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Stigma and healthcare professional support among adults with diabetes in Japan: A cross-sectional study

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Abstract

Aims: Diabetes-related stigma poses challenges for individuals with diabetes, including impaired self-care. Understanding its relationship with healthcare professional support is essential to clarify strategies for reducing stigma. This study aimed to examine the association between diabetes stigma and the support provided by physicians and nurses.

Methods: A cross-sectional survey was conducted from October 2022 to May 2023 in Osaka, Japan, among outpatients attending hospitals and clinics with diabetes specialists. Participants were aged ≥18 years with type 1 or type 2 diabetes; those with gestational diabetes or unable to complete the questionnaire were excluded. Diabetes-related stigma was assessed using the Kanden Institute Stigma Scale, whereas support from physicians and nurses was evaluated using the doctors' and nurses' support scale. Data were analyzed using multivariate logistic regression. Ethical approval was obtained prior to study initiation.

Results: Diabetes-related stigma was inversely associated with physicians' support and nurse's support. Social and self-stigma were associated with physicians and nurses' support among participants aged <65 years but not among those ≥65 years. By contrast, discordant stigma was associated with physicians' support in the younger group and with both physicians' and nurses' support—particularly in health information subscales—among older participants.

Conclusions: Support from physicians and nurses may reduce diabetes-related stigma. Younger adults may benefit from advocacy and personalized care, whereas older adults require enhanced emotional and informational support. Healthcare professionals should address stigma to improve self-management and quality of life among people with diabetes.

KEYWORDS

cross-sectional, diabetes, healthcare professional support, stigma

1 | INTRODUCTION

Diabetes is a chronic disease that affects millions of individuals worldwide, requiring long-term treatment and self-management (International Diabetes Federation, 2025). The physical demands of prolonged treatment and self-care can be substantial, and individuals with diabetes often bear the psychological burden of stigma (Eitel et al., 2024). Diabetes-related stigma is characterized by negative social judgments, stereotypes, and prejudices directed toward a person or group due to their diabetes, typically arising within the context of power imbalance. Several forms of stigma have been identified, including experienced, perceived (or felt), anticipated, internalized (or self-stigma), and cross-stigma (Speight et al., 2024).

Individuals with diabetes are particularly susceptible to experiencing stigma. A review of diabetes-related stigma reported prevalence rates of 78% among adults with type 1 diabetes, 70% among those with type 2 diabetes, and 98% among adolescents with type 1 diabetes (Eitel et al., 2024). In a survey of 12,000 individuals with type 1 or 2 diabetes in the United States, 76% of those with type 1 diabetes and 52% of those with type 2 diabetes indicated that stigma was associated with their condition (Liu et al., 2017).

Diabetes-related stigma has a negative impact on both the psychological well-being and treatment adherence of individuals with diabetes. For example, individuals injecting insulin in public have been reported to have experienced disrespect and to be mistakenly perceived as drug addicts (Browne et al., 2014; Crespo-Ramos et al., 2018). Concerns have also been expressed regarding potential misunderstandings of treatment behaviors by friends, which in some cases led to restricted social interactions (Browne et al., 2014). Furthermore, diabetes-related stigma has been significantly associated with poorer psychosocial functioning, reduced self-care behaviors, higher glycated hemoglobin (HbA1c) levels, and an increased frequency of diabetes-related complications (Eitel et al., 2024). Elevated levels of stigma have further been linked to increased psychological distress and reduced adherence to self-care practices (Alzubaidi et al., 2023). A qualitative study has indicated that individuals with diabetes often perceive themselves as socially vulnerable and report a negative self-image (Nishio & Chujo, 2017). Collectively, these findings suggest that stigma constitutes a critical barrier to psychological health and effective disease management, warranting targeted interventions.

Diabetes-related stigma has been reported to originate from multiple sources, including family members, friends, colleagues, healthcare professionals, and even the patients themselves. Criticism from close family and friends may lead individuals with diabetes to disengage from seeking support, further exacerbating their condition (Du et al., 2024). Additionally, healthcare providers may inadvertently contribute to stigma through their words and actions. For example, individuals with diabetes have reported perceiving that healthcare providers focus more on clinical metrics (weight and HbA1c level) than on supporting efforts to facilitate behavior change (Browne et al., 2013). Patients also report feeling discouraged and judged, often perceiving themselves as inferior to healthy individuals (Browne et al., 2014). Furthermore, the quality of interactions with healthcare professionals has been observed to be lower among patients who experience diabetes-related stigma compared with those who do not (Himmelstein & Puhl, 2021).

In a study of physicians (Bennett & Puhl, 2023), one-third of endocrinology specialists ($n = 205$) reported holding negative attitudes toward patients with type 2 diabetes, perceiving them as lazy (39%), unmotivated (44%), and noncompliant with treatment (44%). Negative remarks regarding individuals with type 2 diabetes have frequently been observed by experts. In Japan, research has demonstrated that diabetes-related stigma is associated with glycemic control, self-care behaviors, patient activation, and illness duration (Hamano et al., 2023; Kato et al., 2016, 2020, 2021). Studies of employed individuals with type 2 diabetes have further highlighted workplace-related stigma and identified specific stigma categories, including perceptions of having a defective body and being socially disadvantaged (Motoyoshi & Ikeda, 2022; Nakao et al., 2015). Although diabetes specialists generally demonstrate awareness of stigma, recognition among nonspecialists remains limited (Matsuzawa et al., 2022). In response, the Japan Diabetes Society and the Japan Association for Diabetes Education and Care established the Advocacy Committee in 2019 to promote a social environment in which individuals with diabetes can continue treatment and lead lives comparable to those without diabetes, without experiencing disadvantages due to their condition (Japan Diabetes Society & Japan Association for Diabetes Education and Care, 2019). Collectively, these findings indicate increasing awareness of diabetes-related stigma in Japan. However, compared with studies conducted internationally, studies within Japan remain limited, underscoring the need for further investigations and the implementation of supportive measures.

Based on these findings, healthcare professionals are positioned to provide essential support to individuals with diabetes and, at times, to contribute to their stigmatization. Effective diabetes management requires not only professional support but also the reinforcement of social networks and access to educational opportunities

(Weaver et al., 2022). Understanding the association between healthcare professional support and diabetes-related stigma is particularly important, as stigma can undermine patient self-care, reduce engagement with healthcare services, and diminish the effectiveness of support interventions. Given these considerations, the association between healthcare professionals and diabetes-related stigma warrants further investigation. Accordingly, this study aimed to examine how stigma experienced by individuals with diabetes is associated with support provided by healthcare providers. By elucidating this association, the study aimed to contribute to the development of more compassionate healthcare practices and living environments that reduce stigma and enhance support systems for individuals with diabetes.

2 | METHODS

2.1 | Study design

This study used a self-administered, unmarked questionnaire. A cross-sectional design was selected owing to the limited research in Japan examining the relationship between diabetes-related stigma and healthcare provider support, highlighting the need to investigate these associations within a Japanese outpatient population. The self-administered format permitted participants to respond confidentially regarding potentially sensitive experiences, such as stigma.

2.2 | Data collection method

This study was conducted in collaboration with one university hospital and two clinics in Osaka, Japan. These sites were selected to capture both advanced diabetes care (university hospital) and community-based treatment (clinics), thereby enabling the inclusion of patients with diverse experiences of stigma and healthcare support. The present study was carried out from October 2022 to May 2023. The study participants comprised individuals diagnosed with diabetes aged ≥18 years who visited an outpatient clinic specializing in diabetes care.

2.3 | Selection criteria

Participants who (1) were capable of verbal communication and literate, (2) were able to complete the self-administered questionnaire independently, and (3) provided informed consent to participate were included in the study. Patients who (1) experienced difficulty completing the questionnaire or (2) had gestational diabetes—whose experiences of stigma and treatment differ from those of individuals with type 1 or type 2 diabetes and are beyond the scope of this study—were excluded from this study.

2.4 | Measures

In addition to collecting demographic information, such as age and sex, and diabetes-related status, including type of diabetes and treatment regimen, the survey employed three established rating scales. The Kanden Institute Stigma Scale (Tanaka et al., 2022) was used to assess the degree of stigma. This scale addresses three perspectives: "social stigma," experienced from the general public; "discordant stigma," primarily arising from interactions with healthcare professionals; and "self-stigma," in which individuals perceive themselves as worthless. Each perspective is further divided into two dimensions—"experiential (enacted) stigma," based on actual experiences of stigma, and "anticipatory (perceived) stigma," in which individuals engage in avoidance behaviors to prevent stigmatization. These divisions result in six subscales: (i) social-enacted, (ii) discordant-enacted, (iii) self-enacted, (iv) social-perceived, (v) discordant-perceived, and (vi) self-perceived. The scale comprises a total of 24 items distributed across these six subscales.

Discordant stigma, a relatively new concept, arises from a mismatch between patients' actual behaviors or conditions and the "ideal diabetic patient model" implicitly expected by healthcare professionals (Tanaka, 2023). This mismatch can manifest in multiple forms, such as discrepancies between ideal and actual self-care or prejudices from providers lacking sufficient disease knowledge. In such cases, healthcare professionals may inadvertently impose the "ideal model" through routine treatment and care, thereby creating a gap between the ideal and the actual patient (first discordant). Even when patients diligently conform to the prescribed "ideal image," they may still recognize that they cannot fully equate themselves with people without diabetes (second discordant) (Tanaka, 2023).

This study evaluated stigma among individuals with diabetes from the perspectives of "social stigma," "discordant stigma," and "self-stigma," with higher scores indicating stronger stigma. The scale demonstrates high reliability, with a coefficient of 0.910 (Tanaka et al., 2022). Permission to use this scale was obtained from the developer. The scale has been applied not only to patients with diabetes but also to those with other chronic noncommunicable diseases (Tanaka et al., 2022).

The doctors' and nurses' support scale was used to assess the degree of social support provided by physicians and nurses. The "physician's support scale" comprises nine items across three subscales: "physician's professional technical support," "physician's emotional support," and "physician's health information support." Similarly, the "nurse's support scale" includes nine items across the same three subscales: "nurse's professional technical support," "nurse's emotional support," and "nurse's health information support." Higher scores indicate greater perceived support. Both scales demonstrated high reliability, with a coefficient of 0.95 (Lee & Oka, 2013). Permission to use the scales was obtained from the developers. Originally developed by Lee and Oka (2013), these instruments were designed to evaluate physicians' and nurses' support for the self-efficacy of outpatients with type 2 diabetes. As self-administered questionnaires, they align with the survey method employed in this study. All questionnaires were administered in Japanese.

2.5 | Statistical analysis

Based on the guideline proposed by Peduzzi et al. (1996), at least 10 events per variable (EPV ≥10) are required for logistic regression analysis. Therefore, assuming 10 explanatory variables and an event rate of 0.5, the target sample size was set at approximately 200 participants. Although the data collection period was extended, a total of 136 valid responses were finally obtained and analyzed. Although the EPV may not have reached 10, previous studies, such as Vittinghoff and McCulloch (2007), have reported that reliable estimates can still be obtained when the model is simple, even with EPV values between 5 and 9. Accordingly, the present study maintained model simplicity and conducted the analysis with caution.

First, descriptive statistics were calculated for participants' characteristics and scale scores. To examine potential differences between participants with valid ($n = 136$) and invalid ($n = 67$) responses, the Wilcoxon rank-sum test was used for continuous variables (e.g., age, duration of illness), and the χ^2 or Fisher's exact test was applied for categorical variables (e.g., sex, educational level). The distribution of stigma scores was examined using the Shapiro–Wilk test. Because the scores were not normally distributed ($p < .05$), the dependent variable was divided into two groups—high and low stigma scores—based on the median value and was analyzed using logistic regression with the forced-entry method. To explore the association between diabetes stigma and healthcare professional support, the dependent variable was the total stigma score, whereas age, disease duration, HbA1c level, insulin use, and educational level were included as covariates. These covariates were selected because previous studies have demonstrated significant associations between these variables and stigma (Gredig & Bartelsen-Raemy, 2017; Hamano et al., 2023; Taher et al., 2023; Tanaka et al., 2022). Independent variables comprised the support scores from doctors and nurses, and a multivariate analysis was performed. Logistic regression analysis yielded the odds ratios (ORs) and 95% confidence intervals (CIs) for each independent variable.

In this analysis, logistic regression revealed a significant association between total diabetes stigma scores and age, suggesting that age may influence perceived stigma. Data were analyzed by dividing participants into those aged <65 years and those aged ≥65 years.

A *P*-value of $< .05$ was considered significant. All statistical analyses were performed using IBM SPSS Statistics for Windows version 28.

2.6 | Ethical considerations

All participants received a research cooperation form outlining the study, assurances of anonymity, and measures to protect patient privacy. They were informed that participation in this study was voluntary, that they could withdraw from the study at any time, that refusal to participate would not result in any disadvantages, and that the study results would be publicly reported. Informed consent was obtained through participants' agreement to complete the questionnaire. This study was approved by the Ethics Review Committee of The University of Osaka Hospital (approval no. 22113-3).

3 | RESULTS

Of the 246 questionnaires distributed, 203 were returned, and 136 were deemed valid, resulting in a completion rate of 67.0%. Questionnaires were considered valid if there were no missing values on the stigma scale and the physician–nurse support scale.

To examine potential response bias, the characteristics of completers ($n = 136$) and non-completers ($n = 67$) were compared. Age differed significantly between the groups: completers had a mean age of 65.2 years, whereas non-completers had a mean age of 70.8 years (Wilcoxon rank-sum test, two-sided, $p = .0031$). No significant differences were found in other demographic characteristics.

3.1 | Participant characteristics

The mean age of the participants was 65.2 years (standard deviation [SD] = 13.0), 60.3% were men, and 59.6% were employed. Among the participants, 72.1% were married,

TABLE 1 Clinical characteristics of the study participants.

Item	All participants ($n = 136$) Mean (SD)	Age < 65 years ($n = 58$) Mean (SD)	Age ≥ 65 years ($n = 78$) Mean (SD)	
Age (years)	65.2 (13.0)	52.3 (8.2)	74.6 (5.5)	
Duration of disease (years)	16.3 (12.7)	11.9 (11.4)	19.5 (12.7)	
HbA1c (%)	7.2 (1.1)	7.2 (1.3)	7.2 (0.9)	
BMI (kg/m^2)	25.1 (4.3)	26.0 (4.8)	24.4 (3.7)	
	Classification			***n* (%)**
Gender	Female	54 (39.7)	24 (41.4)	30 (38.5)
	Male	82 (60.3)	34 (58.6)	48 (61.5)
Educational background	With tertiary education	67 (49.3)	30 (51.7)	37 (47.4)
	Without a tertiary education	69 (50.7)	28 (48.3)	41 (52.6)
Employment status	Unemployed	55 (40.4)	15 (25.9)	40 (51.3)
	Employed	81 (59.6)	43 (74.1)	38 (48.7)
Living arrangements	Living alone	24 (17.6)	9 (15.5)	15 (19.2)
	Living with others	112 (82.4)	49 (84.5)	63 (80.8)
Marital status	Married	98 (72.1)	36 (62.1)	62 (79.5)
	Not married	38 (27.9)	22 (37.9)	16 (20.5)
Type of diabetes	Type 1 diabetes	20 (14.7)	13 (22.4)	7 (9.0)
	Type 2 diabetes	93 (68.4)	38 (65.5)	55 (70.5)
	Other	7 (5.1)	4 (6.9)	3 (3.8)
	Unknown	16 (11.8)	3 (5.2)	13 (6.7)
Insulin injections	With	65 (47.8)	27 (46.6)	38 (48.7)
	Without	70 (51.5)	30 (51.7)	40 (51.3)
	Unknown	1 (0.7)	1 (1.7)	0 (0.0)
Diabetes complications	With	36 (26.5)	14 (24.1)	22 (28.2)
	Without	94 (69.1)	41 (70.7)	53 (67.9)
	Unknown	6 (4.4)	3 (5.2)	3 (3.9)

Abbreviation: SD, standard deviation.

TABLE 2 Scores on the Kanden Institute Stigma Scale.

Item	All participants ($n = 136$) Median (quartile range)	Age < 65 years ($n = 58$)	Age ≥ 65 years ($n = 78$)
Total score	5.0 (0.3–13.5)	10 (3.0–21.3)	4.0 (0.0–10.0)
Social stigma	1.0 (0.0–5.0)	3.0 (0.0–7.3)	0.0 (0.0–3.0)
Discordant stigma	3.0 (0.0–6.0)	3.5 (0.0–7.0)	3.0 (0.0–6.0)
Self-stigma	0.0 (0.0–3.8)	1.0 (0.0–6.3)	0.0 (0.0–1.0)
Total score of the physicians' support	50.0 (45.0–54.0)	49.5 (45.0–54.0)	50.0 (45.0–54.0)
Physicians' professional technical ability supports	28.0 (25.0–30.0)	28.0 (25.0–30.0)	27.5 (25.0–30.0)
Physician's emotional support	17.0 (15.0–18.0)	18.0 (15.0–18.0)	17.0 (15.0–18.0)
Physician's health informational support	16.0 (15.0–18.0)	16.0 (15.0–18.0)	16.0 (15.0–18.0)
Total score of nurses' support	45.0 (41.3–54.0)	46.0 (41.0–54.0)	45.0 (41.8–53.0)
Nurses' professional technical ability support	15.0 (15.0–18.0)	15.0 (15.0–18.0)	15.0 (15.0–18.0)
Nurses' emotional support	15.0 (14.0–18.0)	15.0 (14.0–18.0)	15.0 (12.8–17.3)
Nurses' health informational support	15.0 (12.3–18.0)	15.0 (12.0–18.0)	15.0 (14.0–18.0)

TABLE 3 Associations between factors and the Kanden Institute Stigma Scale.

	Model 1 OR (95% CI)	Model 2 OR (95% CI)
Gender (female vs. male)	0.82 (0.38–1.79)	0.78 (0.35–1.69)
Age (years)	**0.96 (0.93–0.99)***	**0.96 (0.93–0.99)***
Duration of disease (years)	1.02 (0.99–1.06)	1.01 (0.98–1.05)
HbA1c (continuous variable)	1.20 (0.83–1.74)	1.27 (0.87–1.84)
Insulin injection (with vs. without)	0.84 (0.37–1.89)	0.86 (0.40–1.82)
Education (tertiary vs. no tertiary education)	0.85 (0.40–1.82)	0.91 (0.43–1.94)
Total score of physician's support	**0.94 (0.88–1.00)***	–
Total score of nurses' support	–	**0.95 (0.90–1.00)***
Nagelkerke R^2	0.157	0.167

Note: OR: odds ratio, 95% CI: 95% confidence interval, *$p < .05$. Model 1: Total score of physician support and adjustment factors. Model 2: Total score of nurses' support and adjustment factors. Bold values indicate statistical significance ($p < 0.05$).

68.4% had type 2 diabetes, and 47.8% used insulin. The mean duration of diabetes was 16.3 years (SD = 12.7), and the mean HbA1c level was 7.2% (SD = 1.1). Additional participant characteristics are presented in Table 1. The diabetes stigma scores, along with physicians' and nurses' support scores, are listed in Table 2.

3.2 | Association between diabetes stigma and support from healthcare professionals

Diabetes stigma was significantly associated with both physician's and nurse's support (physician: OR = 0.94, 95% CI = 0.88–1.00, $p < .05$; nurse: OR = 0.95, 95% CI = 0.90–1.00, $p < .05$), with higher support corresponding to lower stigma scores. Age was also significantly associated with the diabetes-related stigma, with older participants exhibiting lower stigma scores (Table 3). Given this association, the participants were divided into two groups—those aged <65 years and those aged ≥65 years—using 65 years as the official threshold for older adults in Japan. This stratification allowed examination of differences in diabetes stigma and healthcare professional support between older and non-older adults. Subsequently, the association between diabetes-related stigma and physicians' and nurses' support was analyzed across the social stigma, self-stigma, and discordant stigma dimensions.

The results of logistic regression analysis are presented separately for participants aged <65 and ≥ 65 years. Analyses were adjusted for insulin injection use and HbA1c level, with subscales of physician and nurse's support included as explanatory variables.

3.3 | Association between social stigma and support from healthcare professionals

Among participants aged <65 years, diabetes-related social stigma was significantly associated with the total physician's support score (OR = 0.82, 95% CI = 0.72–0.94, $p < .05$) and all physician subscales: professional technical ability support (OR = 0.72, 95% CI = 0.56–0.93, $p < .05$), emotional support (OR = 0.58, 95% CI = 0.39–0.87, $p < .05$), and health information support (OR = 0.68, 95% CI = 0.51–0.91, $p < .05$). It was also significantly associated with the total nurse's support score (OR = 0.91, 95% CI = 0.83–0.99, $p < .05$) and two subscales: professional technical ability (OR = 0.72, 95% CI = 0.54–0.97, $p < .05$) and nurse health information support scores (OR = 0.80, 95% CI = 0.65–0.98, $p < .05$).

Among participants aged ≥65 years, diabetes-related social stigma showed no significant associations with physicians' support, nurses' support, or scores on any subscales (Table 4).

3.4 | Association between self-stigma and support from healthcare professionals

Among participants aged <65 years, diabetes-related self-stigma was significantly associated with the total physician's support score (OR = 0.87, 95% CI = 0.76–0.98, $p < .05$) and two physician subscales: emotional (OR = 0.68, 95% CI = 0.48–0.98, $p < .05$) and health information support (OR = 0.73, 95% CI = 0.55–0.97, $p < .05$). Self-stigma was significantly associated with the total nurse's support score (OR = 0.92, 95% CI = 0.84–1.00, $p < .05$) and the professional technical ability subscale (OR = 0.68, 95% CI = 0.50–0.92, $p < .05$).

Among participants aged ≥65 years, no significant associations were found between physicians or nurses' support and scores on any of the subscales (Table 5).

3.5 | Association between discordant stigma and support from healthcare professionals

Among participants aged <65 years, diabetes-related discordant stigma was significantly associated with the total

TABLE 4 Associations of factors with subscale social stigma of the Kanden Institute Stigma Scale.

	Age (years)	Model 1 (OR, 95% CI)	Model 1-1 (OR, 95% CI)	Model 1-2 (OR, 95% CI)	Model 1-3 (OR, 95% CI)
Total score of physician's support	<65 years	**0.82 (0.72–0.94)***	–	–	–
	≥65 years	0.98 (0.92–1.05)	–	–	–
Physician's professional technical ability support	<65 years	–	**0.72 (0.56–0.93)***	–	–
	≥65 years	–	1.02 (0.91–1.15)	–	–
Physician's emotional support	<65 years	–		**0.58* (0.39–0.87)***	–
	≥65 years	–	–	0.94 (0.79–1.12)	–
Physician's health information support	<65 years	–	–	–	**0.68 (0.51–0.91)***
	≥65 years	–	–	–	0.91 (0.77–1.09)
		Model 2 (OR, 95% CI)	**Model 2-1 (OR, 95% CI)**	**Model 2-2 (OR, 95% CI)**	**Model 2-3 (OR, 95% CI)**
Total score of nurses' support	<65 years	**0.91 (0.83–0.99) ***	-	–	–
	≥65 years	0.99 (0.94–1.05)	-	–	–
Nurses' professional technical ability support	<65 years	–	**0.72 (0.54–0.97)***	–	–
	≥65 years	–	1.01 (0.84–1.21)		–
Nurses' emotional support	<65 years	–	–	0.83 (0.65–1.05)	–
	≥65 years	–	–	1.01 (0.86–1.18)	–
Nurses' health informational support	<65 years	–	–	–	**0.80 (0.65–0.98)***
	≥65 years	–	–	–	0.93 (0.81–1.08)

Note: Model 2-3: Nurses' health informational support and adjustment factors. OR: odds ratio, 95% CI: 95% confidence interval, *$p < .05$. In all analytical models, the adjustment factors were HbA1c (%) and insulin injection (yes/no). Model 1: Total score of physician support and adjustment factors. Model 1-1: Physician's professional technical ability support and adjustment factors. Model 1-2: Physician's emotional support and adjustment factors. Model 1-3: Physician's health informational support and adjustment factors. Model 2: Total score of nurses' support and adjustment factors. Model 2-1: Nurses' professional technical ability support and adjustment factors. Model 2-2: Nurses' emotional support and adjustment factors. Bold values indicate statistical significance ($p < 0.05$).

physician's support score (OR = 0.85, 95% CI = 0.74–0.95, $p < .05$) and all physician subscales: professional technical ability support (OR = 0.71, 95% CI = 0.55–0.91, $p < .05$), emotional support (OR = 0.58, 95% CI = 0.39–0.87, $p < .05$), and health informational support (OR = 0.75, 95% CI = 0.57–0.98, $p < .05$). Discordant stigma was not significantly associated with nurses' support or its subscales.

Among participants aged ≥65 years, diabetes-related discordant stigma was significantly associated with the total physician's support score (OR = 0.92, 95% CI = 0.85–1.00, $p < .05$) and the physician health information support subscale (OR = 0.78, 95% CI = 0.62–0.97, $p < .05$). Additionally, the total nurse's support score (OR = 0.93, 95% CI = 0.87–0.99, $p < .05$) and two nurse subscales—emotional support (OR = 0.84, 95% CI = 0.70–1.00, $p < .05$) and health information support (OR = 0.81, 95% CI = 0.69–0.95, $p < .05$)—were significantly associated with diabetes-related discordant stigma (Table 6).

4 | DISCUSSION

4.1 | Association between diabetes stigma and healthcare professional support

This study explored the association between diabetes-related stigma and support from physicians and nurses. Diabetes-related stigma was significantly associated with both physicians and nurses' support, with participants reporting lower stigma scores. To the best of our knowledge, this study is the first to examine the association between physicians and nurses' support and diabetes-related stigma. These results highlight the importance of positive and supportive interactions between healthcare professionals and patients with diabetes in daily clinical practice to reduce stigma.

Furthermore, age was significantly associated with diabetes-related stigma in this study. Previous studies on the association between age and stigma have yielded mixed results. Studies conducted in the United

TABLE 5 Associations of factors with subscale self-stigma of the Kanden Institute Stigma Scale.

	Age (years)	Model 3 (OR, 95% CI)	Model 3-1 (OR, 95% CI)	Model 3-2 (OR, 95% CI)	Model 3-3 (OR, 95% CI)
Total score of physician's support	<65 years	**0.87 (0.76–0.98)***	–	–	–
	≥65 years	0.98 (0.92–1.05)	–	–	–
Physician's professional technical ability support	<65 years	–	0.80 (0.63–1.01)	–	–
	≥65 years	–	0.97 (0.86–1.09)	–	–
Physician's emotional support	<65 years	–		**0.68 (0.48–0.98)***	–
	≥65 years	–	–	0.95 (0.79–1.14)	–
Physician's health informational support	<65 years	–	–	–	**0.73 (0.55–0.97)***
	≥65 years	–	–	–	0.94 (0.78–1.12)
		Model 4 (OR, 95% CI)	**Model 4-1 (OR, 95% CI)**	**Model 4-2 (OR, 95% CI)**	**Model 4-3 (OR, 95% CI)**
Total score of nurses' support	<65 years	**0.92 (0.84–1.00)***	–	–	–
	≥65 years	0.99 (0.93–1.04)	–	–	–
Nurses' professional technical ability support	<65 years	–	**0.68 (0.50–0.92)***	–	–
	≥65 years	–	1.00 (0.82–1.22)	–	–
Nurses' emotional support	<65 years	–	–	0.81 (0.64–1.04)	–
	≥65 years	–	–	0.96 (0.81–1.13)	–
Nurses health informational support	<65 years	–	–	–	0.86 (0.71–1.03)
	≥65 years	–	–	–	0.94 (0.81–1.09)

Note: OR: odds ratio, 95% CL: 95% confidence interval, *$p < .05$. In all analytical models, the adjustment factors were HbA1c (%) and insulin injection (yes/no). Model 3: Total score of physician's support and adjustment factors. Model 3-1: Physician's professional technical ability support and adjustment factors. Model 3-2: Physician's emotional support and adjustment factors. Model 3-3: Physician's health informational support and adjustment factors. Model 4: Total score of nurses' support and adjustment factors. Model 4-1: Nurses' professional technical ability support and adjustment factors. Model 4-2: Nurses' emotional support and adjustment factors. Model 4-3: Nurses' health informational support and adjustment factors. Bold values indicate statistical significance ($p < 0.05$).

Arab Emirates (Alzubaidi et al., 2023) and Colombia (Pedrero et al., 2021) found no significant differences in diabetes stigma scores according to age. By contrast, surveys conducted in the United States (Himmelstein & Puhl, 2021), Canada (Housni et al., 2024), and Poland (Sińska et al., 2023) reported a negative correlation between age and diabetes stigma. However, studies conducted in Switzerland (Gredig & Bartelsen-Raemy, 2017) and Ghana (Botchway et al., 2021) indicated that younger participants experienced a wider range of unfair treatment and exclusion and perceived more stereotypes. These findings suggest that the association between age and diabetes-related stigma may vary across populations and regions. Consequently, tailored support that considers both the cultural context and the specific characteristics of each patient group may be beneficial.

Overall, efforts to reduce diabetes-related stigma should involve support from physicians and nurses. However, as the results of this study were affected by age, the types of support required for individuals aged <65 years and those aged ≥65 years are discussed separately below.

4.2 | Diabetes stigma subscale: association between social stigma and healthcare professional support

Among participants aged <65 years, diabetes-related social stigma was significantly associated with the total physician's support score and all physician subscales. This suggests that professional, technical, emotional, and health information support from physicians may reduce social stigma in this population. However, a survey of physicians specializing in endocrinology ($n = 205$) reported that some physicians treated patients with diabetes using negative emotions (Bennett & Puhl, 2023). Further studies are needed to clarify whether such negative treatment contributes to stigma, as its impact may vary depending on individual patient attitudes.

Diabetes-related social stigma was significantly associated with total nurses' support scores and the nurse health information support subscale. This finding suggests that overall nurses' support, particularly in providing health information support, may help reduce diabetes-related stigma in this age group. Health information support provides patients with the knowledge necessary for self-management and informed health decisions

TABLE 6 Associations of factors with subscale discordant stigma of the Kanden Institute Stigma Scale.

	Age (years)	Model 5 (OR, 95% CI)	Model 5-1 (OR, 95% CI)	Model 5-2 (OR, 95% CI)	Model 5-3 (OR, 95% CI)
Total score of physician's support	<65 years	**0.85 (0.74–0.95)***	–	–	–
	≥65 years	**0.92 (0.85–1.00)***	–	–	–
Physician's professional technical support	<65 years	–	**0.71 (0.55–0.91)***	–	–
	≥65 years	–	0.89 (0.78–1.02)	–	–
Physician's emotional support	<65 years	–	–	**0.58 (0.39–0.87)***	–
	≥65 years	–	–	0.81 (0.65–1.01)	–
Physician's health informational support	<65 years	–	–	–	**0.75 (0.57–0.98)***
	≥65 years	–	–	–	**0.78 (0.62–0.97)***
		Model 6 (OR, 95% CI)	**Model 6-1 (OR, 95% CI)**	**Model 6-2 (OR, 95% CI)**	**Model 6-3 (OR, 95% CI)**
Total score of nurses' support	<65 years	0.95 (0.88–1.03)	–	–	–
	≥65 years	**0.93 (0.87–0.99)***	–	–	–
Nurses' professional technical support	<65 years	–	0.78 (0.59–1.03)	–	–
	≥65 years	–	0.82 (0.66–1.01)	–	–
Nurses' emotional support	<65 years	–	–	0.91 (0.73–1.14)	–
	≥65 years	–	–	**0.84 (0.70–1.00)***	–
Nurses' health informational support	<65 years	–	–	–	0.92 (0.77–1.09)
	≥65 years	–	–	–	**0.81 (0.69–0.95)***

Note: OR: odds ratio, 95% CI: 95% confidence interval, *$P < .05$. In all analytical models, the adjustment factors were HbA1c (%) and insulin injection (yes/no). Model 1: Total score of physician support and adjustment factors. Model 1-1: Physician's professional technical ability support and adjustment factors. Model 1-2: Physician's emotional support and adjustment factors. Model 1-3: Physician's health informational support and adjustment factors. Model 2: Total score of nurses' support and adjustment factors. Model 2-1: Nurses' professional technical ability support and adjustment factors. Model 2-2: Nurses' emotional support and adjustment factors. Model 2-3: Nurses' health informational support and adjustment factors. Bold values indicate statistical significance ($p < 0.05$).

(Lee & Oka, 2013). Given that >70% of participants aged <65 years were employed and thus potentially more vulnerable to social stigma, these findings highlight the importance of providing objective and accurate health information.

Among participants aged ≥65 years, social stigma was not significantly associated with physicians' support, nurses' support, or scores on any subscale. The mean age in this group was 74.6 years, and a substantial proportion (51%) were unemployed. Previous studies have demonstrated that employed individuals often experience stigma in the workplace (Motoyoshi & Ikeda, 2022; Nakao et al., 2015). Therefore, fewer opportunities for workplace exposure or verbal harassment among older adults may have contributed to the lack of significant associations observed in this age group.

4.3 | Diabetes stigma subscale: association between self-stigma and healthcare professional support

Among participants aged <65 years, diabetes-related self-stigma was significantly associated with the total physician's support score and the emotional and health information support subscales. Self-stigma occurs when individuals with diabetes perceive themselves as inferior to those without the condition, feeling worthless and unworthy of seeking help or engaging with others (Tanaka, 2023). This process constitutes the formation of self-stigma. Self-stigma is negatively correlated with self-affirmation and self-efficacy (Kato et al., 2020). The results of this study suggest that the total physician's support score and the emotional and health information support subscales are associated with reduced self-stigma among individuals with diabetes. These results suggest that overall support from physicians is associated with a reduction in self-stigma among individuals with diabetes. In particular, emotional support—such as a physician's empathic response to patients' feelings—may play an important role in reducing self-stigma. Furthermore, the provision of appropriate health information may enhance patients' understanding of diabetes, helping to prevent unnecessary self-stigma. In this study, self-stigma was also significantly associated with the total nurse's support score and the professional-technical support subscale. Overall, these findings indicate that nurses' overall

support contributes to reducing stigma among individuals with diabetes. In particular, professional-technical support—such as guidance in self-care techniques—appears to be a key factor in mitigating self-stigma.

Among participants aged ≥65 years, diabetes-related self-stigma was not significantly associated with physicians' support, nurses' support, or scores on any subscale. This may be attributable to the long duration of diabetes in this age group, which averaged 19.5 years, potentially leading to lower levels of self-stigma at this stage of life. Kato et al. (2021) examined self-stigma across five diabetes-duration groups (<5 years, 6–10 years, 11–15 years, 16–21 years, and > 22 years). They found that self-stigma gradually increased after diagnosis, peaked in the 11–15-year group, and subsequently declined. Given that the average diabetes duration among participants aged ≥65 years in this study was 19.5 years, they likely were in the phase of gradual decline in self-stigma. Consequently, self-stigma among participants aged ≥65 years may not have been associated with physician or nurse's support.

4.4 | Diabetes stigma subscale: association between discordant stigma and healthcare professional support

Tanaka et al. (2022) referred to social stigma, particularly that received from healthcare providers, as "discordant stigma." They emphasized that this concept highlights the role of healthcare professionals in potentially contributing to stigma, rather than framing it solely as a social issue. The scale included items such as "I do not expect optimal treatment" and "I do not think there is enough support for treatment," which closely corresponded with the healthcare professional support questions used in this study, likely contributing to the significant associations observed between discordant stigma and many aspects of physicians' and nurses' support. This may explain the observed associations. However, not all items demonstrated significant relationships, and some of these patterns are discussed below.

Among participants aged <65 years, discordant stigma was significantly associated with total physicians' support scores but did not show an association with total nurses' support scores. This indicates that, in this age group, physicians play a central role in treatment decisions and disease management, making physicians' support more likely to influence—or be influenced by—discordant stigma.

Among participants aged ≥65 years, although social stigma and self-stigma were not significantly associated with total physician and nurse's support scores, discordant stigma was significantly associated with both. This finding supports Tanaka et al.'s distinction between discordant stigma and social stigma. As noted earlier, physicians and nurses' support appeared to have a smaller impact on social and self-stigma in this age group compared with participants aged <65 years. However, this does not imply that healthcare professional involvement is irrelevant. Discordant stigma items such as "Physicians and medical staff criticize me about my treatment outcome because of this disease" and "I feel that physicians and medical staff doubt my efforts to cope with this disease" indicate that patients aged ≥65 years can still experience stigma related to interactions with healthcare providers. These results clearly indicate that, even in older adults, physicians and nurses' support can influence discordant stigma, particularly in the context of perceived judgment or doubt regarding patients' efforts and treatment outcomes.

4.5 | Limitations

This study demonstrated a significant association between diabetes stigma and support from physicians and nurses, with participants receiving such support reporting lower stigma scores. To our knowledge, this study is the first to examine the association between healthcare professional support and diabetes stigma. However, several limitations should be considered. First, as a cross-sectional study, causality between diabetes stigma and the physician or nurse's support cannot be established. Second, the study was conducted in facilities with diabetes specialists in the Kansai Region of Japan, which may limit generalizability to other settings. Third, the study participants generally exhibited lower KISS scores compared with previous studies (Tanaka et al., 2022) (particularly those aged ≥65 years), which may have influenced the results. Fourth, the completion rate of 67.0% may introduce potential response bias, especially since non-completers were significantly older than completers, suggesting underrepresentation of older individuals. Although no other significant differences were found, these factors should be considered when interpreting the results.

5 | CONCLUSIONS

This study found a significant association between diabetes-related stigma and physicians and nurses' support, with lower stigma scores observed among those receiving support. These results underscore the importance of involving healthcare professionals who maintain

close relationships with individuals with diabetes in efforts to reduce diabetes stigma. Age was also associated with diabetes-related stigma. Among those aged <65 years, efforts should focus on promoting social advocacy and encouraging proactive engagement from healthcare professionals. For those aged ≥65 years, discordant stigma remains a significant challenge, highlighting the need for comprehensive support from both physicians and nurses. Future studies should develop and evaluate interventions tailored to specific age groups to identify effective strategies for reducing diabetes-related stigma.

AUTHOR CONTRIBUTIONS

Conceptualization: Yuchun Yang, Jiamin Jiang, Kei Takahashi, and Nagaaki Tanaka. Methodology, analysis, and validation: Yuchun Yang, Jiamin Jiang, Kei Takahashi and Nagaaki Tanaka. Investigation: Yuchun Yang, Jiamin Jiang, Kei Takahashi, Nagaaki Tanaka, Keisuke Kosugi, Akemi Ono, Junji Kozawa, Naoto Katakami, Atsunori Fukuhara, Norikazu Maeda, Iichiro Shimomura, Yasuko Shimizu. Writing–original draft preparation: Yuchun Yang, Jiamin Jiang, Kei Takahashi, Nagaaki Tanaka and Yasuko Shimizu. Writing–review and editing: Keisuke Kosugi and Yasuko Shimizu. Supervision, Norikazu Maeda, Iichiro Shimomura and Yasuko Shimizu. All the authors have read and agreed to the published version of the manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors declare that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

Data supporting the findings of this study are available from the corresponding author upon reasonable request. However, they are not publicly accessible owing to privacy and ethical restrictions.

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