BMJ Open

# Exploring factors associated with healthcare professionals' subjective perceptions of complex issues in primary care in Japan: a self-administered survey study on confidence, satisfaction and burden levels

Junji Haruta [1], Ryohei Goto [2]

**To cite:** Haruta J, Goto R. Exploring factors associated with healthcare professionals' subjective perceptions of complex issues in primary care in Japan: a self-administered survey study on confidence, satisfaction and burden levels. *BMJ Open* 2024;**14**:e081328. doi:10.1136/bmjopen-2023-081328

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (https://doi.org/10.1136/bmjopen-2023-081328).

Received 25 October 2023
Accepted 01 March 2024



[1]Center for General Medicine Education, Keio University, Shinjuku-ku, Tokyo, Japan
[2]Department of Primary Care and Medical Education, Institute of Medicine, University of Tsukuba, Tsukuba, Ibaraki, Japan

**Correspondence to**
Dr Junji Haruta;
junharujp@keio.jp

## ABSTRACT

**Objective** The aim of this study was to explore factors associated with healthcare professionals' subjective perceptions of complex issues in primary care settings in Japan.

**Design** Cross-sectional survey conducted through a self-administered web-based questionnaire.

**Setting** Japan, from June to October 2020.

**Participants** Healthcare professionals recruited via an email list from the Japan Primary Care Association.

**Measures** The questionnaire assessed subjective perception of satisfaction, confidence and burden regarding complex issues using a 100 mm Visual Analogue Scale (VAS). Explanatory variables included the Japanese version of the Self-assessment Scale of Interprofessional Competency (JASSIC), basic demographic information, administrative experience and an organisational climate scale. This scale comprised the 'Plan, Do, See' (PDS) factor for management and the 'Do' factor in a leader-centred direction for those working under compulsion. Factors associated with subjective perceptions were analysed using binomial logistic regression analysis and Bonferroni analysis ($p<0.017$).

**Results** Data from 593 participants (average age of 41.2 years, including 133 nurses, 128 physicians and 120 social workers) were analysed. Median (quartile) VAS scores for satisfaction, confidence and burden were 50 (36–70), 52 (40–70) and 50 (30–66), respectively. Higher satisfaction group was significantly associated with PDS factor, Do factor and JASSIC Score. Greater confidence group associated with older age, male, Do factor, administrative experience and JASSIC Score. No factors were significantly associated with the higher perceived burden.

**Conclusion** These findings reveal that interprofessional competency self-assessment influence perceptions of complex issues among healthcare professionals. Moreover, satisfaction with complex issues might be enhanced by a manageable organisational climate, while confidence might be influenced by personal attributes.

## STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Conducts a comprehensive exploration of healthcare professionals' subjective perceptions using a survey across diverse participants in Japan, ensuring broad insights into primary care complexities.
⇒ Employs validated tools such as the Japanese version of the Self-assessment Scale of Interprofessional Competency to provide reliable data on interprofessional competency and its impact on managing complex healthcare issues.
⇒ The study's cross-sectional design and reliance on self-reported data limit the ability to infer causality and may introduce response bias, potentially affecting the interpretation of perceptions of complex healthcare issues in primary care.

## INTRODUCTION

The WHO has underscored the importance of implementing integrated, people-centred health services, particularly for individuals requiring care and support for complex health conditions due to multiple physical and psychosocial factors.[1] Elderly individuals with multiple health issues commonly experience disease complications and dysfunction, necessitating healthcare that spans various levels of care and social services.[2] The complexity of such care poses challenges for medical and social professionals involved,[3] yet the factors associated with healthcare professionals' subjective perceptions of these complex issues have scarcely been explored and remain unclear.

In primary care, many patients presenting for treatment have complicating factors, such as multimorbidity, which are not adequately

addressed by single-disease guidelines.[4 5] Instead, these patients benefit from interprofessional approaches tailored to multimorbidity.[5 6] Furthermore, clear and compassionate communication becomes challenging for healthcare providers when dealing with emotionally charged discussions, including treatment goals and end-of-life discussions.[7] Physicians, in particular, may lack the necessary communication skills or confidence to engage in these complex discussions.[8] Notably, nurses often excel in interprofessional collaboration compared with other professionals,[9 10] while subjective perceptions of complex care may be influenced by personal and environmental constraints.[11] Scoping reviews on physiotherapy collaboration within primary care have identified several barriers, including physicians' limited understanding of physiotherapy's scope, inefficient teamwork and substantial workload and scheduling challenges for physiotherapists.[12] These barriers are further exacerbated by ambiguities in physiotherapists' roles, patients' lack of awareness about physiotherapy services and a general deficiency in organisational knowledge about these services.[13 14] In contrast, the vital role of hospital social work in enhancing healthcare team collaboration is recognised through its emphasis on proactive communication to build relationships and facilitate information exchange, initiatives for team training and patient advocacy and effective risk management strategies.[15] These strategies aim to ensure seamless patient discharges and reduce liability risks. The significance of social work is consistently acknowledged across various healthcare settings, including primary care clinics, highlighting its indispensable contribution to improving teamwork in healthcare.[16]

Subjective perceptions of professional satisfaction and confidence in handling complex tasks can reflect the outcomes of these tasks. Job satisfaction boosts staff enthusiasm, contributes to organisational success and is instrumental in delivering high-quality services.[17] Professional confidence is defined as 'the belief or conviction that one can successfully accomplish a task or achieve a certain level of performance, as well as expressing a sense of control that influences the outcome'.[18] Given these findings, we speculated that patient outcomes for complex issues might be associated with professional satisfaction and confidence. Moreover, the ability to manage complex issues confidently and satisfactorily is a crucial competency for health professionals. Psychological burden, potentially leading to healthcare provider burnout, is another factor impacted by complex care.[19–21] To date, few studies have examined the factors associated with healthcare professionals' subjective perceptions of satisfaction, confidence and burden regarding complex care and interprofessional competencies. The identification of key variables within primary care is crucial for devising strategies aimed at enhancing interprofessional collaboration and the overall quality of care.[22 23] The insights derived from this study are intended to guide the development of practical interventions and policy initiatives designed to promote more cohesive healthcare teams.[23–25] By understanding these dynamics, we can enhance satisfaction among healthcare providers, thereby contributing to substantial advancements in primary care practices. Given the timing of this study amidst the global COVID-19 pandemic, it is crucial to acknowledge the unique and unprecedented challenges faced by healthcare professionals during this period.[26 27] The pandemic has not only intensified the complexity of healthcare delivery but has also potentially affected healthcare professionals' perceptions of satisfaction, confidence and burden.[28–30] These factors are pivotal to our investigation, and as such, the results of this study should be interpreted with an understanding of the extraordinary circumstances under which the data were collected. The pandemic's widespread impact on healthcare systems worldwide provides a critical backdrop for our analysis, influencing both the context and the responses of the healthcare professionals who participated in our study.

Here, we aimed to explore factors significantly associated with healthcare professionals' subjective perceptions of complex issues in primary care in Japan through a comprehensive survey.

## METHODS

### Design and setting

A cross-sectional survey was conducted in Japan from June to October 2020 based on a self-administered web-based questionnaire.

### Participants

Primary care providers in routine interprofessional collaboration across various health professions were included. Participants were recruited through two primary methods: an email link from the Japan Primary Care Association (JPCA)[31] email list and directly email. The JPCA, established in 2010 through the merger of three academic societies in primary care academic societies, represents Japan's primary care sector with 10 023 doctors, 755 pharmacists and 688 other health professionals registered as of September 2022.[32] Due to the exponential non-discriminative snowball sampling used to ensure broad and unbiased representation across different regions of Japan, accurately calculating response rates was not feasible.[33] This approach was specifically chosen to mitigate regional bias and address the low responses from nurses, pharmacists and rehabilitation therapists, reflecting the interprofessional nature of primary care in Japan.

### Survey instrument

The survey, requiring consent for participation, was administered via a web-based platform. It included a Visual Analogue Scale (VAS) for assessing subjective perception of satisfaction, confidence and burden regarding complex healthcare issues. Explanatory variables included the total score of the Japanese version of the Self-assessment Scale

of Interprofessional Competency (JASSIC), basic demographic information, professional and institutional experience, administrative experience and understanding of management ('Plan, Do, See' (PDS) factor) and leader-centred direction for people who work in an unwilling manner ('Do' factor), as per the organisational climate questionnaire.[34 35]

The VAS assesses psychometric properties independent of qualitative characteristics, demonstrating stability and high inter-rater reliability.[36] Literature review and consideration of complex issue impacts and interprofessional competencies informed the selection of explanatory variables.[9 37–39] Participants rated their confidence, satisfaction and burden on complex issues from 0 to 100 on the VAS, with scores divided into high and low groups at the 50 mm midpoint. The question designed to elicit broad reflections was:

'We would like to ask you about the response to complex healthcare issues in your area or facility. Where would you place your confidence/satisfaction/level of burden in responding to the complex healthcare issues you are currently facing?'

This question aims to provide quantitative assessments of satisfaction, confidence and perceived burden, offering insights into the emotional and professional impacts of managing complex healthcare issues.

Recognising the potential influence of interprofessional competencies on subjective perceptions of complex healthcare issues, this study used the Japanese version of the JASSIC to assess these competencies. The JASSIC, which we have previously validated through a robust statistical process,[40 41] encompasses an interprofessional competency framework consisting of six domains. This framework is structured around six factors, with a total of 18 items, including 3 items per domain.

Furthermore, we posited that administrative experience, defined as holding a leadership role within a unit, department or institution, could play a significant role in navigating complex issues. The concept of organisational climate, evolving from Lewin's initial work on experimentally created social climates,[42] also forms a critical component of our analysis. One definition of organisational climate is 'the meanings people attach to interrelated bundles of experiences they have at work'.[43] In alignment with this conceptual framework, we adopted an organisational climate questionnaire characterised by a two-factorial structure: the 'PDS' factor for management and the 'Do' factor, which reflects a leader-centred direction.[44] The PDS factor implies an organisational climate conductive to the effective implementation of Plan–Do–Check–Act (PDCA) cycle, suggesting that high scores are indicative of a more favourable physical and psychological environment, the clearer activity planning, grater managerial attention and a more autonomous climate with extensive organisational member participation.[45] Conversely, the 'Do' factor refers to a highly pressured, coercive and unfair organisational climate where employees may feel compelled to work under unfavourable conditions. Higher scores on the 'Do' factor score denote a more manager-centred organisation with the lower staff participation and increased workplace tension.

The questionnaire includes 10 items for each of a PDS (10 items) and a Do factor (10 items), reflecting aspects of the organisational climate that could influence interprofessional competency. Responses were collected using a 5-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree), allowing for a total score range from 10 to 50 points for each factor.

The details of the Japanese and English versions of this questionnaire can be referred to in online supplemental file 1.

### Statistical analysis

We examined variable distribution and descriptive statistics, exploring associations between the exploratory and the objective variables (VAS scores). VAS scores for satisfaction, confidence and burden of complex healthcare issues and other continuous variables are each presented as mean (SD or median (range)). To enhance the interpretability of our exploratory analysis, we categorised VAS scores into high and low groups. This decision was informed by the study's exploratory nature and the limited practical significance of minor changes in VAS scores. By simplifying the data into binary variables, we aimed to uncover broad trends and relationships that offer preliminary insights into the complex dynamics of satisfaction, confidence and perceived burden among healthcare professionals in primary care settings.

In univariate analysis, we examined differences between the two groups by using a t-test for continuous variables and $\chi^2$ test or Fisher's exact test for categorical variables, to identify factors associated with the VAS scores related to satisfaction, confidence and burden. Variables with moderate association ($p<0.1$) underwent binomial logistic regression analysis,[46] considering confounders such as age, type of professionals, administrative experience and 20 organisational climate items. Given the tendency of nurses to engage more in a collaborative culture compared with other professionals, we categorised the data by profession, distinguishing between nurse and non-nurse (other professionals).[9 38] To eliminate potential multicollinearity, we reviewed significant explanatory variables based on correlation coefficients, selecting those for inclusion in the binomial logistic regression analysis to avoid redundancy. Sensitivity analysis used threshold values of 40% and 60% for the VAS scores, ensuring a comprehensive evaluation of variables' impacts. All statistical analyses were performed using IBM SPSS V.27.0. To account for the analysis of three objective variables within the binominal logistic regression framework, we applied Bonferroni correction, setting the significant level at $p<0.017$, to maintain analytical rigour.[47]

### Sample size

For the binomial logistic regression analysis, aiming for 15 and 20 observations per predictor, the target a sample size exceeded 240 participants.[48]

### Patient and public involvement

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans.

## RESULTS

A total of 593 self-administered web-based questionnaires were analysed. The respondents had an average age of 41.2 (SD=11.3), with 312 being women (52.6%). The average years of professional experience and work experience at the current institution were 16.4 (SD=9.7) and 9.2 (SD=8.3), respectively. The professional breakdown included 133 nurses (22.4%), 128 doctors (21.6%), 120 social workers (20.2%) and 113 rehabilitation therapists (19.1%). Further, 303 participants (51.1%) reported having administrative experience. The average and median of total JASSIC Score were 71.5 (SD=9.8) and 72 out of 90 (range: 66–78), respectively. The PDS and Do factors scored an average of 31.6 (SD=6.0) and 26.7 (SD=6.4), respectively (table 1).

Regarding the objective variables, the average (SD) and median VAS Score for satisfaction, confidence and burden regarding complex healthcare issues were 51.3 (SD=23.3) and 50 (range: 36–70), 53.7 (SD=22.3) and 52 (range: 40–70) and 47.7 (SD=24.3) and 50 (range: 30–66), respectively (table 2).

To identify the explanatory factors associated with healthcare professionals' subjective perceptions of complex healthcare issues, we compared sociodemographic characteristics, professionals, total JASSIC Score, PDS factor and Do factor between the high-scoring and low-scoring groups in univariate analyses (online supplemental table 1).

Univariate analysis revealed significant associations with the higher satisfaction group at a significance level of <0.1 for age, gender, profession (nurse or non-nurse), administrative experience, total JASSIC Score, PDS factor and Do factor (online supplemental table 1). Binomial logistic regression analysis was performed with these explanatory variables, cording gender, profession and administrative experience as female=1, nurse=1 and 1=yes, respectively. The ORs for administrative experience, PDS factor, total JASSIC Score and Do factor were 1.602 (95% CI 1.070 to 2.400, p=0.022), 1.121 (95% CI 1.076 to 1.167, p<0.001), 1.030 (95% CI 1.009 to 1.052, p=0.005) and 0.955 (95% CI 0.922 to 0.989, p=0.010), respectively (table 3).

For the more confident group, significant associations at <0.1 included age, gender, professional and institutional experience, administrative experience, total JASSIC Score, PDS factor and Do factor (table 3). Due to collinearity, only years of professional experience was employed in the subsequent analysis. The OR for total JASSIC Score, age, Do factor and gender were 1.074 (95% CI 1.049 to 1.099, p<0.001), 1.052 (95% CI 1.028 to 1.076, p<0.001), 0.947 (95% CI 0.914 to 0.982, p=0.003) and 0.404 (95% CI 0.262 to 0.623,<0.001), respectively (table 3).

**Table 1** Demographic characteristics of 593 professional healthcare participants in this cross-sectional study about interprofessional education, 2020

| Characteristic | |
|---|---|
| Basic demographic information | |
| Mean age (years) | 41.2 (11.3) |
| Female, n (%) | 312 (52.6) |
| Mean years of experience as professional (years) | 16.4 (9.7) |
| Mean years of experience working at the current institution (years) | 9.2 (8.3) |
| Attendance type (regular) | 557 (93.9) |
| Administrative experience (yes) | 303 (51.1) |
| Profession (including duplicates), n (%) | |
| Nurses | 133 (22.4) |
| Physician | 128 (21.6) |
| Social worker | 120 (20.2) |
| Rehabilitation therapist | 113 (19.1) |
| Pharmacist | 59 (9.9) |
| Care manager | 25 (4.2) |
| Psychiatric social worker | 22 (3.7) |
| Care worker | 14 (2.4) |
| Others | 35 (5.9) |
| Facility n (%) | |
| University hospital (over 500 beds) | 55 (9.3) |
| Medium hospital (100–499 beds) | 238 (40.1) |
| Small hospital (20–99 beds) | 43 (7.3) |
| Clinic | 99 (16.7) |
| Home-visit nursing station | 23 (3.9) |
| Pharmacy | 26 (4.4) |
| Administrative agency | 10 (1.7) |
| Nursing home | 28 (4.7) |
| Others | 71 (12.0) |
| Total JASSIC Score | |
| Mean (SD) | 71.5 (9.8) |
| Median (IQR) | 72 (68–78) |
| PDS factor | |
| Mean (SD) | 31.6 (6.0) |
| Median | 32 (28–36) |
| Do factor | |
| Mean (SD) | 26.7 (6.4) |
| Median | 26 (22–30) |

Do factor, top–down ordering of work, such as in a leader-centred organisation; JASSIC, Japanese version of the Self-assessment Scale of Interprofessional Competency; PDS factor, 'Plan, Do, See' action for management.

Table 2 VAS Score of satisfaction, confidence and burden of 593 professional healthcare participants in this cross-sectional study in 2020

| | |
|---|---|
| VAS Score of satisfaction (100 mm) | |
| Mean (SD) | 51.3 (23.3) |
| Median (IQR) | 50 (36–70) |
| VAS Score of confidence (100 mm) | |
| Mean (SD) | 53.7 (22.3) |
| Median (IQR) | 52 (40–70) |
| VAS Score of burden (100 mm) | |
| Mean (SD) | 47.7 (24.3) |
| Median (IQR) | 50 (30–66) |

VAS, Visual Analogue Scale.

The analysis of factors associated with a heavier burden did not reveal any significant associations (table 3). Consequently, we did not proceed with multivariate analysis for this aspect, as the lack of significant findings in the univariate analysis suggested further analysis was unlikely to yield meaningful insights into the factors influencing the subjective burdens of healthcare professionals in interprofessional collaboration.

Sensitivity analysis, employing threshold values of 40% and 60% for VAS scores, corroborated these findings (online supplemental file 2).

## DISCUSSION

This study suggests that interprofessional competency may influence healthcare professionals' satisfaction and confidence in addressing complex issues in primary care. A manageable organisational climate can enhance satisfaction, while personal attributes may shape confidence. Interestingly, no factor was identified as being associated with a heavier burden of complex healthcare issues, highlighting distinct relationships between subjective perceptions in dealing with complex healthcare issues and variables such as interprofessional competency, organisational climate and personal attributes.

Satisfaction and confidence in complex care were linked to the self-assessment of interprofessional competency, aligning with previous findings that underscore the necessity of interprofessional collaboration for complex issues.[49] For instance, a study within a nursing home visited complex patients as opportunities for interprofessional learning, where participants managed complex issues through developed facilitation skills and the ability to structure new knowledge amidst professional conflicts.[50] Considering the inherent uncertainty in many complex issues, where health professionals often perceive challenges vaguely, we propose comparing these findings to the model of uncertainty in complexhealth care environments.[51] (figure 1) This model illustrates how uncertainties in healthcare are interconnected across personal, scientific and practical categories, suggesting that

Table 3 Binomial logistic regression analysis of the association with higher satisfaction and more confidence by sociodemographic characteristics in this cross-sectional survey of 593 Japanese professional healthcare participants in primary care

| Variable | OR | 95% CI | P value |
|---|---|---|---|
| Satisfaction | | | |
| Age | 1.006 | 0.985 to 1.027 | 0.596 |
| Gender (female:1) | 0.859 | 0.569 to 1.298 | 0.47 |
| Profession (nurse:1) | 0.727 | 0.449 to 1.179 | 0.196 |
| PDS factor | **1.121** | **1.076 to 1.167** | **<0.001** |
| Do factor | **0.955** | **0.922 to 0.989** | **0.01** |
| Administrative experience | 1.602 | 1.070 to 2.400 | 0.022 |
| JASSIC | **1.03** | **1.009 to 1.052** | **0.005** |
| Confident | | | |
| Age | **1.052** | **1.028 to 1.076** | **<0.001** |
| Gender (female:1) | **0.404** | **0.262 to 0.623** | **<0.001** |
| Profession (nurse:1) | 1.166 | 0.713 to 1.908 | 0.54 |
| PDS factor | 1.025 | 0.986 to 1.067 | 0.212 |
| Do factor | **0.947** | **0.914 to 0.982** | **0.003** |
| Administrative experience | 1.296 | 0.855 to 1.963 | 0.222 |
| JASSIC | **1.074** | **1.049 to 1.099** | **<0.001** |

Binomial logistic analysis of the association with more satisfaction, and the more confident group about complex issues. Bold text indicates a statistically significant correlation with a p value less than 0.17.
Do factor, top–down management style, such as in a leader-centred organisation; JASSIC, Japanese version of the Self-assessment Scale of Interprofessional Competency; PDS factor, 'Plan, Do, See' action for management.

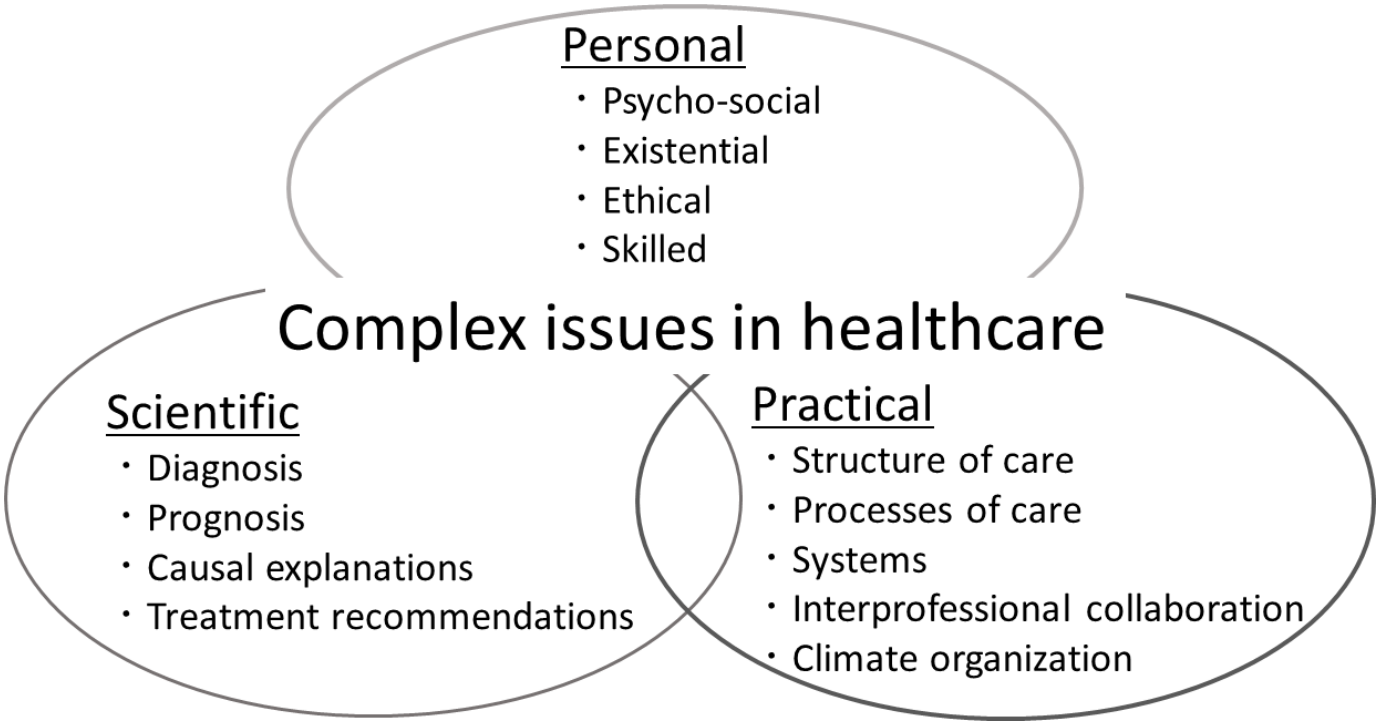


**Figure 1** Revised model of uncertainty in a complex healthcare setting.

ongoing engagement with complex issues may enhance interprofessional competency and frame such issues as learning opportunities.

The identified associations of age, administrative experience and organisational climate with satisfaction regarding complex healthcare issues suggest that an overarching organisational perspective is crucial for addressing complex challenges. This encompasses understanding the healthcare environment and the organisation, interpersonal and communication skills and the ability to lead and manage change.[52] A collaborative communication strategy, essential for administrative roles, includes maintaining the free flow of information among team or organisation members.[53] An adaptable organisational climate, resistant to fragmentation in care, supports the integration of complex issues,[54] suggesting that satisfaction associated with an organisational climate conductive to the PDCA cycle.[55]

Furthermore, our findings indicate that satisfaction with complex issues may be higher in less authoritarian organisation, where hierarchical and autocratic leadership styles are often linked with poorer healthcare outcomes.[56] Conversely, authoritarian leadership might be advantageous in emergencies.[56] However, for ongoing positive management of complex issues, a non-hierarchical communication style and the timely, appropriate suggestions of ideas are vital.[57] Satisfaction regarding complex issues may be affected by the organisational climate of the unit, department or institution in which providers work, and the formation or incomplete formation of their interprofessional identity,[58 59] but not solely by personal attributes and individual experiences, including age and administration.

Confidence in dealing with complex issues was influenced by age and gender, with men and those with more experience showing higher confidence,[60] and the association between professional inexperience and low confidence was similar to that reported previously.[61] However, the relationship between confidence and competence, particularly in specific clinical skills,[62] is complex and not always direct. High confidence, especially if based solely on personal attributes, might not accurately reflect competence.[63] Confidence is not a substitute for competence and can be mistaken for arrogance.[61] Given these findings, healthcare professional satisfaction may provide a more relevant and authentic assessment of clinical outcomes, but further validation is required.

A notable finding is that individual or organisational factors did not significantly associate with a heavier burden of complex healthcare issues. This contrasts with studies on health professionals involved in COVID-19 treatment, where workload and future uncertainty were major stressors, suggesting that psychological burden.[64] Attributes such as hospital work and nursing have also been reported to affect psychological burden.[65] Review studies suggest that psychological resources may ease the burden on mental health for healthcare providers.[66] In this light, the interaction of individual and organisational variables in this study may have offset factors associated with burden and could not therefore be identified. Further verification is required.

Our findings highlight significant insights into healthcare professionals' perceptions of complex issues within primary care settings. However, it is important to contextualise these results within the ongoing COVID-19 pandemic, which has undoubtedly

influenced the experiences and responses of participants. The pandemic has presented a multitude of challenges, from increased workloads to the rapid adaptation of new practices and protocols, which could have significantly impacted the levels of satisfaction, confidence and burden reported by healthcare professionals. Therefore, while interpreting our findings, one must consider the potential effects of the pandemic situation on these perceptions. The pandemic's influence underscores the necessity for resilience and adaptability in healthcare settings, pointing to areas where support and resources might be optimised to address the evolving needs of healthcare professionals during such crisis situations.

Several limitations of this study warrant mention. First, potential self-selection bias may exist, as the professionals who participated were self-selected recipients recruited using an email list and with indiscriminate snowball sampling.[41] Second, our analysis by type of professional was limited to nurses and non-nurses, necessitating a broader, more representative sample for comprehensive analysis (more professional categories, regional differences, hospital size, etc). As this study is fundamentally an exploratory study with a limited participant pool, the extent of its generalisability should be approached cautiously. Future studies should also evaluate objective measures associated with satisfaction about complex issues, such as clinical outcomes. Third, the timing of this study during the COVID-19 pandemic might have influenced the subjective perceptions of the complex healthcare issue.[67 68] Due to the disruption caused by COVID-19 to the social system and the resulting confusion regarding the complex problem,[69 70] respondents' satisfaction, confidence and perceived burden in dealing with the issue might have been more grounded in reality in their responses. Last, the potential overestimation of risk associated with the ORs in logistic regression highlights the need for cautious interpretation of our findings, particularly in decision-making contexts.[71] Nevertheless, allowing for these limitations, and given the current lack of evidence on factors associated with health professionals' subjective perceptions of complex issues, this study is valuable because it identifies factors associated with satisfaction about complexity, interprofessional competencies and administrative experience. Our findings—that an organisational climate that is not strongly hierarchical facilitates the promotion of quality improvement to improve the system of the medical institution to which it belongs and is associated with high satisfaction on complex issues—can be applied to clinical practice and have international significance for continuous professional development and interprofessional education in primary healthcare. Additionally, its relevance could extend to future research endeavours for both health professionals and policy-makers, given that the satisfaction of health professionals with increasingly intricate issues could serve as a reflection of the healthcare institutions' quality.

## CONCLUSION

The study suggests that interprofessional competency, administrative experience, age and organisational climate significantly influence satisfaction with complex healthcare issues, while confidence is shaped by gender and age. These findings underscore the importance of fostering a supportive, non-hierarchical organisational climate and continuous development in primary healthcare, offering insights for both clinical practice and future research.

**Contributors** JH and RG conceived and designed the study, conducted all inquiries, and analysed the data. JH primarily wrote and revised the manuscript, while RG reviewed and approved the final version. Both JH and RG had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. JH agrees to serve as the guarantor of the work, ensuring that questions related to any part of the work are appropriately investigated and resolved.

**Funding** This work was supported by JSPS KAKENHI Grant-in-Aid for Young Scientists (B) Grant Number JP19K19377 and for Scientific Research (B) Grand Number 22H03320.

**Competing interests** None declared.

**Patient and public involvement** Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

**Patient consent for publication** Not applicable.

**Ethics approval** This study involves human participants and was approved by the ethics committee of the faculty of medicine, University of Tsukuba (No. 1483). Participants gave informed consent to participate in the study before taking part.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** No data are available. The data collected and analysed during the current study are not publicly available because we did not receive informed consent concerning data sharing from the participants.



**ORCID iDs**

Junji Haruta http://orcid.org/0000-0003-4176-7665
Ryohei Goto http://orcid.org/0000-0002-7315-2959

## REFERENCES

1 World Health Organization. Continuity and coordination of care: a practice brief to support implementation of the WHO framework on integrated people-centred health services. World Health Organization; 2018.
2 McGilton KS, Vellani S, Yeung L, *et al*. Identifying and understanding the health and social care needs of older adults with multiple chronic

conditions and their caregivers: a Scoping review. *BMC Geriatr* 2018;18:231.
3 Grimsmo A, Løhre A, Røsstad T, *et al*. Disease-specific clinical pathways – are they feasible in primary care? A mixed-methods study. *Scand J Prim Health Care* 2018;36:152–60.
4 Mc Namara KP, Breken BD, Alzubaidi HT, *et al*. Health professional perspectives on the management of multimorbidity and polypharmacy for older patients in Australia. *Age Ageing* 2017;46:291–9.
5 Smith SM, Wallace E, O'Dowd T, *et al*. Interventions for improving outcomes in patients with multimorbidity in primary care and community settings. *Cochrane Database Syst Rev* 2016;3:CD006560.
6 Larsen A, Broberger E, Petersson P. Complex caring needs without simple solutions: the experience of interprofessional collaboration among staff caring for older persons with multimorbidity at home care settings. *Scand J Caring Sci* 2017;31:342–50.
7 Roberts SD, Lindsey P, Limon J. Assessing students' and health professionals' competency learning from interprofessional education collaborative workshops. *J Interprof Care* 2019;33:38–46.
8 Einstein DJ, Einstein KL, Mathew P. Dying for advice: code status discussions between resident physicians and patients with advanced cancer—a national survey. *J Palliat Med* 2015;18:535–41.
9 Haruta J, Ozone S, Goto R. Factors for self-assessment score of interprofessional team collaboration in community hospitals in Japan. *Fam Med Community Health* 2019;7:e000202.
10 Minamizono S, Hasegawa H, Hasunuma N, *et al*. Physician's perceptions of interprofessional collaboration in clinical training hospitals in northeastern Japan. *J Clin Med Res* 2013;5:350–5.
11 Antes AL. A systematic approach to instruction in research ethics. *Account Res* 2014;21:50–67.
12 ShahAli S, Shahabi S, Etemadi M, *et al*. Barriers and facilitators of integrating physiotherapy into primary health care settings: a systematic scoping review of qualitative research. *Heliyon* 2023;9:e20736.
13 Narain S, Mathye D. Strategies to integrate physiotherapists into primary health care in South Africa. *S Afr J Physiother* 2023;79:1796.
14 Worum H, Lillekroken D, Roaldsen KS, *et al*. Physiotherapists' perceptions of challenges facing evidence-based practice and the importance of environmental empowerment in fall prevention in the municipality – a qualitative study. *BMC Geriatr* 2020;20:432.
15 Craig SL, Eaton AD, Belitzky M, *et al*. Empowering the team: a social work model of Interprofessional collaboration in hospitals. *J Interprof Educ Pract* 2020;19:100327.
16 Tadic V, Ashcroft R, Brown JB, *et al*. The role of social workers in interprofessional primary healthcare teams. *Healthc Policy* 2020;16:27–42.
17 Kvist T, Voutilainen A, Mäntynen R, *et al*. The relationship between patients' perceptions of care quality and three factors: nursing staff job satisfaction, organizational characteristics and patient age. *BMC Health Serv Res* 2014;14:466.
18 Castle N, Garton H, Kenward G. Confidence vs competence: basic life support skills of health professionals. *Br J Nurs* 2007;16:664–6.
19 Khammissa RA, Nemutandani S, Shangase SL, *et al*. The burnout construct with reference to healthcare providers: a narrative review. *SAGE Open Med* 2022;10:20503121221083080.
20 Sexton JB, Adair KC, Proulx J, *et al*. Emotional exhaustion among US health care workers before and during the COVID-19 pandemic, 2019-2021. *JAMA Netw Open* 2022;5:e2232748.
21 Yoshida S, Matsushima M, Wakabayashi H, *et al*. Correlation of patient complexity with the burden for health-related professions, and differences in the burden between the professions at a Japanese regional hospital: a prospective cohort study. *BMJ Open* 2019;9:e025176.
22 Valaitis R, Cleghorn L, Dolovich L, *et al*. Examining interprofessional teams structures and processes in the implementation of a primary care intervention (health TAPESTRY) for older adults using normalization process theory. *BMC Fam Pract* 2020;21:63.
23 Russell GM, Miller WL, Gunn JM, *et al*. Contextual levers for team-based primary care: lessons from reform interventions in five jurisdictions in three countries. *Fam Pract* 2018;35:276–84.
24 Lafortune C, Huson K, Santi S, *et al*. Community-based primary health care for older adults: a qualitative study of the perceptions of clients, caregivers and health care providers. *BMC Geriatr* 2015;15:57.
25 Valaitis RK, Carter N, Lam A, *et al*. Implementation and maintenance of patient navigation programs linking primary care with community-based health and social services: a scoping literature review. *BMC Health Serv Res* 2017;17:116.
26 Donnelly C, Ashcroft R, Bobbette N, *et al*. Interprofessional primary care during COVID-19: a survey of the provider perspective. *BMC Fam Pract* 2021;22:31.
27 Gray R, Sanders C. A reflection on the impact of COVID-19 on primary care in the United Kingdom. *J Interprof Care* 2020;34:672–8.
28 Dymecka J, Filipkowski J, Machnik-Czerwik A. Fear of COVID-19: stress and job satisfaction among Polish doctors during the pandemic. *Postep Psychiatr Neurol* 2021;30:243–50.
29 Alrawashdeh HM, Al-Tammemi AB, Alzawahreh MK, *et al*. Occupational burnout and job satisfaction among physicians in times of COVID-19 crisis: a CONVERGENT parallel mixed-method study. *BMC Public Health* 2021;21:811.
30 Schrimpf A, Bleckwenn M, Braesigk A. COVID-19 continues to burden general practitioners: impact on workload, provision of care, and intention to leave. *Healthcare (Basel)* 2023;11:320.
31 Japan primary care Association. Available: https://www.primary-care.or.jp/jpca_eng/index.html [Accessed 03 Apr 2021].
32 Japan Primary Care Association. About the Japan primary care Association [Internet]. Available: https://www.primary-care.or.jp/about/index.html [Accessed 07 Nov 2022].
33 Etikan I. Comparision of snowball sampling and sequential sampling technique. *BBIJ* 2016;3.
34 Peruzzo HE, Silva ES, Batista VC, *et al*. Organizational climate and teamwork at the family health strategy. *Rev Bras Enferm* 2019;72:721–7.
35 Yutaka T. *A Study on Variance of the Survey Results among Five Hospitals on the Cognition of Organizational Climate and its Relationship to the Psychological Tendency of the Hospital Staff — Two dimensional model of organizational climate, morale, job satisfaction*. Nihon University: Journal of business, 2015: 37–91.
36 Lesage FX, Berjot S, Deschamps F. Clinical stress assessment using a visual analogue scale. *Occup Med (Lond)* 2012;62:600–5.
37 Finn R, Learmonth M, Reedy P. Some unintended effects of teamwork in healthcare. *Soc Sci Med* 2010;70:1148–54.
38 Karam M, Brault I, Van Durme T, *et al*. Comparing interprofessional and interorganizational collaboration in healthcare: a systematic review of the qualitative research. *Int J Nurs Stud* 2018;79:70–83.
39 FitzGerald C, Hurst S. Implicit bias in healthcare professionals: a systematic review. *BMC Med Ethics* 2017;18:19.
40 Haruta J, Goto R. Development of a Japanese version of the self-assessment scale of interprofessional competency (JASSIC). *J Interprof Care* 2022;36:599–606.
41 Haruta J, Goto R. Factors associated with interprofessional competencies among healthcare professionals in Japan. *J Interprof Care* 2023;37:473–9.
42 Lewin K. *Field theory in social science: Selected Theoretical Papers*. New York, NY: Harper & Row, 1951: 346.
43 Schneider B, Ehrhart MG, Macey WH. Organizational climate and culture. *Annu Rev Psychol* 2013;64:361–88.
44 Fukui S, Haratani T, Toshima Y, *et al*. Measuring workplace climate: reliability and validity of the 12-item organizational climate scale (OCS-12). *Sangyo Eiseigaku Zasshi* 2004;46:213–22.
45 Berberoglu A. Impact of organizational climate on organizational commitment and perceived organizational performance: empirical evidence from public hospitals. *BMC Health Serv Res* 2018;18:399.
46 Bursac Z, Gauss CH, Williams DK, *et al*. Purposeful selection of variables in logistic regression. *Source Code Biol Med* 2008;3:17.
47 Lee S, Lee DK. What is the proper way to apply the multiple comparison test. *Korean J Anesthesiol* 2018;71:353–60.
48 Siddiqui K. Heuristics for sample size determination in multivariate statistical techniques. *World Appl Sci J* 2013;27:285–7.
49 Jentoft R. Boundary-crossings among health students in interprofessional geropsychiatric outpatient practice: collaboration with elderly people living at home. *J Interprof Care* 2021;35:409–18.
50 Svensberg K, Kalleberg BG, Rosvold EO, *et al*. Interprofessional education on complex patients in nursing homes: a focus group study. *BMC Med Educ* 2021;21:504.
51 Pomare C, Churruca K, Ellis LA, *et al*. A revised model of uncertainty in complex healthcare settings: a scoping review. *J Eval Clin Pract* 2019;25:176–82.
52 Kakemam E, Liang Z, Janati A, *et al*. Leadership and management competencies for hospital managers: a systematic review and best-fit framework synthesis. *J Healthc Leadersh* 2020;12:59–68.
53 Bossidy L, Charan R, Burck C. *Execution: The discipline of getting things done*. New York: Crown Business, 2002.
54 Vella K, Goldfrad C, Rowan K, *et al*. Use of consensus development to establish national research priorities in critical care. *BMJ* 2000;320:976–80.
55 Brown DK, Fosnight S, Whitford M, *et al*. Interprofessional education model for geriatric falls risk assessment and prevention. *BMJ Open Qual* 2018;7:e000417.
56 Sfantou DF, Laliotis A, Patelarou AE, *et al*. Importance of leadership style towards quality of care measures in healthcare settings: a systematic review. *Healthcare (Basel)* 2017;5:73.

57 Faculty of Leadership and Management. Leadership and management standards for medical professionals; 2016. Available: https://www.fmlm.ac.uk/standards
58 Khalili H, Hall J, DeLuca S. Historical analysis of professionalism in Western societies: implications for interprofessional education and collaborative practice. *J Interprof Care* 2014;28:92–7.
59 Khalili H. Interprofessional socialization and dual identity development amongst cross-disciplinary students. University of Western Ontario - Electronic Thesis and Dissertation Repository; 2013. Available: http://ir.lib.uwo.ca/etd/1742 [Accessed 05 Mar 2015].
60 Madrazo L, Lee CB, McConnell M, *et al*. Self-assessment differences between genders in a low-stakes objective structured clinical examination (OSCE). *BMC Res Notes* 2018;11:393.
61 Athanasius N. Exploring the role of confidence to enhancing sports performance. *Educational Research International* 2013;1:69–77.
62 Wayne DB, Butter J, Siddall VJ, *et al*. Graduating internal medicine residents' self-assessment and performance of advanced cardiac life support skills. *Med Teach* 2006;28:365–9.
63 Kruger J, Dunning D. Unskilled and unaware of it: how difficulties in recognizing one's own incompetence lead to inflated self-assessments. *J Pers Soc Psychol* 1999;77:1121–34.
64 Zerbini G, Ebigbo A, Reicherts P, *et al*. Psychosocial burden of healthcare professionals in times of COVID-19 - a survey conducted at the university hospital augsburg. *Ger Med Sci* 2020;18:Doc05.
65 Skoda E-M, Teufel M, Stang A, *et al*. Psychological burden of healthcare professionals in Germany during the acute phase of the COVID-19 pandemic: differences and similarities in the international context. *J Public Health (Oxf)* 2020;42:688–95.
66 Hannemann J, Abdalrahman A, Erim Y, *et al*. The impact of the COVID-19 pandemic on the mental health of medical staff considering the interplay of pandemic burden and psychosocial resources—a rapid systematic review. *PLoS One* 2022;17:e0264290.
67 Deschênes AA. Professional isolation and pandemic teleworkers' satisfaction and commitment: the role of perceived organizational and supervisor support. *Eur Rev Appl Psychol* 2023;73:100823.
68 Corral de Zubielqui G, Harris H. Why the COVID-19 crisis is an ethical issue for business: evidence from the Australian jobkeeper initiative. *J Bus Ethics* 2023:1–14.
69 Valenzuela-Vidal M, Alvarado-Quinteros A, Márquez-Ossandón D, *et al*. Percepción de Usuarios de Servicios de Salud Sobre La Visibilidad social de Los Profesionales de Enfermería Durante La Pandemia de COVID-19. *Enfermería: Cuidados Humanizados* 2023;12:e3122.
70 Roncero C, Remon-Gallo D, Casado-Espada N, *et al*. Healthcare professionals' perception and satisfaction with mental health TELE-medicine during the COVID-19 outbreak: a real-world experience in telepsychiatry. *Front Psychiatry* 2022;13:981346.
71 Nemes S, Jonasson JM, Genell A, *et al*. Bias in odds ratios by logistic regression modelling and sample size. *BMC Med Res Methodol* 2009;9:56.