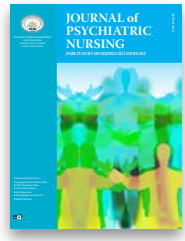
JOURNAL OF
PSYCHIATRIC NURSING

DOI: 10.14744/phd.2026.00087
J Psychiatric Nurs 2026;17(3):254-261



Education

Auditory hallucination-based voice hearing simulation: Development process and implementation guide

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Auditory hallucinations are experiences perceived by individuals as different from their own thoughts and occurring in the absence of any external stimulus.[1] These voices, which are not actually heard, are generally associated with an individual's own inner speech and may occur in approximately 10% of the general population over the course of a lifetime.[2,3] Although auditory hallucinations may occur in various conditions such as psychiatric disorders, neurodegenerative diseases, substance use/withdrawal, and sleep disorders, they are considered among the main symptoms of schizophrenia.[4]

Although the content of auditory hallucinations varies among individuals, approximately 60% of these experiences have been reported to be negative and hostile in nature.[5] Experiencing such voices may lead to intense emotional reactions in individuals, such as confusion, fear, distress, anxiety, and anger.[6] However, the subjective and internal nature of these experiences makes them difficult for patients' relatives and society to understand; this may create a basis for the development of negative attitudes and behaviors such as stigma, discrimination, prejudice, and social exclusion.[7,8] At this point, efforts aimed at understanding what individuals with auditory hallucinations feel and the difficulties they experience may provide guidance for better understanding and acceptance of this symptom and for developing the most appropriate attitudes and behaviors toward the individual.[9]

The difficulty in understanding auditory hallucinations is not limited to patients, their relatives, and society. Health professionals and students studying in health-related fields may also have difficulty fully comprehending the subjective and internal nature of this experience.[10] When the nature of these symptoms is not sufficiently understood, inadequacies may arise in establishing effective communication, developing an empathic approach, and creating an appropriate individualized care plan.[11] This may negatively affect both the effectiveness of the treatment process and patient safety.[12] Therefore, there is a need for experiential and educational tools that enable health professionals and students to better understand the experience of auditory hallucinations.[9]

Voice hearing simulations that enable an understanding of the experience of auditory hallucinations are innovative practices developed in response to this need. These simulations have been reported to increase empathy, improve awareness and knowledge, and reduce prejudice and stigma.[12–14] Studies in the international literature have reported that these practices are particularly effective educational tools for health professionals and students in health-related fields, facilitate understanding of individuals with auditory hallucinations, and strengthen therapeutic communication.[10,11,15,16]

The international literature shows that simulation practices that enable individuals to experience auditory hallucinations are increasingly being used.[10,11,15,16] In contrast, the absence of a simulation practice in the national (Turkish) literature that can provide an auditory hallucination experience represents an important gap. Based on this gap, the Auditory Hallucination-Based Voice Hearing Simulation (AHVHS) was developed to facilitate understanding of the auditory hallucination ex-

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Submitted Date: February 25, 2026 **Revised Date:** July 18, 2026 **Accepted Date:** August 24, 2026 **Available Online Date:** September 30, 2026
Journal of Psychiatric Nursing - Available online at www.phdergi.org

perience.[17] The aim of this study is to systematically present the development process of the AHVHS, its implementation stages, and the key principles that should be considered during implementation. This study is an application-oriented guide presenting the development process and implementation principles of the AHVHS.

What is presently known on this subject?

- Voice hearing simulations are used to increase empathy and raise awareness.
- Simulation practices with different content and durations are available in the literature.
- However, structured guideline studies on how these simulations can be implemented safely, consistently, and systematically are limited.

What does this article add to the existing knowledge?

- It systematically describes the development process of a voice hearing simulation developed using three-dimensional (binaural) sound technology.
- It presents the preparation, implementation, and termination stages of the simulation within a detailed and standardized framework.
- It provides guidance on the points that should be considered during the implementation of the simulation.

What are the implications for practice?

- The simulation can be implemented safely in psychiatric nursing education and clinical practice.
- It contributes to the standardization of interventions based on experiential learning.
- It provides a methodological model for similar simulation studies to be developed in the field of mental health.

Voice Hearing Simulations and AHVHS

Voice hearing simulation practices are educational interventions that aim to facilitate an understanding of the difficulties experienced by individuals who hear voices by simulating exposure to unreal auditory stimuli.[12] Historically, the first example of a voice hearing simulation was developed by psychologist Patricia Deegan. Having herself been diagnosed with schizophrenia and experienced auditory hallucinations, Deegan prepared a 45-minute audio recording and developed a simulation entitled "Hearing Voices that are Distressing" in order to make visible the difficulty of managing these symptoms.[11,18] This approach, developed under Deegan's leadership, subsequently became widespread as an educational intervention for health professionals and students.[19] The literature indicates that voice hearing simulations are implemented in three main forms: (i) listening through headphones to recordings prepared using an audio recording device, (ii) practices involving short-term whispering by real individuals, and (iii) digital simulations conducted through mobile phone applications.[16,18] In these practices, participants are asked to perform everyday functions such as completing a form, solving problems, or making a telephone call while listening to the voices.[12,20]

Similarly, the AHVHS is an intervention that aims to facilitate a better understanding of the subjective experience of individuals who hear voices that are not actually present by simulating this experience.[17] Unlike existing practices, this simulation was designed using three-dimensional (binaural) sound technology,[21] providing participants with a realistic auditory experience and enabling them to understand the cognitive, emotional, and functional effects of auditory hallucinations in a more comprehensive manner. In this way, caregivers can experience auditory hallucinations in a deeper and more realistic manner. In addition, while most existing international voice hearing simulations have been developed for health professionals and health sciences students, the AHVHS was also designed to be suitable for use by patients' relatives and healthy individuals.[2,10,11,12,13,16]

In a study conducted among caregivers of individuals diagnosed with schizophrenia, the AHVHS was found to significantly reduce caregivers' levels of expressed emotion and perceived family burden. Detailed findings regarding the effects of the AHVHS on expressed emotion and perceived family burden are comprehensively presented in the relevant doctoral dissertation.[17] In addition, the AHVHS implementation protocol presented in this article constitutes one of the methodological components of the aforementioned doctoral dissertation. These findings indicate that the AHVHS can be used not only as an educational tool but also as an intervention with therapeutic potential. In this respect, the AHVHS stands out as an original and applicable tool that can be used in clinical education, support programs for caregivers, and awareness activities conducted in the field of mental health.[17]

Development Process of the AHVHS

The AHVHS is not merely an audio recording project; it is a comprehensive implementation ecosystem. To ensure that the platform is implemented in a standardized and sustainable manner, the development process includes four basic components: (i) Auditory Hallucination-Based Audio Recording, (ii) audio recording device, (iii) information brochure, and (iv) implementation manual.

Auditory Hallucination-Based Audio Recording

During the development of the AHVHS, information regarding the types and characteristics of voices heard by individuals experiencing auditory hallucinations was first comprehensively examined and compiled based on the relevant literature.[21–23] Relevant documentaries were also reviewed (Schizophrenia—Discovery Channel Documentary; We, You, Them, Bilgi Açık Kapı—Friends of Schizophrenia; Bilgi Açık Kapı—Stigma in Mental Health; Prejudice Against Schizophrenia; Disorganized Schizophrenia—Take Good Care of Yourself; Butterfly Effect

Schizophrenia Documentary). Based on the data obtained, a script was developed to reflect the content of auditory hallucinations. The prepared text was evaluated by a psychiatrist to ensure the appropriateness of its content, and the final version of the text was prepared.

The revised text was recorded by a professional voice and music company in a specially prepared recording environment using real human voices and a three-dimensional (binaural) sound format. Three-dimensional sound recording enables heard voices to be perceived more realistically.[21] Thus, the aim was to enable participants to perceive auditory hallucinations more realistically. During the recording process, various sounds representing environmental stimuli, such as female, male, and child voices, as well as dog barking, airplane sounds, and doorbell sounds, were used. In addition, short pauses between sounds were included to create a realistic auditory experience. As a result of recording all the sounds included in the text, a total audio recording of 14 minutes was obtained. To ensure content validity, the demo version was presented for evaluation by five experts in psychiatric nursing. All experts were professionals with academic and/or clinical experience in the field of mental health. During the expert evaluation process, the appropriateness, comprehensibility, content, and overall quality of the audio recordings were evaluated through open-ended questions; necessary revisions were made based on the feedback, and the audio recording was finalized. Expert opinions were analyzed qualitatively, and the recommendations were combined under common themes and incorporated into the content. It is recommended that the audio recording be presented to participants at 60 decibels, which corresponds to a normal conversational speech level (five out of 10).[24,25]

Audio Recording Device

The audio recording device is used to play the auditory hallucination-based audio recording. During the simulation, the prepared sounds are stored on this device, and participants listen to the recorded sounds using headphones. Before and after each implementation, it is recommended that the audio recording device and headphones be disinfected using alcohol-based disinfectant wipes containing 70% isopropyl alcohol.

Information Brochure

The information brochure was prepared by the researcher based on information from the literature.[22,26] It was designed to provide participants with basic knowledge about schizophrenia and auditory hallucinations and thereby facilitate the more effective implementation of the AHVHS. The brochure contains information about what schizophrenia is, the definition of auditory hallucinations, the types of voices individuals may hear during auditory hallucinations, the emotions these voices may evoke in individuals, and how auditory hallucinations may affect individuals' daily lives. In addition, the brochure includes the necessary contact information (full name, telephone number, and e-mail address) to enable participants to contact the researcher if needed, as well as the date and time of the next meeting.

Auditory Hallucination-Based Voice Hearing Simulation Implementation Manual

The implementation manual was prepared based on information from the literature.[10,11,13] It was designed to standardize the implementation process of the simulation and ensure that it is conducted in a more systematic manner. The manual aims to ensure that the procedures are conducted systematically. It consists of three main stages—preparation, implementation, and termination—which describe the procedures for conducting the AHVHS, as well as an additional section for planning the next meeting.

Implementation of the AHVHS

The AHVHS implementation consists of three main sections: the preparation process, the implementation stage, and the termination stage.

During the preparation process, the environment in which the implementation will take place is first arranged according to the task to be performed. The researcher introduces themselves, facilitates introductions among the participants, and provides information about the purpose, duration, and content of the implementation. At this stage, participants are provided with an information brochure containing basic information about schizophrenia and auditory hallucinations. If data collection is planned as part of the research, data collection instruments may be administered at this stage.

The recording devices and headphones to be used during the implementation are introduced to the participants. While listening to the audio recording prepared using three-dimensional (binaural) sound technology, participants are asked to simultaneously perform predetermined tasks. These tasks are selected to represent routine daily activities and include activities such as completing an address form, watching television, reading a book, having a conversation, and calculating change. A predetermined duration is defined for each task. Two tasks were assigned in this study. These tasks were (i) watching a city promotional film and answering verbal questions about the film and (ii) reading a story and answering questions about the story in writing. The duration of each task was set at 10 minutes. Even if participants complete the task in less than the specified time, they continue listening to the

audio recording; participants who cannot complete the task within the specified time are asked to terminate the task. If the audio recording ends, it is restarted from the beginning to ensure that the simulation continues without interruption. Participants are informed that they must wear both headphones to effectively perceive the three-dimensional sound experience. They are asked not to remove their headphones during the implementation and are instructed to stop the device and inform the researcher if they experience any discomfort.

During the termination stage, a debriefing session is conducted with the participants. During this session, participants are encouraged to express the experiences and emotions they had during the simulation. Their perceptions of the auditory hallucination experience, the difficulties they noticed, and the contribution of this experience to understanding the lives of individuals diagnosed with schizophrenia are discussed. Any negative emotional reactions that may arise in participants are assessed, and appropriate referrals for psychological support are made when necessary. Following the debriefing process, participants are thanked for their participation. If planned, participants are informed of the date and time of the next meeting, and the process is briefly concluded. A flowchart showing the development process and implementation stages of the AHVHS is presented in Figure 1.

Points to Consider During AHVHS Implementation

Because the AHVHS aims to artificially induce a psychotic-like experience in participants, it may cause short-term psychological, cognitive, and physical reactions.[12] The literature reports that such simulations may produce effects such as distress, fear, anxiety, agitation, confusion, difficulty concentrating, emotional and physical fatigue, headache, and sleep disturbances.[10,11] Similar simulations have been reported to cause short-term emotional distress but not to result in persistent negative effects.[10,11,12] Therefore, it is of great importance to provide participants with detailed information before implementation, increase their awareness of possible effects, and ensure that participation is voluntary. Participants should be clearly informed that they may withdraw from the implementation at any time and that doing so will not negatively affect their position in the research process.

Considering the characteristics of the sample, it is considered appropriate to include mental health professionals, patients' relatives, and healthy individuals in the study. The age range should be determined in accordance with the characteristics of the target implementation group and ethical requirements. Individuals with clinically active psychiatric disorders should be excluded from the study due to potential risks.

However, there is insufficient scientific evidence regarding the safe and effective listening duration of the simulation. Examination of the studies shows that implementation durations vary considerably. For example, Skoy et al.[19] implemented the simulation for 45 minutes, whereas Sideras et al.[27] used an experience period of 60 minutes. In contrast, Mawson et al.[28] implemented a five-minute simulation, while McEnteggart et al.[29] conducted short-term simulations lasting two minutes. In this study, the simulation duration was set at 20 minutes.[17] These differences indicate that there is not yet a consensus regarding the optimal implementation duration for voice hearing simulations. Accordingly, it is recommended that AHVHS implementations initially be planned for short periods, that participants' responses be closely monitored during and after the implementation, and that the implementation be terminated early if necessary. In addition, adopting flexible implementation models in which the simulation duration is gradually increased and participant feedback is considered at each stage is regarded as a more appropriate approach both ethically and in terms of participant safety.[17]

To increase the safety of the implementation, it is recommended that the simulation be conducted under the supervision of a health professional, preferably a psychiatric nurse. It is important to inform participants in advance about support resources they can access if they experience distress, such as emergency medical services (112), crisis counseling lines, or mental health support services. In addition, it is recommended that the simulation not be administered to individuals diagnosed with chronic mental disorders and that participants' mental status be assessed before implementation using valid and reliable screening instruments such as the General Health Questionnaire-12 (GHQ-12).

If negative psychological effects occur during the implementation, the simulation should be terminated immediately, the participant should be moved to a safe environment, and a brief assessment and emotional support should be provided. If symptoms persist, the participant should be referred to appropriate mental health services, and when necessary, emergency health services should be contacted. In addition, after the implementation, participants should be provided both verbally and in writing with contact information for mental health services, crisis counseling lines, and emergency support resources, and they should be encouraged to seek professional support when necessary. The flowchart including the assessment of participant eligibility before AHVHS implementation, the management of possible psychological reactions that may occur during the implementation, and the referral steps to be followed after the implementation is presented in Figure 2.

Limitations

The study is an implementation guide and focuses on standardizing the simulation and describing the implementation

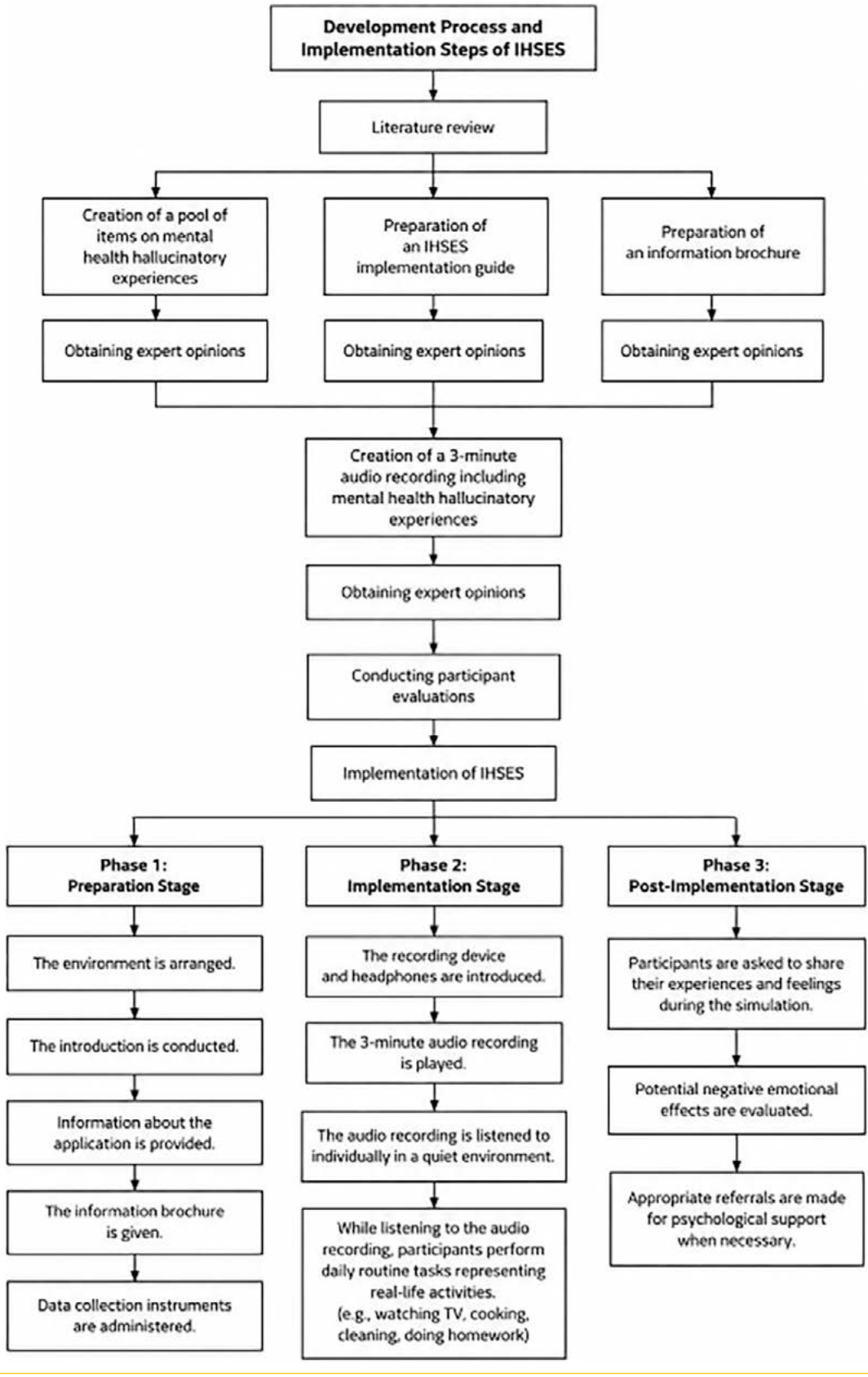

Figure 1. Development process and implementation stages of the AHVHS.

AHVHS: Auditory Hallucination-Based Voice Hearing Simulation.

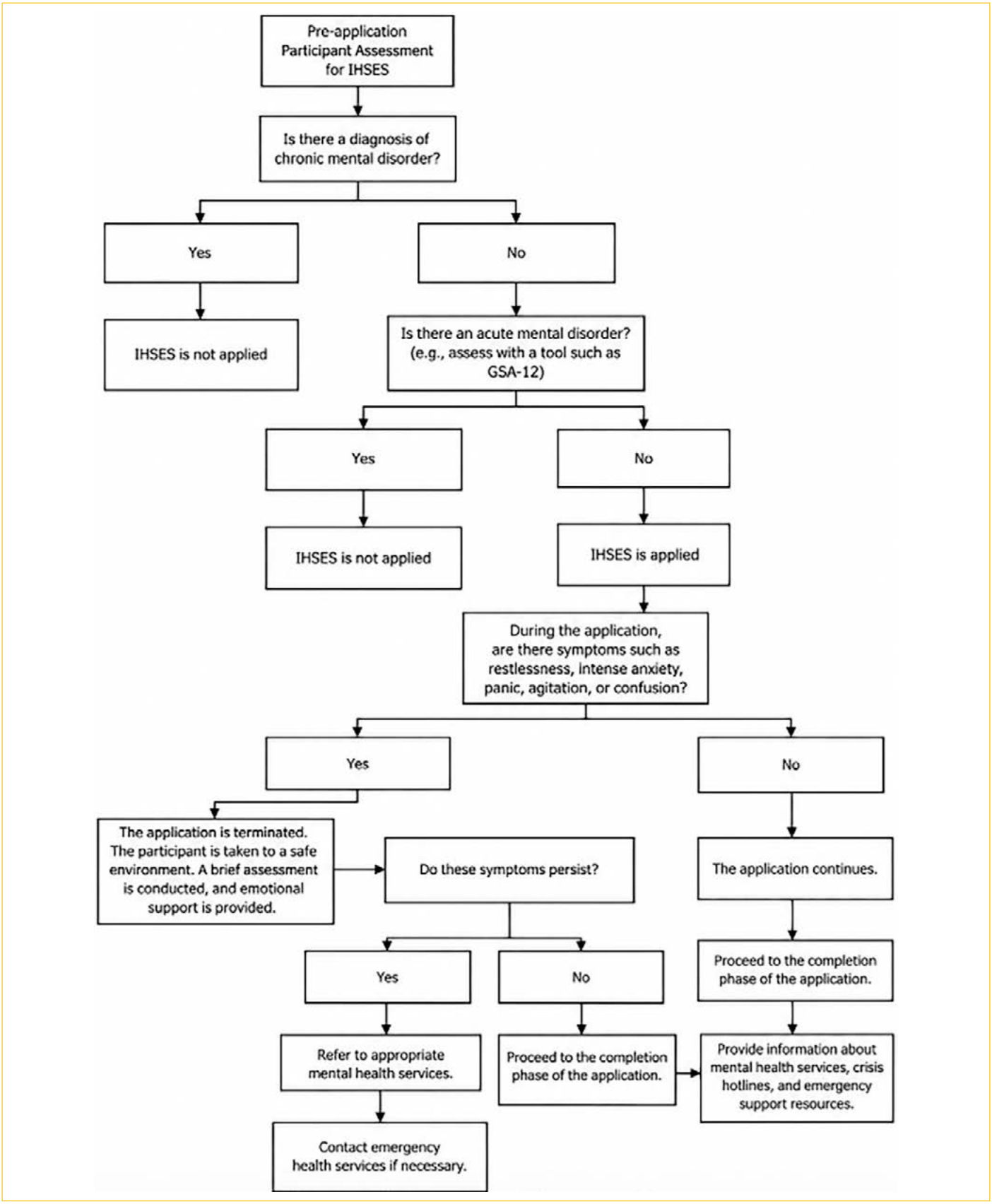

Figure 2. Flowchart for participant assessment before AHVHS implementation.

AHVHS: Auditory Hallucination-Based Voice Hearing Simulation.

process. Therefore, the effectiveness of the simulation was not comparatively evaluated in terms of different variables.

Conclusion and Recommendations

This study fills an important gap in the literature by providing a comprehensive guide for the safe, repeatable, and controlled implementation of the AHVHS, which was developed to facilitate an experiential understanding of the auditory hallucination experience in clinical and educational settings. The proposed framework is expected to guide future research and practice and to provide a methodological basis for similar simulation studies developed in different fields. In addition, the developed implementation guide may be used as a standardized practice resource supporting experiential learning in psychiatric nursing education, caregiver education, in-service training for mental health professionals, and interdisciplinary mental health education.

Although evaluating the effectiveness of the AHVHS was beyond the scope of this study, future effectiveness studies are recommended to select appropriate measurement instruments according to the outcome variables under investigation. In this context, valid and reliable measurement instruments assessing psychosocial variables such as empathy levels, awareness of mental illness, attitudes toward stigma, perceived family burden among caregivers, expressed emotion levels, and similar variables may be used. In addition, owing to its structure based on binaural sound technology, the AHVHS has the potential to be implemented online through digital platforms. This feature may increase the accessibility of the simulation and facilitate its use in different geographical regions and among different target groups. Accordingly, future studies are recommended to evaluate the adaptation of the AHVHS to an online environment and its integration into digital platforms.

It is recommended that similar simulation approaches not be limited to schizophrenia but also be developed for different psychiatric disorders. Within this scope, simulation scenarios based on the specific symptoms of different clinical conditions, such as depression, anxiety disorders, and trauma- and stressor-related disorders, can be designed. Such studies are expected to contribute to a better understanding of the subjective experiences of mental illnesses and support education, awareness, and care practices in the field of mental health.

To determine the effect of the AHVHS on empathy, experimental research designs are recommended for future studies. Accordingly, intervention- and control-group pretest-posttest designs are recommended, with empathy levels assessed before and after the simulation using valid and reliable measurement instruments.

Informed Consent: Informed consent was obtained from the patients as part of the study.

Conflict of Interest Statement: The authors declare that there is no conflict of interest.

Funding: No financial support was received for this study.

Use of AI for Writing Assistance: No artificial intelligence tools were used in the process of preparing, writing, or editing this study. An artificial intelligence tool was used solely for language assistance during the preparation of this study. The authors verified the accuracy and appropriateness of the content generated by the artificial intelligence tool.

Authorship Contributions: Concept – F.G.S., E.U.; Design – F.G.S., E.U.; Supervision – E.U., G.G.; Funding – F.G.S.; Materials – F.G.S., E.U., G.G.; Data collection and/or processing – F.G.S.; Data analysis and/or interpretation – F.G.S., E.U., G.G.; Literature search – F.G.S.; Writing – F.G.S.; Critical review – E.U., G.G.

Peer-review: Externally peer-reviewed.

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