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Exploring the Direction for Developing Lifelong Education Program for the Hearing Impaired in G Metropolitan City

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Purpose : The purpose of this study is to investigate the current state and needs of lifelong education participation among individuals with hearing impairments.
Methods : The study focused on the lifelong education status and needs of individuals with hearing impairments in G Metropolitan City. A total of 51 participants were selected through stratified sampling, and a focused group interview was conducted with three.
Results : First, the survey on the participation status of lifelong education programs among individuals with hearing impairments in G Metropolitan City revealed that only 58.8% had participated in such programs. The main reasons for non-participation were a lack of information (45.0%), lack of time (30.0%), and lack of motivation (5.0%). The primary purposes of participating in lifelong education programs were for hobbies and leisure activities (40.6%), expanding opportunities for social participation (43.7%), and acquiring diverse information (31.2%). An analysis of satisfaction with lifelong education programs showed an average score of 3.67 (.85). The highest-rated factors were staff attitudes toward individuals with disabilities (3.58), the convenience provided by lifelong education institutions (3.76), and instructors' attitudes toward individuals with disabilities (3.68). Key factors identified for the future development of lifelong education included the development of dedicated lifelong education programs for individuals with disabilities (31.5%), financial support for programs (20.8%), and the provision of information on lifelong education institutions and programs (12.5%).
Conclusions : Based on the study's findings, lifelong education programs for individuals with hearing impairments should consider life stages and family relationships. Since the needs of adulthood, middle age, and old age differ, strategies must be tailored accordingly. specific social policy recommendations were made for individuals with hearing impairments and families.

Keywords : Hearing impaired, lifelong education, status analysis, demand survey

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Ⅰ. Introduction

In contemporary society, the extension of average life expectancy and the acceleration of the Fourth Industrial Revolution have emphasized the importance of lifelong education more than ever. These societal changes require continuous adaptation and self-development, raising the demand for inclusive learning opportunities for all, including individuals with disabilities. For individuals with disabilities, lifelong education is not only a matter of equal educational rights but also a crucial tool for improving their quality of life and promoting social integration (Cho et al., 2022; D. Y. Kim et al., 2017).

The participation rate of individuals with disabilities in lifelong education remains significantly low compared to their non-disabled counterparts. According to surveys, less than 2% of individuals with disabilities participate in lifelong education, reflecting a substantial gap between disabled and non-disabled populations (S. H. Kim et al., 2017). This indicates that existing lifelong education programs fail to adequately reflect the diverse needs of individuals with disabilities. Despite varying learning demands based on disability type and severity, current education programs do not sufficiently incorporate this diversity in their design (Kim et al., 2016).

The necessity of lifelong education for individuals with hearing impairments is increasingly emphasized. Due to

restricted access to information and communication barriers, their educational opportunities significantly decline after the school years. Vocational training and the acquisition of daily living skills are essential for achieving independence and social integration. Moreover, lifelong education plays a crucial role in empowering individuals with hearing impairments and safeguarding their rights. Human rights education within lifelong learning frameworks enhances awareness and sensitivity among both individuals with and without disabilities, serving as a foundational element for fostering an inclusive society (Kang et al., 2017; Yun et al., 2016). The necessity of such education also plays a crucial role in enabling individuals with hearing impairments to sustain and enhance their careers and quality of life in the era of increased life expectancy (D. Y. Kim et al., 2017).

The COVID-19 pandemic in 2020 brought significant changes to daily life and increased social distancing, profoundly impacting the educational environment. As in-person classes transitioned to remote learning, educational disparities among vulnerable groups, including individuals with disabilities, became more pronounced. For individuals with hearing impairments, communication difficulties and technological limitations in virtual settings significantly restricted access to learning opportunities (Yun et al., 2016). While traditional face-to-face education allowed direct support such as sign language interpretation, remote learning environments lacked essential accommodations, including captioning, remote interpretation systems, and accessible digital content, further deteriorating the educational conditions for individuals with hearing impairments (Park et al., 2020).

In 2016, South Korea amended the Lifelong Education Act, designating lifelong education for individuals with disabilities as a primary responsibility of the national and local governments. The revised Lifelong Education Act plays a crucial role in protecting the educational rights of individuals with disabilities while supporting them in overcoming social isolation and leading independent and self-sufficient lives (NISE, 2020). Such legal support also contributes to the formation of community-based networks, such as lifelong learning cities, ensuring that lifelong education for individuals with disabilities is integrated rather than segregated. However, despite this legal framework, significant challenges remain in the implementation of lifelong education for individuals with disabilities. Key obstacles include insufficient funding, inadequate infrastructure, and a shortage of specialized personnel, all of which hinder the advancement of lifelong education for individuals with disabilities (Kim et al., 2016). In particular, educational programs for individuals with hearing impairments remain limited, with their content and structure failing to sufficiently accommodate learners' needs. This issue contradicts the fundamental purpose of lifelong education, which aims to foster an inclusive society where individuals with and without disabilities can learn and coexist.

Issues related to educational accessibility for individuals with hearing impairments have been comparatively underexplored in the existing literature. This oversight is closely associated with the notably low educational participation rates among individuals with hearing impairments. Currently, there is a scarcity of systematic and comprehensive research examining their educational environments and distinct educational needs. Thus, it is imperative to conduct a detailed investigation into the status of educational participation among individuals with hearing impairments and to identify specific accessibility barriers they face. Such research would facilitate the development of evidence-based policy recommendations and practical support interventions aimed at enhancing educational environments for individuals with hearing impairments. Furthermore, the outcomes of this research could serve as essential foundational data in safeguarding educational rights and promoting the social integration of individuals with hearing impairments, underscoring the significance of conducting further scholarly inquiry in this area.

This study aims to analyze the current status and needs of lifelong education programs for individuals with hearing impairments and explore strategies for enhancing their quality and expanding access. Specifically, it seeks to propose a sustainable lifelong education model based on the experiences and needs of individuals with disabilities and relevant stakeholders to ensure effective program implementation. Through this approach, the study aims to contribute to creating an environment where individuals with disabilities can lead independent and fulfilling lives within an inclusive society alongside non-disabled individuals.

The specific research questions are as follows:

Fist, What is the current status of lifelong education for individuals with hearing impairments?

Second, What are the needs and demands for lifelong education programs in G Metropolitan City based on focused group interviews (FGI) with individuals with hearing impairments?

II. Methods

1. Participants

In this study, a survey and group interviews were conducted with individuals with hearing impairments in G Metropolitan City. With the cooperation of institutions such as disability welfare centers, developmental disability support centers, and lifelong education centers, a total of 51 individuals with hearing impairments were selected through stratified sampling, and three participants took part in a focused group interview (FGI). General information is presented in Table 1.

2. Research instruments

To develop the survey for this study, prior research, including "analysis of the status and policy directions of lifelong education for individuals with disabilities in Gyeonggi Province" by the Gyeonggi Lifelong Education Promotion Institute (2017) and "survey on the status of lifelong learning for individuals with disabilities" by the Gwangju Lifelong Education Promotion Institute (2018), was reviewed and adapted to fit the objectives of this study. Additionally, the questions for the focused group interview (FGI) were designed based on previous studies related to lifelong education (D. Y. Kim et al., 2017; Kim et al., 2018) and were structured around topics related to lifelong education programs for individuals with hearing impairments.

To ensure content validity, the questionnaire was reviewed by one professor specializing in lifelong education for individuals with disabilities, two experts in special education, one Ph.D. in social welfare, and another Ph.D. in social welfare with 10 years of experience working at a disability welfare center. For FGI analysis, the question format and process proposed by Krueger & Casey (2000) were applied, proceeding in the following sequence: Opening questions, introduction questions, transition questions, key questions, and ending questions.

3. Data analysis

The collected data were analyzed using IBM SPSS 20.0, applying frequency analysis and descriptive statistics. To ensure the reliability of the study, Cronbach's α coefficient was calculated, yielding an overall value of .957, indicating a high level of reliability. For the analysis of focused group interviews (FGI), an inductive analysis method was employed. The interview data were transcribed using Hangul Word Processor, and key content was summarized based on the structured interview guide. The first-level summary was used to identify major issues and integrate meaningful direct statements into categorized sections, aligning them with the overall thematic flow. To enhance the reliability of the qualitative analysis, a cross-validation method was applied, ensuring that the selected direct quotations were mutually agreed upon by researchers in alignment with the research topic and interview questions.

Table 1. Participants' information

Classification		*n*	Classification		*n*
Gender	Male	20	Age	20s	5
	Female	31		30s	8
Martial status	Single	24		40s	11
	Married	27		50s	15
Income level	BLSR	23		60s	8
	NPC	2		70s	4
	NOT	23	Education level	No formal education	2
Disability severity	Severe	37		Elementary dropout	1
	Mild	13		Elementary dropout	6
Employment	Employed	19		Elementary graduate	1
	Unemployed	32		Middle school graduate	5
Use of activity support	Utilizing	11		High school dropout	3
	Not utilizing	40		High school graduate	21
				College graduate	9

Note. BLSR=basic livelihood security recipient; NPC=near-povery class; NOT=not applicable.

Table 2. FGI question items

Classification	Content
Current programs	• Difficulties in participating in programs • Reasons for not participating in lifelong education programs
Program environment	• Experience and environment of lifelong education programs • Preferred environment for future lifelong education programs
Desired lifelong education	• Expectations and improvements needed for participation • Programs not currently available but desired in the future

Ⅲ. Results

1. Lifelong education programs for individuals with hearing impairments

1) Experience in lifelong education program participation

The survey on lifelong education participation revealed that 32 respondents (58.8%) had experience participating in lifelong education programs, while 20 respondents (41.1%) had not participated. Among those who had not participated, various reasons were cited. The most common reason was "lack of access to program-related information" reported by 9 respondents (45.0%). The second most common reason was "lack of time", mentioned by 6 respondents (30.0%). Other reasons included "lack of motivation or confidence", "absence of desired programs", and "other reasons", each cited by 1 respondent (5.0%).

2) Purpose of participation in lifelong education programs

A survey was conducted to examine the primary purposes of participation in lifelong education programs, ranking the importance from first to third priority. The results are as follows: First priority: The most common reason was "hobbies and leisure activities (music, art, sports, etc.)", cited by 13 respondents (40.6%). Second priority: The most selected response was "expanding opportunities for social participation (club activities, community groups)", chosen by 14 respondents (43.7%), Third priority: The most common response was "acquiring diverse information (economy, religion, general knowledge, etc.)", reported by 10 respondents (31.2%).

Table 3. Purpose of participation in lifelong education programs

Category	1st priority (%)	2nd priority (%)	3rd priority (%)
Basic literacy: Korean, math	2 (6.2)	1 (3.1)	3(9.3)
Academic completion: Qualification exam prep	1 (3.1)	2 (6.2)	1 (3.1)
Employment & skill development	8 (25.0)	1 (3.1)	2 (6.2)
Hobbies & leisure: Music, art, sports, etc.	13 (40.6)	5 (15.6)	5 (15.6)
Social participation: Club activities, etc.	5 (15.6)	14 (43.7)	4 (12.5)
Diverse information: Economy, religion, general knowledge, etc.	3 (9.3)	3 (9.3)	10 (31.2)
Lack of space for group activities	-	4 (12.5)	3 (9.3)
Support for family & child education	-	2 (6.2)	4 (12.5)

Table 4. Satisfaction with participation in lifelong education program

Category	*M* (*SD*)
Enrollment & registration process	3.59 (.86)
Content of lifelong education programs	3.62 (.82)
Instructor's expertise & competence	3.50 (.90)
Staff attitude toward individuals with disabilities	3.85 (.78)
Instructor attitude toward individuals with disabilities	3.68 (.91)
Institutional convenience & accessibility	3.76 (.82)
Institutional convenience & accessibility	3.67 (.85)

2. Status of participation in lifelong education programs for individuals with hearing impairments

1) Satisfaction with lifelong education programs

A survey was conducted to assess the satisfaction levels of individuals with hearing impairments who participated in lifelong education programs. The overall average satisfaction score was 3.67 (*SD*= .85).

Among the specific factors evaluated, the highest satisfaction was reported for "staff attitudes toward individuals with disabilities" with a score of 3.85 (*SD*= .78). This was followed by: "convenience and accessibility provided by lifelong education institutions" 3.76 (*SD*= .82), "instructor attitudes toward individuals with disabilities" 3.68 (*SD*= .91), "content of lifelong education programs" 3.62 (*SD*= .82), "enrollment and registration procedures for lifelong education programs" 3.59 (*SD*= .86), "instructor expertise and qualifications" 3.50 (*SD*= .90).

2) Considerations and requirements for future lifelong education programs

The survey results on key considerations for future participation in lifelong education for individuals with disabilities revealed the following: For the 1st priority, the most frequently selected response was “development of specialized and diverse lifelong education programs exclusively for individuals with disabilities”, chosen by 15 respondents (31.5%). This was followed by “increased financial support for programs” with 10 respondents (20.8%), and “expansion of lifelong education institutions for individuals with disabilities”, selected by 6 respondents (12.5%). For the 2nd priority, the most common response was “expansion of accessibility facilities in lifelong education institutions”, cited by 7 respondents (14.5%). This was followed by “strengthened promotion of lifelong education institutions and improved access to program information”, both chosen by 6 respondents (12.5%).

For the 3rd priority, the highest response was “strengthened promotion of lifelong education programs and expansion of accessibility facilities”, with 8 respondents (16.6%) selecting this option. The next most frequent response was “improvement of societal awareness regarding individuals with disabilities”, chosen by 6 respondents (12.5%).

3. Strategies for advancing lifelong education for individuals with hearing impairments in G Metropolitan City

The survey on proposed improvements for enhancing lifelong education in G Metropolitan City yielded the following results: For the 1st priority, the most frequently cited improvements were “augmentative and alternative communication (AAC) support” (e.g., tablet PCs, picture exchange communication tools, paid communication apps) and “information accessibility support” (e.g., Braille materials, enlarged print, text files, audio files, sign language, subtitles), each selected by 12 respondents (28.5%). These were followed by “provision of lifelong learning materials for individuals with disabilities” with 5 respondents (11.9%) and “providing lifelong education information via phone, SNS, and websites” with 4 respondents (9.5%). For the 2nd priority, the most requested improvements were “augmentative and alternative communication (AAC) support” and “support for assistive personnel” (e.g., learning assistants, activity support workers), each cited by 8 respondents (19.5%). These were followed by “Provision of assistive technology” (e.g., learning aids, mobility aids, assistive devices) and “providing lifelong education information via phone, SNS, and websites”, both selected by 7 respondents (16.6%). For the 3rd priority, the most frequently mentioned improvement was “providing lifelong education information via phone, SNS, and websites”, chosen by 9 respondents (21.9%), followed by “transportation support” (e.g., vehicle assistance, transportation cost subsidies) with 8 respondents (19.5%), and “augmentative and alternative communication (AAC) support”, cited by 7 respondents (17.0%). These findings suggest that in order to increase participation in lifelong education for individuals with disabilities, G Metropolitan City should focus on enhancing communication and information accessibility, providing assistive personnel and technology, and improving transportation.

Table 5. Considerations and requirements for participation in lifelong education programs

Category	1st priority (%)	2nd priority (%)	3rd priority (%)
Development of specialized and diverse lifelong education programs for individuals with disabilities	15 (31.5)	2 (4.1)	3 (6.2)
Qualified instructors / teachers for lifelong education programs	4 (8.3)	4 (8.3)	1 (2.0)
Expansion of lifelong education institutions for individuals with disabilities	6 (12.5)	5 (10.4)	4 (8.3)
Strengthened promotion of lifelong education programs	5 (10.4)	6 (12.5)	8 (16.6)
Improved access to information about lifelong education institutions and programs	1 (2.0)	6 (12.5)	6 (12.5)
Increased financial support for programs	10 (20.8)	5 (10.4)	5 (10.4)
Development of specialized lifelong education instructors, teachers, and staff	1 (2.0)	4 (8.3)	4 (8.3)
Social recognition and benefits for program graduates	2 (4.1)	5 (10.4)	3 (6.2)
Expansion of accessibility facilities in lifelong education institutions	3 (6.2)	7 (14.5)	8 (16.6)
Improvement of societal awareness regarding individuals with disabilities	1 (2.0)	4 (8.3)	6 (12.5)

Table 6. Improvement measures for the revitalization of lifelong education in G Metropolitan City

Category	1st priority (%)	2nd priority (%)	3rd priority (%)
Support for various assistive devices (learning aids, mobility aids, assistive equipment)	3 (7.1)	7 (16.6)	2 (2.4)
Augmentative and alternative communication (AAC) support (tablet PC, picture exchange communication tools, paid apps, etc.	12 (28.5)	8 (19.5)	7 (17.0)
nformation access support (braille materials, enlarged materials, text files, audio materials, sign language, subtitles, etc.)	12 (28.5)	5 (11.9)	6 (14.6)
Professional personnel support	3 (7.1)	3 (7.1)	3 (7.3)
Support for auxiliary personnel (learning assistants, activity assistants, etc.)	3 (7.1)	8 (19.5)	3 (7.3)
Mobility support (vehicle support, transportation subsidies, etc.)	3 (7.1)	2 (4.7)	8 (19.5)
Information support for lifelong education for people with disabilities (via phone, SNS, website, etc.)	4 (9.5)	7 (16.6)	9 (21.9)
Provision of lifelong learning materials for people with disabilities	5 (11.9)	2 (4.7)	3 (7.3)

Table 7. Categorization of meaning

Subcategory	Concept
Demand for communication support such as sign language and text interpretation	• Conducting lifelong education programs in sign language • Necessity of text interpretation services • Need for specialized sign language instructors
Lifelong education program environment	• Participation limitations due to restricted access to information • Need for network infrastructure support
Lifelong education development directions required in G Metropolitan City	• Essential computer literacy traing for the untact • Survival-oriented education using smartphones • Post-cochlear implant language education

4. Needs for lifelong education programs for individuals with hearing impairments through FGI analysis

1) Categorization of meaning

Based on the analysis results, subcategories and corresponding concepts were derived as follows:

2) Demand for communication support such as sign language and text interpretation

It has been found that there are various forms of demands, such as sign language interpretation, text interpretation, and specialized instructors.

> Since the same teacher could not use sign language, that part seemed to be a bit challenging... Even if education is conducted through sign language interpretation, it would be much better and more comfortable for learners if the teacher could use at least some sign language. However, since the teacher could not use sign language at all, that part was somewhat inconvenient. (A)

> There was someone assisting with sign language interpretation, but the phone screen was too small, making it difficult to follow. (C)

> I couldn't understand any of the important information from the news... For individuals with hearing impairments, they often gather information through word of mouth or conversations with other deaf individuals. However, when that is not possible, the lack of information exchange and communication becomes frustrating. (B)

> It would be great if lifelong education content could provide both subtitles and sign language simultaneously. The words and terms that appear in news subtitles are often very difficult, and many individuals with hearing impairments have lower literacy levels and struggle with understanding certain vocabulary. (C)

3) Lifelong education program environment

The aging of internet devices and equipment caused significant difficulties, especially during online classes, where these issues were not well addressed. (C)

> Typically, non-disabled individuals can easily find places to learn art if they want to, but I have never had the opportunity to attend such classes. I have never received any information about them, so I don't know where they are offered. (A)

4) Directions for the development of lifelong education in G Metropolitan City

Personally, I would like to see basic education

programs that teach computer usage and internet skills. (B)

Since I am not skilled in using the internet, I struggle with online banking and must visit the bank in person. Ordering food through delivery apps is also difficult, as I often need to rely on sign language interpreters to complete the process. (C)

Even after receiving a cochlear implant, I still struggle to speak fluently like a non-disabled person. Because of this, I face difficulties adapting to general society and ultimately return to the deaf community. (C)

Instead of focusing solely on general education, it would be beneficial to strengthen deaf culture and provide lifelong education that fosters a sense of pride across generations. (A)

Beyond education for hearing-impaired individuals themselves, there should also be services supporting language education for their children. Teaching them to speak is very challenging, and there is little to no guidance available for parents in this area. (B)

My child attends a special needs daycare, but none of the teachers there can use sign language, which makes it very difficult. (B)

Ⅳ. Discussion and Conclusion

A stratified sampling survey of 51 individuals and a focused group interview (FGI) with three participants were conducted to examine the current state and needs of lifelong education for individuals with hearing impairments in G Metropolitan City.

First, the survey on the participation status of lifelong education programs among hearing-impaired residents in G Metropolitan City revealed that only 58.8% of respondents had experience participating in lifelong education programs. The main reasons for non-participation were lack of information (45.0%), lack of time (30.0%), and lack of motivation (5.0%).

Additionally, the primary reasons for participating in lifelong education programs were hobbies and leisure activities (40.6%), expanding opportunities for social participation (43.7%), and acquiring various types of information (31.2%).

Previous studies have also reported that, although education programs for people with disabilities exist, insufficient promotion and low accessibility contribute to low participation rates (Kim, 2022; Seo et al., 2022). This study confirms that strengthening promotional efforts and improving information accessibility are essential to increasing participation rates.

In particular, institutions providing lifelong education programs for hearing-impaired individuals should implement promotional strategies utilizing online platforms such as SNS, YouTube, and official websites. Additionally, it is necessary to activate community engagement through disability-related institutions to ensure that offline promotional efforts are also conducted in parallel. The 5th Lifelong Education Promotion Plan (2023~2027) has established measures to strengthen and disseminate the disclosure of disability-related information for each program offered by regional lifelong learning institutions as a means of intensively supporting lifelong learning for individuals with disabilities. To expand lifelong learning opportunities for people with disabilities, it is essential to move beyond policy formulation and effectively implement these policies in practice, thereby improving information accessibility and enhancing disability-centered services.

Additionally, individuals with hearing impairments often experience social isolation due to communication difficulties, leading to feelings of loneliness caused by communication barriers. In this context, the importance of social interaction and community participation has been increasingly emphasized (Kim & Yoon, 2017). Lim (2012) stated that leisure activities play a crucial role in enhancing social interactions and alleviating isolation among individuals with hearing impairments. This suggests that social connections and community activities can help mitigate isolation and ultimately improve life satisfaction for people with hearing impairments.

Similarly, a study by Lee & Park (2018) found that the most common reason for participating in lifelong education among individuals with disabilities was for hobbies and leisure activities. When selecting programs, people with disabilities primarily considered their level of interest, the program's usefulness, and its schedule and timing. Moreover, an analysis of satisfaction with lifelong education programs revealed an average rating of 3.67 (.85). The highest-rated factors included staff attitudes toward individuals with disabilities (3.58), convenience provided by lifelong education institutions (3.76), and instructors' attitudes toward individuals with disabilities (3.68). These findings indicate that a disability-friendly environment and attitude are key factors in enhancing educational

satisfaction.

Key elements identified as necessary for the future development of lifelong education include the development of exclusive lifelong education programs for individuals with disabilities (31.5%), budget support for programs (20.8%), and the provision of information on lifelong education institutions and programs (12.5%).

These findings align with previous research, which indicates that individuals with hearing impairments have a strong demand for basic literacy education and specialized vocational training. Additionally, those who acquire hearing impairments later in life tend to prefer lifelong learning programs that cover community adaptation. This suggests that lifelong education needs vary depending on the type and characteristics of the disability (Lee et al., 2024).

Furthermore, there is a demand for technological support, including augmentative and alternative communication (AAC) assistance (28.5%), information accessibility support (28.5%), and assistive technology device support (16.8%).

Secondly, when examining the demands for lifelong education programs for individuals with hearing impairments, there is a strong need for customized education and welfare services tailored to different life stages to meet their educational needs. Research by Kim (2020) also emphasized that before conducting any program, it is essential to provide separate materials containing key vocabulary and core concepts.

In the operation of lifelong learning programs for individuals with hearing impairments, language choice is crucial. Learners should have the option to communicate through written notes, amplified speech for oral communication, or sign language interpretation. Various alternative visual media, such as emojis, symbols, and illustrations, can also be used to emphasize tone and rhythm.

Additionally, transcripts should be provided for video or audio materials, musical scores should be available for music or sound-based content, and sign language interpretation services should be included. When presenting information visually, color cues are important, and simplified illustrations or schematics tend to be more effective than realistic images or photographs. However, it is critical not to overlook the necessity of providing spoken explanations, as auditory information is still essential for individuals with hearing impairments (KSEHLI, 2012; Lee et al., 2018).

To address these needs, a systematic media education program should be developed, incorporating images, videos, and subtitles in educational materials (Choi et al., 2024). Moreover, when providing sign language interpretation, it is important to consider relevant guidelines and best practices. Additionally, online pre-learning materials should be introduced so that participants can familiarize themselves with the content before engaging in lifelong education programs.

Lastly, enhancing the disability awareness and professional expertise of educators and instructors involved in lifelong education programs for individuals with disabilities is crucial (Kim, 2019; Kim & Lee, 2017; Park et al., 2020; Seo et al., 2015).

According to the KSEHLI (2012), the most commonly used assistive devices for individuals with hearing impairments include hearing aids and cochlear implants, along with various accessibility technologies such as TV captioning devices, including broadcasting services that provide subtitles, amplified telephones that enhance audio clarity, text-based communication devices for phones and faxes, including mobile phones and PDAs, wireless signal devices that notify users of incoming calls through light signals, and computer-based assistive technologies, as well as hearing dogs and sign language interpreters, which provide both daily life and educational support (Lee et al., 2018). These assistive technologies play a significant role in supporting individuals with hearing impairments in both education and daily life, and to further enhance lifelong learning opportunities for them, G Metropolitan City should develop a training program for professionals working in disability-focused lifelong education and secure sufficient budgetary support to provide various competency development programs for professionals assisting individuals with hearing impairments.

The need for education not only for individuals with hearing impairments but also for their children has emerged as an important issue, as teaching language to hearing children of deaf parents can be challenging, and in cases where the child is hearing-impaired, difficulties arise due to the lack of sign language proficiency among preschool teachers. A domestic study on the parenting burden of deaf parents with hearing children found that these parents primarily obtain childcare-related information from acquaintances with hearing impairments, leading to their exclusion from diverse sources of parenting information, and reported a high demand for support programs related to language guidance and academic instruction for their children (Kim & Jin, 2014). Some studies have demonstrated the

effectiveness of interactive storytelling education for hearing children of deaf parents, showing that AI speakers providing information on storytelling content enable parents to play a more active role in interactions with their children, thereby enhancing the children's narrative skills and comprehension abilities depending on parental involvement (Kim & Yim, 2021).

Additionally, as previous research suggests(Kang & Won, 2006), the needs of parents vary depending on their child's age, as parents of younger children, such as preschoolers or lower elementary students, tend to require support for disability compensation activities like speech therapy, while parents of older elementary students and beyond often seek academic, extracurricular, and talent development programs, highlighting the necessity of comprehensive services not only for individuals with hearing impairments but also for their families.

Based on the discussions and conclusions drawn from this study, the following limitations and recommendations regarding lifelong education for individuals with hearing impairments are proposed.

First, when planning lifelong education programs for individuals with hearing impairments, it is essential to consider life stages and family composition, as the characteristics and needs of individuals differ across adulthood, middle age, and old age, requiring distinct life stage-specific strategies in program design.

Second, as society transitions into the untact (non-face-to-face) era, there is a growing need to expand online educational institutions tailored for individuals with hearing impairments, along with the training of experts specializing in instructional methods and educational materials for this population.

Third, to facilitate communication for families of individuals with hearing impairments, it is crucial to establish integrated programs with sign language support, allowing them to naturally engage in social activities and fostering a sense of community and cultural inclusion.

A key limitation of this study is that it was conducted with individuals with hearing impairments in a specific metropolitan area, which means that the findings may not be representative of the overall state and needs of lifelong education for individuals with hearing impairments nationwide. Therefore, future research should conduct more comprehensive investigations to address these limitations. Furthermore, although individuals with hearing impairments have been treated as a single group, it is necessary to examine the potential differences in lifelong education needs based on factors such as the type of hearing impairment, communication method, and educational level. Additionally, it is crucial to clearly define the criteria for selecting research participants, including specific factors such as age, degree of hearing impairment, and prior experience with educational programs.

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