

Assessing and Charting the Future Path : Addressing the Decline of Brain Tumor Specialists in Korea - Insights from the Korean Brain Tumor Society (KBTS) Future Strategy Committee of 2023

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Objective : Although Republic of Korea is an advanced country in medical technology with a successful treatment rate for serious diseases, such as cancer, and has improved technology for highly difficult surgery, many excellent medical doctors and physicians are struggling due to the recent unreasonable medical environment. Specialization in brain tumor surgery also faces challenges in Republic of Korea, including low financial incentives, legal threats, and limited career prospects. In response, the Korean Brain Tumor Society (KBTS) formed the Future Strategy Committee to assess these obstacles and propose solutions.

Methods : A survey was conducted among the KBTS members to understand their perceptions and concerns across different career stages.

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Results : The findings revealed a decline in interest among chief residents in brain tumor surgery, owing to limited job opportunities and income prospects. Neurosurgical fellows expressed neutral satisfaction but highlighted challenges, such as low patient numbers and income. Faculty members with varying levels of experience echoed similar concerns, emphasizing the need for improved financial incentives and job stability. Despite these challenges, the respondents expressed dedication to the field and suggested strategies for improvement.

Conclusion : The KBTS outlines a vision that focuses on practical excellence, comprehensive research, professional education, responsibilities, and member satisfaction. Addressing these challenges requires collaborative efforts among healthcare institutions, professional societies, and policymakers to support brain tumor specialists and enhance patient care.

Key Words : Brain tumor · Specialist · Future · Strategy · Quality of life · Patients.

INTRODUCTION

In Republic of Korea, neurosurgeons specializing in brain tumors are invaluable assets in tertiary hospitals. It is an intellectually stimulating and compelling specialization the pursuit of which requires extensive and rigorous training. However, in Republic of Korea, numerous obstacles have impeded the flourishing of brain tumor specialization, including low medical fees, the looming threat of medical litigation, and relatively low incomes for specialists in this domain^{1,3-6}.

Recognizing the pressing need to address these challenges, Dr. Sun Hwan Kim, the 33rd President of the Korean Brain Tumor Society (KBTS), has convened a dedicated committee known as the “KBTS Future Strategy Committee.” Comprising eight esteemed members, this committee is tasked with conducting a comprehensive evaluation of the current landscape surrounding brain tumor specialists in the country. The committee’s mandate extends to identifying the factors contributing to the declining numbers of brain tumor specialists in this critical area of healthcare.

The committee’s objectives are twofold : first, to meticulously assess the existing conditions confronting brain tumor specialists, and second, to formulate a strategic roadmap for the KBTS that is aimed at overcoming these hurdles and charting a course toward a more robust and sustainable future. Through a collaborative and evidence-driven approach, the committee endeavors to shed light on the systemic challenges faced by brain tumor specialists and proposes innovative solutions to address them effectively.

In this report, we present the culmination of the committee’s efforts, including a detailed analysis of the current challenges,

insightful findings, and a visionary blueprint for the future trajectory of the KBTS. We hope that the recommendations will serve as a catalyst for positive change, fostering an environment conducive to the growth and flourishing of brain tumor specialization in Republic of Korea.

MATERIALS AND METHODS

The ethical screening was waived by the Institutional Review Board (IRB) of Samsung Changwon Hospital. This is because there is no institution in this study to administer IRB screening, and as an internal research project for members of a non-profit association as KBTS, all studies did not collect basic information of the study subjects based on the Google questionnaire survey, and all collected information was destroyed after data had been organized. In addition, this study is a study for public service programs, a minimum risk study for those who participated in the survey, and it is judged that it does not adversely affect the dignity, rights, and welfare of those who participated in the survey.

Research design

Before developing a questionnaire for the survey, the Future Strategy Committee first conducted an internal survey of the executive members of KBTS to investigate factors that are problematic in working as neurosurgeons specializing in brain tumors and how they perceive the current situation of KBTS.

What should be done has been specified in the survey. Based on these results, a questionnaire was developed, reviewed, and revised through three separate comprehensive questionnaire

development meetings. The final version of the questionnaire was developed using the Google Forms platform (www.google.com; Google, Mountain View, CA, USA), and the survey link was distributed via email to all KBTS members registered on the board.

Participants

Every KBTS member received an email and text message on their cell phones containing a Google Forms survey link. Consequently, 89 training hospitals in Republic of Korea and their staff were included in the study. For the specialist group excluding 1st, 2nd, and 3rd grade residents, a questionnaire commonly administered to brain tumor neurosurgeons and chief residents was included. Depending on the subgroup, the survey participants were included, and different types of questionnaire links were distributed to those in their 4th year (chief) of residency, clinical fellows of brain tumors, and to those with less than 5 years and more than 5 years of experience as faculty.

Purpose of survey

The final purpose of the survey is to create an environment for the growth and prosperity of the KBTS. However, the environment and training conditions of the Korean healthcare system have changed with each new generation of clinicians. Therefore, the factors that clinicians perceive as problems may differ across generations. Therefore, it is necessary to understand how the members of each generation of the KBTS perceive the contemporary times as neurosurgeons and brain tumor specialists, and whether there are valid issues of concern. It is also about seeking for solutions and analyzing ones proposed by them.

Research questions

Each group received a common questionnaire and a questionnaire pertaining to that group. The details of the questionnaire are described in Supplementary Table 1. The questions were organized into three categories: understanding the respondent's current situation as a clinician, the respondent's satisfaction with it, problematic situations, and suggestions for improving problems.

Types of questionnaires

The survey questions included approximately 10 main questions for each group, and one or two sub-questions were added

to a few questions. Questions were developed as multiple-choice items, and if the respondent was unable to provide an answer from the multiple choices, the question was structured such that other items could be selected and written on the open-ended answer sheet. Therefore, the survey was structured so that it could be completed in approximately 5 minutes. For each question, keywords related to it were selected and used to analyze the survey answers.

Data analysis

Responses to each item were analyzed as a ratio of the total number of respondents. The number of respondents in each group was not sufficient to analyze statistical significance, and the answers varied, limiting statistical interpretation. Rather, it was interpreted by considering the background of the respondent group and medical reality in Republic of Korea.

RESULTS

A total of 106 respondents from 89 institutions were included in the survey. The study included 51 institutions (57.3%) from Seoul and its metropolitan area and 38 institutions (42.7%) from non-metropolitan areas (Fig. 1). Thirty-seven chief residents and 79 boarders responded to the questionnaire (Table 1).

Chief residents' perspective

In this study, we surveyed chief residents to delve into their inclinations, priorities, and considerations regarding specialization in brain tumor surgery. We meticulously analyzed the responses to unravel the factors shaping their career decisions and perceptions of the field.

Our survey included 37 chief residents, revealing that majority were interested in spinal surgery (56.8%) while only 8.1% were interested in brain tumor surgery. The primary reasons for not choosing brain tumor surgery as a specialty included limited faculty positions (75.8%), followed by low-income prospects (54.5%) and philosophical difficulty of the field (45.5%).

Regarding preferred work settings, respondents (n=36) showed clear preference for higher-level medical institutions, with 66.7% favoring both tertiary and secondary hospitals. Only 25.0% preferred private hospitals.

More details are provided in Supplementary Table 2.

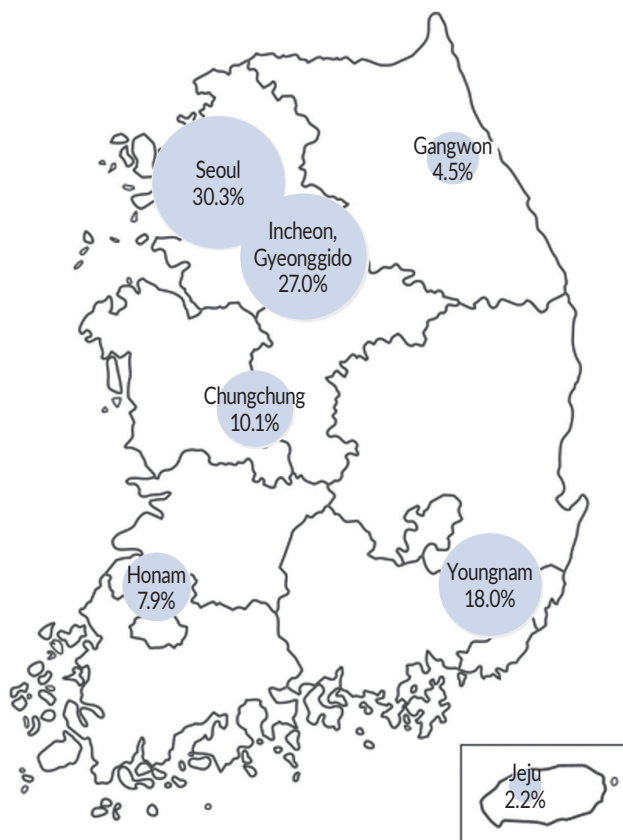


Fig. 1. Institutions that participated in the survey. Eighty-nine institutions were included : Seoul, 27 (30.3%); Incheon/Gyeonggi, 24 (27.0%); Yeongnam, 16 (18.0%); Chungcheong, 9 (10.1%); Honam, 7 (7.9%); Gangwon, 4 (4.5%) and Jeju, 2 (2.2%).

Table 1. Survey participants

Subject	Value
Chief resident	37 (31.9)
Fellow in brain tumor section	6 (5.2)
Faculty below 5 years' experience	30 (25.8)
Faculty over 5 years' experience	43 (37.1)

Values are presented as number (%)

Neurosurgical fellows' perspectives

This study explored neurosurgical fellows' perspectives on brain tumor specialization, along with their views on the activities of the KBTS (Supplementary Table 3). Most fellows (66.7%) reported working in hospitals with more than 1500 beds. An equal proportion of fellows (33.3% each) reported spending between 50–80% and over 80% of their time on brain tumor treatment and research. While most fellows (66.7%) expressed

neutral satisfaction, a notable portion (16.7%) reported regret. Despite many challenges, a significant number of fellows wished to continue specializing in brain tumors, with spinal surgery as a preferred alternative.

Key challenges identified included a scarcity of brain tumor patients, challenges in meeting institutional research workloads, and low incomes. They emphasized the necessity of enhancing these aspects to augment the allure of brain tumor specialization in the future. Support for junior staff or new members was seen as crucial for future development. The fellows evinced a strong preference for pursuing careers as faculty members in tertiary hospitals or as professors, underscoring their commitment to academic and clinical excellence in neurosurgery.

For detailed findings, refer to Supplementary Table 3.

Faculty's (below 5 years' experience) perspective

Faculty members with less than 5 years of clinical experience reported varied satisfaction levels, with 48.3% content and 10.3% expressing regret primarily due to low income and limited number of patients. Among those expressing regret, reasons included dissatisfaction with income (61.5%) and the limited number of patients with brain tumors (30.8%). Many respondents (75.9%) reported the presence of other senior or junior professors specializing in brain tumors at their institutions, and 54.2% expressed satisfaction with their relationships with their colleagues.

Overall, respondents reported a mixture of satisfaction (31%), neutrality (51.7%), and dissatisfaction (17.2%) with their current medical treatment environment. Regarding the KBTS, the respondents generally viewed their current activities positively, with 51.7% rating them as good and 44.8% as neutral. Their responses revealed aspects such as satisfaction with and challenges related to the specialty and suggestions for the improvement of their workplaces and professional societies. Further details are available in Supplementary Table 4.

Faculty's (over 5 years' experience) perspective

Nearly half of the respondents (48.3%) expressed satisfaction with their roles, while any regret was mainly due to low income and a limited number of patients. Interestingly, if given the opportunity to choose their specialization again, 60% would prefer cerebrovascular surgery, though 48.8% would still choose the brain tumor specialization, highlighting a prevailing dedi-

cation to their current field. High income (56.1%) was crucial for attracting more residents. The most significant challenge was the low number of patients with brain tumors (50%), indicating a potential barrier to the advancement of brain tumor research and treatment. Despite these challenges, optimism remains for the future development of brain tumor treatment within the Korean medical system, with 24.4% of respondents expressing positive sentiments. The respondents generally viewed the activities of the KBTS favorably, with 51.2% rating them as excellent or good.

Most respondents were middle-aged (47.6% aged between 50 and 59 years), worked in Seoul (38.1%) or metropolitan areas (31%), and had 16–20 years of experience (33.3%). These insights can inform strategies for improving work environments, enhancing professional satisfaction, and driving advancements in brain tumor research and treatment within the Korean medical system. For detailed findings, refer to Supplementary Table 5.

DISCUSSION

The current state of healthcare in Republic of Korea is undergoing significant challenges. The number of doctors and hospitals responsible for handling what is commonly referred to as essential medical care, which involves the preservation of life, is decreasing¹⁾. Conversely, there is a growing trend among the doctors working in fields such as cosmetics and plastic surgery to be primarily motivated by financial incentives²⁾. In vital departments of medicine, such as brain neurosurgery, there is a high volume of emergency surgeries, and the surgical process is directly related to the patient's health outcomes, making fatal complications and unpredictable outcomes difficult and highly risky. However, in Republic of Korea, medical fees in these vital departments are remarkably lower than the OECD average, and the number of medical lawsuits in these high-risk medical fields high compared with other developed countries; furthermore, the number of lawsuits is gradually increasing^{1,3-5)}. Consequently, the number of doctors choosing high-risk, low-income vital departments, such as brain neurosurgery, is declining, with abnormal increases in the number of doctors in low-risk, high-income non-vital departments²⁾.

The aforementioned trends have been observed in the field of neurosurgery. While specialties such as spine surgery, which involve fewer emergency cases, lower litigation risks, and offer

easier career opportunities, are seeing an increase in practitioners, the number of doctors pursuing specialization in brain tumor treatment is declining¹⁾. In response to this perceived crisis, the KBTS conducted a survey to assess the challenges faced by doctors at different career levels and formulate long-term strategies for the future.

Based on the survey findings, it is evident that there are significant challenges and trends affecting brain tumor specialization from the perspectives of chief residents, neurosurgical fellows, and faculty members.

The declining interest in brain tumor surgery among neurosurgery residents and the increasing preference for other specialties, such as spine surgery, underscore the need to address the various factors influencing career decisions in neurosurgery. One of the primary concerns highlighted by respondents across all groups was the poor quality of life of brain tumor neurosurgeons. As mentioned previously, brain tumor surgery is a challenging operation using state-of-the-art technology that takes a long time to perform, requires a long period of training, and requires intensive post-surgery care. Therefore, the hospital working hours are relatively long and so, brain tumor neurosurgeons have concrete limitations in making efforts to improve their quality of life.

Another reason for lower life satisfaction is the low income and limited job opportunities in brain tumor surgery compared with other medical specialties. Despite the high intensity of work in brain tumor surgery compared with other neurosurgical procedures, low compensation is a factor that makes brain tumor neurosurgeons feel relatively deprived. This disparity in financial incentives can deter aspiring neurosurgeons from pursuing a career in brain tumor surgery, leading to a shortage of specialists in this critical area.

Furthermore, the perception of a high workload and the risk of medical litigation associated with brain tumor surgery contribute to the reluctance of neurosurgeons to specialize in this field. In fact, patients and their families also understand that brain tumor surgery is very difficult and requires advanced technology; however, when unwanted results occur, legal lawsuits are often filed, and it is true that these situations result in tremendous stress for brain tumor neurosurgeons. Thus, a challenging social atmosphere also plays a part in the declining interest in brain tumor surgery among neurosurgical residents. The pressure to balance clinical demands with potential legal ramifications adds to the overall stress and challenges that

practitioners in this specialty face.

In addition to financial and workload-related concerns, there is a need to address the structural and organizational aspects of brain tumor surgery within the Korean Government Health Insurance System. Improving access to resources, enhancing collaboration among healthcare partners, and implementing supportive measures for neurosurgeons can help create a more conducive environment for brain tumor surgery.

These findings also underscore the importance of professional societies such as the KBTS in addressing the challenges and needs of neurosurgeons specializing in brain tumors. By providing support, resources, and opportunities for collaboration and professional development, organizations such as the KBTS play a crucial role in advancing the field and supporting the well-being of its members.

In terms of academic advancement, brain tumor specialists exhibited a strong sense of mission and a profound desire for academic achievement. However, they perceived their compensation and treatment to be dissatisfactory relative to their efforts. Despite dedicating considerable effort to academic pursuits, they found their achievements lacking in comparison. This sentiment arises from the necessity of engaging in diverse activities within clinical settings and the perceived lack of support and opportunities for academic achievement from institutions or professional societies. From this perspective, the following issues must be considered : 1) there is a growing demand for improvements in the clinical environment that may allow for a greater focus on the treatment of patients with brain tumors; 2) there is a need for enhanced research support to foster academic endeavors; and 3) satisfaction with compensation and treatment is sought through improvements in the medical environment.

Despite these challenges, the survey results highlight several positive aspects and potential for improvement. Nearly half of the respondents expressed satisfaction with their roles, and a significant proportion would still choose brain tumor specialization, indicating a strong commitment to the field. This intrinsic motivation is a powerful asset for driving continuous improvement and innovation. Optimism for future development was expressed by 24.4% of respondents, suggesting a foundation for growth and improvement. The favorable view of KBTS activities and the emphasis on supporting junior staff reflect a proactive approach to addressing issues and fostering a supportive professional community. Lastly, the fact that the

current research is being conducted by a group of experts in the field of brain tumors with awareness of these problems and with the aim of improving them is proof that the spark of hope in the field of brain tumors has not yet been extinguished.

Middle-aged specialists with substantial experience can leverage their knowledge to mentor newer generations, enhancing the overall quality of brain tumor treatment in Korea. By improving financial incentives, reducing workload, and enhancing educational opportunities, more specialists can be attracted to this critical field. The collective effort of healthcare institutions, professional societies, and policymakers is essential to create a more conducive environment for brain tumor specialists and ensure the continued advancement of patient care.

Moreover, there is a growing sense of optimism as years of experience lead to changes in the clinical environment, allowing for increased focus on patients with brain tumors and the gradual establishment of research support systems, leading to an improved sense of satisfaction. Additionally, as experience accumulates, compensation based on clinical performance improves, leading to increased satisfaction with compensation and treatment.

The evaluation of engagement in professional societies reflects a shared perspective, seeking avenues to satisfy academic demands while requesting more information and opportunities. There is a unified stance within the community of brain tumor specialists advocating for improvements in medical environments, such as fees and compensation. As a professional body, there is a demand for a strong voice advocating improvements in medical environments.

The KBTS has formulated its vision based on the survey results to prepare for the future and enhance the clinical and research activities of neuro-oncologists as follows : a global innovator who pioneers uncharted territory with the light of wisdom and resistance.

Furthermore, five key priority areas were identified to guide the future direction of the KBTS : 1) personal development as competent brain tumor specialists (practical excellence); 2) establishment of research networks and platforms (comprehensive research); 3) provision of professional opportunities for young researchers (professional education); 4) development of a society with a sense of mission and expertise (responsibility and specialty); and 5) strengthening the status of brain tumor specialists (member satisfaction).

The clinical environment has become increasingly challenging and there seems to be no easy way to transform the current distorted state of Korean healthcare. Moreover, doctors currently performing more essential treatments are experiencing a worsening clinical environment. Government policies and populism-driven measures are abundant. Nevertheless, there is a need to persist in efforts without losing hope, and the KBTS plays a pivotal role in this endeavor.

By pursuing these strategic initiatives and actions, we can overcome the existing challenges and barriers to brain tumor specialization, foster a supportive and conducive environment for doctors, and ultimately improve patient care and outcomes in neurosurgery.

Last comment for advancement in the field of brain tumors by committee members

Suggestions for further development of KBTS were included in these surveys in an open-ended format, with respondents suggesting the following: to advance the brain tumor field, it is essential to improve medical reimbursement rates to adequately compensate healthcare professionals for their efforts in performing brain tumor surgeries. Developing and implementing educational programs for new members and clinical instructors, along with providing lectures on advanced surgical techniques is crucial. Additionally, establishing forums or sessions for multiple institutions to collaborate on clinical trials and retrospective studies would invigorate research.

Expanding brain tumor case conferences nationwide would facilitate broader participation from regional medical staff, addressing the current limitation of conferences being predominantly held in specific regions. Adopting a more integrated approach to the brain tumor field, reducing excessive specialization, would enhance efficiency and collaboration. Establishing appropriate standards for surgical techniques and promoting constructive academic criticism within the field are also necessary steps.

Providing special consideration and support for brain tumor specialists in regional areas, along with expanded opportunities for research presentations, is vital. Ensuring the direction of the professional society includes input from a broader range of members, not just a few active participants, will foster inclusivity and diverse perspectives. Developing a patient distribution and transfer system can address the concentration of patients in major hospitals, promoting equitable access to care.

Improving financial management practices, addressing

large-scale expenditures, and supporting new member programs are essential for the sustainability and growth of the professional society. Encouraging efforts to increase the number of international publications in the brain tumor field will enhance its global recognition and impact. By implementing these recommendations, the brain tumor field can advance, providing better support for professionals and improved outcomes for patients.

CONCLUSION

The present survey sheds light on the complex landscape of brain tumor specialization in Korea, highlighting both the challenges and opportunities for improvement. Addressing issues related to financial incentives, workload, legal concerns, and organizational support is essential to attract and retain talented neurosurgeons. Despite challenges, brain tumor specialists are satisfied and optimistic about the field's future. Positive evaluations of KBTS activities and support for junior staff reflect a proactive approach to fostering a supportive community. Collaborative efforts involving healthcare institutions, professional societies, and government policymakers are needed to ensure the continued advancement of brain tumor surgery and the delivery of high-quality care to patients.

AUTHORS' DECLARATION

Conflicts of interest

No potential conflict of interest relevant to this article was reported.

Informed consent

This type of study does not require informed consent.

Author contributions

Conceptualization : YZK, SMK; Data curation : JB, KOG, KMK, DWS, JY, YSK; Formal analysis : JB, KOG, KMK, DWS, JY, YSK; Funding acquisition : YZK; Methodology : JB, KOG, KMK, DWS, JY, YSK, YZK; Project administration : YZK, SMK; Visualization : JB, KOG; Writing - original draft : JB, KOG; Writing - review & editing : JB, KOG, YZK, SMK

Data sharing

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• Supplementary materials

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