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Preliminary psychometric testing of a newly developed scale to assess perceived social stigma of Thai adolescents with type 1 diabetesManutsawin Kunthamas¹, Tassanee Prasopkittikun², Sathima Suratham³, Jeerunda Santiprabhob⁴**Author information**^{1,2,3} Department of Pediatric Nursing, Faculty of Nursing, Mahidol University, Thailand⁴ Department of Pediatrics, Faculty of Medicine Siriraj Hospital, Mahidol University, Thailand

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<https://doi.org/10.31603/jhns.v13i1.14955>**Abstract**

Adolescents with type 1 diabetes (T1D) are vulnerable to social stigma because their visible disease management may draw unwanted attention, misunderstanding, or judgment. These social pressures can cause emotional distress and hinder self-management, affecting both psychological well-being and diabetes control. Reliable tools to assess perceived social stigma remain limited, especially in Thailand. To address the gap, the Perceived Social Stigma in Diabetes Questionnaire (PSSDQ) was developed for Thai adolescents with T1D. The study examined the preliminary psychometric properties, including content validity and internal consistency reliability. Participants consisted of 90 adolescents (10–19 years) with T1D recruited from pediatric diabetes clinics at two Bangkok university hospitals. Recruitment followed a convenience sampling approach, targeting those treated with multiple daily injections of basal-bolus insulin. Data were collected between June and December 2024. Content validity index (CVI), Cronbach's alpha, average inter-item correlations, and corrected item-total correlations were computed to evaluate the psychometric properties of the 20-item PSSDQ. Results showed strong content validity with item-level CVIs ranging from 0.80 to 1.00. The total scale demonstrated acceptable internal consistency (Cronbach's alpha=0.86). Average inter-item correlations of the total scale and subscales ranged from 0.23 to 0.32, indicating that the items measured a coherent construct. However, four items had low corrected item-total correlations (<0.30) because their wording did not reflect negative social perceptions or experiences of unwanted attention. Also, item mean scores were skewed toward the lower end with small standard deviations, indicating a potential ceiling or floor effect. Thereupon, future testing within a more heterogeneous sample may be necessary to elicit broader response variability. Such advancements will enhance its utility in both research and clinical practice, allowing for a deeper understanding of the social stigma experienced by adolescents with T1D.

Keywords: Adolescent, psychometrics, social stigma, surveys and questionnaires, Thailand, type 1 diabetes**Introduction**

Type 1 diabetes (T1D) remains a critical global health challenge among the pediatric and adolescent population, with an estimated prevalence of 1.81 million individuals under age 20 and an annual incidence of 219,000 new cases worldwide as of 2024 (International Diabetes Federation, 2025). These global figures are mirrored by the escalating epidemiological trends across Asia, as the prevalence of T1D in children and adolescents has risen from 17.6 per 100,000 in 2015 to 29.5 per 100,000 in 2020 in Thailand (Rittiphairoj et al., 2022). These data emphasize that T1D continues to be a significant health issue necessitating ongoing management (Kandemir et al., 2024). T1D is a lifelong, incurable, non-communicable disease that typically develops during childhood and adolescence (Allen et al., 2024). It requires continuous daily self-management to maintain optimal glycemic control and prevent complications (Anderson et al., 2017). Although clinical guidelines address for patient with diabetes (American Diabetes Association, 2025), physical aspects often take priority in real-world practice (Virmani et al., 2022). The clinical emphasis frequently overlooks the complex emotional burden associated with the disease. Therefore, it is important to recognize psychological issues such as stigma, diabetes distress, anxiety, and depression emerging in this population.

Negative social appraisal, or social stigma, is one significant consequence of living with T1D. According to a framework for understanding diabetes-related stigma (Schabert et al., 2013), experience of social stigma can trigger adverse psychological consequences, including fear, embarrassment, self-blame, diminished self-esteem, worry and anxiety, anger, depression, distress, and feelings of loneliness. The model also explained that psychological consequences can undermine the ability to self-

manage diabetes and contribute to the failure to attain optimal glycemic control (Schabert et al., 2013). Adolescents with T1D face unique challenges as hormonal changes during puberty contribute to insulin resistance and complicate glycemic control (Russo, 2022). At the same time, adolescents are navigating identity development, seeking peer acceptance, and gaining independence (Laursen & Veenstra, 2021; Russo, 2022). Many adolescents prioritize peer interactions over family time and may consequently skip or conceal their diabetes management tasks to avoid peer victimization or the perceived stigma of 'standing out' (Yang et al., 2018). It is important to note that peer dynamics can thus play a powerful role in influencing adherence.

Although peer interaction is fundamental for development, it may also become a source of distress—particularly through experiences of social stigma. The World Health Organization (WHO) defines health-related social stigma as negative perceptions or discrimination directed at individuals because of characteristics associated with a specific disease (World Health Organization, 2020). Studies indicate a high prevalence of social stigma among adolescents with T1D is 49.2% among Latino youth (Crespo-Ramos et al., 2018) and 65.5% among adolescents and young adults in Canada (Brazeau et al., 2018). These experiences lead to emotional distress, social withdrawal, and reduced diabetes self-care. Qualitative evidence indicates that adolescents often conceal their diabetes in public settings to evade social judgment. For instance, many express concerns that using syringes or medical devices in public spaces, such as restaurants or buses, may be misinterpreted as illicit substance use (Leung et al., 2021). They are also often confused with individuals who have type 2 diabetes (T2D). Although limited research has focused on adolescents, findings from adult populations provide additional insight into how people with T1D experience social stigma. Adults with T1D report being scrutinized regarding their dietary intake, discouraged from administering insulin in public, and subjected to stigma when utilizing needles or medical devices. Others experience distress due to pervasive stereotypes linking diabetes with poor lifestyle choices and report being excluded from social gatherings where sugary foods are served (Browne et al., 2014; Liu et al., 2017). In some cases, adolescents also face discrimination at work or fear disclosing their diagnosis due to concerns about job security (Markou & Papakonstantinou, 2024).

These stigma-related experiences can negatively affect emotional well-being, identity, social relationships, and self-care behavior among adolescents with T1D (Luo et al., 2025; Ortiz-Domenech & Cumba-Avilés, 2021; Wang et al., 2025). Stigmatization leads to long-term adverse outcomes, such as reduced self-esteem and increased psychiatric morbidity, which often persist from adolescence into adulthood (Browne et al., 2017; Eitel et al., 2024). Early detection and support are therefore critical for adolescents with T1D and their families (Wang et al., 2025). Regarding the emergence of social stigma and its adverse consequences, the assessment of social stigma with a validated instrument is essential. In Western countries, several instruments were developed to evaluate diabetes-related stigma. For instance, the Type 1 Diabetes Stigma Assessment Scale (DSAS-1) is a 19-item scale with a five-point Likert response scale ranging from 1 (strongly disagree) to 5 (strongly agree) (Browne et al., 2017). The DSAS-1 assessed perceived and experienced stigma among adults with T1D across three domains: blame/judgment, being treated differently, and identity concerns. Furthermore, the tool demonstrated good reliability and construct validity in the adult population (Browne et al., 2017; Embick et al., 2024; Luo et al., 2025). However, the literature described diabetes-related stigma questionnaires specifically designed for adolescents with T1D was limited. Only one found from the literature review is the Type 1 Diabetes Stigma Scale-12 (T1DSS-12), a 12-item instrument developed to assess health-related stigma among university students with T1D aged 18 years and older (Singg & Johnson, 2018). The tool development was informed by two existing health-related stigma questionnaires, one for adolescent girls with overweight and another for patients with psychiatric conditions. The T1DSS-12 demonstrated an acceptable internal consistency, with a Cronbach's alpha coefficient of 0.72 (Singg & Johnson, 2018). The questionnaire appears to focus primarily on experiences of social stigma among young adults rather than adolescents.

Due to a lack of stigma assessment tools for adolescents with T1D in China, the DSAS-1 was translated and modified for youth in this population. The adapted Chinese version contains 17 items and uses a Likert response scale; its psychometric testing showed good reliability and multiple forms of validity (Yang et al., 2024). Our literature review revealed that no studies in Thailand examined social stigma among adolescents with T1D, and no validated Thai instruments exist for this population. Thus, psychological and social stigma issues in Thai adolescents with T1D are poorly understood. Furthermore, after reviewing existing tools, the researcher found that several items may not be appropriate or relevant to Thai adolescents with T1D. Given the lack of appropriate Thai-language tools, the Perceived Social Stigma in Diabetes Questionnaire (PSSDQ) was developed as a framework to address diabetes-related stigma (Schabert et al., 2013). This study aims to evaluate the initial psychometric properties of the PSSDQ, focusing on content validity and internal consistency. The findings are expected to inform future refinement, validation of the instrument, and support its application in both clinical practice and research with Thai adolescents with T1D.

Method

The study employed a methodological research design, which is appropriate for developing and validating measurement instruments (Polit & Beck, 2022). The psychometric evaluation reported here used existing data of perceived social stigma that were extracted from a primary study (currently under peer review) to examine the preliminary properties of the newly developed Perceived Social Stigma in Diabetes Questionnaire (PSSDQ). The primary study investigated factors predicting diabetes self-management behaviors among Thai adolescents with T1D. Perceived social stigma was included as one of the study variables and was assessed using the PSSDQ, which had been developed through an initial instrument-development process. Although perceived social stigma did not emerge as a predictor of diabetes self-management behaviors in the primary study, the variable demonstrated significant correlations with several key variables—including intrinsic motivation, perceived health status, and family support. These findings highlighted the importance of having a psychometrically sound instrument to measure perceived social stigma in this population. Therefore, a secondary analysis using the full dataset from the primary study was conducted to evaluate the preliminary psychometric properties of the PSSDQ.

The population of the current study was Thai adolescents (aged between 13 and 19 years) with T1D who followed up during the year 2024 at the pediatric outpatient diabetes clinics at two university hospitals located in Bangkok. Data were collected between June and December 2024. As the investigators were not allowed to access the name list of adolescents with T1D who followed up the clinics; thus, convenience sampling was used for recruiting the sample. The inclusion criteria for recruiting the participants were aged between 10 and 19 years, well-literate, being in a school, having a smartphone for contact, diagnosed with T1D for at least one year, and using basal-bolus insulin with multiple daily injections. Adolescents would be excluded from the study if they were diagnosed with an intelligence quotient below 90, had developmental disabilities and/or mental health problems, or were currently using continuous subcutaneous insulin infusion and/or continuous glucose monitoring. As the current study used data from the primary study, no new sample size calculation was performed. In the primary study, sample size was calculated based on the statistics used (that is, stepwise multiple regression analysis) and the number of independent variables. Finally, a total of 90 adolescent was included. In the current study, data obtained from participants were utilized for the psychometric analysis of the PSSDQ.

The related instrument used in the current study included a general Information form. The form was developed by the researchers to collect information on adolescents' characteristics, including gender, age, years of education, comorbidity, and duration of illness. The form was filled out via a 5-minute interview with the participants. Perceived Social Stigma in Diabetes Questionnaire (PSSDQ)—This questionnaire was developed by the researchers based on the framework for understanding diabetes-related stigma (Schabert et al., 2013), a literature review, and the experience of perceived stigma by adolescents with T1D. An objective of the PSSDQ is to examine an adolescent's perception of the views or beliefs of a group of people or a society about individuals with T1D. The instrument development process consists of the deductive method for item generation through literature review and assessment of existing tools and indicators (Boateng et al., 2018). Literature about social stigma among individuals with diabetes was searched and reviewed; conceptual models related to social stigma and the measurement were specifically focused. The framework for understanding diabetes related-stigma was selected to serve as a guide to scale development. Items that reflected the scale's purpose were generated to align with the three aspects of the social stigma stated in the framework: perceived stigma—6 items (e.g., being judged, monitored, and treated unfairly by others), stereotypes from self or others 3 items (e.g., being viewed as unhealthy, lacking of control, and lazy), and stigmatizing practices 8 items (e.g., being treated by the actions of others including restrictions in employment opportunities, loss of relationship, restrictions in travel, being treated differently, and being mistaken for other stigmatized medical conditions). To help enrich item content, two adolescents with T1D were recruited to share experiences of being discriminated against by others due to diabetes. Initially, 17 items were generated to cover these three aspects. The response task of the PSSDQ is a 5-point rating scale ranging from 1 (never true) to 5 (always true). The range of the total score is 17 to 85. A higher total score indicates a greater perceived social stigma. The PSSDQ data was collected using a self-administered method, taking about 7-10 minutes.

The psychometric testing process includes content validity evaluation, internal consistency, and item analysis. Five experts assessed the content validity of the PSSDQ. They were a pediatric endocrinologist, two pediatric advanced practice nurses in diabetes, a nurse instructor specialized in pediatric diabetes, and a child psychologist. Content validity index (CVI) was computed to assess the quality of the PSSDQ by evaluating the degree to which its items accurately reflect the study concept. Item-level CVI (I-CVI) for each item was calculated then the I-CVIs of all items were averaged to determine Scale-level CVI (Average) or S-CVI/Ave. S-CVI/UA (Universal Agreement) was also computed to determine the degree to which all experts agreed on the relevance of each item. Revision was made according to the experts' suggestions during the discussion. Internal consistency analysis and item analysis were conducted after the questionnaire administration.

Statistical analysis was performed by using SPSS version 18.0 (SPSS Inc., Chicago, IL, USA). The level of significance was set at 0.05. Descriptive statistics were used to describe characteristics of the sample and the overall questionnaire and its

subscales. Cronbach's alpha coefficients and average inter-item correlation were calculated for internal consistency analysis. Mean and standard deviation of each item, average item means, and corrected item-total correlations were also computed for item analysis. Before the study began, the study obtained approval from Mahidol University Multi-Faculty Cooperative IRB Review (MU-MOU CoA No. IRB-NS2024/860.0105). The study followed ethical principles of autonomy, beneficence, and justice. Informed consent from caregivers and assent were obtained from adolescents with the right to withdraw. Participant welfare was ensured through risk minimization and secure, anonymous data management, while fair selection was maintained by inviting all eligible clinic attendees.

Results

The majority of adolescents in the current study were female (60%), with a mean age of 14.86 years ($SD=2.48$). Most participants (77.8%) were studying at the high school level. The average duration since being diagnosed with T1D was 6.58 years ($SD=3.46$). Approximately 87% had poor glycemic control, with a mean HbA1c of 8.81% ($SD=1.63$). All participants (100%) used Aspart as their rapid-acting insulin. For long-acting insulin, 68.9% used Glargine U100, 21.1% used Glargine U300, and 10% used Degludec (**Table 1**). For content validity evaluation, one expert recommended adding one additional item in the aspect of stereotypes from self or others, and two additional items in stigmatizing practices. Based on the expert review, all items were retained with minor revisions to improve clarity and reduce redundancy. An I-CVI of 0.78 or higher, an S-CVI/Ave of 0.90 or higher, and an S-CVI/UA of 0.80 or higher are considered acceptable (Polit et al., 2007). For the 20-item PSSDQ, the I-CVI values ranged from 0.80 to 1.00; the S-CVI/Average was 0.98; and the S-CVI/UA was 0.90, all values indicating satisfactory content validity (**Table 2**).

The mean score for the entire scale was 36.36 ($SD=10.57$). The scores were not normally distributed, and the medians with inter-quartile ranges were presented for the entire scale and its subscales. The average item means of the entire PSSDQ (1.82 ± 0.53) and its subscales were low. Cronbach's alpha coefficients were 0.86 for the entire PSSDQ, 0.67 for perceived stigma, 0.63 for stereotypes, and 0.72 for stigmatizing practices (**Table 3**). Generally, the alpha value of 0.70 is often considered the minimum for a newly developed instrument (Nunnally, 1978). Alphas between 0.70 and 0.80 are acceptable; between 0.80 and 0.90, very good (DeVellis & Thorpe, 2022). The results indicated that the entire PSSDQ consistently measures what it is intended to measure. However, the subscales of perceived stigma and stereotypes show slightly modest alphas. The average inter-item correlation falling in the range of 0.15–0.50 is recommended (Clark & Watson, 1995). In the current study, the average inter-item correlation of the entire scale was 0.26, perceived stigma 0.27, stereotypes 0.32, and stigmatizing practices 0.23. That is, the values were within the acceptable range, ensuring that the items were related but not redundant (**Table 3**).

Regarding the item analysis, item-level descriptive statistics and corrected item-total correlations were examined to evaluate the contribution of individual items to the overall scale reliability. Compared with the optimal item score of 5, the item mean varied from a minimum of 1.03 for item 9 to a maximum of 3.20 for item 6 (**Table 4**). Ideally, 50% of the items should have scores falling in the middle range of the response options, and 25% should fall at each extreme (DeVellis & Thorpe, 2022). Seven items (35%) of the PSSDQ scored between 2, 3, and 4, while the remaining (65%) scored at the lower extreme. The results suggested a skewed distribution of responses, primarily towards the lower end of the scale. Similar patterns of low scores were also found in the three subscales. Additionally, the standard deviation for the mean of each item was examined to determine item stability. In line with the item stability criterion (Howard, 1988), where items were considered stable if their standard deviation was less than one-half of their mean. In the results, 5 out of 20 items (i.e., items 4, 6, 9, 10, 13) in the current sample met this criterion, while the remaining items showed very slightly higher than this threshold. The results indicated that responses to these five specific items, as well as the remaining items, were relatively consistent and clustered near their mean scores. This suggests minimal variability in how the adolescents responded across the instrument. The corrected item-total correlations ranged from 0.16 to 0.63 for the entire scale (**Table 4**). Following the recommendations of a study (Ferketich, 1991), an individual item with corrected item-total correlations between 0.30 and 0.70 would make a good component of a summated rating scale. In this study, four items (items 4, 6, 9, and 19) with corrected item-total correlation less than 0.30 were found for the entire scale. On closer inspection, of the nineteen possible times that each item could have 0.30 to 0.70 correlations with the others, these four items met the criteria only twice or less (1/19, 2/19, 0/19, and 1/19, respectively). The results of low corrected item-total correlations and the very small proportion of times the item sufficiently correlated between 0.30 and 0.70 with other items were mutually supported the need to modify or delete these four items.

After identifying four problematic items, we sought to clarify whether participants interpreted these items as reflecting stigma. Therefore, the researcher conducted informal conversations with 10 adolescents who happened to attend their next scheduled follow-up visits. The conversations served to verify item comprehension and to guide necessary revisions. For item 4 ("Friends always ask me, 'Have you checked your blood sugar?' or 'Have you injected insulin?' or 'Can you eat this kind of food?'"), and item 6 ("When doing activities together, friends will observe or ask if I'm still feeling well").

Table 1. Demographic characteristics of participants.

Characteristics	Frequency (n)	Percentage (%)
Gender		
Female	54	60.0
Male	36	40.0
Age (years) / Mean (SD)=14.86(2.48)		
Education level		
Primary school	14	15.6
High school	70	77.8
Undergraduate	6	6.6
Duration of T1D diagnosis (years) / Mean (SD)= 6.58 (3.46)		
HbA1c (%) / Mean (SD)=8.81 (1.63)		
Good glycemic control (<7 %)	12	13.3
Poor glycemic control (≥7 %)	78	86.7
Insulin regimen		
Rapid-action insulin		
Aspart	90	100.0
Long-acting insulin		
Glargine U100	62	68.9
Glargine U300	19	21.1
Degludec	9	10.0

Table 2. Content validity evaluation.

Item	Rating*					Number of agreements (rating 3 or 4)	I-CVI ²
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5		
Item 1	4	4	2	4	4	4	0.80
Item 2	4	4	3	4	3	5	1
Item 3	3	3	3	4	4	5	1
Item 4	4	4	4	4	3	5	1
Item 5	4	4	4	4	3	5	1
Item 6	4	4	4	4	4	5	1
Item 7	3	4	4	4	3	5	1
Item 8	4	3	3	4	3	5	1
Item 9	4	4	3	4	4	5	1
Item 10	4	4	4	4	4	5	1
Item 11	3	2	3	4	4	4	0.80
Item 12	4	3	4	4	4	5	1
Item 13	4	4	4	4	4	5	1
Item 14	4	4	3	4	3	5	1
Item 15	4	4	3	4	4	5	1
Item 16	4	4	3	4	4	5	1
Item 17	4	4	4	4	4	5	1
Item 18	4	4	4	4	4	5	1
Item 19	4	4	4	4	4	5	1
Item 20	4	4	4	4	4	5	1
S-CVI/Ave ³							0.98
S-CVI/UA ⁴							0.90

*:¹Rating 3 or 4 referring to relevance, rating 1 or 2 referring to non-relevance; ²I-CVI = number of experts rating either 3 or 4 on the item/total number of experts; ³S-CVI/Ave = sum of the I-CVIs/total number of items; and ⁴S-CVI/UA = sum of I-CVIs valued at 1/total number of items.

Table 3. Descriptive statistics, Cronbach's alpha, and average inter-item correlation.

PSSDQ (number of items)	Min-max	Mean (SD)	Median (IQR)	Average item means (SD)	Cronbach's alpha	Average inter-item correlation
Entire PSSDQ (20)	22 - 67	36.36 (10.57)	34.00 (13.25)	1.82 (0.53)	0.86	0.26
Perceived stigma (7)	9 - 25	15.38 (4.46)	15.00 (6.25)	2.20 (0.64)	0.67	0.27
Stereotypes (4)	4 - 18	7.42 (3.16)	6.00 (4.00)	1.86 (0.79)	0.63	0.32
Stigmatizing practices (9)	9 - 27	13.56 (4.46)	12.00 (6.00)	1.51 (0.50)	0.72	0.23

Table 4. Item-level descriptive statistics, corrected item-total correlation, and Cronbach's alpha if item deleted.

Items	Mean (SD)	Corrected item-total correlation	Proportion of times*	Cronbach's alpha**
Item 1	2.20 (1.33)	0.43	8/19	0.85
Item 2	2.19 (1.30)	0.55	10/19	0.84
Item 3	1.54 (0.95)	0.59	12/19	0.84
Item 4	3.14 (1.40)	0.16	1/19	0.87
Item 5	1.64 (0.99)	0.50	10/19	0.85
Item 6	3.20 (1.38)	0.17	2/19	0.86
Item 7	1.74 (0.88)	0.50	9/19	0.85
Item 8	1.33 (0.85)	0.35	4/19	0.85
Item 9	1.03 (0.24)	0.26	0/19	0.86
Item 10	1.19 (0.45)	0.61	13/19	0.85
Item 11	2.49 (1.32)	0.63	13/19	0.84
Item 12	1.30 (0.77)	0.44	6/19	0.85
Item 13	2.89 (1.37)	0.55	7/19	0.84
Item 14	1.30 (0.66)	0.60	14/19	0.85
Item 15	1.67 (0.96)	0.62	12/19	0.84
Item 16	2.10 (1.32)	0.51	10/19	0.85
Item 17	1.29 (0.74)	0.59	12/19	0.85
Item 18	1.48 (0.99)	0.59	12/19	0.84
Item 19	1.13 (0.57)	0.21	1/19	0.86
Item 20	1.49 (0.90)	0.55	12/19	0.85

*: The proportion of times the item correlated between 0.30 and 0.70 with other items in the PSSDQ. **: If item deleted.

Not all adolescents felt their friends were stigmatizing them, but rather showing concern that made them feel supported. For item 9 ("Friends aren't very close to me because I have diabetes"), these adolescents did not perceive diabetes as an obstacle to developing or maintaining close friendships; their peers treated them similarly to others. Regarding item 19 ("When I inject insulin, some people misunderstand that I am using illegal drugs"), the adolescents reported that they did not experience negative stigma, although they acknowledged that some people occasionally looked at them with curiosity.

Discussion

The study examined the preliminary psychometric properties of the PSSDQ, an instrument developed to assess perceived social stigma among Thai adolescents with T1D. Content validation from five experts in diabetes care demonstrated strong agreement that the items adequately represented key aspects of stigma, including perceived stigma (awareness of negative attitudes), stereotyping (attribution of undesirable characteristics), and stigmatizing practices (discriminatory or exclusionary behaviors) (Schabert et al., 2013). The PSSDQ was developed based on the conceptual framework of diabetes-related stigma proposed by Schabert et al. (2013), which guided the identification of stigma domains and the item-generation process. Our intention in providing a single citation was to reflect the sole theoretical foundation underpinning the instrument. Because no additional conceptual models were used in developing the PSSDQ, the researcher believes that citing Schabert et al. (2013) alone most represents the nature of the scale. Even though the PSSDQ items were generated from a deductive method via the review of literature and existing instruments (Boateng et al., 2018; Giesler & Fabry, 2026), insights from adolescents allowed the items to reflect realistic contexts in which stigma may be experienced—an element that expert review alone might not fully capture. The low mean scores across the scale and subscales indicate that many adolescents in this sample reported relatively low levels of perceived stigma. This pattern should be interpreted in relation to the study context.

Participants were drawn from two university-affiliated diabetes clinics, where adolescents typically receive comprehensive multidisciplinary care and the structured Diabetes Self-Management Education and Support, or DSMES (Davis et al., 2022). These settings emphasize supportive communication, empowerment, and destigmatizing language. Previous research also shows that such positive interactions with healthcare providers could consequently enhance adolescents' self-management (Hung et al., 2020; Sangngam et al., 2023). Such supportive clinical environments—for example, the use of stigma-free and respectful language, providers' awareness of diabetes-related stigma, and advocacy for the rights and dignity of individuals with diabetes—may have contributed to the lower levels of perceived stigma observed in this study (Matsuzawa et al., 2022). This suggests that stigma levels among Thai adolescents are closely intertwined with the quality of care and support they receive. Similar patterns have been reported internationally, indicating that supportive healthcare environments play a critical role in mitigating diabetes-related stigma. For example, younger adults with type 1 or type 2 diabetes in Japan who received comprehensive support from healthcare providers—including technical guidance, emotional support, and health information—reported lower levels of perceived stigma (Yang et al., 2026). In contrast, Aboriginal youth with type 2 diabetes in Australia experienced heightened feelings of shame and stigma, which were partly attributed to limited diabetes education and unsupportive healthcare interactions (Weaver et al., 2022).

It is also plausible that the characteristics of these specialized clinical settings contributed to a degree of sample homogeneity. Adolescents who regularly attend university-based diabetes clinics—where providers are perceived as knowledgeable, respectful, and trustworthy, and where supportive clinic policies and environments facilitate access—may represent a subgroup of the broader T1D population that is more consistently engaged in care and has greater access to clinical support (Garney et al., 2024). Such homogeneity compared with a variety of community samples may help explain the clustering of scores at the lower end of the stigma scale, potentially resulting in a floor effect. The observed distribution may not generalize to adolescents who receive care in different settings or who face greater challenges in disease management. These groups might report higher levels of perceived stigma, and future research should consider including more varied populations. Regarding the average response patterns and variability of responses, the small standard deviations across PSSDQ items suggest that adolescents tended to respond similarly to many items. Though the consistency can be desirable, it may also indicate limited ability of the items to differentiate between varying levels of perceived stigma, particularly when item means are uniformly low (Tsang, Royse, & Terkawi, 2017). The pattern is consistent with the relatively homogeneous nature of our participants, which may not have reflected the full range of stigma experiences. When a sample lacks heterogeneity, even well-constructed items can show restricted variance (Streiner et al., 2015). In contrast, a larger sample produces greater variability in responses, enhancing the capacity of items to capture subtle differences in the construct (DeVellis & Thorpe, 2022).

Internal consistency for the overall scale was strong with a Cronbach's alpha of 0.86, suggesting that the items collectively assessed a cohesive construct. However, alpha is most meaningful when unidimensionality is established (Doval et al., 2023). Although the PSSDQ is grounded in a three-dimensional conceptual framework, factor analysis was beyond the current study's scope. Consequently, the internal structure and dimensionality of the scale require further empirical verification. Subscale alphas of perceived stigma and stereotypes were modest; however, the alphas remained in the acceptable range (0.50 to 0.60) for early-stage scale development, where item pools are still limited (Nunnally, 1978). Average inter-item correlations, which are a straightforward measure of internal consistency for these subscales, were within acceptable ranges. This indicates adequate coherence without redundancy (Clark & Watson, 1995). Additional items may strengthen these subscales in future versions (Doval et al., 2023; Schrepp, 2020). In spite of high expert ratings (CVI), four items showed low corrected item–total correlations, indicating a mismatch between their conceptual relevance and how adolescents interpreted them. Brief informal conversations with ten adolescents provided essential insight: items related to peer surveillance (items 4 and 6) were often viewed as signs of support rather than stigma, while items concerning friendships or public insulin injection (items 9 and 19) were perceived as less relevant sources of stigma. This diverges from prior evidence where adolescents reported discomfort, embarrassment, or fear of negative judgment—particularly in relation to public insulin administration (Brazeau et al., 2018; Elissa et al., 2017). These contextual differences highlight the need to refine the item wording by more explicitly emphasizing discomfort, embarrassment, or negative social reactions to better capture the intended construct. Such refinements also align with the understanding that stigma experiences are situated and may vary across social environments (Schabert et al., 2013; Eitel et al., 2024).

The insights from item performance and adolescent feedback highlight the potential value of the PSSDQ beyond methodological development. Understanding perceived stigma is vital as stigma is associated with self-management competency, mental well-being, behavior problems, and barriers to treatment compliance (Luo et al., 2025; Ortiz-Domenech & Cumba-Avilés, 2021). In response to these challenges, nurses play a critical role in assessing stigma experiences during routine clinical encounters, providing appropriate education to normalize diabetes self-management behaviors, and promoting supportive communication. Through counseling, advocacy, and coordination with families and schools, nurses can help

adolescents develop coping strategies, strengthen self-efficacy, and reduce the negative psychosocial impact of stigma (Alshammari et al., 2021; Nikitara et al., 2019). Unexpressed or subtle stigma may influence adolescents' willingness to disclose their condition, participate fully in social or school activities, or perform visible self-care behaviors such as insulin administration or glucose monitoring in public settings (Eitel et al., 2024; Embick et al., 2024). The availability of a validated instrument facilitates early identification of stigma and related psychosocial challenges, enabling healthcare providers to tailor education, provide psychosocial support, and implement interventions that address stigma within family, school, and healthcare contexts (American Diabetes Association, 2024; Young-Hyman et al., 2016). As part of routine psychosocial assessment, Thai nurses can use the PSSDQ to identify stigma, support interventions, facilitate communication, and prevent stigma-related barriers to diabetes care.

In particular, the findings of this research are applicable outside the Thai setting. For instance, the development and preliminary validation of the PSSDQ provides an example of how instruments can be designed to capture adolescents' lived experiences of stigma within specific sociocultural contexts. For international readers and nursing researchers, these findings highlight the importance of assessing stigma as a routine component of adolescent diabetes care and underscore the central role of nurses in addressing both psychosocial and clinical aspects of chronic disease management. The findings also reinforce the need for appropriate stigma assessment tools, as stigma experiences and their impact may vary across healthcare systems, cultural norms, and social support structures (Eitel et al., 2024). Integrating stigma assessment into routine care may help nurses worldwide identify at-risk adolescents, inform psychosocial interventions, and improve long-term diabetes self-management outcomes.

Conclusion

The study introduces the PSSDQ as the first instrument specifically developed to assess perceived social stigma among Thai adolescents with T1D. The initial psychometric findings demonstrate promising content validity and acceptable internal consistency. The instrument can be used to support healthcare providers—especially nurses—in addressing psychosocial barriers, guiding patient-centered communication, and promoting healthier self-management behaviors. Although the findings are encouraging, this preliminary evaluation also reveals areas needing further development. Items with low item-total correlations should be refined to enhance clarity, cultural relevance, and discriminatory ability. Although the scale was conceptualized to represent three stigma-related domains, further validation using exploratory factor analysis is essential to clarify its dimensional structure. Future studies should include more heterogeneous samples across various settings and sociodemographic backgrounds to enhance the generalizability and robustness of the instrument.

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AI statements

During the preparation of this manuscript, the authors used ChatGPT and Quill Bot in order to edit English grammar and improve readability and language. After using these tools, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Author's declaration

All the authors contributed to the conceptualization, methodology, data analysis, and preparation of the manuscript for international publication.

Availability of data and materials

The datasets analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethical clearance

The study obtained ethical approval from Mahidol University Multi-Faculty Cooperative IRB Review (MU-MOU CoA No. IRB-NS2024/860.0105).

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Publishers and journal's note

Although the psychometric testing focused on adolescents with T1D in Thailand, the results serve as a vital reference point for global advancements in diabetes-related research and instrument validation in the field. Nursing researchers can utilize the results of this analysis to enrich the existing body of knowledge within the field of diabetes care services.

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Authors' insight

Key points

- The study establishes the psychometric properties and cultural relevance of a novel scale designed to quantify perceived social stigma among Thai adolescents managing T1D.
- The research quantifies how intensive self-management regimes impact social identity and feelings of exclusion during a developmental stage defined by peer influence.
- A validated tool allows healthcare providers to screen for stigma-related stress, which is often a hidden barrier to treatment adherence and quality of life in adolescents with T1D.

Emerging nursing avenues

- What existing scales, if any, were considered or adapted before deciding to develop a new one specifically for Thai adolescents with T1D?
- What were the main cultural or social factors in Thailand that made it necessary to develop a new scale for perceived social stigma, rather than using an already established one from another country?
- What were the initial findings or challenges encountered during this preliminary psychometric testing that suggest further refinement or validation might be needed for the scale?

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