyses were performed using Statistica software (v. 13.3 en). The study was analysed using Wilcoxon test, Mann–Whitney U-Test and ANOVA test. The mean values (X) and standard deviations (SD) were statistically analysed.

Additionally, the Mann–Whitney U-Test and ANOVA factor analysis was conducted to assess the significance of differences in outcomes, considering separately N valid sessions of women and men. Finally, the Wilcoxon signed-rank test was used to assess the statistical significance of changes in outcomes across the group when pre and post-intervention measurements were considered.

**Results**

At the hippotherapy course, where the physiotherapy students themselves had the opportunity to experience both pleasant and unpleasant feelings, they were able to experience what future patients are likely to feel during therapy on horseback and experience the emotions associated with riding a horse themselves. The following results were obtained from the studies carried out:

1. Both male and female students frequently experienced pleasant feelings (SPANE-P) and rarely experienced unpleasant feelings (SPANE-N) before they started exercising on the horse, as shown in Figures 2 and 3, and Tables 3 and 4. Compared to the first day of the hippotherapy class (SPANE-P1), the frequency of pleasant sensations increased on the third day in women after dismounting from the horse (SPANE-P2) \(p=0.0000\) (Figure 2), and decreased unpleasant feelings (SPANE-N) \(p=0.0000\), as shown in Figure 3 and Table 3.

On the other hand, no statistically significant differences were observed in men, positive and negative emotions in men remained constant, both on the first and third day of the turn (Figures 2 and 3, Table 4).

Therefore, only a statistically significant increase in positive emotion (SPANE-P) was observed in females, compared to males, on the third day during the hippotherapy course. The difference between men and women of positive feelings (SPANE-P2) was statistically significant at \(p=0.044629\), while the reduction in negative feelings in both men and women followed a similar pattern as shown in Figure 2 and Table 5.
2. The “Happiness Balance” obtained from the difference SPANE-P - SPANE-N = SPANE-B of the Emotional Well-being Scale, was statistically significant in women who went from the happy group to the very happy group after three days of participation in the hippotherapy classes, as shown in Figure 4. Whereas the men’s “happiness balance” was consistently “happy” both on the first day before and on the third day of participation in the hippotherapy course (Figure 4).

The difference of day three between men and women in the balance of happiness (SPANE-B2) was statistically significant at p=0.044678, as shown in Figure 4 and Table 5.

3. The results shape similarly in the heart rate study in female and male students. The heart rate of the women was higher than that of the men for three days of hippotherapy to reach a significantly statistical difference on the third day (p=0.0345). This difference may be related to the women experiencing the hippotherapy more emotionally than the men, which also causes physiological changes in the body by raising the heart rate in the women, which was observed on the second (p=0.0038) and third (p=0.0002) day. The difference in heart rate between men and women is illustrated in Figures 5 and 6.
The presented research shows that the psychological effect of students’ participation in hippotherapeutic activities is positive. After three days of contact with the horse, the level of pleasant feelings increases, while the level of unpleasant feelings decreases. Similarly, the overall satisfaction with the course, as indicated by the so-called SPANE-B happiness balance obtained from the Emotional Well-being scale (SPANE), ranks high both before and after the course, especially

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Notes: SPANE-P1 - positive feelings, before hippotherapy; first day; SPANE-P2 - positive feelings, after a three-day turnout of hippotherapy; SPANE-N1 - negative feelings, before hippotherapy; first day; SPANE-N2 - negative feelings, after the three-day hippotherapy session; SPANE-B1 - happiness balance before hippotherapy, first day; SPANE-B2 - happiness balance after the three-day hippotherapy session.

Figure 3 Negative feelings before (SPANE-N1) and after (SPANE-N2) 3-day’s hippotherapy session.

Notes: Mann–Whitney test (with correction for continuity) for the variable: gender, p<0.05000.

Discussion
The presented research shows that the psychological effect of students’ participation in hippotherapeutic activities is positive. After three days of contact with the horse, the level of pleasant feelings increases, while the level of unpleasant feelings decreases. Similarly, the overall satisfaction with the course, as indicated by the so-called SPANE-B happiness balance obtained from the Emotional Well-being scale (SPANE), ranks high both before and after the course, especially...
in women p=0.0000. During the hippotherapy course the women went from an emotional state of happy to a very happy group (SPANE-B). In contrast, men on the happiness balance (SPANE-B) were consistently happy.

A review of the literature shows that patients’ emotional reactions during close contact with a horse vary. In our work, we have demonstrated that the level of positive emotions increases statistically significantly more in women than in men (p=0.0446).

For some, there is a sense of danger that comes from the height of the horse as well as its movement through space. The basis of hippotherapy is the selection of a suitable horse in terms of its height and temperament. An important part of the exercise is for the patient to get to know the horse by cleaning, stroking, feeding and talking. In addition, horseback riding, for most patients, offers the possibility of independent movement without the help of a carer or orthopaedic supplies. The experience of such success strengthens the patient’s self-esteem, contributes to improved motivation to make efforts and encourages increasing independence.\(^8\)

A similar study was carried out at the beginning of studies on 600 psychology and medical students from Monterrea and Saltillo, Mexico, where the assessment of depression, perceived stress and life satisfaction, in students was studied using the Emotional Wellbeing Scale.\(^9\)

The study on Mexican students concluded that SPANE is reliable and shows validity among Mexican psychology and medical students, and that the binary model is appropriate for representing affective balance, i.e. the level of expression of emotions. The investigators referred to SPANE-P as the positive affect (PA) and SPANE-N as the negative affect (NA). In contrast, they defined the SPANE-B, balance score as the constitute subjective well-being (SWB). Mexican medical students showed more negative NA feelings than psychology students p=0.001. On the happiness balance, men studying both medicine and psychology showed higher levels than women p=0.002.\(^9\)
The usefulness of the SPANE scale was also confirmed by Vera-Villarroel, Pavez and Silva (2012) in their study, they indicated that people with higher levels of PA and optimism have better physical and mental health. Academic stress that is experienced by health science students was considered (Pakenham and Stafford-Brown, 2012; Ruiz-Aranda et al.) It was demonstrated that it can be of great benefit for students to develop skills that can help them achieve and sustain an emotional balance, with predominance of PA.

The two-factor SPANE model has been validated in several countries using confirmatory factor analysis (CFA) and the evidence supporting the assumption of its greater universality was shown. In Latin America, validation studies have been conducted in Peru (Cassaretto et al.), and Chile (Carmona-Halty et al.). Other western countries in which SPANE has been validated are Portugal (Silva et al.), Canada (Howell et al.), Serbia (V. Jovanović, 2015), Turkey (Telef, 2015), Germany (Rahm, Heise, and et al.), and Italy (Giuntoli, Ceccarini, Sica et al, 2017). Validation studies were also performed in Asian countries, such as China (Li, Bai et al.), Japan (Sumi, 2014), and India (Singh, Junnarkar et al.).

Because of the expected psychological effects of hippotherapy, its value as a method of supporting the patient’s emotional and social development is emphasised. According to Choińska, hippotherapy helps the patient to cope with their feelings, ie to increase their awareness, by expressing (ie relieving) and controlling them. Tilešová-Rychlewskia in her book states that a horse gives a sense of boundaries but also the possibility to experience consequences - positive and negative. The horse corrects our behaviour and gives a sense of I can, I am able, I can do it, i.e. it triggers positive feelings. The research conducted by Earles et al shows that equine therapy can be an effective treatment for symptoms of anxiety and post-traumatic stress. Analysis of the statements of patients participating in the

Figure 4 Balance of happiness of men and women before (SPANE-B1) and after (SPANE-B2) hippotherapy.
Notes: Mann–Whitney test (with correction for continuity) for the variable: gender, p<0.05000.
study conducted by Kern-Godal et al. showed that contact with the horse is related to the emotional effect of the therapy received. Patients experienced a sense of well-being, feelings of calm, and increased self-awareness.

According to Strauß and Choińska, therapeutic horseback riding influences the development of our senses through the formation of the sensory integration process, developing the perception of body schema, balance (vestibular system), coordination, deep sensation (sensation from the muscle joints and fascia) and superficial sensation (temperature, pain and touch), combined with visual, auditory and taste perception. This is done by changing the pace, and direction of movement in the horse’s space.\\n
To date, there is little research on the psychological effects of horse contact conducted in groups of potential therapists such as physical therapy students. A study conducted by Choińska et al on physiotherapy students participating in hippotherapy classes in 2011 found that the level of stress measured by the diagnostic synthetic function $Z_{PS}$ according to Professor Anna Krefft is statistically significantly higher in men than in women, both immediately before and immediately after horseback riding ($p<0.005$).\\n
On the other hand, the presented research shows that the intensity of pleasant feelings, and thus the positive well-being of the students increases after the hippotherapeutic course. The results presented in this paper were produced in a project that aimed to document the need for students to participate in practical hippotherapy activities by forming their belief in the effectiveness of hippotherapy. Hopefully, the results presented will encourage the enrichment of Master’s degree courses with equine activities.

![Figure 5](image-url)
Our study of a hippotherapy session with students has shown an increase in emotion and heart rate. Similar observations were made by Cabbidu et al who observed an increase in HRV sinus rhythm complexity compared to baseline values during HPT. The authors of the Brazilian study suggested that this increase may affect vagus nerve activation. This in turn may be an explanation for the tendency to experience positive emotions during and after HPT, as reported by the patients. The regulatory mechanism of our patients responded positively to HPT-induced disruption. Cabiddu et al concluded that HPT can be beneficial to children with development disorders of neurological nature. Such disorders involve the autonomic nervous system which is stimulated during HPT.

A human being is also an indivisible unity on the plane of body and spirit. The body is governed by the senses: sight, taste, hearing, smell, touch, deep feeling - proprioception. The soul is associated with the psyche, and therefore with the intellect, the will, the emotions and the conscience. Both the physical and the psychological worlds are governed by eternal and immutable laws of nature, no earthly force is able to change its laws, every even the slightest disobedience to these laws, causes an imbalance, and as a consequence can lead to many misfortunes and diseases. So by all means we should return to a life that is in harmony with nature. During hippotherapy classes, which involve direct contact between a person and a horse, patients experience positive emotions that are in harmony with nature, which enhances the attractiveness of the therapy.

Figure 6 The average scores of pulse rate of female and male physiotherapy students before PB (pulse before) and after PA (pulse after) hippotherapy (before getting on and off the horse) during the 3-day’s hippotherapy session; p<0.0500.
Conclusions
Hipppotherapy exercises bring the physiotherapy students an increase in pleasant feelings and a decrease in unpleasant feelings, which in turn fosters a good attitude to the hippotherapy itself as well as to life (happiness balance).

During the hippotherapy the students experienced an increase in pleasant feelings and a decrease in unpleasant feelings, which are likely to be experienced by their future patients. The therapist’s personal experience of contact with a horse is the best way to understand and consciously apply the therapeutic method of hippotherapy.

Experiencing a surge in pleasant feelings during hippotherapy, is associated with an increase in heart rate and stimulation of the autonomic nervous system and may translate into stimulation of the vagus nerve – especially in women.

There is a need to enrich the didactic offer directed to physiotherapy students with practical hippotherapy classes in Poland.

Disclosure
The authors report no conflicts of interest in this work.

References


