

Current State and Challenges of Dental Intervention in Aspiration Pneumonia Management from the Perspective of Hospitalists: A Cross-Sectional Survey in Japan

Taro Kunitomi¹, Taiju Miyagami², Satoshi Teranaka³, Tomohiro Matsumoto⁴, Yuki Yoshimatsu^{5,6}, Shinichi Matsumoto⁷, Kohei Yamaguchi⁸, Toru Morikawa^{9,10}, Toshio Naito²

¹Department of Medicine, Juntendo University Faculty of Medicine, Tokyo, Japan; ²Department of General Medicine, Juntendo University Faculty of Medicine, Tokyo, Japan; ³Department of Physical Medicine and Rehabilitation, Japanese Red Cross Ashikaga Hospital, Tochigi, Japan; ⁴Division of General Medicine, Nerima Hikarigaoka Hospital, Tokyo, Japan; ⁵Department of Ageing and Health, Guy's and St Thomas' NHS Trust, London, UK; ⁶Centre for Exercise Activity and Rehabilitation, School of Human Sciences, University of Greenwich, London, UK; ⁷Yushoukai Home Care Clinic Katsushika, Tokyo, Japan; ⁸Department of Dysphagia Rehabilitation, Institute of Science Tokyo, Tokyo, Japan; ⁹Department of General Medicine, Nara City Hospital, Nara, Japan; ¹⁰Department of Clinical Epidemiology, Hyogo Medical University, Nishinomiya, Japan

Correspondence: Taiju Miyagami, Department of General Medicine, Juntendo University Faculty of Medicine, 1-5-29 Yushima, Bunkyo-ku, Tokyo, 1130034, Japan, Tel +81- 3-3813-3111, Fax +81- 3-5802-1190, Email tmiyaga@juntendo.ac.jp

Purpose: The incidence of aspiration pneumonia is increasing in the rapidly aging population of Japan. Although dental care is crucial, little is known about the collaboration between hospitalists and dental professionals. Therefore, this study aimed to clarify the state of dental involvement in aspiration pneumonia management and identify challenges that need to be addressed.

Patients and Methods: An observational cross-sectional survey was administered to hospitalists in the Japanese Society of Hospital General Medicine between August and November 2023. We collected data via an anonymous, self-administered web-based questionnaire. Baseline data (eg, age, hospital type, presence of an oral surgery department, number of full-time dentists, and presence of dental hygienists) and dental referral practices were analyzed.

Results: Of the 352 respondents, 305 (86.7%) were male, and the median age was 48 years. An oral surgery department was present in the workplaces of 234 (66.4%) respondents, and 141 (40.1%) referred patients to dental services. Referrals were significantly associated with the presence of an oral surgery department (50.4% vs 19.5%, $P<0.001$), full-time dentists (50.7% vs 20.8%, $P<0.001$), dental hygienists (49.8% vs 20.0%, $P<0.001$), and university hospitals (52.6% vs 35.3%, $P<0.001$). The most common reasons for referrals were oral health care (89.4%), denture adjustment (60.2%), and swallowing assessment (43.3%). Conversely, non-referral reasons included reliance on other professionals (45.0%), lack of referral habits (43.1%), and the absence of onsite dentists (41.2%).

Conclusion: Access to dental resources and regular oral assessments in the management of aspiration pneumonia benefit both hospitals and patients. Hospitals and patients benefit from accessible dental resources and routine oral assessments. Strengthening referral habits and expanding dental staff may improve the outcomes of patients with aspiration pneumonia.

Keywords: medical-dental collaboration, respiratory infection, elderly care, hospitalists referral patterns, dentists, dental hygienists

Introduction

The world is trending toward an aging society, and this trend is expected to continue.¹ In Japan, this impact is particularly pronounced, with projections suggesting that by 2060, nearly 40% of the population will be older than 65 years.² In addition, the incidence of aspiration pneumonia in Japan increased by 53.7% between 2005 and 2019.³ The United States has a similar substantial burden: a recent epidemiological analysis identified over 1.1 million aspiration pneumonia-related deaths from 1999 to 2017, averaging about 58,000 deaths per year.⁴ Although the incidence decreased between

2002 and 2012, the median total cost of hospitalization for patients aged ≥ 65 years doubled over the decade, rising from US \$16,173 to US \$30,280.⁵ Addressing these issues has become an urgent global challenge.^{4,6}

Generally, the risk of aspiration pneumonia is influenced by diminished swallowing function and the intraoral environment.⁷ In particular, disruption of the oral microbiome and biofilm formation is a core mechanism linking oral conditions to systemic health.⁸ Poor oral hygiene plays a pivotal role in this process by increasing the oropharyngeal bacterial load. Pathogenic microorganisms that proliferate in unclean mouths, including anaerobes, such as *Fusobacterium* spp., and Gram-negative bacilli, such as *Klebsiella pneumoniae*, can be aspirated into the lungs, especially in patients with dysphagia or an altered gag reflex.⁹ Therefore, it has been shown that indicators of good oral hygiene, such as receiving regular professional dental cleanings and frequent toothbrushing (≥ 3 times a day), are independently associated with lower pneumonia incidence.¹⁰ Also, specialized oral health care provided by dentists and dental hygienists has been shown to significantly reduce the incidence of aspiration pneumonia during the perioperative period for esophageal cancer.¹¹ Furthermore, recent reports suggest that oral health care by dentists can prevent the recurrence of aspiration pneumonia, highlighting the critical importance of dental intervention in the management of aspiration pneumonia.^{12–14}

Given the clear link between oral health interventions and pneumonia, dental professionals have a vital role to play in the multidisciplinary management of aspiration pneumonia. However, some barriers persist in achieving collaboration between physicians and dentists. One challenge is the separation of the healthcare system: in many countries, dentistry has operated largely in parallel to medicine rather than integrated within it.¹⁵ Also, the number of dentists in hospitals is limited: only 28% of hospitals in Japan currently employ full-time dentists.¹⁶ Furthermore, another barrier is the limited awareness and training across professions. Some physicians and nurses underestimate the impact of oral hygiene on systemic health or view oral care as a “nursing task” rather than a medical priority.^{14,17}

Hospitalists, through their interventions, have been reported to reduce the length of hospital stays, improve the quality of medical care, and have a favorable impact on healthcare economics.^{18,19} Also, it is shown that hospitalist management of pneumonia is associated with shorter length of stay and lower costs compared with non-hospitalist care.²⁰ Although they are familiar with aspiration pneumonia, to the best of our knowledge, there have been no investigations into the frequency or specific nature of hospitalists’ collaboration with dentists in the management of aspiration pneumonia.

Therefore, we aimed to clarify the state of dental involvement in aspiration pneumonia management and identify challenges that need to be addressed.

Materials and Methods

Study Design, Setting, and Participants

This study was an observational cross-sectional survey based on questionnaires sent to all individuals listed on the Japanese Society of Hospital General Medicine (JSHGM) mailing lists. JSHGM is primarily responsible for the board certification of hospitalists, whereas the Japan Primary Care Association (JPCA) is mainly responsible for the board certification of family physicians. Many hospitals in Japan belong to both organizations. Since this study focused on hospitalists, the survey was conducted among members of JSHGM,²¹ as it was considered suitable for surveying hospitalists in Japan. In this study, hospitalists were defined as general medicine doctors working in a hospital, which was defined as a hospital with 20 or more beds.²² The participants of this study were Japanese hospitalists. We included data collected from August 23 to November 15, 2023. Individuals who did not provide consent and those who were not hospitalists were excluded.

Survey Instrument Variable

In this study, we developed an original questionnaire to collect baseline data on participants’ basic attributes and work environments, as well as outcome data on the extent to which dentistry-related practices are being implemented ([Appendix Figure 1](#)). Baseline data included age, gender, years of experience as a doctor, type of hospital (community-based hospital or university hospital), the presence or absence of an oral surgery department, the number of full-time dentists (0, 1, 2, or 3 or more), and the availability of dental hygienists.

For the outcome data, we examined whether the following actions, considered important steps in consulting an oral surgery department when treating aspiration pneumonia, were performed: oral evaluation, use of oral healthcare assessment tools, checking dentures, identifying the patient's primary care dentist, recommending a dental visit after discharge, and encouraging a dental visit for patients with relevant medical histories. These items were evaluated in 20% increments (0%, 1–20%, 21–40%, 41–60%, 61–80%, 81–100%) and recategorized into four groups: 0% as “never”, 1–40% as “sometimes”, 41–80% as “often”, and 81–100% as “always”.

Our primary outcome was whether respondents made any dental referral for aspiration-pneumonia management (0% vs 1–100%). A prespecified secondary outcome was routine referral, defined as a referral frequency of 81–100%. Explanatory variables comprised (i) system-level resources—the presence of an oral surgery department, the number of full-time dentists, the presence of dental hygienists, and hospital type; (ii) clinician practices—six oral-care activities (oral evaluation, use of an oral health assessment tool, denture check, identifying the patient's primary-care dentist, recommending a dental visit after discharge, and encouraging a dental visit in those with a relevant history), each recorded on a six-category frequency scale and recoded as never/sometimes/often/always; and (iii) demographics—age, sex, and years in practice.

We evaluated whether respondents initiated dental referrals for the management of aspiration pneumonia by classifying their referral frequency into 20% increments (0%, 1–20%, 21–40%, 41–60%, 61–80%, 81–100%). Those who referred between 1% and 100% were assigned to the “refer group”, while those with 0% referral were categorized as the “non-refer group”. Within the Refer group, individuals referring 81–100% of the time were identified as the “routinely refer group”. Furthermore, the referral rate was examined among respondents who reported performing multiple actions in the always group. Specifically, we identified respondents who consistently performed both “oral evaluation” and “use of oral healthcare assessment tools” or both “oral evaluation” and “checking dentures” in the always group. Among these respondents, the routinely refer group was calculated and compared with the proportion in the non-refer group.

Respondents were also asked, through multiple-choice questions, to indicate their reasons for referring or not referring. These options were determined through discussions involving TM, ST, and TM (Matsumoto). We then analyzed the clinical practices (“always”) routinely performed by hospitalists in the Refer group. Furthermore, we analyzed the sum of these practices.

Data Analysis

All statistical analyses were performed using JMP version 18.1 (SAS Institute, Cary, NC). Patient-level variables are presented as medians and interquartile ranges (IQR) for continuous variables and as numbers and percentages for categorical variables. For continuous variables, the Mann–Whitney *U*-test was used after normality was assessed. Statistical significance was defined as a *p*-value of < 0.05 using a two-tailed test. Regarding missing data, analyses were conducted using only the non-missing portions of the dataset.

Ethics

The study was approved by the ethics committee of the Ashikaga Red Cross Hospital (No.2024–34) and was conducted in accordance with the principles of the Declaration of Helsinki. All participants reviewed the study document detailing data anonymization, voluntary participation, and the dissemination of research results prior to participation. Only participants who provided informed consent (opt-in) were included in the study. Additionally, participants could withdraw from the study at any time.

Results

A total of 370 hospitalists participated in this study. Of these, 18 worked in clinics and were excluded from the analysis, leaving 352 participants in the final study sample.

Among the participants, 305 (86.7%) were male, and the median age (IQR) was 48 (40–56) years. The median number of years of practice was 22 (13–31) years. A total of 255 (72.4%) worked at community-based hospitals, and 234 (66.4%) worked at institutions with an affiliated oral surgery department. Regarding the number of full-time dentists,

hospitals with three or more full-time dentists were common, accounting for 159 participants (45.1%). Finally, 237 participants (67.3%) reported having dental hygienists available at their workplaces.

Among these participants, 141 (40.1%) referred patients for dental consultation as part of their treatment for aspiration pneumonia. In this group, the following factors showed significant differences. Hospitalists whose hospitals had an affiliated oral surgery department were more likely to make referrals (affiliated: 118 [50.4%] vs unaffiliated: 23 [19.5%], $P<0.001$). Similarly, those working in hospitals with full-time dentists showed a higher referral rate (0 full-time dentists: 26 [20.8%], 1 full-time dentist: 12 [42.9%], 2 full-time dentists: 25 [62.5%], 3 or more full-time dentists: 78 [49.1%], $P<0.001$). A similar difference was observed regarding the presence of dental hygienists (presence: 118 [49.8%] vs absence: 23 [20%]; $P<0.001$). Moreover, hospitalists at university hospitals were more likely to make referrals than those at community-based hospitals (university hospitals: 51 [52.6%] vs community-based hospitals: 90 [35.3%]; $P<0.01$) (Table 1).

Furthermore, among the participants, the proportion of those who routinely performed the following practices in aspiration pneumonia care (always group) was as follows: 138 (39.2%) reported conducting oral evaluations themselves for patients admitted with aspiration pneumonia. Of these, 37 (11.3%) used the oral health assessment tool. In addition, 169 (48.0%) checked whether patients had dentures. Only 30 (8.5%) recommended a dental visit after discharge, and 36 (10.2%) encouraged dental visits for patients with a history of aspiration pneumonia (Table 2).

Table 1 Participant Characteristics

Characteristics	Total N=352 (%)	Refer Group 141(40.1%)	Non-Refer Group 211(59.9%)
Female	47(13.3)	19(13.5)	28(13.3)
Age, median (range), years	48(40–56)	47(39–56)	48(40–56)
Years of experience as a doctor (IQR)	22(13–31)	21(13–32)	22(14–31)
Type of hospital			
University hospital	97(27.5)	51(52.6)	46(47.4)
Community-based hospital	255(72.4)	90(35.3)	165(64.7)
Oral surgery department			
Yes	234(66.4)	118(50.4)	116(49.6)
No	118(33.5)	23(19.5)	95(80.5)
Number of full-time dentists			
0	125(35.5)	26(20.8)	99(79.2)
1	28(7.9)	12(42.9)	16(57.1)
2	40(11.3)	25(62.5)	15(37.5)
3 or more	159(45.1)	78(49.1)	81(50.9)
Availability of dental hygienists			
Yes	237(67.3)	118(49.8)	119(50.2)
No	115(32.6)	23(20)	92(80)

Notes: Nominal variables are shown as n (%), and continuous variables are shown as median and interquartile range. Those who referred between 1–100% were assigned to the “refer group”, while those with 0% referral were categorized as the “non-refer group”.

Table 2 Regarding the Treatment of Aspiration Pneumonia by Japanese Hospitalists

	Never	Sometimes	Often	Always
Oral evaluation	25(7.1)	96(27.3)	93(26.4)	138(39.2)
Use of oral health assessment tools	194(59.3)	55(16.8)	41(12.5)	37(11.3)
Checking dentures	40(11.4)	77(21.9)	66(18.8)	169(48.0)
Identifying the patient's primary care dentist	146(41.5)	111(31.5)	55(15.6)	40(11.4)
Recommending a dental visit after discharge	138(39.2)	116(33.0)	68(19.3)	30(8.5)
Encouraging a dental visit for patients with relevant medical history	142(40.3)	117(33.2)	57(16.2)	36(10.2)

Notes: Nominal variables are shown as n(%). The extent to which each of these items was performed in daily clinical practice was evaluated. These items were evaluated in 20% increments (0%, 1–20%, 21–40%, 41–60%, 61–80%, 81–100%), then recategorized into four groups: 0% as “never”, 1–40% as “sometimes”, 41–80% as “often”, and 81–100% as “always”.

A total of 126 (89.4%) participants were referred for oral healthcare, 85 (60.3%) for denture adjustment, 61 (43.3%) for swallowing function assessment, and 58 (41.1%) for tooth extraction. Meanwhile, 95 (45.0%) did not make referrals because they consulted other healthcare professionals, such as speech-language therapists and nurses. Additionally, 91 (43.1%) cited a lack of a habit of making referrals and 87 (41.2%) mentioned the absence of a dentist in the hospital as reasons for not referring patients (Table 3).

Table 3 The Reasons for Each Group of Patients Who Were (a) Referred to a Dentist or (b) Not Referred to a Dentist

(a) Reason for referral to dentist	
Reasons for referral	Total N=141(%)
Denture adjustment	85(60.3)
Tooth extraction	58(41.1)
Oral care	126(89.4)
Swallowing function assessment	61(43.2)
(b) Reason for not referring	
Reasons for non-referral	Total N=211(%)
Lack of a habit of making referrals	91(43.1)
Absence of a dentist in the hospital	87(41.2)
Consulting with other healthcare professionals such as speech-language therapists and nurses	95(45.0)
Not see the value of making a referral during the acute phase	33(15.6)
The patient's condition is unstable during the acute phase, making consultation difficult	36(17.1)
Lack of knowledge regarding dental treatment	31(14.7)
Too busy to consult	12(5.7)
Do not know how to make a referral	12(5.7)
Concern about incurring costs when making a referral	10(4.7)
The patient or family does not desire a referral	5(2.4)
Reluctant to invest the effort required for making a referral	5(2.4)

Note: Nominal variables are shown as n(%).

Table 4 Comparison of Medical Care Between Groups That are Always and are Not Introduced

	Routinely Refer Group N=141	Non-Refer Group N=211
Oral evaluation	75(54.3)	63(45.7)
Using Oral healthcare assessment tools	22(59.5)	15(40.5)
Denture	80(47.3)	89(52.7)
Primary care dentists	26(65.0)	14(35.0)
Oral evaluation + Using Oral healthcare assessment tools	19(59.4)	13(40.6)
Oral evaluation + Denture	63(55.3)	51(44.7)
Oral evaluation + Primary care dentists	25(69.4)	11(30.6)
Using Oral healthcare assessment tools + Denture	18(56.3)	14(43.8)
Using Oral healthcare assessment tools + Primary care dentists	14(73.7)	5(26.3)
Denture + Primary care dentists	26(65.0)	14(35.0)

Notes: Nominal variables are shown as n(%). Those who referred between 1–100% were designated the “refer group”, while those with 0% referral were categorized as the “non-refer group”. Within the Refer group, individuals referring 81–100% of the time were identified as the “Routinely refer group”. Furthermore, the referral rate was examined among respondents who reported performing multiple actions in the always group. Specifically, for example, respondents who consistently performed both “oral evaluation” and “use of oral healthcare assessment tools”, or both “oral evaluation” and “checking dentures”, in the always group were identified. Among these respondents, the routinely refer group was calculated and compared with the proportion in the non-refer group.

The referral frequency results for those who routinely referred patients were as follows: among those in the always oral evaluation group, 75 (54.3%) referred patients with aspiration pneumonia. Within this group, 25 (69.4%) who routinely checked for a primary care dentist had a higher referral rate. Similarly, in the always group, 22 (59.5%) who used the oral healthcare assessment tool referred patients when they developed aspiration pneumonia. Moreover, 14 (73.7%) in this group who routinely consulted their primary care dentists also had a high referral rate (Table 4).

Discussion

This study investigated the involvement of dentists in the management of aspiration pneumonia among hospitalists in Japan. Our findings revealed that the most common reason for not referring patients was consultation with other non-dental professionals. This study identified the hospital and practice characteristics of hospitalists who routinely referred patients to dentists.

Reasons Why Hospitalists Do Not Refer Patients to Dentists

In this study, the main reasons for not referring patients to dentists were consultation with other medical professionals, such as speech-language therapists and nurses, lack of a referral habit, and absence of dentists within the hospital. The first reason was reliance on others. Oral bacteria predispose patients to aspiration pneumonia, and previous studies have suggested that oral health care provided by dentists can reduce bacterial levels.^{23,24} Although oral rehabilitation by speech-language therapists has been shown to shorten hospital stay and improve outcomes,²⁵ they are unable to provide oral health care themselves, making it difficult to fully address oral health issues. In contrast, while 80.2% of nurses recognized the importance of oral health care in preventing aspiration pneumonia, studies suggest that collaborative care with dentists is more effective than nurse-led care alone.^{12,26} In a Japanese stroke unit, embedding a full-time dentist to develop and lead an oral care system (including nurse training and standardized techniques) significantly lowered pneumonia incidence compared to periods without dentist involvement.¹⁴ These studies emphasize the importance of oral health care by dentists.

The second reason was the lack of referral habits. Studies in Japan and the United States have highlighted the limited collaboration between hospitalists and dentists in routine clinical practice.^{27,28} Similarly, our study suggests that the lack of a habit of referring patients to dentists may be reflected in the low referral rates observed during aspiration pneumonia

management. In contrast, a qualitative study from Germany indicated that while hospitalists did not perceive the need for collaboration with dentists, they considered such collaboration important.²⁹ This suggests that the lack of collaboration between hospitalists and dentists may be driven by hospitalists' attitudes. To address this challenge, implementing systematic referral prompts in electronic health records (EHR) may be beneficial. A study of oral health promotion in primary care found that automatically bundling dental referrals with related medical orders in EHR systems significantly improved referral consistency.³⁰ One Japanese hospital's program assigned a dentist to its acute stroke ward and defined procedures for nurses to request dental intervention promptly for any patient with compromised oral health.¹⁴ Additionally, borrowing core elements from antimicrobial stewardship programs, which are widely implemented to address antibiotic resistance, may be beneficial.³¹ These interventions reduce the referral barrier, potentially enhancing dental referral rates during aspiration pneumonia management.

The third reason was the absence of dentists in hospitals. The proportion of dentists working in hospitals is as low as 0.4% and 3.0% in the United States and Japan, respectively.^{32,33} Furthermore, only about 28% of hospitals with dental departments have full-time dentists.¹⁶ This highlights the current shortage of hospital-based dentists capable of providing specialized oral health care. Teledentistry, a hub-and-spoke model in which intra-oral images and other clinical data are transmitted electronically from "spoke" wards to a central (hub) dentist, enables a university-hospital dentist to monitor and advise on the oral health of inpatients in surrounding hospitals even when no onsite dentist is available.³⁴ Although there is limited direct evidence linking teledentistry to a reduction in the risk of aspiration pneumonia, it can enable hospitals to access dental care services remotely, potentially improving oral health management for at-risk patients.

Background of Hospitalists Who Refer Patients to Dentists

Several key characteristics were identified among hospitalists who referred patients to dentists. The first was the number of dentists in the hospital. Referral rates were higher in hospitals with dentists. Dentists have been reported to desire greater collaboration with their doctors.²⁹ Our study found that hospitals with two or more dentists had higher referral rates than hospitals with no dentists or only one dentist. This suggests that hospitals with a larger dental workforce may be better equipped to provide a wider range of oral healthcare services, such as oral hygiene management and swallowing function support. The second factor was the presence of dental hygienists. Oral health care provided by dental hygienists has been shown to be effective in preventing aspiration pneumonia.^{35,36} Additionally, dental hygienists have been reported to play a key managerial role in medical-dental collaborations.³⁷ The presence of dental hygienists may improve access to oral health care and facilitate collaboration between medical and dental professionals. The third factor was hospital type. Our findings indicate that hospitalists working in university hospitals had higher referral rates than those working in community-based hospitals. In Japan, university hospitals are legally required to offer 16 medical departments, including dentistry,³⁸ whereas community-based hospitals have no such requirement. Consequently, university hospitals are guaranteed to have at least one dentist, which may have contributed to a more established referral habit. Additionally, university hospitals in Japan often treat patients with multiple underlying conditions, resulting in increased complexity and potentially higher referral rates. Moreover, because referrals to other specialties are more common for diseases outside one's own expertise, this practice may have contributed to the higher referral rate observed in our study.³⁹

Actions Taken by Hospitalists Who Refer Patients for Dental Consultation

A key finding of this study was the clear association between hospitalists' attention to oral health in daily practice and the likelihood of referring patients to dentists. Hospitalists who routinely performed oral evaluations had higher referral rates than those who did not. Furthermore, among those who not only used the oral healthcare assessment tool but also confirmed whether patients had a primary care dentist, the referral rate exceeded 70%, suggesting that performing both actions as part of routine care further increased the likelihood of referral. Therefore, it is critical to conduct oral healthcare assessments. Paying attention to oral health can increase referral rates.

The oral healthcare assessment tool is a screening method that evaluates oral health across eight categories and can be used for patients with dementia.⁴⁰ Studies have shown that patients with Oral Health Assessment Tool (OHAT) scores of 3 or higher have significantly lower 60-day survival rates post-hospitalization compared to those with lower scores.⁴¹

Additionally, OHAT scores have been found to be significantly worse in patients with aspiration pneumonia compared to those with other types of community-acquired pneumonia.⁴² However, the utilization of OHAT remains low, with fewer than 5% of initial outpatient visits, including OHAT assessments.⁴³ The findings of this study suggest that when hospitalists prioritize oral health using assessment tools and primary care dentists, they are more likely to refer patients to dentists. In Australian acute-care hospitals, national safety-and-quality guidance stipulates that an oral-health assessment, performed with a validated tool such as the OHAT, must be completed and documented within 24 hours of admission, alongside other vital signs.⁴⁴ Consistent with earlier quality-improvement projects,³⁰ embedding two mandatory EHR pop-up prompts at admission: (i) confirmation that the oral-health assessment is complete and (ii) documentation of whether the patient has a primary-care dentist, would ensure these checkpoints are actioned in real time. Designating these two assessments as mandatory Day-1 tasks within the admission order set is expected to expedite dental referrals and reduce the incidence of aspiration pneumonia.

Limitations

This study had some limitations. First, it focused on hospitalists in Japan, and the findings may not be generalizable to other countries with different healthcare systems and cultural backgrounds. Second, the survey targeted hospitalists primarily from general medicine departments, meaning that physicians from other medical specialties were excluded. This limitation should be considered when interpreting the results. Moreover, the questionnaire was designed by two of the authors and reviewed by the other authors. Because this is the original version, no external reference exists.

Additionally, there is a possibility of selection bias, as the physicians who participated in this study may have had a greater interest in the research topic. Consequently, the perspectives of hospitalists with lower motivation to participate in such surveys may not have been adequately captured. Furthermore, because this study was based on a cross-sectional, self-report survey, it did not establish a causal relationship between actual clinical behavior and dental referrals. Nevertheless, there has never been a survey on medical-dental collaboration with a large number of respondents before, making this research an important baseline for future study.

Future research should include a broader range of medical professionals, such as physicians from various specialties. Moreover, prospective studies are necessary to clarify the causal relationship between hospitalists' actions and dental consultations.

Conclusions

This study investigated the status of collaboration between hospitalists and dentists in Japan regarding the management of aspiration pneumonia. The results revealed that organizational factors, such as the presence of a dental specialist, and individual factors, such as the degree to which an oral evaluation was performed, significantly affected the referral rates to dentists in aspiration pneumonia management. Attention to the oral environment during examinations may improve dental collaboration.

Abbreviations

JSHGM, Japanese Society of Hospital General Medicine; JPCA, Japanese Primary Care Association; OHAT, Oral Health Assessment Tool.

Data Sharing Statement

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Ethics Approval and Informed Consent

The study was approved by the ethics committee of the Ashikaga Red Cross Hospital (No.2024-34) and was conducted in accordance with the principles of the Declaration of Helsinki. All participants reviewed the study document detailing data anonymization, voluntary participation, and the dissemination of research results prior to participation. Only participants who provided informed consent (opt-in) were included in the study. Additionally, the participants could withdraw from the study at any time.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors report no conflicts of interest in this work.

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