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Influencing physician distribution through education: a qualitative study on retention in Japan's rural hospitals

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Abstract

Background Addressing the shortage of healthcare professionals in rural Japan poses significant challenges. At Sanmu Medical Center, incorporating resident physicians into a general medicine training program has proved effective in retaining them as supervising physicians. This study aims to identify the key factors contributing to the success of such programs.

Methods We used a qualitative research design to comprehensively understand the factors contributing to physician retention in regional community hospitals in areas with physician shortages. Interviews were conducted with four experienced physicians, including the center director, who participated in the general or family medicine training programs at Sanmu Medical Center. Using a semi-structured questionnaire, we explored the factors influencing physician retention in community-based hospitals experiencing shortages. Two physicians specializing in community medicine conducted a content analysis under the supervision of three experts in community-oriented medical education and qualitative research. This approach helped compare retention factors perceived by physicians and the center director.

Results Content analysis revealed 10 categories and 47 subcategories. The analysis revealed that "Educational activity" and "Supervising physicians and guidance system" are crucial for physician retention in rural hospitals in Japan. The study highlighted key educational factors contributing to retention: engagement in educational activities led to personal and professional growth, creating a rewarding experience for the physicians. Furthermore, a structured supervising physician system provided essential guidance and mentorship, improving the educational environment. Diverse learning opportunities and protected learning times were identified as critical for fostering a sustainable commitment among physicians to work in rural settings. These findings contribute to existing literature by detailing how structured educational activities and mentorship programs in rural hospital settings can significantly impact physician retention.

Conclusions Community-based medical education programs that focus on diverse clinical settings, mentorship, and a supportive work environment can enhance physician retention in rural areas. By fostering such educational

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and professional environments, healthcare institutions can address physician maldistribution and improve care quality in underserved communities. Our study offers practical insights that can be replicated or adapted by other rural hospitals facing similar challenges. It offers targeted strategies to address the unique challenges faced by female physicians in rural healthcare settings.

Keywords Community-based medical education, Physician retention, Rural health, Qualitative research, Training programs, Japan

Background

Japan's healthcare system is currently at a critical juncture as the uneven distribution of physicians, especially in rural areas, has led to a severe crisis in local healthcare delivery. The situation is particularly dire in community hospitals in rural regions, where the shortage of medical professionals is acute [1, 2]. The historical trend of urbanization has exacerbated this problem, drawing an increasing number of physicians to urban centers and leaving rural areas underserved [3–5]. Physician maldistribution is a complex issue, with roots in societal preferences and systemic healthcare challenges.

This phenomenon extends beyond Japan, manifesting as a global concern that impacts diverse regions, including Australia, Canada, China, India, the United States, and numerous countries across Europe [6–8]. Each of these regions has been grappling with its own set of challenges related to physician distribution, and the international community has been actively seeking effective solutions. Sharing knowledge and strategies across borders could potentially lead to innovative approaches to addressing this issue.

In response, Japan's Ministry of Health, Labour and Welfare implemented an intervention policy in 2019, aiming to mitigate geographical disparities in physician distribution at the prefectural level [1, 9–11]. This policy marked a significant step toward addressing the issue at a systemic level; it introduced the Physician Uneven Distribution (PUD) index as a tool to measure the extent of physician maldistribution [11]. The PUD index considers both medical demand and supply factors at the prefectural level and provides a comprehensive overview of the situation (Fig. 1). Prefectures with lower PUD indices have more pronounced physician disproportionality, indicating the need for targeted interventions.

This study aims to identify the key factors contributing to the retention of physicians, with a particular focus on female doctors, in rural medical centers such as Sanmu Medical Center. While previous research has examined general retention factors, this study seeks to explore the specific elements that have led to a high retention rate of female physicians in the primary care department at Sanmu Medical Center. In addition to addressing physician shortages through residency programs, the literature suggests that targeting earlier stages of medical education is crucial. Studies have shown that physicians with a

rural upbringing are more likely to practice in rural areas [12–14]. Programs like the Physician Shortage Area Program at Thomas Jefferson University and the Rural Medical Education Program at the University of Illinois have demonstrated success in retaining physicians in rural settings by focusing on rural medical school curricula [15, 16]. These findings highlight the need for a comprehensive approach that begins at the medical school level, emphasizing rural upbringing and targeted educational interventions.

Sanmu Medical Center is the sole general hospital in Sanmu City, located in a region that suffers from the most severe physician shortage in Japan, with a PUD index of 96.1—ranking it among the bottom 20 out of 335 areas in Japan. The city is situated 30 km east of the center of Chiba Prefecture and is accessible in less than one hour by car or train. As of 2024, the city's population is under 50,000. Older adults constitute 38% of the populace, and the area is experiencing a demographic decline owing to low birthrates and an aging citizenry. Compared with other Japanese cities with similar population sizes, a significant portion of Sanmu's residents is employed in primary industries, with many working as farmers and fishermen. Despite these demographic challenges, Sanmu Medical Center has remained dedicated to mitigating the physician shortage. The hospital has initiated a general medical training program, which has successfully retained five general practitioners trained on-site. This accomplishment underscores the potential of localized training initiatives to instill a sense of community among medical professionals and incentivize them to remain in underserved regions.

Sanmu Medical Center has further embraced this approach by introducing a general medical specialist training program. This program not only equips resident physicians with the necessary skills and knowledge to excel in their field but also fosters a supportive environment that encourages long-term commitment. Consequently, many of the resident physicians choose to stay as supervising physicians, contributing to the successful retention of medical talent at the institution. Previous research indicates that supervising physicians' involvement in academic activities, including teaching, may aid in community retention [17]. Female physicians are more likely to choose primary care specialties than male physicians but less likely to locate in rural areas. However, this

Physician Uneven Distribution Index (PUD index)

$$\text{PUD index} = \frac{\text{Standardized number of physicians}^{\S}}{(\text{Population in the districts}) \div 100,000 \times (\text{Standardized consultation rate of the district}^{\#})}$$

$$\begin{aligned} \text{\S Standardized number of physicians} &= \text{Total number of doctors stratified by gender and 10-year interval age group} \times \frac{\text{Working time for each sex and age group}}{\text{National mean of working time}} \\ \text{\# Standardized consultation rate of the district} &= \frac{\text{Expected consultation rate for the district}}{\text{National mean of expected consultation rate}^{\S}} \\ \text{\S National mean of expected consultation rate} &= \frac{\Sigma (\text{National mean of age and sex-adjusted consultation rate} \times \text{by gender and 10-year interval age group})}{\text{Population of the district}} \end{aligned}$$

Fig. 1 Physician uneven distribution (PUD) index

hospital successfully retained female physicians through specialized training in general medicine [18].

In this study, the term “physician” refers to doctors who are recognized as specialists in internal medicine. Four participants were board-certified in internal medicine, with three of them also certified in family medicine. Acknowledging the significance of this issue and the potential impact of institutional interventions, this study explored the underlying factors that contribute to the successful retention of physicians in rural areas [19], with a particular focus on the impact of educational activities. We pursued the following research question: “What are the factors leading to physician retention in regional hospitals in areas with physician shortages?” Through qualitative research, we uncovered the underlying mechanisms that facilitate physician retention, specifically examining how educational programs and training initiatives influence physicians’ decision to remain in underserved regions. Our findings provide actionable insights and recommendations for other healthcare institutions grappling with similar challenges, potentially transforming healthcare delivery in rural Japan and contributing to the global discourse on addressing physician maldistribution.

Methods

Study design overview

We adopted a qualitative research design to gain a comprehensive understanding of the factors that contribute to physician retention in regional community hospitals in

areas with physician shortages. The study utilized a sample size of five interviews based on the concept of theoretical saturation, which occurs when no new themes or insights emerge from further data collection. Previous studies have shown that thematic saturation can be reached with a limited number of in-depth interviews, especially when the participants are homogeneous and the research question is focused [20]. In this study, the homogeneity of the participants— all experienced physicians from the same institution—allowed saturation to be achieved with just five interviews. This design facilitated an in-depth exploration of participants’ experiences and perceptions, providing rich and nuanced insights into the phenomenon being studied [21].

This study is situated within the constructivist paradigm [22], acknowledging that reality is constructed through individual experiences and interactions. We adhered to the Standards for Reporting Qualitative Research recommendations [23] in conducting and reporting this study. Semi-structured interviews served as a tool to explore factors contributing to physician retention in core community hospitals in underserved areas, allowing for a nuanced and participant-centered exploration of the topic.

Participants and context

Participants were selected using purposive sampling to ensure the relevance and depth of the data collected [24]. Two inclusion criteria were established: being a physician and currently working at Sanmu Medical Center.

The recruitment process was conducted via email during January–February 2023. Initially, four physicians who met the established criteria were recruited for interviews. In addition to these initial participants, the same selection criteria were applied to recruit one additional participant. This step was undertaken to verify whether theoretical saturation had been achieved from the coding results. Thematic saturation was considered to have been achieved when no new themes emerged from the additional interview. Although only five interviews were conducted, the homogeneity of the participants and the focused research question quickly led to reaching saturation [20]. This approach is consistent with qualitative research methodologies that suggest that smaller samples can suffice when the research question is specific and participants share similar experiences. Participants were provided with an information sheet, consent form, and consent withdrawal form as well as the researcher's contact information, ensuring that they were fully informed and could opt out of the study at any point.

Data collection

A qualitative inquiry was conducted (a sample of five physicians was selected) [25]. Each interview lasted approximately 60 min in order to ensure comprehensive data collection while minimizing participant fatigue and disruptions to their workflow. While interviews for content analysis can sometimes be longer, we found this duration effective in obtaining detailed and meaningful responses from our participants. We then conducted interviews with four participants, each lasting approximately 60 min, after obtaining informed consent. This duration was designed to minimize participant fatigue and disruptions to their regular workflow. We also employed qualitative interview techniques [26, 27] to enrich our data collection and strengthen the robustness of our findings. This approach leveraged the strengths of different qualitative methodologies, addressed potential shortcomings, and provided a more holistic understanding of the factors influencing physician retention. Considering reflexivity, as the interviewer had firsthand experience in the training program and was employed as a supervising physician at the time of the study, they provided valuable insights but also necessitated awareness of potential biases. This background enabled a deeper understanding of the context while maintaining objectivity during

data collection and analysis. The interviewers (DS and KS) were trained professionals with higher education experience in their respective countries and educational research backgrounds. A semi-structured questionnaire was employed to guide the interviews, centering on the key research question (Supplement 1). The responses were recorded and transcribed verbatim for analysis. This final code template was further confirmed by analyzing the remaining transcripts, which can be interpreted as a sign that code saturation was reached [28].

Data analysis

A qualitative content analysis was conducted using the data gathered from the interviews. Interview transcripts were analyzed using inductive content analysis with cognitive process dimensions serving as categories and subcategories [29, 30]. The analysis was conducted by two physicians (DS and KS) with expertise in regional medical care and medical education. The authors independently performed the initial coding of the transcripts, followed by collaborative discussions to identify, verify, and reach agreement on the coding of descriptors. Thereafter, three authors (KY, NA, and SI) discussed, identified, and agreed on the coding of the descriptors. Similar codes were grouped into categories and subcategories derived directly from the data. The categories and subcategories were regularly reviewed and discussed by an author experienced in qualitative research to ensure credibility of the findings.

Results

Initially, four physicians who met the criteria were recruited for interviews. To verify whether theoretical saturation had been achieved from the coding results, an additional interview was conducted with one new participant. In total, five participants (three men and two women) with a median work experience of 10 years (interquartile range: 8–37 years) were included in the study (Table 1). Three of them were married. All physicians established their careers through the training.

Content analysis

A total of five individual interviews were conducted. The individual interviews were conducted with physicians who had attended the general medical or family medicine training program at the hospital, including the director

Table 1 Participant characteristics

ID	Gender	Years	Years as a physician	Training experience at the Sanmu medical center	Board-certified specialist
1	Female	32	9	Yes	General medicine / Family Medicine
2	Male	34	10	Yes	General medicine / Family Medicine
3	Female	34	10	Yes	General medicine / Family Medicine
4	Male	61	37	Yes	General Surgery / Gastroenterology
5	Male	36	8	Yes	General medicine

physician. The interviewer, a physician with firsthand experience of the training program and a supervising physician at the time of the study, provided a unique perspective to the data collection process. This interviewer possesses the most comprehensive understanding of Sanmu Medical Center's work environment and the situations of the other interviewees.

This study identified the factors contributing to physician retention in underserved areas. Thematic saturation was achieved after analyzing the transcripts from five interviews. Table 2 shows the absolute frequencies of the codes. A total of 187 codes were extracted and 47 subcategories were identified. The semantic content of the subcategories was further classified into 10 categories of similar content based on the participants' perceptions of the program's effects, and these categories were then arranged as follows.

Work environment

The subcategories "appropriate workload," "on-time work," "competitive salary," "on-call system," "recognition and evaluation of work," "well-prepared learning environment," and "academic environment" were included in the category *Work Environment*:

Even with a small number of members, we managed to effectively arrange the on-duty and on-call shifts, which was a significant achievement.

Educational activity

The subcategories "learning from educational activities," "growth of learners," "rewarding experience in educational activities," "diversity of learners," "presence of learners," "protection of learning opportunities," "resonance with the growth of learners," "educational collaboration with other institutions," and "successful experiences in physician retention" were included in the category *Educational Activity*:

Currently, I'm in charge of the students, and teaching them indeed gives me an opportunity to reflect on myself.

Supervising physicians and guidance system

The subcategories "presence of a mentor," "presence of common understandings," "presence of a supervising physician," "experience of good guidance," "good relationship with supervising physician," "good reputation of training," "acquisition of supervising physician qualification," and "handover and enhancement of educational system" were classified in the category *Supervising Physicians and Guidance System*:

I thought that it was significant that everyone's way of thinking was not all over the place.

Human relationship

The subcategories "good relationship with colleagues," "good relationship with other professions," and "recognition from other professions" were classified under *Human Relationships*:

We could understand each other's thoughts and values well.

Diverse clinical experience

The subcategories "clinical experience in diverse settings," "experience with common diseases," "community integrated care," and "collaboration with clinics" were categorized under *Diverse Clinical Experience*:

In such circumstances, being able to experience various situations was also a charm of the region.

Work-life balance

The subcategories "childcare support," "work-life balance," "acceptable commuting time," and "family's occupation" were classified under the category *Work-Life Balance*:

When a child suddenly gets a fever, it's concerning, right? In such times, it's easier to take childcare leave here.

Environment respecting individuality

The subcategories "understanding of educational activities," "environment respecting individuality," "self-discretion," "acceptance of diversity," "awareness of generational differences in education," and "presence of hospital advocates," were included in the category *Environment Respecting Individuality*:

Rather than just limiting the amount of work with work style reforms, I think I want to let everyone do what they feel passionate about.

Expectations for general medicine

The subcategories "presence of general medicine" and "recognition of the need for general medicine" were included in the category *Expectations for General Medicine*:

Table 2 Results of content analysis

Category	Subcategory	Quotes
Work Environment	(35) Appropriate workload	(7) <i>While the range of tasks was wide, it's not like the workload was too much.</i>
	[*] On-time work	(7) <i>The general atmosphere was to finish the work within working hours, and I also made an effort to do so.</i>
	Competitive salary	(6) <i>I was quite satisfied with the salary.</i>
	On-call system	(6) <i>Even with a small number of members, we managed to effectively arrange the on-duty and on-call shifts, which was a significant achievement.</i>
	Recognition and evaluation of work	(6) <i>Well, they truly worked beyond expectations, providing immediate and efficient labor.</i>
	Well-prepared learning environment	(2) <i>They also made efforts to provide a conducive learning environment.</i>
Educational Activity	Academic environment	(1) <i>I felt like I wanted to create an environment where I could focus on the work and studies I was passionate about.</i>
	(30) Learning from educational activities	(12) <i>Currently, I'm in charge of the students, and teaching them indeed gives me an opportunity to reflect on myself.</i>
	Growth of learners	(4) <i>Nurturing the new generation is truly crucial, especially for ensuring we have enough physicians.</i>
	Rewarding experience in educational activities	(4) <i>There's a certain burden in terms of education, but I wouldn't say I dislike that stress.</i>
	Diversity of learners	(2) <i>And I believe it's definitely better to have young blood and turnover.</i>
	Presence of learners	(2) <i>They rotated every three months, and I genuinely believe they were exceptional.</i>
	Protection of learning opportunities	(2) <i>I believe it was very significant that the places and times for outputting and inputting were protected.</i>
	Resonance with the growth of learners	(2) <i>Those well-educated, like the resident doctors, have shown interest in the local community.</i>
	Educational collaboration with other institutions	(1) <i>I believe there were significant requests to the clinic's supervising doctors to send proper instructors.</i>
	Successful experiences in physician retention	(1) <i>When people gather, it becomes rewarding, doesn't it?</i>
Supervising Physicians and Guidance System	(24) Presence of a mentor	(5) <i>I think the teachers' guidance has shifted to a mentorship system.</i>
	Presence of common understandings	(5) <i>I thought that it was significant that everyone's way of thinking was not all over the place.</i>
	Presence of a supervising physician	(4) <i>In our hospital, unlike the senior doctors, there were no instructors for internal medicine or comprehensive medical care.</i>
	Experience of good guidance	(3) <i>I learned a lot and I think our relationship was good.</i>
	Good relationship with supervising physician	(3) <i>I had positive feelings towards the supervising physician.</i>
	Good reputation of training	(2) <i>I think people gather at (the training hospital) because of the reputation that they take good care of you.</i>
	Acquisition of supervising physician qualification	(1) <i>I and my colleagues obtained the supervising doctor certification of general medicine.</i>
	Handover and enhancement of educational system	(1) <i>It felt like various instructional systems were being handed over and enriched.</i>
Human Relationship	(21) Good relationship with colleagues	(15) <i>We could understand each other's thoughts and values well.</i>
	Good relationship with other professions	(5) <i>We also shared challenging management cases in gatherings with care managers, among other things.</i>
	Recognition from other professions	(1) <i>I felt it was easier to work when relied upon by other professions.</i>
Diverse Clinical Experience	(20) Clinical experience in diverse settings	(16) <i>In such circumstances, being able to experience various situations was also a charm of the region.</i>
	Experience with common diseases	(2) <i>I think wanting to hone the ability to handle common cases was a significant factor.</i>
	Community integrated care	(1) <i>Our home visits, being from the hospital, coordinated well with the regional comprehensive care ward, ensuring a good backup system, making it easier for both patients and us.</i>
	Collaboration with clinics	(1) <i>Furthermore, the strong connection between the hospital and clinics made various collaborations easier.</i>

Table 2 (continued)

Category	Subcategory	Quotes
Work-Life Balance	(19) Childcare support	(12) <i>When a child suddenly gets a fever, it's concerning, right? In such times, it's easier to take childcare leave here.</i>
	Work-life balance	(4) <i>I believe the environment here offers a fairly good work-life balance.</i>
	Acceptable commuting time	(2) <i>I wanted to live in Chiba City, which is urban, while working in the region.</i>
	Family's occupation	(1) <i>My husband's commute plays a role.</i>
Environment Respecting Individuality	(17) Understanding of educational activities	(6) <i>I think, apart from medical practice, I'm most involved in education.</i>
	Environment respecting individuality	(5) <i>Rather than just limiting the amount of work with work style reforms, I think I want to let everyone do what they feel passionate about.</i>
	Self-discretion	(3) <i>In established hospitals, tasks are often fixed. However, here, we can take on challenges while considering the community's needs and our own capacities. It's nice.</i>
	Acceptance of diversity	(1) <i>We also don't reject those who don't fit into our value norms.</i>
	Awareness of generational differences in education	(1) <i>I feel the way teachers educate now is truly different from our time, to put it strongly.</i>
	Presence of hospital advocates	(1) <i>Yes, our connection with the a clinic started during the incorporation in 2010, where Professor B was a member of an external organization.</i>
Expectations for General Medicine	(10) Presence of general medicine	(6) <i>I also mentioned the shortage of internal medicine doctors and asked if there was any general medicine who could join us.</i>
	Recognition of the need for general medicine	(4) <i>Indeed, in a place with many doctors specializing in specific organs, I thought it was necessary to meet the needs of an aging community. After all, those outside the specialty can't handle it.</i>
Contribution to the Community	(8) Contribution to the community	(7) <i>Engaging in community activities like performing in a diabetes education class and interacting with community members, I've been involved in community activities since my time as a resident physicians, and I wanted to continue doing that.</i>
	Various contributions	(1) <i>I've already done half of my training here, and there are still many unexplored challenges, or rather, things I can do.</i>
Community Medicine	(3) Community general medicine	(2) <i>I found the general practice in the countryside more appealing than the urban general medicine like what's being done in Chiba City.</i>
	Community hospital	(1) <i>I felt the appeal of working at a community hospital compared to an university.</i>

*() Number of codes

Indeed, in a place with many doctors specializing in specific organs, I thought it was necessary to meet the needs of an aging community. After all, those outside the specialty can't handle it.

I found the general medicine in the countryside more appealing than the urban general medicine like what's being done in Chiba City.

Contribution to the community

The subcategories “contribution to the community” and “various contributions” were included in the category *Contribution to the Community*:

Engaging in activities like performing in a diabetes class and interacting with local residents, I've been involved in community activities since my specialist days, and I wanted to continue doing that.

Community medicine

The subcategories “community general medicine” and “community hospital” were classified in the category *Community Medicine*:

Discussion

This study underscores the critical role of educational strategies in enhancing physician retention in rural Japanese hospitals. Content analysis yielded 10 categories, two of which—Educational Activity and Supervising Physicians and Guidance Systems—were directly related to education and featured prominently owing to a high frequency of codes. Our findings emphasize that well-structured educational and mentorship programs are not only beneficial but also essential for sustaining the physician workforce in underserved areas.

Previous studies on rural physician retention have highlighted various factors such as work environment, community engagement, and educational opportunities [31]. While these studies provide a broad understanding of retention issues, our study offers a unique perspective by focusing on the integration of educational activities and mentorship programs within a single institution. This specific context allows us to delve deeper into the

mechanisms through which these factors interact to influence retention.

Our findings contribute to the existing literature by providing a detailed analysis of how structured educational activities and mentorship programs within a rural hospital setting can significantly impact physician retention. Unlike broader studies that generalize retention factors across multiple institutions, our study offers an in-depth look at a successful model of physician retention at Sanmu Medical Center. This localized approach provides practical insights that can be replicated or adapted by other rural hospitals facing similar challenges. Furthermore, our study highlights the critical role of a supportive work environment and positive human relationships, which are often mentioned in the literature but rarely explored in such detail.

The thematic saturation achieved with five interviews aligns with existing qualitative research methodologies, which indicate that a small, focused sample can yield comprehensive insights when participants share similar experiences and the research topic is narrowly defined [20]. Despite the limited sample size, the findings provide valuable insights into the factors influencing physician retention in rural areas, supported by the literature and the participants' detailed accounts.

Educational activity

The central role of educational activities in our study underscores their effectiveness in fostering professional growth and job satisfaction, which are key to physician retention. These activities provide continuous learning opportunities, leading to professional fulfillment and a strong sense of achievement among physicians. This aligns with previous research that has demonstrated the importance of professional development in enhancing job satisfaction and retention among healthcare professionals [32]. Additionally, educational interventions such as targeted rural experiences during postgraduate training significantly influence physicians' decisions to practice in rural areas [33]. These strategies ensure a pipeline of well-prepared physicians who are more likely to choose and remain in underserved locations. Engaging physicians in educating the next generation not only contributes to their own professional growth but also instills a sense of responsibility and fulfillment. The dual role of learners and mentors creates a dynamic work environment that can encourage retention [34, 35]. Our study extends this by showing that diverse educational opportunities, such as interdisciplinary collaborations and learner-centered educational environments, further reinforce physicians' desires to remain in rural settings.

Supervising physicians and guidance system

The presence of a structured supervising physician system plays a pivotal role in retention by providing mentorship and guidance, crucial for early-career physicians navigating the complexities of rural medical practice. Mentorship from experienced physicians helps to instill confidence and competence, important for professional autonomy and satisfaction. Moreover, our findings suggest that effective guidance systems contribute to creating a supportive work culture that values learning and growth, aligning with studies that highlight the importance of mentorship in retaining healthcare staff [36, 37]. Sanmu Medical Center's structured supervising physician system assigns a dedicated supervisor to each trainee that provides ongoing supervision throughout the training period. The system includes regular one-on-one interviews, performance reviews, and educational sessions tailored to individual learning needs. Information about each learner's training status is shared through meetings between supervisors at least once a month. Every three months, a meeting of the training management committee is held with the participation of the interprofessional team, which includes not only doctors but also nurses and therapists. The supervisors are experienced practitioners who also participate in continuous professional development to ensure the best possible teaching. This systematic approach helps to create a supportive and fulfilling learning environment for trainees.

Integration of educational and work environments

While focusing on educational factors, it is important to consider how these integrate with other aspects of the work environment. Our data show that elements such as appropriate workload, competitive salary, and recognition are essential for retention but are significantly enhanced by educational activities that provide context and depth to the work physicians do [37]. For instance, diverse clinical experiences, often part of educational curricula, make the clinical practice more engaging and fulfilling, thereby contributing to job satisfaction [33].

Human relationships, work-life balance, and environment respecting individuality

The influence of human relationships and work-life balance intersects importantly with educational activities, and these elements are further enhanced by a workplace environment that respects individuality [37–39]. Positive interpersonal relationships developed through shared educational experiences and mentoring not only enhance workplace satisfaction and teamwork but also foster an inclusive environment where the individuality of each physician is valued. This inclusive culture significantly contributes to job satisfaction and retention, highlighting the importance of diversity and inclusion in the

workplace. Educational programs that respect work–life boundaries and support family-oriented policies, such as childcare support, make rural practice more appealing and sustainable for physicians. Factors in the working environment that female doctors seek in their pursuit of work–life balance include shorter working hours, exemption from overtime, in-house day-care facilities, and arrangements for replacement doctors when on leave [40]. Sanmu Medical Center provides each of these facilities. In 2016, the Japan Medical Association reported that 59.1% of female doctors took parental leave. The overall parental leave utilization rate in Japan is approximately 85%, making it relatively difficult for female doctors to take parental leave. However, two of the female doctors interviewed have taken more than six months of parental leave. The integration of these elements—interpersonal relationships, individuality, and work–life balance—into educational strategies is essential for creating a supportive and appealing work environment that can sustain the physician workforce in underserved areas.

General medicine, community engagement, and rural practice

The evolving needs of an aging population in areas predominantly served by specialists underline the critical role of general practitioners. This situation presents a clear opportunity for policy interventions aimed at enhancing comprehensive healthcare delivery by emphasizing the importance of general medicine [41]. Moreover, our findings indicate that physicians who actively engage with their communities gain a deeper sense of purpose and belonging. Such engagement, extending beyond clinical responsibilities to include contributions to community health and well-being, serves as a potent motivator for retention [42]. The unique challenges and rewards of rural practice not only meet the professional needs of physicians but also appeal to those seeking a distinctive professional experience, thus addressing regional physician shortages [43, 44]. Together, these elements underscore the importance of integrating community-oriented practices and general medicine to foster a robust healthcare system in rural settings.

Policy implications

Given the importance of educational interventions in retaining physicians, policymakers and healthcare administrators should consider investing in robust educational frameworks for rural hospitals. This includes enhancing the capacity for local training programs, increasing support for supervising physicians, and ensuring that educational activities are well integrated with the overall mission and operations of the healthcare facility. Additionally, broader policy measures such as improving infrastructure, providing financial incentives, enhancing

work–life balance policies, and fostering community integration should be considered. We emphasize that while recruitment and training have been extensively studied, retention is a crucial yet under-addressed aspect of workforce management, particularly in rural healthcare settings. Our findings on the significant role of educational activities and supervision provide new insights that can be applied to other jurisdictions, extending the relevance of this study beyond the Japanese context.

Limitations

The current study has some limitations. First, the study included a limited number of participants (five healthcare professionals), which may not be representative of the broader population of healthcare professionals in underserved areas. The small sample size may limit our findings' generalizability. Second, the study was conducted in a single institution and area, resulting in single-institution bias. The experiences and perceptions of professionals from this institution might be unique to its environment, practices, or policies and might not reflect the views of professionals from other institutions. Third, thematic saturation was achieved after analyzing transcripts from five interviews. Conducting additional interviews or involving more participants could have yielded further insights or nuances regarding the identified themes. Fourth, the results were based on self-reported perceptions and experiences of the participants. This can introduce bias, as participants may have provided socially desirable responses or unintentionally misremembered or misrepresented certain experiences. Fifth, comparative data were unavailable. This study did not compare the experiences of healthcare professionals from underserved and well-served areas. Such a comparison may have provided a more comprehensive understanding of the unique challenges and motivating factors in underserved areas. Sixth, the predefined categories and subcategories used for the content analysis might have influenced data interpretation, potentially leading to confirmation bias. Our discussion highlights the critical role of educational activities and mentorship in rural physician retention, particularly for female physicians. However, we acknowledge that the small sample size of our study limits the robustness of our conclusions. Future research with larger, more diverse samples is necessary to validate these findings and explore additional factors influencing physician retention in rural areas.

Future research and recommendations

Future studies should adopt a broader conceptual framework based on existing literature and conduct a national study in Japan to examine residency graduates who choose to practice in rural areas. This approach will provide a comprehensive understanding of the factors

influencing rural physician retention. Additionally, collaborating with Japanese medical schools to establish rural medicine programs and targeting students from rural backgrounds will be essential. Programs like the Physician Shortage Area Program and the Rural Medical Education Program have demonstrated success in retaining physicians in rural settings by focusing on rural medical school curricula [15, 16]. Establishing a network of rural health system and hospital training sites where Japanese rural medical students can be mentored by rural Japanese physicians during their medical school clinical rotations is also crucial. Such comprehensive approaches are necessary to develop sustainable solutions for the retention of rural physicians. Among the Rural Medical Education Program graduates practicing in Illinois, 62.1% and 73.3% are located within 60 and 90 miles, respectively, of their hometown. This proximity highlights the importance of training programs that encourage physicians to remain close to their rural origins while practicing. Our findings offer valuable insights that can be applied to other rural hospitals. By adopting structured educational activities, mentorship programs, and supportive work environments, other institutions can similarly enhance physician retention. The strategies outlined in this study provide a practical framework that can be adapted to different rural contexts, thereby addressing the broader issue of physician shortages in underserved areas.

Conclusions

This study enriches the current understanding of how educational strategies can significantly impact physician retention in rural Japanese hospitals. By highlighting the integral roles of educational activities, supervising systems, and community engagement, we provide actionable insights that emphasize the necessity of these elements in sustaining a skilled physician workforce in underserved regions. While our study provides preliminary insights into factors influencing physician retention in rural Japan, the small sample size in this study limits our ability to make broad policy recommendations. Future research should utilize larger, more diverse samples to confirm these findings and develop comprehensive strategies for addressing physician shortages in rural areas. This study uniquely contributes to the existing literature by specifically examining the factors that influence the retention of female physicians in rural areas, a topic that has not been extensively explored. Our findings highlight the critical role of structured educational activities and mentorship programs tailored to meet female doctors' needs. Additionally, the study provides a detailed account of how these factors are implemented at Sanmu Medical Center, offering a replicable model for other rural hospitals. These insights extend beyond the general factors

of physician retention, providing targeted strategies that can address the unique challenges faced by female physicians in rural healthcare settings.

Abbreviations

PUD Physician Uneven Distribution

Supplementary Information

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Supplementary Material 1: Interview guide

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None. I hope this message finds you well. I am writing to request a discount on the Article Processing Charge (APC) for my upcoming submission to *BMC Medical Education*. As an Editor for this journal, I, Kiyoshi Shikino, have been actively contributing to the peer review process and supporting the journal's mission. <https://bmcmededuc.biomedcentral.com/about/editorial-board> Considering my role and ongoing commitment to *BMC Medical Education*, I kindly request a reduction in the APC for my manuscript. Your assistance in this matter would be greatly appreciated and would further motivate my continued dedication to the journal. Thank you for your time and consideration.

Author contributions

DS and KS had full access to all the study data and took responsibility for the integrity and accuracy of the data analysis. DS, KS, KY, NA, YK, and SI: study concept and design; KS, KY, NA, YK, SA, YM, MM, and YK, SI: data acquisition, analysis, and interpretation; DS and KS: manuscript drafting; SI: critical content revisions; DS, KS, KY, NA, and SI: statistical analysis; SI: administrative, technical, and material support; KY, NA, YK, SA, YM, MM, and YK, SI: supervision. Additionally, DS contributed equally to this work and should be considered a co-corresponding author.

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Data availability

The datasets obtained and analysed during the current study can be availed through the corresponding author upon reasonable request.

Declarations

Ethics approval

This study was performed in accordance with the Declaration of Helsinki and was approved by the Ethics Committee and Institutional Review Board of Chiba University Graduate School of Medicine (Chiba, Japan).

Consent to participate

The researchers explained the study to the participants and obtained their informed and voluntary consent.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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