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RESEARCH ARTICLE

EMPATHY AND ATTITUDE UPON AN AGED BODY: SHORT TERM EFFECTS OF THE AGED SIMULATION SUIT AMONG UNDERGRADUATE PHYSIOTHERAPY STUDENTS

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ABSTRACT

Purpose: When empathy and attitude levels of health professionals are high, patient compliance and satisfaction are increased. The purpose of this study was to assess the empathy and attitude levels of undergraduate physiotherapy students towards older people before and after wearing the aged simulation suit by performing pre-defined related scenarios.
Material and Methods: The aged simulation suit was put on 63 students to complete the pre-defined scenarios, which included reading, eating, walking, and sitting to determine the experiences and emotions of students via semi-structured questions and interviews. The empathy and attitude levels were evaluated using the Jefferson Scale of Empathy-Health Professions Students (JSE-HPS) version and Kogan's Attitudes Towards Old People (KAOP) scales at baseline and immediately after performed scenarios.
Results: The scores of the JSE-HPS and its sub-scales, including "perspective-taking" ($p<0.001$) and "compassionate care" ($p=0.008$), were significantly improved, while "standing in patient's shoes" was significantly decreased after the intervention ($p=0.005$). KAOP positive items were found to be higher compared to the baseline results ($p=0.040$). Besides, 87.1% of the students stated that their behavior towards older people would change positively.
Conclusion: Using aged simulation suits may be an effective educational technique that positively contributes to undergraduate physiotherapy students' attitudes and empathy.

Keywords: Empathy, attitude, physiotherapy students, aged simulation suit, older people

INTRODUCTION

The twenty-first century brings many developments and milestones concerning life expectancy due to the improved health care system. Since the proportion and increased length of life of older people compared to other age groups is growing in almost every

country globally, managing of issues which can be faced among the aging population has been gaining attention. It was reported that 12.3% of the world's population is 60 years or older, while it is estimated that this rate will be increased to 16.5% and 22% in 2030 and 2050, respectively (1). According to the 2019 data from the Turkish Statistical Institute, approximately 7.5 million individuals were aged 65 or above (2). However, it has been expected that the older people ratio will reach 9.1% to 25.6% for the years between 2019 to 2080 (2-4). Thus, managing the issues experienced by older people and improving their wellbeing has been understood as an essential preventive health strategy that can lower health expenses by increasing their quality of life.

The decline in physical performance is a significant point that can predict hospitalization, disability, mortality, and independent living in older people. Physical performance in older people is mainly related to reducing muscle-related functions (5). In addition to reducing physical performance, older people usually face weakness and slowness, cognitive and psychological challenges, falls and those all affect one's mobility by negatively contributing to independent living and being the level of benefit from health care services (6-8). It is known that physiotherapists are in a great position to significantly contribute to the urgent global effort to prevent falls and improve independent mobility among the older people (9).

Health professionals, especially those working with older people, should have specific visions and understandings about their target population about physical, emotional, cognitive, and other parameters affecting the health care process (10). In this manner, empathy, which can be described as the ability to feel and understand the experiences of others (11), is of much importance when considering the aged population. However, if health professions students have never experienced empathy toward older people with age-related disabilities and challenges, their empathy level may be inadequate. In the literature, studies have found a lack of empathy and attitude toward older people among health professions students (12-15).

The compliance and satisfaction of patients are increased at which health professionals' empathy and attitude levels are high (16, 17). Besides, Hojat et al. stated that better clinical outcomes were achieved in patients treated by health professionals with a higher level of empathy when compared to others with a lower level (18). Health care providers must have the ability to understand patients' feelings and perspectives (cognitive empathy) and be able to relate to patients' feelings and experiences (emotional empathy) (19). However, it was stated that health professionals might lack empathy and attitudes towards older adults (20). Since the importance of empathy and its clinical consequences has been addressed in medical literature, measuring empathy upon older people in health professionals and undergraduate health professions students is gaining importance. In this line, simulation activities such as an aged simulation suit or game-based approach might be helpful to improve empathy and attitude toward older people (21-23) because simulation-based modalities impact students' perceptions regarding empathy (21). However, there have been limited specific lessons that directly focus on empathy and attitude in undergraduate education in medical and health sciences (physiotherapy, nursing, midwifery, nutrition, dietetics, etc.).

Aims

In the light of the literature, we would like to investigate whether wearing an aged simulation suit while doing some daily activities affects the empathy levels of undergraduate physiotherapy students and their attitudes toward older people. Thus, this study mainly aimed to show the short-term effects of the aged simulation suit on the empathy level and attitude towards older people among undergraduate physiotherapy students. The second aim of this study was to compare the effects of the aged simulation suit according to the gender of the students and living or not living with an older person. The intervention was mainly based upon wearing an aged simulation suit through which some typical daily activities related to independent living and mobility were performed.

MATERIAL AND METHODS

Study Design

The research was designed as a pretest and post-test quasi-experimental design. In addition, the mixed methods consisted of both quantitative and qualitative analysis were used.

Study Setting and Sample

This research was conducted with the physiotherapy students in the first year of bachelor's degree education in Department of Physiotherapy and

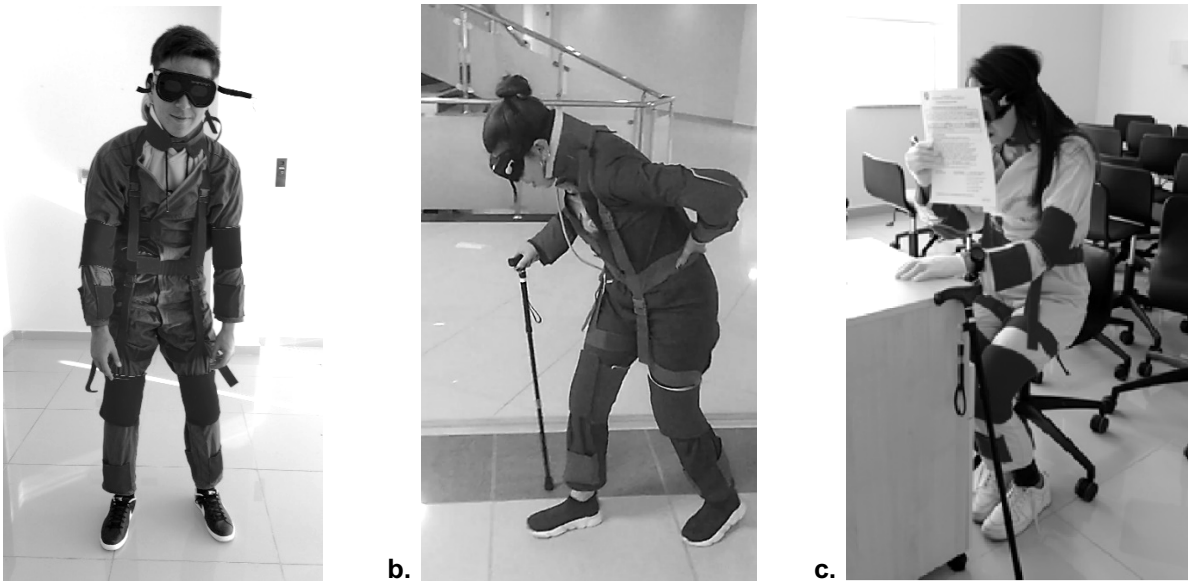

Figure 1. The aged simulation suits used in the study. Examples of the posture of the students wearing the aged simulation suits during standing upright position (a), walking activity (b), and reading activity (c) are shown

Rehabilitation. A priori power analysis calculated according to middle effect size and 95% CI showed that 34 students were needed to reach 80% power at the 0.05 significance level. We aimed to include at least 50 students to eliminate effect size deviations. The research sample consisted of 63 students randomly enrolled from a population willing to volunteer to participate in this research. Post-hoc power analysis showed that 86% power was achieved (24). Simple randomization was done by a computer-generated random number list from the web-based program (https://www.randomizer.org). This study was approved by Izmir Bakircay University Ethics Committee (Date: 06.03.2020, No:14). The manuscript was prospectively registered, and the clinical trial registration number is NCT04603534. The written informed consent was taken from each student. The inclusion criteria were set as being a volunteer to participate, while exclusion criteria were set as having advanced visual and balance problems mainly associated with the inner ear.

Data Collection Tools

The data were gathered using the sociodemographic form in which gender, age, and family issues such as whether living with an older person were collected. The levels of empathy and attitude were assessed by fulfilling the following tools: Jefferson Scale of Empathy-Health Professions Students (JSE-HPS) and Kogan's Attitude towards Old People Scale (KAOP).

JSE-HPS was initially developed by Jefferson University intended to measure empathy levels for health professions students. The JSE-HPS consists of a total of 20-items, each scored by a seven-point Likert Scale as 1: "Strongly disagree" through 7: "Strongly agree". Ten out of 20 items are scored directly according to the Likert weights, while the other half are reversely scored. The minimum and maximum scores for JSE-HPS can be reached from 20 to 140, respectively. Sub-scores of JSE-HPS include Factor 1 (perspective taking), Factor 2 (compassionate care), and Factor 3 (standing in patient's shoes). The higher scores indicate, the more empathic or vice versa (25). The reliability coefficient of JSE-HPS was 0.78 (26). JSE-HPS was copyrighted by © Thomas Jefferson University, 2001. All rights reserved.

KAOP scale consists of a total of 34 items which was initially developed by Kogan et al. The KAOP scale has subs-scores including positive and negative items. Seventeen items are directly scored as Likert weights according to the 6-point Likert scale in which 1: "Strongly disagree" through 6: "Strongly agree" while the rest of seventeen items are scored reversely. The minimum and maximum points of KAOP can be 34 and 238, respectively. The interpretation of the score of KAOP is linear in which higher scores indicate a more positive attitude while

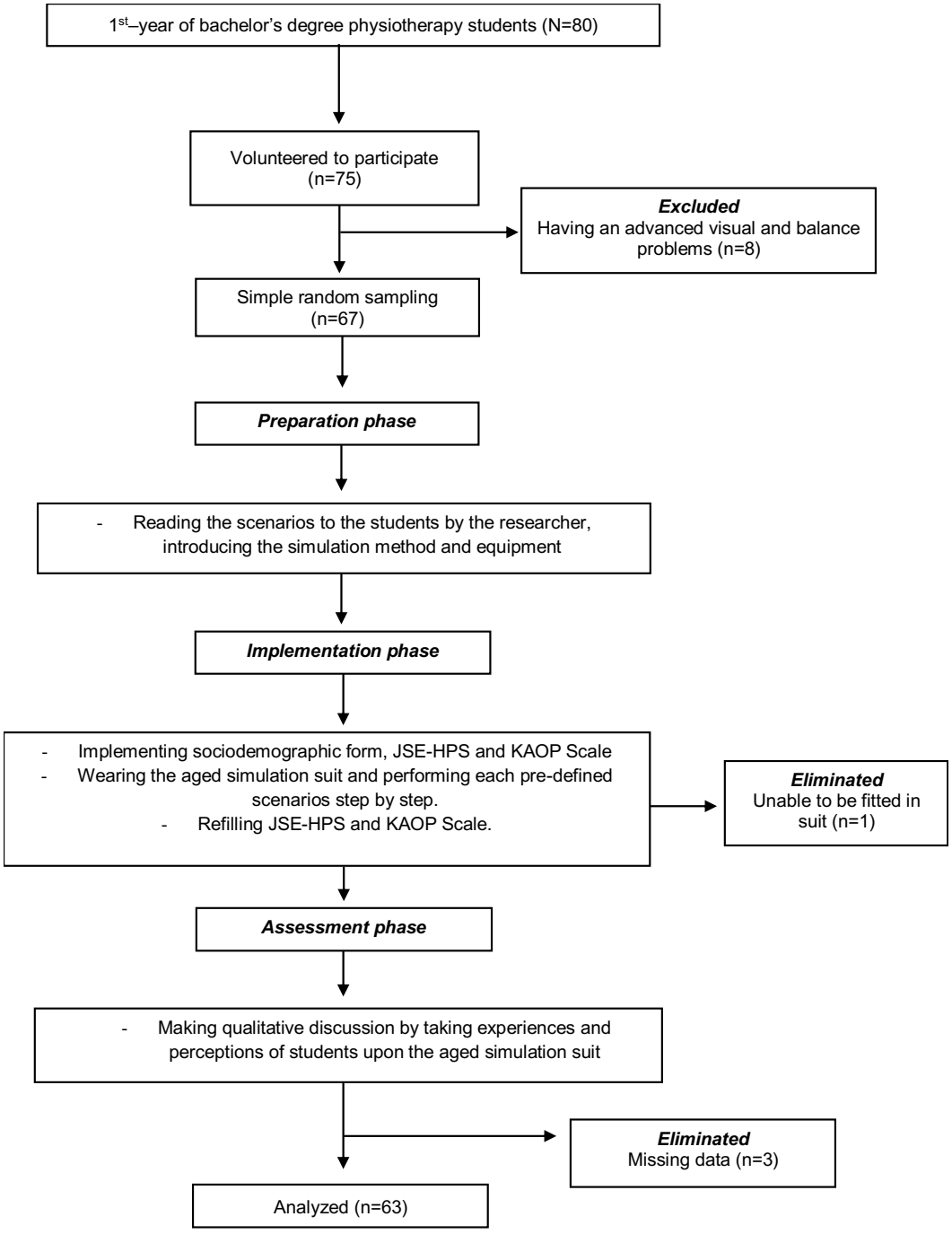

Figure 2. Study flow diagram

lower scores indicate the worse. Reliability of the total KAOP scale was found in different studies as 0.87 (27) and 0.89 (28).

The aged simulation suit (Sakamato Model M716, Tokyo, Japan) has been utilized in a variety of research, and related procedures (scenarios) associated with it have been thoroughly explained (29, 30). Briefly, the aged simulation suit consists of several components. One of the components is loads directly placed on joints to restrict the range of motion as simulating the aged body. 400-500- and 800-1000-grams loads should be placed in bilateral elbows and knee joints, respectively. In addition, a soft material band with Velcro is placed to prevent compression on arteries and nerves around the neck to restrict the cervical range of motion. Glasses that imitate a diminished visual ability are placed. This glass serves as a flu vision to participants, yet the lenses are not

Table 1. Descriptive information of physiotherapy students

Descriptive data	n = 63	%
Gender		
Female	44	69.8
Male	19	30.2
Having older relative(s)		
Yes	58	92.1
No	5	7.9
Living with an older person		
Yes	23	36.5
No	40	63.5
How many years have lived with older relative(s)? *		
Up to 5 years	14	60.9
6-10 years	4	17.4
11-20 years	5	21.7
Willing to live with older relative(s)		
Yes	38	60.3
No	25	39.7
The reason why willing to live with older relative(s) #		
An older person should not live alone in a home	13	34.2
An older person is a member of family	23	60.5
Wish to help an older person	7	18.4
Necessity of caring an older person according to traditional	2	5.3
Turkish family structure		
Other	1	2.6
The reason why willing not to live with an older relative		
Believing that it would be better to be in separate houses	10	15.9
Believing that have not enough time to care older person	5	9.5
An older person could live alone if he/she has no disease	5	9.5
Living with an older person will restrict his/her life	4	6.3
Other	2	16
Willing to work in a place that service to older people?		
Yes	45	71.4
No	18	28.6

*The analysis was performed on 23 students, # Three out of 38 students marked more than one statement.

harmful. Additional accessories are earplugs and gloves, which should imitate loss of contrast hearing and sensory loss of skin by touching. Belts are also defaulted in this suit and placed before, which are helpful to strengthen and tighten to bend one's posture, just like in older people whose posture is marked within bent and flexor manner (see Figure 1.a). Belts in both lower extremities, back to the knee joint, and front trunk provide a kyphotic posture by tightening them efficiently. The company provides small, medium, and large sizes of suits. Thereby each suit was suitable for each student related to their wearing size. Before the study, a total of three sizes (one set) of suits were gathered.

Procedure

The intervention procedure was explained in three phases: The preparation, implementation, and semi-structured interview phases. The study flow diagram is demonstrated in Figure 2.

Preparation phase

Four different simulation scenarios were prepared related to restrictions associated with aged simulation suits (see Supplement file 1). The scenarios were included commonly used daily life activities in a hospital related to independent living and mobility. These scenarios were set as (1) drinking a soup from a plastic bowl with a spoon, (2) walking through the corridor (see Figure 1.b) and going downstairs, (3) going to the toilet, (4) reading (see Figure 1.c) and signing a form for each student in a same order. Pre-defined scenarios were shared with the students just before the application. Simulation methods and equipment were also presented, where pre-defined

Table 2. Pre-test and post-test result and change of empathy and attitudes of physiotherapy students

Scales	Pretest Mean±SD	Posttest Mean±SD	*t*	*p*
JSE-HPS Total	108.54±14.12	112.42±14.99	-3.180	0.002*
JSE-HPS Factor 1	57.35±9.43	60.50±9.37	-4.044	<0.001
JSE-HPS Factor 2	43.76±6.20	45.29±6.54	-2.737	0.008*
JSE-HPS Factor 3	7.44±2.88	6.02±2.88	2.933	0.005*
KAOP Scale Total	141.70±22.14	142.92±20.27	-0.801	0.426
KAOP Positive items	71.44±12.05	73.52±11.23	-2.093	0.040*
KAOP Negative items	70.25±13.14	69.40±12.11	0.837	0.406

JSE-HPS: Jefferson Scale of Empathy–Health Professions Students, JSE-HPS Factor 1: Perspective taking, JSE-HPS Factor 2: Compassionate care, JSE-HPS Factor 3: Standing in patient's shoes, KAOP: Kogan Attitudes towards Old People, Paired sample t test, *p < 0.05

activity scenarios were placed and prepared according to the scenarios.

Implementation phase

The implementation phase was performed within three main steps. In the first step, the scales (JSE-HPS and KAOP Scale) were assessed and requested to fulfill before the intervention. In the second step, the aged simulation was put on by students with the assistance of the researchers. As soon as the simulation suit was put entirely on, three to five minutes were provided for their adaptation. Then, each student performed each pre-defined scenarios step by step. During the activities, no help or leading was given to the students. However, one of the researchers supervised the students during the activities to integrate safety. In addition, each student was informed that they could terminate the activity whenever required. The students have spent 20 to 25 minutes in the simulation suit. The last 3rd step of implementation included re-assessing the outcomes. In this step, each student was asked to re-fill JSE-HPS and KAOP scale after taking off the suit.

Semi-structure interview phase

The students' experiences and emotions regarding the aged simulation suit were collected by asking reflective questions for each student one by one. Data was collected through semi-structured interviews in which participants were asked a series of open-ended questions (see Supplement file 2). In this phase, the qualitative discussion is made by taking experiences and perceptions of students upon the aged simulation suit.

Data Analysis

Quantitative data were analyzed using SPSS version 15.0 software (SPSS Inc., Chicago, IL, USA) in this study. The Kolmogorov-Smirnov test was used to determine whether the data were normally distributed. Descriptive analyses were presented using frequency, percentage, and mean ± standard deviation. Independent sample t-test and paired sample t-test were used to compare between-group and inter-group comparisons. A p-value of less than 0.05 was considered to show a statistically significant result.

Directed content analysis was used to analyze two independent reviewers' qualitative data from interviews (31). The themes obtained through the interviews were analyzed, with four themes being determined.

RESULTS

According to the demographic information of the 63 participating physiotherapy students, there were 37 (58.7%) students under the age of 19, and 26 (41.3%) students were between 19-21 years old. Forty-four (69.8%) students were female, and the remaining 19 (30.2%) students were male. The descriptive data of students' older relative (s) and thoughts about older people are shown in Table 1.

Pretest and post-test results and changes of the JSE-HPS and KAOP scale are shown in Table 2. JSE-HPS total scores (p=0.002), JSE-HPS Factor 1 (p<0.001) and Factor 2 (p=0.008), and KAOP positive items (p=0.040) were found to be higher after the aged simulation suit scenarios compared to the baseline results. JSE-HPS Factor 3 scores were significantly lower (p=0.005) (see Table 2).

In Table 3, the detailed analysis results are shown in which pretest and post-test result in the difference of empathy and attitude when considering the gender. In addition, similar parameters were analyzed according to another factor as living or not living with older people (Table 4).

Table 3. Pre-test and post-test result and difference of empathy and attitudes according to the gender

	Female (n=44)				Male (n=19)				Difference (delta) between groups
Scales	Pretest Mean ± SD	Posttest Mean ± SD	*Difference (delta)*	p^T	Pretest Mean ± SD	Posttest Mean ± SD	*Difference (delta)*	p^T	$p^\#$
JSE-HPS Total	108.17 ± 14.23	113.40 ± 15.33	-5.22 ± 8.95	<0.001	109.39 ± 4.19	110.15 ± 14.30	-0.76 ± 10.79	0.762	0.093
JSE-HPS Factor 1	56.90 ± 10.13	61.08 ± 10.10	-4.17 ± 5.97	<0.001	58.37 ± 7.68	59.15 ± 7.47	-0.78 ± 6.17	0.588	0.045*
JSE-HPS Factor 2	43.93 ± 5.76	45.84 ± 6.37	-1.90 ± 3.44	0.001*	43.36 ± 7.26	44.00 ± 6.89	-0.63 ± 6.13	0.658	0.297
JSE-HPS Factor 3	7.34 ± 2.95	5.90 ± 2.89	1.43 ± 4.03	0.023*	7.65 ± 2.76	6.26 ± 2.90	1.39 ± 3.45	0.096	0.968
KAOP Scale Total	142.00 ± 22.74	141.63 ± 20.51	0.36 ± 11.76	0.838	141.00 ± 21.26	145.89 ± 19.91	-4.89 ± 12.44	0.104	0.115
KAOP Positive items	71.81 ± 11.98	72.61 ± 10.16	-0.79 ± 8.09	0.518	70.57 ± 12.49	75.63 ± 13.43	-5.05 ± 6.64	0.004*	0.048*
KAOP Negative items	70.18 ± 13.58	69.02 ± 12.99	1.15 ± 8.04	0.345	70.42 ± 12.40	70.26 ± 10.06	0.15 ± 8.48	0.936	0.657

JSE-HPS: Jefferson Scale of Empathy–Health Professions Students, JSE-HPS Factor 1: Perspective taking, JSE-HPS Factor 2: Compassionate care, JSE-HPS Factor 3: Replacing yourself with the patient, KAOP: Kogan Attitudes towards Old People, ^{T}Paired sample t test, $^\#$Independent sample t test, *p < 0.05

Table 4. Pre-test and post-test result and difference of empathy and attitudes according to living or not living with an older person

	Living with an older person (n=23)				Not living with an older person (n=40)				Difference (delta) between groups
Scales	Pretest Mean ± SD	Posttest Mean ± SD	*Difference (delta)*	p^T	Pretest Mean ± SD	Posttest Mean ± SD	*Difference (delta)*	p^T	$p^\#$
JSE-HPS Total	106.71 ± 17.22	109.07 ± 19.95	-2.35 ± 9.37	0.240	109.60 ± 12.09	114.34 ± 11.05	-4.74 ± 9.85	0.004*	0.349
JSE-HPS Factor 1	56.04 ± 11.93	58.98 ± 12.88	-2.94 ± 5.85	0.035*	58.10 ± 7.70	61.37 ± 6.61	-3.27 ± 6.44	0.003*	0.839
JSE-HPS Factor 2	42.47 ± 6.95	43.30 ± 7.95	-0.82 ± 4.35	0.372	44.50 ± 5.67	46.42 ± 5.33	-1.92 ± 4.46	0.010*	0.347
JSE-HPS Factor 3	8.19 ± 2.49	6.47 ± 2.62	1.71 ± 2.81	0.008*	7.00 ± 3.02	5.74 ± 3.01	1.25 ± 4.34	0.077	0.649
KAOP Scale Total	138.91 ± 22.68	140.82 ± 20.44	-1.91 ± 12.34	0.465	143.30 ± 21.94	144.12 ± 20.32	-0.82 ± 12.12	0.669	0.735
KAOP Positive items	69.39 ± 11.57	72.17 ± 11.85	-2.78 ± 7.68	0.096	72.62 ± 12.30	74.30 ± 10.93	-1.67 ± 8.07	0.197	0.596
KAOP Negative items	69.52 ± 14.11	68.65 ± 12.10	0.86 ± 8.62	0.634	70.67 ± 12.72	69.82 ± 12.25	0.85 ± 7.93	0.502	0.993

JSE-HPS: Jefferson Scale of Empathy–Health Professions Students, JSE-HPS Factor 1: Perspective taking, JSE-HPS Factor 2: Compassionate care, JSE-HPS Factor 3: Replacing yourself with the patient, KAOP: Kogan Attitudes towards Old People, ^{T}Paired sample t test, $^\#$Independent sample t test, *p < 0.05

Table 5. Feelings and thoughts of the students during the simulation with the aged simulation suit

Theme	Examples quotes from the interviews or open-ended questions
Awareness	"…I understand much better what older people experience with joint restrictions, difficulty moving, poor eyesight and so on…"
Empathy	"…Empathy established by thinking and by experiencing are two different things. Experiencing it was good…"
Sadness	"…I had great difficulty, seeing older people's difficulties made me sad…"
Neediness	"…I saw that when you get old, your life gets difficult, and I felt the need for help…"
Loneliness	"…It was bad to stay alone in hospital like someone who's all alone…"
Helplessness	"…I felt that I couldn't even do basic things. It was a situation of helplessness and difficulty…"

Findings Obtained from Semi-Structured Interviews

When the content analysis was performed on the effects on students of simulation conducted with the aged simulation suit, two main themes were determined: (1) the creation of awareness towards older people (79.03%) and (2) establishing empathy (37.9%). In addition, performing content analysis on the effects on students' feelings of the simulation conducted with aged simulation suit, themes of sadness (20.96%), feeling in need of others (17.74%), loneliness (9.67%), and helplessness (6.45%) were determined (Table 5).

In interviews after the simulation scenarios, the students said that when they were in the role of older people, they wanted people to behave towards themselves in a way that was helpful (67.74%), understanding or tolerant (33.87%), concerned (16.12%), cheerful (11.29%), patient and respectful, polite, or kind (11.29%).

After the simulation scenarios were conducted with the aged simulation suit, 87.10% of the students stated that their behavior towards older people would change positively. Those who reported that their behavior would change as more helpful towards older people (66.66%), more understanding (42.59%), more concerned (11.11%), more attentive, patient, cheerful, and respectful (7.40%).

DISCUSSION

This study showed that a simulated environment, even created artificially, can improve undergraduate physiotherapy students' empathy and attitudes towards older people, especially those associated with physical difficulties they face in their daily routine in a hospital. The secondary output of this study also showed that some factors such as living with older people or gender significantly impact empathy and attitude levels.

Since health care has been evolving in a geriatric patient-specific manner, providing patient-centered health service should be integrated for fields and bachelor education. Empathy is accepted as a teachable qualification. Thereby it is crucial to integrate into education, especially in health sciences (32). In this regard, the geriatric population, dramatically growing globally, is the one whose health care needs should be appropriately met to improve the quality of both health care services and patient perception. Besides, empathy which is widely described and understood its effect on health care outputs recently drew our attention to this topic from the perspective of physiotherapy students. The literature states that students' attitudes towards older people tend to be negative and that this arises from deficiencies in their empathic approach (19, 33, 34). In our sample, the students' empathy levels were increased according to the results of JSE-HPS. However, the sub-factor of JSE-HPS, including Factor 3 (standing in patient's shoes) results, seems contradictory compared with the other sub-factors and JSE-HPS itself. JSE-HPS Factor 3 consists of two items; *(1)* "*It is difficult for a health care provider to view things from patients' perspectives"* and *(2) "Because people are different, it is difficult to see things from patients' perspectives".* The significant decrease in JSE-HPS Factor 3 may be interpreted that understanding the current situation of an older person is more difficult for the students when viewed through the perspective of a health professional. Therefore, we are supported that the students' empathy levels increased relatively according to Factor 3 due to their perspectives compared to their initial thoughts via their experience. Similarly, 37.9% of the students stated their empathic approach level

increased in the semi-structured interviews. This was an expected result, and it corresponded to findings in the literature (35), which demonstrated an increase in empathy in medical students as a result of an intervention based on a simulation game. Other studies also support those simulative-based interventions have improved empathy, yet these studies only focused on medical and nursing students (29, 36, 37). The education level and student department can also affect attitudes towards older people and their preferences for geriatric management after graduation (38). Wilson et al. (39) reported no difference between health sciences (pharmacy and nursing) students and law students in the first year of education; however, the third grade pharmacy students' empathy level was significantly higher compared to first grade. Differences in the curriculums inter disciplines, or cultural diversity may have contributed to the variations. For instance, Turan et al. (13) reported that physiotherapy students' attitudes were better than students in other health disciplines. In the light of the literature, our study can be accepted as the unique one that focuses on some gaps related to empathy in physiotherapy education.

Immersive and experiential simulation-based interventions were defined as effective because perspective simulations enable students to see the world through 'another person's eyes' (40). However, the current curriculum of physiotherapy bachelor programs in which basic sciences and specific treatment and evaluation methods related to physiotherapy did not seem to focus on empathy. In literature, there are several methods, such as geriatric medication games (19), aging simulation games (21), and aged simulation suits (29) which can be proved to be efficient to increase the levels of empathy and attitudes of health professions students towards older people. We thought that adding a combination or modification of these methods to the curriculum of the physiotherapy programs might be efficacious.

The optimum geriatric patient-centered management plan could allow achieving the best outputs regarding the quality of health management. Establishing good communication between older people and health professional is a prerequisite for the best clinical outcomes (41, 42). Thus, an optimal attitude towards older people is essential, especially for physiotherapists. We evaluated the effect of intervention performed with simulation suit by KAOP, and there was no significant difference in total score except for positive items in the total sample. When analyzing the effects of "Living or not living with an older person" and "gender" on empathy and attitude, there was no significant difference in the former; however, a significant difference was found in the male gender in KAOP positive items in the latter. Short-term intervention might not affect the KAOP total scores much more because the baseline KAOP total scores are around 140, which were already higher in the total sample that is accepted good according to the scoring of KAOP (43). The male gender is accepted as having relatively lower attitudes and empathy scores than females. In addition, "gender" based KAOP analysis in positive items was significant in favor of females. It can be interpreted according to this assumption. A qualitative interpretation after the intervention also supports the significant difference in positive items in KAOP, in which 87% of students stated that their attitudes and behaviors changed positively.

Gender is also the major contributing factor to empathy. Since empathy is a more feminine feature, females are expected to have more empathy levels than males (39, 44). Within-group analysis showed that females significantly differed in all subdomains and JSE-HPS total between pre-and post-test results. However, males did not at all. According to the differences between baseline and post-test, there was no significant difference except for JSE-HPS Factor I between groups. Gender effect might also affect the empathy level of the entire group since the great majority of participants (70%) were female.

Family structure, especially in eastern cultures, might significantly influence the attitudes, especially towards an older person. In our country, living with an older person is more familiar for people compared to western countries. Since living with an older person may direct observation of difficulties older people face, this might also yield an increased empathy and attitude. When we analyze the differences between pre-and post-intervention JSE-HPS and KAOP scores within the stratified sample, students "living with an older person" showed a significant difference in JSE-HPS Factor 1 and JSE-HPS Factor 3. While students "not living with an older person" showed a significant difference in JSE-HPS total score and all JSE-HPS Factors except for Factor 3. It can be accepted as a reflective result supporting our hypothesis that living with an older person improves one's empathy, as seen in this group's higher level of baseline empathy. In addition to the effect of "living or

not living with an older person", a higher level of "willingness to live with an older person" (60.3 %) and "willingness to work in a place that services older people" (71.4 %) might also affect these improved empathies especially in Factor 1 and Factor 3. While students who were not living with an older person may be affected more by the intervention when compared to the other group, this might explain the significant difference within a total score in addition to Factors 1 and Factor 3.

In literature, similar simulation suits were used for simulation scenarios (45, 46). Sari et al. reported that using an aged simulation suit (Sakamato Model M716, Tokyo, Japan) can help nursing bachelor students overcome challenges on empathy and positive attitude towards older people. In addition, they also reported that the themes determined according to the content analysis of the semi-structured interviews were as follows: awareness (100%), empathic approach (50%), and helplessness/helplessness (36.6%) (46). According to the content analysis in our study, the results of similar themes stated in the previous study were as follows: the creation of awareness towards older people (79.03%), establishing empathy (37.9%), and helplessness (6.45%). Notably, using the aged simulation suit in our study created awareness in the great majority of the students. It is especially pleasing that students became aware of older people's increasing need for help because of the reduction in their physiological capacities.

Examining the effects of the aged simulation suit on students' feelings, sadness, needs, loneliness, and helplessness was prominent. This emotional effect on students strengthened their empathy and, at the same time, enabled self-criticism, and they showed a desire to change their behavior towards older people. In addition, they stated that they would be more helpful, understanding, concerned, sensitive, patient, cheerful, and respectful towards older people. In this way, it was seen that the aged simulation suit affected both the cognitive and emotional areas of empathy in students and brought out a motivational approach. We believe that this result is essential in positively changing negative attitudes towards the elderly. The literature also emphasizes that, particularly in health care, negative attitudes towards older people can cause significant problems in areas such as caring for them or establishing communication with them (47-49).

According to the literature, simulation-based interventions assessing empathy should be kept through during health education since the long-term maintenance of these perceptions and attitudes might change. We suggest that further studies consider which simulation method and duration concerning its impact would be more productive.

Limitations

This study only focused on the short-term impacts of the simulation suit; the long-term consequences of this intervention can also be studied via repeated measures. This study was conducted in a single center focused on physiotherapy students. The generalizability of the results could be debatable. However, to the best of our knowledge, this is the first study that directly focuses on physiotherapy students. Besides, importance is known that the timing of these kinds of interventions related to empathy has a crucial effect on enhancing empathy and perceptions among students (39). Our sample consisted of only students in their first year of bachelor's degree, and this early recognition of empathy could be considered a strength. Nevertheless, comparing different empathy grades would have also provided a possible strength.

CONCLUSION

In conclusion, it was found that physiotherapy students' total empathy and attitude levels towards older people increased following wearing an aged simulation suit and completing the pre-defined scenarios. In addition, this study showed that living with older people and being female have positive effects on empathy and attitude levels. We suggested that the physiotherapy curriculum should require more simulation lessons, courses, or laboratories, including theoretical and clinical practices, to increase physiotherapy students' level of empathy and attitudes towards older people or any patients.

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