Title:

A RANDOMIZED CONTROLLED TRIAL COMPARING TRAINING PROGRAMS DESIGNED TO IMPROVE AWARENESS, ATTITUDES, AND EMPATHY TOWARD INDIVIDUALS WITH DISABILITIES IN NURSING STUDENTS

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Introduction

According to World Health Organization estimates, 1.3 billion people worldwide—approximately 16% of the global population—live with a disability (WHO, 2023). UNICEF reports indicate that there are 240 million children with disabilities (UNICEF, 2021). The needs of people with disabilities are an inalienable right, just like those of every individual in society. The literature indicates that people with disabilities face difficulties in accessing their fundamental rights -such as education, transport and healthcare- due to reasons including inadequate physical accessibility, transport issues, insufficient provisions for people with disabilities in public spaces, the lack of or inaccessibility to accessible housing, low disability benefits, insufficient employment opportunities, the non-implementation of legislation or inadequate enforcement, and the perception of people with disabilities within society as "needy" or "limited" within society, are cited as reasons why people with disabilities face difficulties in accessing fundamental rights such as education, transport and healthcare (Pineda, 2024; Erdurak & Yıldız, 2025; TÜREV, 2025; Talen, 2019; WHO, 2023; İpek, 2020; Taşkın and Ateş, 2025; Kanyılmaz Polat, 2020; Baybora, 2006; Öztürk, 2011; Çakır et al., 2019; Yenihan & Yılmaz, 2019; Shildrick, 2009; Barnes, 2012; Reeve, 2015; Deal, 2003; Findler et al., 2007; WHO, 2023; Kaldık, 2024; Kul Parlak, 2023; Seylim, 2021; Rutter, 1989; Deater-Deckard, 2001; Hay, Payne, & Chadwick, 2004).

Having the highest standard of health is a fundamental right of every human being, regardless of race, religion, political belief, or economic or social status. Under the United Nations Convention on the Rights of Persons with Disabilities, health also guarantees the right of persons with disabilities to enjoy the highest attainable standard of health without discrimination (Official Gazette of the Republic of Turkey, 2009). Lack of access to healthcare services can have negative effects on the health and well-being of people with disabilities, leading to an increase in unmet health needs (Popplewell et al., 2014; Sakellariou & Rotarou, 2017).

Despite efforts to address the right to health for persons with disabilities as outlined in the United Nations Convention on the Rights of Persons with Disabilities, it has been reported that there are shortcomings in their access to healthcare services. This inadequacy may stem not only from the physical, social, economic, and policy-related challenges faced by people with disabilities but also from healthcare professionals (Karatana and Gür, 2019; WHO, 2023). A study conducted in the United States with a large sample reported that people with disabilities are less satisfied with the healthcare they receive, spend less time in care, and experience poorer interactions with healthcare professionals compared to those without disabilities (Stone et al., 2024). People with disabilities may be unable to access healthcare due to reasons such as healthcare professionals lacking knowledge about the right to health for people with disabilities and the presence of negative attitudes and behaviors toward them (Karatana and Gür, 2019; WHO, 2023). The literature also includes studies indicating that people with disabilities are more likely to refuse medical care due to factors such as cost, the lack of accessibility or communication facilities in healthcare provision, and healthcare professionals' lack of necessary training—and in some cases, willingness—to support patients with disabilities (Iezzoni et al., 2021; Lagu et al., 2022; Stone et al., 2024).

People with disabilities, like every other member of society, should have equal and non-stigmatizing access to healthcare services. The health issues faced by people with disabilities may lead to them requiring more healthcare services and, consequently, having more interaction with healthcare professionals (Topaloğlu Ören, Dereli & Yıldırım Sarı, 2021). Healthcare professionals who can identify the needs of people with disabilities, advocate for their rights, demonstrate sensitivity to their issues, protect them and provide guidance, create a biopsychosocially safe environment for them, and deliver holistic healthcare will play a crucial role in ensuring their access to healthcare. To this end, it is emphasized that all healthcare professionals must develop positive attitudes and behaviors toward people with disabilities (Topaloğlu Ören, Dereli & Yıldırım Sarı, 2021).

The roles of nurses are listed in the 2011 Nursing Regulation as follows: providing care; developing and implementing plans for medical diagnosis and treatment prepared by a doctor; creating a safe and healthy environment; education; counseling; research; management; quality improvement; collaboration; facilitating communication; patient advocacy; and shaping health policies (Turkish Ministry of Health Nursing Regulation, 2011). The points outlined regarding ensuring access to healthcare for people with disabilities align closely with the roles of nurses. Consequently, nurses play a significant role in ensuring that people with disabilities have access to healthcare (Topaloğlu Ören, Dereli & Yıldırım Sarı, 2021; Doody, Hennessy & Bright, 2022; Nirgiz, Doğan and Gür, 2024). Nurses are healthcare professionals who, by being present at all levels of the healthcare system, can contribute to the prevention of disability, fulfillment of the health needs of people with disabilities, and social inclusion of people with disabilities (Karatana and Gür, 2019; Topaloğlu Ören, Dereli & Yıldırım Sarı, 2021). The literature indicates that nurses are among the occupational groups most frequently in contact with people with disabilities, and through these interactions, nurses make positive contributions to the lives of people with disabilities, help them adopt new health behaviors, and improve their well-being (Nirgiz, Doğan and Gür, 2024). For this reason, nurses may be key healthcare professionals capable of facilitating disabled individuals' access to healthcare and their participation in social life.

The literature indicates that nurses' awareness, attitudes, and empathy toward people with disabilities may influence the provision of healthcare for these individuals. Therefore, to ensure that people with disabilities have access to high-quality healthcare services, it is recommended that nurses be equipped with positive attitudes and behaviors toward people with disabilities (Karatana and Gür, 2019; WHO, 2023). The literature indicates that nurses possess positive attitudes toward people with disabilities (Ayyıldız and Ulupınar, 2016; Çelik et al., 2019; Akca et al., 2024; Dikici and Özdemir, 2025). Furthermore, studies indicate that the vast majority of nurses have not received training on disability and find it challenging to interact with people with disabilities (Ayyıldız and Ulupınar, 2016; Doğan and Gür, 2024). The literature emphasizes the importance of professional education in improving the healthcare provided by nurses to people with disabilities and in meeting their health needs (Doody, Hennessy & Bright, 2022; Doğan and Gür, 2024). The literature suggests that individuals with a high level of empathy exhibit more positive attitudes toward people with disabilities; consequently, educational curricula should include empathy training, information sessions, practical training, and awareness-raising activities designed to foster positive attitudes and facilitate better communication with people with disabilities (Balsak and Ayhan, 2025).

There are studies in the literature examining nursing students' attitudes toward people with disabilities. According to these findings, nursing students hold negative attitudes toward people with disabilities (Shpigelman, Zlotnick & Brand, 2016; Rozani, Zur-Peled & Aharon, 2024). It has been determined that the attitudes of nursing students in Turkey are at a moderate level (Özdemir and Karadağ, 2021). In the study by Subay et al. (2022), it was found that nursing students possess positive attitudes toward people with disabilities, and awareness-raising initiatives are recommended to sustain and develop these attitudes. Furthermore, the literature indicates that nursing students' knowledge, attitudes, and preparedness to provide care for people with disabilities are inadequate (Rozani et al., 2024; Warshawski, 2025). In the study by İlter and Ovayolu (202), nursing students' empathetic tendencies were at a moderate level, and as empathy levels increased, their perceptions regarding aging also improved positively. In Dinçer and İnangil (2021) found no correlation between empathy tendency scores across groups. The studies emphasize the importance of developing nursing students' awareness, attitudes, and empathy toward people with disabilities to improve the healthcare services provided to them (Özdemir and Karadağ, 2021; Subay et al., 2022; Rozani, Zur-Peled & Aharon, 2024; Dikici and Özdemir, 2025; Warshawski, 2025; Geçgil et al., 2025). In studies aimed at developing nursing students' attitudes toward people with disabilities, it is noted that the training provided to nursing students facilitates the development of awareness, positive attitudes, and empathy (Dikici and Özdemir, 2025; Campbell et al., 2021).

The literature indicates that nursing students' contact with people with disabilities fosters positive attitudes toward them (Dikici and Özdemir, 2025; Finkelstein & Orr, 2021; Edwards, Hekel & Cron, 2021; Paden et al., 2025; Ozkara San, 2025). For this reason, experiential learning should be incorporated into the development of attitudes toward people with disabilities among nursing students (Dikici and Özdemir, 2025). In addition to these practices, the literature frequently highlights simulation-based interventions aimed at developing attitudes toward people with disabilities, which have proven successful (Blas et al., 2024; Newton and Crebs, 2020; Grady et al., 2018; McIntosh et al., 2018; Yüksel and Ünver; Reid-Seel et al., 2020; Saunder and Berridge, 2015; Tiffany et al., 2016; Walters et al., 2021; Geçgil et al., 2017; Macaden et al., 2017; Nasrabadi et al., 2020; Campbell et al., 2021).

Simulation is a valuable teaching technique that helps nursing students develop clinical decision-making skills by providing a safe environment, enhancing effective learning, reducing errors, and improving teamwork and communication skills (Uslusoy, 2018; Topbaş, 2019; Leal-Costa et al., 2024). Simulation, which facilitates the active participation of nursing students, leads to increased self-confidence, reduced stress levels, improved care skills, enhanced learning motivation, and improved problem-solving, critical thinking, and empathy skills, and that students are satisfied with simulation applications (Başaran et al., 2025; Kök et al., 2022; Çulha, 2019; Sarı et al., 2024; Knapp, 2023; Arrogante et al., 2022; Dinçer and İnangil, 2022). In a randomized controlled trial by Araújo et al. (2021), it was reported that nursing students who received simulation-based training retained more information than those who received lectures demonstrating the skills. In the meta-analysis conducted by Küçükavcı (2018), it was found that virtual reality applications and three-dimensional virtual environment applications had a moderate effect on students, exerted a greater influence on learning success than traditional teaching, and that virtual reality applications had a higher impact than three-dimensional virtual environments. In the study by Chang et al. (2021), it was determined that the implementation of a mobile application for simulation-based learning had a positive effect on nursing students' knowledge and skill performance and reduced the cognitive load during the learning process. In a meta-analysis by Oh et al. (2021), it was demonstrated that simulation-based learning using standardized patients may have a positive effect on self-efficacy and learning motivation, which influence the acquisition of knowledge and clinical skills. The studies reviewed indicate that nursing students developed positive attitudes toward people with disabilities and that their levels of empathy increased; consequently, the simulation applications used are reported to have made positive contributions to nursing students (Ochs, 2025; Blas et al., 2024; Newton and Crebs, 2020; Grady et al., 2018; McIntosh et al., 2018; Yüksel and Ünver, 2016; Reid-Searl et al., 2020; Saunder and Berridge, 2015; Tiffany et al., 2016; Walters et al., 2021; Geçgil et al., 2017; Macaden et al., 2017; Nasrabadi et al., 2022; Dinçer and İnangil, 2022; Campbell et al., 2021; Ozkara San et al., 2023; Ozkara San et al., 2025). Studies aimed at developing attitudes toward people with disabilities suggest that simulation applications should be integrated into nursing education (Ozkara San et al., 2022; Ozkara San et al., 2023).

With the advancement of technology in education today, students are opting for technological applications such as mobile learning, digital tools, and online learning platforms in their learning processes; various studies report that students have positive attitudes toward these technological applications and a strong preference for them (Mukumba & Shambira, 2022; AlBalawi et al., 2022; Eltaib et al., 2024). During simulation applications in education, students report experiencing certain negative experiences defined as a lack of familiarity, such as complexity, tension, curiosity, surprise, doubt, and feeling intimidated (Dalinger et al., 2020; Dittrich et al., 2022). Some studies suggest that these negative experiences can be reduced by repeating the simulations (Çiğdem & Unver, 2016).

The literature highlights that the use of simulation applications is challenging, technical issues may arise, problems may occur due to inadequate infrastructure, and high costs are cited as the negative aspects of simulation applications (Koukourikos et al., 2021; Bray and Østergaard, 2024; Elendu et al., 2024; Doe, Smith & Lee, 2025). There are studies that discuss the costs of simulation applications. In the study by

Lapkin and Levett-Jones (2011), it was found that manikins with moderate realism are more cost effective, as they require only one-fifth of the cost of manikins with high realism to achieve the same effect on clinical reasoning, knowledge acquisition, and student satisfaction. In Haerling's (2018) study, a cost-benefit analysis of the two types of simulation was conducted, comparing the learning outcomes of students participating in manikin-based simulation activities with those participating in virtual simulation activities. According to Haerling's study (2018), based on improvements in nursing students' satisfaction, self-confidence, knowledge per point, and instrumental costs, the cost-benefit ratio of virtual simulation (1.08 dollars) was found to be lower than that of manikin-based simulation (3.62 dollars). Haerling's (2018) study suggests that further research is needed on cost analyses in simulation studies. Additionally, studies have highlighted the importance of virtual simulations, as they provide students with the flexibility to practice patient care at their own convenience without the personnel or equipment costs associated with face-to-face simulations (Azher et al., 2023). No simulation studies involving cost-benefit analyses conducted in Turkey have been identified in the literature.

In the literature, various simulation activities are used to develop attitudes toward individuals with disabilities in nursing education. In the studies reviewed, the standard patient method was found to be the most frequently used simulation method (Blas et al., 2024; Newton and Crebs, 2020; Grady et al., 2018; McIntosh et al., 2018; Yüksel and Ünver). Mobile games (Reid-Seel et al., 2020; Saunder and Berridge, 2015; Tiffany et al., 2016), low-fidelity simulations (Walters et al., 2021), empathy activities (Geçgil et al., 2017; Macaden et al., 2017; Nasrabadi et al., 2022), and virtual reality (Campbell et al., 2021) simulation applications are also present in the literature. The reason why the standard patient approach is most frequently used among simulation applications in nursing education may be attributed to its lower cost and greater accessibility.

The literature indicates that there are contemporary educational methods designed for students with disabilities that appeal to a wider range of senses, make learning more enduring, enhance students' satisfaction, empathy and sense of trust, improve their knowledge and skills, and develop their problem-solving and critical thinking skills (Ochs, 2025; Blas et al., 2024; Newton and Crebs, 2020; Grady et al., 2018; McIntosh et al., 2018; Yüksel and Ünver; Reid-Seel et al., 2020; Saunder and Berridge, 2015; Tiffany et al., 2016; Walters et al., 2021; Geçgil et al., 2017; Macaden et al., 2017; Nasrabadi et al., 2022; Campbell et al., 2021; Ozkara San et al., 2023; Ozkara San et al., 2025; Chang et al., 2021; Araújo et al., 2021; Başaran et al., 2025; Kök et al., 2022; Çulha, 2019; Sarı et al., 2024; Knapp, 2023; Arrogante et al., 2022; Uslusoy, 2018; Topbaş, 2019; Leal-Costa et al., 2024). These training methods may incorporate virtual approaches as their primary focus. However, given that the simulation method frequently preferred in the literature involves the use of a standardized patient, the positive outcomes of these studies, and the costs associated with virtual simulation applications, the standardized patient approach holds an important place in nursing education (Koukourikos et al., 2021; Bray and Østergaard, 2024; Elendu et al., 2024; Doe, Smith & Lee, 2025; Blas et al., 2024; Newton and Crebs, 2020; Grady et al., 2018; McIntosh et al., 2018; Yüksel and Ünver).

Although the literature emphasizes the importance of nurses in meeting the needs of people with disabilities, it is believed that nursing education gives limited attention to people with disabilities. An examination of the curricula of nursing schools in Turkey reveals that education regarding people with disabilities is predominantly delivered within the 'disadvantaged groups' module of the Public Health Nursing course, and only 10 nursing schools offer elective courses addressing care for people with disabilities; furthermore, the content of these courses is entirely presented in a standard, didactic format.

It is also observed that the measurement techniques used in studies aimed at developing awareness, attitudes, and empathy toward people with disabilities are one-dimensional or that the concepts of awareness, attitude, and empathy are addressed in isolation. Given the role of empathy in attitude development, studies evaluating these concepts together would contribute to the literature (Güven Özdemir & Şendir, 2020; Sarman and Tuncay, 2024; An et al., 2025).

The literature demonstrates that nursing students' awareness, attitudes, and empathy toward people with disabilities have been developed using various methods. However, rigorous studies in this field are limited (San Ozkara et al., 2022). There is a need for high-quality randomized controlled trials involving interventions designed to foster awareness and empathy toward people with disabilities, aim to change attitudes, encourage learning, and utilize mixed-methods approaches (Havercamp et al., 2021). In this context, this study was designed to evaluate the effectiveness of simulation applications developed to foster awareness, positive attitudes, and empathy toward people with disabilities among nursing students.

Research Hypotheses

H1: Disability Awareness Training affects nursing students' development of awareness toward people with disabilities.

H2: Disability Awareness Training affects nursing students' development of attitudes toward people with disabilities.

H3: Disability Awareness Training affects nursing students' development of empathy toward people with disabilities.

H4: Disability Awareness Training supported by the Standard Patient Program affects nursing students' development of awareness toward people with disabilities.

H5: Disability Awareness Training supported by the Standard Patient Program affects nursing students' development of attitudes toward people with disabilities.

H6: Disability Awareness Training supported by the Standard Patient Application affects nursing students' development of empathy toward people with disabilities.

H7: Disability Awareness Training supported by the Virtual Reality Application affects nursing students' awareness toward people with disabilities.

H8: Disability Awareness Training supported by a Virtual Reality Application affects nursing students' development of attitudes toward people with disabilities.

H9: Disability Awareness Training supported by a Virtual Reality Application affects nursing students' development of empathy toward people with disabilities.

Study Design

This study was designed as a randomized controlled trial with a control group, employing a pre-test, mid-test, and post-test design.

Study Setting and Timing

This study will be conducted among third- and fourth-year students in the Department of Nursing, Faculty of Health Sciences, Başkent University, following approval from the ethics committee.

Study Population and Sample

The study population will consist of third-year (class size: 86) and fourth-year (class size: 85) students in the Department of Nursing, Faculty of Health Sciences, Başkent University, during the Autumn semester of 2026–2027. Within the scope of the HSH219 'Lifelong Health Protection and Promotion' course at the Department of Nursing, Faculty of Health Sciences, Başkent University, a two-hour module on 'Disability and Nursing' is delivered theoretically. All students to be included in the study have taken this module. In the literature, regarding randomized controlled trials aimed at developing awareness, attitudes, or empathy in people with disabilities, the sample has been defined as nursing

students taking courses such as Public Health Nursing or Pediatric Nursing, and it has been noted that students who volunteered to participate in the classroom study were included; however, no information has been found indicating that the sample size was determined using a priori power analysis. When calculating the required sample size to test the research hypothesis, Cohen's medium effect size was used (Cohen's calculations were performed using the G*Power 3.1.9.4 program). Participants were assigned to groups using the Random Allocation Software 2.0 program, with a 1:1:1 ratio and a block size of 3. The minimum sample size required for the study, based on an effect size of f = 0.25 for "Analysis of Variance with Repeated Measures," was 54 participants in total, with intervention 1 having n1 = 18, intervention 2 having n2 = 18, and the control group having n3 = 18, to provide 95% power at a 95% confidence level, given an effect size of f = 0.25. Considering the expected dropout rate of approximately 20% during the study, the total sample size was increased, and it was planned to include a total of 66 participants, with at least 22 participants in each group. The minimum sample size required to cover the entire study was 66 participants.This sample size covers the sample size required for all statistical methods to be used in the study.

Inclusion criteria: Being a third- or fourth-year student in the Department of Nursing at Başkent University. Volunteering to participate in the study.

Exclusion criteria: Having any form of disability. Having a vision-related problem.

Withdrawal criteria: Participants withdraw of their own volition. Failure to attend or incomplete attendance at the pre-test, interim test, or post-test. Participants not attending the training sessions.

Randomization

Randomization will be applied to prevent selection bias in the allocation of participants to research groups. Third- or fourth-year nursing students will be included in the study. To ensure the reliability of the study, randomization will be performed by a statistician. During this process, student names will be kept confidential, and a database containing student numbers and class information will be created and forwarded to the statistician. Stratified block randomization will be used to minimize differences between groups.

Study variables

Dependent variables: Scores obtained from the "Disability Awareness Scale", the "Multidimensional Attitude Scale toward People with Disabilities" and the "Multidimensional Emotional Empathy Scale".

Independent variables: Disability Awareness Training, Simulation-Standard Patient Application, and Simulation-Virtual Reality Application.

Data Collection Tools

The data collection form for this study consists of four sections. The first section contains 33 questions regarding students' demographic information and the definition of disability, developed by the researchers based on a literature review (Altıparmak and Yıldırım Sarı, 2012; Dikici & Özdemir, 2025; Warshawski, 2025).

The second section contains the Disability Awareness Scale. The Disability Awareness Scale is a valid and reliable tool developed by Ota et al. in 2020 as part of the Disability Awareness Program. The Disability Awareness Scale was designed to measure the awareness gained by students in the areas of basic human rights awareness, disability awareness, and diversity awareness through the Disability Awareness Program. The scale, comprising 15 five-point Likert-type items, has Cronbach's Alpha values of 0.831, 0.856, and 0.94 for the subdimensions, respectively, whereas the overall scale value was determined to be 0.70 (Ota et al., 2020). To ensure the scale's suitability for use in this study, a validity and reliability study will be conducted among first- and second-year nursing students at the

Faculty of Health Sciences, Başkent University, to assess its appropriateness for Turkish nursing students. The necessary ethical approval has been obtained for the use of the scale in this study (Appendix 1). To ensure the scale's suitability for use in this study, content and construct validity analyses, as well as item analysis, will be conducted. The scale will be used within the scope of the research subject to positive results.

The third section contains the multidimensional attitude scale toward people with disabilities. The Multidimensional Attitude Scale toward People with Disabilities (EYÇBTÖ) was developed by Findler, Vilchinsky, and Werner in 2007. A valid and reliable instrument, the EYÇBTÖ provides a multidimensional measurement of adults' attitudes toward people with disabilities in cognitive, affective, and behavioral terms. The fact that positive attitudes examined in a single dimension are insufficient for people with disabilities to find their place in society and the need to assess attitudes across three main dimensions meant that the EYÇBTÖ's multidimensional examination of attitudes toward disability (Findler, Vilchinsky & Werner 2007) was a key factor in the selection of the scale. Yelpaze and Türküm state that the scale, whose validity and reliability in Turkish were established among university students in 2018, is suitable for the Turkish population. The scale consists of three subdimensions: thought, emotion, and behavior. The Thought sub-dimension comprises 9 items, the Emotion sub-dimension 14 items, and the Behavior sub-dimension 8 items. The scale is a 5-point Likert-type scale, rated "1=Not at all, 2, 3, 4, 5=Very much." The 11 items in the Emotion sub-dimension (items 1, 2, 3, 4, 5, 9, 10, 11, 12, 14, 15) and 6 in the Behavior sub-dimension (items 1, 2, 3, 4, 5, 6) are coded as negative. Scores for each dimension and the total scale score can be calculated. High scores on the scale indicate a positive attitude toward people with disabilities. The Cronbach's Alpha values for the scale's subdimensions were 0.88, 0.89, and 0.84, respectively, with the total scale value being 0.90 (Yelpaze & Turkum, 2018). The necessary ethical approval for the use of the scale in this study has been obtained (Appendix 2).

The selection of the awareness, attitude, and empathy scales used in this study was based on the Consensus-based Standards for the Selection of Health Measurement Instruments (COSMIN) methodology (Prinsen et al., 2016).

Research Process

The research is planned to be conducted in four stages. In the first stage, during the preparatory phase of the research, the validity and reliability of the Disability Awareness Scale will be assessed. In the second stage, Disability Awareness Training and simulation scenarios will be prepared. In the third stage, a pilot study of the data collection tools and simulation applications will be conducted. In the fourth stage, the effectiveness of the educational methods to be used in developing nursing students' awareness, attitudes, and empathy toward people with disabilities will be evaluated. This study will be reported in accordance with the CONSORT methodology.

PREPARATORY PHASE OF THE RESEARCH

Validation of the Disability Awareness Scale

In the first phase of the research, the language and content validity of the Disability Awareness Scale, which is planned to be used in the study, will be assessed through item analysis to determine whether it is a valid and reliable tool. The Lawshe technique will be used for content validity. In this context, in the first phase, the scale will be translated into Turkish by at least two translators. A translator must be a language specialist. Subsequently, the translations will be compared by the researcher and experts to select the most appropriate phrasing, and a Turkish version of the scale will be created. The prepared scale will then be translated back into English by two different translators who have not seen the original scale. This form and the original scale will be compared to finalize the scale. In the second phase, the content of the prepared scale will be evaluated through content validity. For content validity, expert opinions will be sought from 8–10 experts, and the content of the prepared scale will be evaluated using

the Lawshe technique. It will be ensured that the experts are specialists in the field of nursing, proficient in the field of measurement and evaluation, and experts in language assessment. As a result of the evaluations received, the item-level content validity index and scale-level content validity index of the scale will be calculated. In this way, the suitability of each item and the scale's overall scope for the scale's purpose will be assessed. The literature indicates that I-CVI should be ≥ 0.78 and S-CVI should be ≥ 0.80 (Polit and Beck, 2006).

A pilot study of the developed scale will be conducted with a sample of 10 first- and second-year students from the Department of Nursing, Faculty of Health Sciences, Başkent University, to assess the comprehensibility of the items and the time taken to complete the scale. Students included in the pilot study will not be included in the main application of the scale. As a result of these evaluations, items requiring revision in the scale will be preliminarily amended. The scale will be administered to first- and second-year students in the Department of Nursing at the Faculty of Health Sciences, Başkent University. At this stage of the study, the population consists of approximately 90 first- and 93 second-year students in the Department of Nursing. To assess the scale's validity and reliability, it is recommended that the number of students volunteering to participate in the study from these classes should be at least five times the number of scale items (Watson and Thompson, 2006). Accordingly, the aim is to reach all students in the first and second years, and no sample selection will be made. It is planned to conduct exploratory analyses of the scale's reliability and validity with at least 75 students who agree to participate and confirmatory analyses with at least 75 students. Structural validity will be assessed once the administration of the scale is complete. Based on the data obtained at this stage, the suitability of the scale for factor analysis will be assessed using the Kaiser-Meyer-Olkin (KMO) test, and the Bartlett sphericity test will be used to determine whether there is a significant relationship between the scale items. In the literature, a KMO value of ≥ 0.60 and a Bartlett's test p-value of < 0.05 are considered significant. Exploratory factor analysis will also be conducted to assess whether the scale's items align with the dimensions of the original scale. Once it is determined that the scale is a valid and reliable instrument, it will be used in the second and third sections of the study.

Development of Disability Awareness Training

The topics for the disability awareness training were developed by the researcher through a literature review and examination of the curricula of nursing schools' disability-related courses (Havercamp et al., 2021; Öztek, 2020; Council of Europe, 2025; Zaks, 2023; Kahraman-Güloğlu, 2022; ICF, 2001; Erdurak & Yıldız, 2025; Pineda, 2024; Kanyılmaz Polat, 2020; Stone et al., 2024; Karatana & Gür, 2019; Iezzoni et al., 2021; Topaloğlu Ören, Dereli & Yıldırım Sarı, 2021; Lagu et al., 2022; Doğan & Gür, 2024; Doody, Hennessy & Bright, 2022; Rozani, Zur-Peled & Aharon, 2024; Warshawski, 2025).

Development of simulation scenarios

In the second phase of the research, the researcher will develop the scenarios intended for use in simulation applications in parallel with scale development. During the research preparation process, the aim is to enrich the training content and scenarios through the training the researcher has received and will receive. In this context, the researcher attended the Simulation Training Course organized by the Koç University Semahat Arsel Center for Nursing Education, Practice and Research on February 25–27, 2026.

Preparation of the Simulation–Standard Patient Application

The standard patient scenario consists of four modules. Each module will feature a standard patient with a different type of disability. The standard patient will be one or more individuals who have been trained to accurately and consistently describe and demonstrate the history, symptoms, and emotional state of a real patient. Participating students are expected to take on the role of a nurse and perform the nursing tasks assigned to them. The aim is for the researcher to receive simulation training to develop the scenarios and write them in an appropriate format.

Preparation of Simulation–Virtual Reality Application-Supported Training

A simulation comprising four modules and compatible with virtual reality headsets will be developed for the virtual reality application. Here, the student assumes the role of a nurse providing care to a person with a disability who faces a different challenge in each module. The game will follow a scenario parallel to that in the Standard Patient Application. The participant in the nurse's role will be expected to perform the nursing tasks outlined in the scenario. During this process, a software company will be engaged to assist in the development of the virtual reality application.

Evaluation of educational content

The Lawshe technique will be used to assess the suitability of educational content for the research objective. The Lawshe technique is a widely used evaluation method designed to assess the content validity of educational materials based on expert opinions (Baghestani et al., 2019). In this context, the Disability Awareness Training and simulation scenarios will be submitted for review to at least 5 academic staff members from the Department of Nursing, Faculty of Health Sciences, Başkent University; 3 officials from the Confederation of People with Disabilities; and 3 academic staff members from the Faculty of Education. In the evaluation of the training content, academic staff with expertise in the relevant training topics will be asked to score the content using a 3-point Likert scale (3=necessary, 2=necessary but insufficient, 1=unnecessary) and, if they tick the 'can be revised' option for the training content, their suggestions will be requested. In line with the experts' feedback, the content validity index of the training materials will be calculated to assess their suitability.

Pilot Study

The pilot study will be conducted with second-year nursing students at the Faculty of Health Sciences, Başkent University, following the completion of the validity and reliability testing of the Disability Awareness Scale in Turkish, and after the development of the educational content and scenario and the completion of the mobile game. The study will proceed to implementation once the necessary revisions have been made following the evaluations.

Implementation of the Study

Once the ethical committee and institutional approvals have been secured, an information session explaining the purpose of the study will be held with the experimental and control groups. During this meeting, pre-test assessments will be administered to all three groups. The pre-test assessment comprises the Student Information Form, Disability Awareness Scale, Multidimensional Attitude Scale toward People with Disabilities, and Multidimensional Empathy Scale. Data collection is expected to take approximately 30 minutes.

The Disability Awareness Training will be delivered separately to Intervention 1, Intervention 2, and the control groups to minimize interaction between the groups in the study.

Following the pre-test, the 5-week disability awareness training will be delivered to all groups in one of the vacant classrooms at the Department of Nursing, Faculty of Health Sciences, Başkent University, with the experimental and control groups receiving the training separately. The timing of the training will be determined according to the students' schedule and the researcher's work schedule, with the aim of conducting it at the same time each week.

Implementation of the Study in the Control Group (Disability Awareness Training)

Following the administration of the pre-test to the control group, no intervention other than the Disability Awareness Training will be implemented. An interim test will be administered to the control group at the end of the 5-week Disability Awareness Training program. Six weeks after the mid-test is administered to the control group, the post-test will be conducted. Once the research data have been

collected, a virtual reality application will be administered to the control group to prevent missed opportunities. To avoid increasing the research budget, the standard patient procedure will not be performed.

Implementation of the Study in Intervention Group 1 (Simulation – Standard Patient Procedure)

Intervention 1 (Simulation – Standard Patient Procedure) will be conducted at the Ankara University Professional Skills Laboratory. For the Standard Patient Procedure, the Professional Skills Laboratory will be arranged to simulate certain sections of the hospital. The student's procedure will be observed via two cameras positioned to view both the student and the standard patient; the session will be recorded, and during the analysis session, the procedure of a randomly selected or volunteer student will be reviewed.

In parallel with the Disability Awareness Training, during the same week within the relevant module, the Standard Patient Simulation will be conducted for Intervention Group 1 following a schedule arranged to suit the researchers' and students' timetables. Following the simulation session, semi-structured qualitative interviews will be conducted during the debriefing sessions to elicit participants' perceptions of their experiences, emotional responses, and clinical reasoning processes. The interview questions will be prepared in accordance with the INACSL debriefing standards for simulation-based learning and debriefing sessions and will consist of open-ended questions that allow participants to express their experiences in a reflective manner.

Following the debriefing session, a midterm test will be administered to the group. Six weeks after the midterm test, a final test will be administered to the Intervention 1 group.

Implementation of the Study in Intervention Group 2 (Simulation – Virtual Reality Application)

In Intervention Group 2, the Virtual Reality Application will be implemented in the same week as the Disability Awareness Training, following a schedule arranged by the researcher and students based on their schedule. Following the application, it is planned to gather students' thoughts on the application via a few open-ended questions. A pre-test will be administered to the students following the application. Six weeks after the pre-test, the post-test will be administered to the Intervention 2 group.

Expectations and scientific contributions

This randomized controlled trial incorporates various simulation methods aimed at developing nursing students' awareness, attitudes, and empathy toward people with disabilities while examining these factors in a multidimensional manner. In this respect, our study may help fill a significant gap in the literature. Experimentally examining the impact of simulation-based teaching not only on the acquisition of clinical skills but also on the development of attitudes in the cognitive and affective domains related to fostering awareness and empathy could provide an innovative perspective to both national and international literature. Furthermore, it is anticipated that the simulation scenario to be used in the research could contribute to the development of a highly applicable, structured, and original educational model within nursing education. It is predicted that the findings obtained will help nursing students become better prepared and more sensitive when providing healthcare services to people with disabilities and will assist them in developing a holistic approach to care. In this respect, the study could guide the wider adoption of disability-themed simulation applications within the nursing curriculum and the development of nursing education curricula.