JAQMER journal of action qualitative & mixed methods research
Volume 5, Issue 1, 2026
Journal of Action Qualitative & Mixed Methods Research (JAQMER)

Adaptation, validity and reliability of hypoglycemic confidence scale into Turkish: Mixed methods research

Muslu Leyla*, Fatma Betül Özdemir**, Nusret Yılmaz***

To cite this article:

Muslu L, Özdemir, F. B. & Yılmaz, N. (2026). Adaptation, validity and reliability of hypoglycemic confidence scale into Turkish: Mixed methods research. *Journal Action Qualitative & Mixed Methods Research, Volume 5* (Issue 1), 39-55 [Online] www.jaqmeronline.com DOI: 10.5281/zenodo.19083879

Article Information: *Received: November 12th, 2025 Revised: January 7th, 2026 Accepted: March 5th, 2026*

Abstract. This study aimed to evaluate the validity and reliability of the Turkish version of the Hypoglycemic Confidence Scale (HCS) and to examine its applicability through qualitative analysis. A mixed-methods embedded design with embedded instrument development and validation variant was used for scale adaptation and validation. The sample consisted of 301 individuals with diabetes attending the endocrinology outpatient clinic of a university hospital. Data were collected using a sociodemographic form, the HCS, the Hypoglycemia Fear Scale, and a semi-structured interview form. Quantitative analyses included descriptive statistics, correlation analysis, Cronbach's alpha, exploratory and confirmatory factor analyses. Qualitative data were analyzed using thematic and descriptive methods. As a result, it was found that the Turkish version of the HCS is a valid and reliable instrument for assessing confidence in managing hypoglycemia among individuals with diabetes. The integration of qualitative findings further supports its clinical applicability. The scale may be useful in nursing education and counseling interventions aimed at strengthening hypoglycemia management confidence.

Keywords: Diabetes Mellitus; hypoglycemia; psychometrics; reliability; scale adaptation; self-confidence; validity

Introduction

Diabetes is a complex metabolic condition that has increased markedly across the globe, reducing quality of life and creating substantial economic pressures on health systems (International Diabetes Federation [IDF], 2025; World Health Organization [WHO], 2016). Today, diabetes stands among the foremost causes of illness and death and represents one of the most expensive challenges in global health (Bommer et al., 2018). Recent estimates show that approximately 589 million adults aged 20–79 are affected by diabetes, a number projected to rise to 853 million by 2050 (IDF, 2025). Such projections highlight the urgency of considering diabetes not merely as an individual medical issue but as a critical public health concern with far-reaching systemic consequences.

Hypoglycemia is among the most common acute complications of diabetes and may carry life-threatening risks for people with either type 1 or type 2 diabetes (American Diabetes Association [ADA], 2024). Studies suggest that nearly 45% of people with type 2 diabetes encounter hypoglycemic episodes, whereas those with type 1 diabetes may experience mild events approximately twice a week, with severe hypoglycemia reported in up to 30% of cases (Davies et al., 2022). Defined by plasma glucose levels falling below 70 mg/dL, hypoglycemia may lead to a wide range of problems such as cognitive

* Akdeniz University, leylamuslu@akdeniz.edu.tr , https://orcid.org/0000-0002-3253-3464
** Akdeniz University, fatocozdemir07@gmail.com , https://orcid.org/0000-0001-9723-7941
*** Akdeniz University, nusretyilmaz@akdeniz.edu.tr , https://orcid.org/0000-0002-7494-1562

impairment, behavioral changes, cardiac arrhythmia, visual disturbances, and in severe cases, fatal events (Cryer, 2011; Sircar et al., 2016; Türkiye Endokrinoloji ve Metabolizma Derneği [TEMD], 2020).

The consequences of hypoglycemia go beyond physical health, giving rise to major psychological and social difficulties, including anxiety, social withdrawal, reduced self-assurance, and depressive symptoms (Brown et al., 2019; Seaquist et al., 2013). Therefore, effective diabetes care should address not only blood glucose regulation but also the development of a sense of safety and confidence in dealing with possible hypoglycemic episodes. In this context, hypoglycemic confidence appears as a key psychological concept, representing individuals' self-efficacy and emotional strength in managing risks linked to hypoglycemia (Polonsky et al., 2017).

This study was conducted to adapt the Hypoglycemic Confidence Scale (HCS), first developed by Polonsky et al. (2017), into Turkish and to examine its validity and reliability. Furthermore, a complementary qualitative approach was integrated to examine the practical relevance and contextual applicability of the scale in real-life experiences.

Methodology

This research used a mixed-methods embedded design with embedded instrument development and validation variant, focusing on scale adaptation and validation within a broader framework to provide a comprehensive evaluation via quantitative step based on functionalist paradigm of post-positivism and qualitative phase based on interpretive paradigm of post-modernism (Gunbayi, 2020).

Sampling

The study was conducted between October 2019 and April 2020 at the Endocrinology and Metabolic Diseases Outpatient Clinic of Akdeniz University Hospital. The participants were adults aged 18–65 years who had been diagnosed with Type 1 or Type 2 diabetes for at least one year, were using insulin or a combination of insulin and oral antidiabetic medications, had no known psychiatric or cerebral disorders, were literate, and voluntarily agreed to participate in the study.

A priori power analysis was performed using G*Power 3.1.9.2 software with a 95% confidence level ($\alpha = 0.05$), 95% statistical power, and an effect size of 0.3, which indicated that a minimum of 254 participants would be required. In validity and reliability studies, it is generally recommended that the sample size be five to ten times the number of items (Esin, 2018). The measurement instrument examined in the study was the Hypoglycemic Confidence Scale (HCS), which consists of nine items.

However, in psychometric research, a sample of fewer than 200 participants is considered inadequate, and at least 300 participants are recommended to ensure a stable and valid factor structure (Şencan, 2005; Gregoire, 2017). Based on these recommendations, a purposive sampling method with a criterion-based approach was employed, and a total of 301 individuals diagnosed with diabetes were included in the quantitative section of the study.

Qualitative data were collected from 12 participants selected using the same criterion-based purposive sampling approach. The data collection process continued until no new data or emerging themes were identified, indicating that thematic saturation had been reached (Creswell & Creswell, 2017).

Data collection and analysis

Quantitative data were analyzed using IBM SPSS Statistics for Windows, Version 25.0, and confirmatory factor analysis was performed with AMOS 21.0. The significance level was set at $p < 0.05$. Normality was assessed using skewness and kurtosis values. Descriptive statistics (mean, standard deviation, frequency, percentage), exploratory and confirmatory factor analyses, item–total correlations,

and Cronbach's alpha coefficients were calculated. The Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity were used to evaluate the suitability of the data for factor analysis. Item discrimination was examined using independent samples *t*-tests comparing the upper 27% and lower 27% groups (Tavşancıl, 2010).

Test–retest reliability of the HCS was evaluated using the Pearson correlation coefficient. To assess temporal stability, the scale was re-administered to 75 participants approximately 2 weeks after the first administration. Qualitative data were analyzed thematically and descriptively using NVivo 12 software. Interview recordings were first subjected to descriptive analysis to summarize participants' expressions and provide an overall understanding of their experiences. Subsequently, codes were derived inductively from the data, and thematic analysis was conducted by two independent researchers using NVivo 12 software. Inter-coder reliability was established through comparison and discussion of independently generated codes, and consensus was reached on all themes.

Ethics statement

Permission to adapt and use the Hypoglycemic Confidence Scale (HCS) was obtained from the original developer, Dr. William H. Polonsky, prior to initiating the study. Ethical approval for the study was obtained from the university's ethics committee (Approval Date: 16.01.2019, No: 53). Institutional permission was also granted (Approval Date: 28.02.2019, No: E.28583). All participants provided written informed consent prior to data collection.

Findings

Participant characteristics

The study included 301 adults diagnosed with Type 1 or Type 2 diabetes, aged between 18 and 65 years (mean age = 51.31 ± 11.83). Of the participants, 55.1% were female and 44.9% were male. Most participants were married (82.7%) and had health insurance coverage (92.7%). Regarding educational background, 60.8% had completed high school, 26.6% held a bachelor's degree, and 12.6% had postgraduate education. A total of 42.2% were employed, while 57.8% were not working. In terms of clinical characteristics, 19.3% had Type 1 diabetes and 80.7% had Type 2 diabetes, with a mean disease duration of 13.45 ± 8.21 years. Of the participants, 27.6% reported a previous hospitalization due to diabetes-related complications. Regarding treatment, 62.8% were using insulin and oral antidiabetic medications, while 37.2% were using insulin only.

Adaptation of the hypoglycemic confidence scale into Turkish

The adaptation of the Hypoglycemic Confidence Scale (HCS) into Turkish was carried out in two stages:

- Assessment of psycholinguistic properties (language adaptation)
- Assessment of psychometric properties (validity and reliability analyses)

Language adaptation

The adaptation process followed the translation and cultural adaptation procedures recommended by the World Health Organization and the International Test Commission guidelines (Gregoire, 2017; World Health Organization [WHO], 2019). This included forward

translation, expert panel review, back translation, pre-testing and cognitive interviews, development of the final version, and documentation.

Psychometric properties of the hypoglycemic confidence scale

Validity analyses of the hypoglycemic confidence scale

The validity of the Hypoglycemic Confidence Scale (HCS) was evaluated through assessments of linguistic, content, criterion-related, and construct validity, as well as findings from individual interviews. Following the translation and adaptation procedures recommended by the World Health Organization, the final version of the scale was obtained. To establish content validity, expert opinions were obtained from 13 professionals (academics, physicians, and nurses). Content validity was evaluated using the Davis technique. The clarity scores for the items ranged between 0.84 and 1. According to Davis, the content validity index (CVI) should exceed 0.80. In this study, all item-level CVI scores were above 0.80, and the overall CVI was calculated as 0.95 (Davis, 1992).

Criterion-related validity of the HCS was established through item analysis based on extreme group means and concurrent validity. Table 1 presents the results of the independent samples t-test and item-total correlation values, indicating item discrimination power. A minimum item-total correlation value of 0.40 is required for adequacy (Şencan, 2005). All items showed item-total correlation values between 0.53 and 0.80. Based on these results, it can be concluded that all items were significantly related to the overall scale.

To determine item discrimination, raw scores were ranked from highest to lowest, and the mean scores of the lower 27% and upper 27% of participants were compared using an independent samples t-test. The difference in mean scores between these groups was statistically significant ($p < 0.05$), indicating satisfactory item discrimination (Table 1).

Concurrent validity was assessed using the Hypoglycemia Fear Survey (HFS), originally developed and psychometrically validated by Gonder-Frederick et al. (2011) and later adapted into Turkish by Erol (2009). A significant, moderate, and negative correlation was found between participants' HCS scores and their HFS scores ($r = –0.557$, $p < 0.001$), supporting concurrent validity.

Construct validity of the HCS was evaluated through confirmatory factor analysis (CFA) based on a theoretical single-factor model. The Kaiser–Meyer–Olkin (KMO) value was 0.913, which is considered "excellent" for conducting factor analysis (Tavşancıl, 2010). Additionally, Bartlett's test of sphericity was statistically significant ($p < 0.001$), confirming the suitability of the data for factor analysis. Confirmatory factor analysis further verified the single-factor structure of the 9-item scale (Figure 1). Model refinement was performed by correlating error terms with high modification indices (MI). Goodness-of-fit indices indicated good model fit: $\chi^2/df = 2.303$, GFI = 0.955, AGFI = 0.955, CFI = 0.971, NFI = 0.950, TLI = 0.960, IFI = 0.971, and RMSEA = 0.066 (Table 3).

Reliability analysis of the hypoglycemic confidence scale

Table 4 presents the means, standard deviations, and Likert scale distribution for the Turkish version of the HCS. The item means ranged from 1.97 ± 0.98 to 3.25 ± 0.83. None of the items had a standard deviation of zero. The overall mean score for participants diagnosed with either Type 1 or Type 2 diabetes was 2.76 ± 0.65, with a minimum and maximum score range of 1.05 to 4.00. An item-total correlation coefficient is considered acceptable when it is positive and greater than 0.25 (Şencan, 2005). As shown in Table 5, item-total correlation coefficients ranged between 0.53 and 0.80. A Cronbach's alpha coefficient between 0.80 and 1.00 indicates high internal consistency (Tavşancıl, 2010). The Cronbach's alpha for the HCS was calculated as 0.88, demonstrating that the scale has a high degree of

reliability. No substantial changes were observed in the overall reliability when any individual item was removed; therefore, no items were excluded from the final version of the scale.

For test–retest reliability, the HCS was re-administered to 75 participants after a two-week interval. Test–retest findings demonstrated strong temporal stability ($r = 0.794$, $p < 0.001$). Cronbach's alpha at retest was 0.85, indicating maintained internal consistency.

Evaluation of the HCS validity through qualitative data

To assess the construct validity of the Hypoglycemic Confidence Scale (HCS), semi-structured interviews were conducted with participants regarding their experiences and perceptions of hypoglycemic confidence. Qualitative findings confirmed that participants' narratives aligned closely with the intended constructs of the HCS, offering strong support for the scale's content and structural validity. The interviews revealed clear congruence between participants' interpretations and the theoretical framework underpinning each item. Through thematic analysis of the interview transcripts, five main themes and 21 subthemes were identified (Table 6). These themes reflect core dimensions of hypoglycemic confidence in daily life.

Main Theme 1: Feeling safe

Taking precautions "For example, we went to Ankara recently with my wife. I made sure to take precautions." (Participant 8)

Hypoglycemic confidence during sleep

"If my blood sugar is above a certain level, I don't eat before bed. But if it's low, I have a snack just in case." (Participant 11)

Hypoglycemic confidence in social settings
"I already tell my friends what to do in emergencies. They know what's needed." (Participant 12)

Measuring blood glucose
"The moment I feel safest is when I measure my blood sugar. That numerical value tells me." (Participant 2)

Hypoglycemic confidence when alone
"As long as I have my glucagon and glucometer, I feel safe—being alone or in a social setting doesn't change that." (Participant 12)
"I eat. I mean, I'm home alone… if they can't reach me…" (Participant 11)

Main Theme 2: Avoiding serious problems related to hypoglycemia

Trying to balance blood glucose

"I reduce the insulin a bit or eat something sugary. That's how we manage." (Participant 1)

Maintaining a careful diet
"I'm very careful about what and when I eat and drink. That's why I rarely experience hypoglycemia." (Participant 9)

Trusting healthcare professionals
"I'm always under control. I go to the doctor, I get checked regularly. They warn me if there's an issue." (Participant 9)

Experience and confidence
"I trust myself. After 13–14 years, I can tell when my blood sugar is dropping." (Participant 1)

Fear of hypoglycemia
"What I fear most is low blood sugar. I don't really care if it's 300. But when it's low, I struggle." (Participant 8)

Main Theme 3: Recognizing and managing hypoglycemia

Sensing the onset hypoglycemia
"I can easily tell when it drops. I sweat heavily. Right away, I know and take action." (Participant 2)

Having self-confidence
"I can recognize the symptoms, so I feel confident about responding." (Participant 6)

Utilizing technology
"I trust it because I use specific technology. It generally guides me, shows whether it's going to rise or fall." (Participant 12)

Keeping/consuming sugary foods
"I always carry sugar somewhere easy to reach. Just in case." (Participant 5)

Main Theme 4: Continuing life despite risks of hypoglycemia

Restriction of daily life
"I wanted to be a football player. I had the talent, but because of this disease, it didn't happen. We tried alternative paths." (Participant 12)

Impact of hypoglycemia on social life
"You feel like you're a half-person… Your social life weakens. I can't act like a normal person." (Participant 8)

Trying to keep blood glucose levels high
"I don't let it drop. I keep it high because I believe it's safer. The intervention when it's high is easier than when it's low." (Participant 2)

Experiencing exhaustion

"You go weak, your hands and feet fail. It's terrible." (Participant 9)
"You're drained. Nothing's left." (Participant 1)

Receiving education

"After the training I received, I'm no longer a new patient. I've had diabetes for 10–11 years now." (Participant 4)

Main Theme 5: Confidence from and in close relatives to manage hypoglycemia

Relatives' Trust in the individual
"I think they trust me. I've had extreme lows, highs, and after seven years of dealing with this, I believe I have control. They trust me." (Participant 5)

Individual's trust in relatives
"My only security is having my wife by my side. She knows my condition and checks on me at night. That's how we try to stay safe." (Participant 9)

The qualitative findings revealed a strong conceptual consistency between the Hypoglycemic Confidence Scale (HCS) and participants' lived experiences. The theme of *feeling safe* overlapped with the first five items, which assess confidence in managing hypoglycemia during exercise, sleep, driving, social situations, and when alone. The theme of *avoiding serious problems* was associated with the sixth item, while *recognizing and managing hypoglycemia* corresponded to the seventh, both reflecting self-efficacy in prevention and early intervention. The theme of *continuing life despite risks* aligned with the eighth item, whereas *confidence from and in close relatives* was linked to the ninth item. These findings strongly support the content and construct validity of the HCS.

Discussion

Although previous Turkish adaptations of the Hypoglycemic Confidence Scale have been conducted for specific diabetic populations—Type 1 (Şahin, 2019) and Type 2 diabetes (Büyükkaya Besen & Dervişoğlu, 2021)—the present study differs in scope and methodology. It includes both Type 1 and Type 2 diabetes patients, applies updated international adaptation guidelines, and incorporates a mixed-methods design that combines quantitative psychometric testing with qualitative validation. This broader and more integrative approach enhances the methodological rigor and practical applicability of the Turkish version for diverse clinical contexts.

Hypoglycemia, as an acute complication of diabetes, negatively impacts patients and their families in physical, psychological, and social aspects. Such adverse consequences also interfere with diabetes management and diminish both patients' and families' sense of confidence in coping with the disease (Ahola et al., 2016; Gonzalez et al., 2016; Herbert et al., 2015). Assessing the level of hypoglycemic confidence is thus an essential element of diabetes self-management. Identifying this level allows for the development of targeted strategies aimed at strengthening quality of life and, more importantly, improving hypoglycemic control (Polonsky et al., 2017). In this section, the findings from the Turkish adaptation and psychometric testing of the Hypoglycemic Confidence Scale (HCS) are discussed in relation to validation studies conducted in different cultural contexts.

Validity of the Turkish version of the HCS

Exploratory factor analysis revealed that the single factor accounted for 52% of the total variance. Subsequent confirmatory factor analysis supported the adequacy of this structure and demonstrated good overall model fit. This finding is consistent with the original validation by Polonsky et al. (2017), where the single factor accounted for 51–74% of the variance across different diabetic populations. Similar one-dimensional structures were also reported in Turkish validation studies by Şahin (2019) and Büyükkaya Besen and Dervişoğlu (2021). In the present study, factor loadings ranged from 0.50 to 0.87, aligning closely with the original findings (0.50–0.92). The model fit indices ($\chi^2/df = 2.303$, GFI = 0.955, AGFI = 0.955, CFI = 0.971, RMSEA = 0.066) further confirmed the structural validity of the scale within the Turkish sample.

Criterion validity was evaluated using the Hypoglycemia Fear Survey (HFS) as a benchmark. A significant, moderate, and negative correlation was found between HCS and HFS scores, indicating that higher confidence was associated with lower fear of hypoglycemia. This relationship supports the scale's

criterion validity and is consistent with the original and cross-cultural validations. In the Brazilian adaptation (Pastore, 2020) and in Polonsky et al.'s study (2017), similar negative correlations between confidence and fear were observed. These findings collectively confirm that the HCS demonstrates stable construct and criterion validity and that the association between confidence and fear remains consistent across different cultural contexts.

Reliability of the Turkish version of the HCS

Reliability analyses indicated that the Turkish version of the HCS is a consistent and stable measure. The Cronbach's alpha coefficient was 0.88, demonstrating strong internal consistency. This value is comparable to those reported in the original study (0.87–0.95) and in the Brazilian adaptation (0.84) (Polonsky et al., 2017; Pastore, 2020). Similar reliability coefficients were also observed in previous Turkish studies, ranging between 0.81 and 0.86 (Büyükkaya Besen & Dervişoğlu, 2021; Şahin, 2019). These findings suggest that the internal consistency of the scale remains stable across different cultural contexts.

Item–total correlations were satisfactory, and no item removal improved the overall reliability, indicating homogeneity among the scale items. The mean total score in the present study (2.76 ± 0.65) was slightly lower than that reported in the original validation study (3.05–3.09) (Polonsky et al., 2017), which may reflect contextual differences across samples. Test–retest findings further supported the temporal stability of the scale ($r = 0.794$). Overall, these results demonstrate that the Turkish version of the HCS is both internally consistent and stable over time.

Qualitative validity of the hypoglycemic confidence scale

The qualitative analysis provided additional support for the content and construct validity of the Turkish HCS. Participants clearly understood the items and expressed experiences consistent with the intended constructs of the scale. Thematic analysis identified five main themes—feeling safe, avoiding serious problems, recognizing and managing hypoglycemia, continuing life despite risks, and confidence from and in close relatives—which directly correspond to the nine HCS items. This conceptual overlap reinforces the scale's ability to capture real-world experiences of confidence in hypoglycemia management.

Participants' narratives reflected both emotional and behavioral dimensions of hypoglycemic confidence. Fear of hypoglycemia emerged as a prominent emotional response, often linked to previous negative experiences or concerns about nocturnal events. As one participant explained, "I once experienced hypoglycemia while sleeping and lost consciousness. Since then, I always check my blood sugar before bed." Similar concerns were documented by Brown et al. (2019), who found that nocturnal fear strongly influenced self-monitoring behaviors. Despite these fears, participants demonstrated a clear sense of self-efficacy: "After 13–14 years, I can tell when my blood sugar drops." This aligns with another study that highlighted experience and reflection as important contributors to hypoglycemic confidence (Brown et al., 2019).

Social and familial support also played a crucial role. Participants described reassurance in knowing that spouses or relatives could assist when needed: "My only trust is in my husband being with me. He knows my condition and checks on me at night." Such findings correspond with evidence showing that social support enhances self-efficacy and glycemic control in diabetes (Whittemore et al., 2018; Shao et al., 2017). Education further strengthened confidence; individuals who received structured diabetes training reported greater competence in recognizing and managing hypoglycemia, underscoring the link between knowledge and empowerment.

Limitations

This study was conducted in a university hospital setting, which may limit the generalizability of the findings to different healthcare contexts. Although test–retest reliability was evaluated over a two-week interval, longer-term stability of hypoglycemic confidence was not assessed. In addition, the data were based on self-report measures. While the mixed-methods design strengthened the overall evaluation of the scale, qualitative data were obtained from a smaller subgroup of participants.

Conclusion

The Turkish version of the Hypoglycemic Confidence Scale (HCS) demonstrated high internal consistency and sound construct and criterion validity, indicating that it is a reliable and valid measure for assessing confidence in hypoglycemia management. Qualitative findings further reinforced the conceptual validity of the scale, showing that participants' lived experiences were consistent with the theoretical constructions underlying the items. This integration of quantitative and qualitative evidence indicates that the Turkish HCS is both psychometrically sound and experientially meaningful. The validated HCS provides researchers and healthcare professionals with a practical, evidence-based tool to assess patients' confidence in managing hypoglycemia and to design targeted educational or counseling interventions that support self-management. Future studies with larger and more diverse samples are recommended to confirm its clinical applicability and to explore changes in confidence following structured educational programs.

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.Table 1.

Item analysis results of the hypoglycemic confidence scale items

n=301	Item-Total Score Correlation	Mean ± SD	P-Value
HIGO1	0,679	3,60±0,56 1,90±0,82	0,001
HIGO2	0,535	2,78±0,95 1,23±0,53	0,001
HIGO3	0,662	3,64±0,54 1,94±0,79	0,001
HIGO4	0,720	3,67±0,47 2,04±0,83	0,001
HIGO5	0,797	3,59±0,49 1,46±0,63	0,001
HIGO6	0,569	3,25±0,78 1,74±0,69	0,001
HIGO7	0,532	3,88±0,33 2,63±0,95	0,001
HIGO8	0,607	3,58±0,65 1,83±0,80	0,001
HIGO9	0,592	3,85±0,36 2,40±0,92	0,001

Table 2.

Exploratory factor analysis results of the hypoglycemic confidence scale (n=301)

Factors and Items	Explained Variance (%)	Eigenvalue (Λ)	Factor Loading
F1:			
HIGO5	52,351	4,712	0,862
HIGO4			0,803
HIGO1			0,769
HIGO3			0,754
HIGO8			0,696
HIGO9			0,683
HIGO6			0,656
HIGO2			0,631
HIGO7			0,619

Table 3.

Fit Indices of the confirmatory factor analysis model for the hypoglycemic confidence scale (n = 301)

Goodness-of-Fit Indices	Criteria for Excellent Fit	Criteria for Acceptable Fit	Before Modification	After Modification
CMIN/df	≤ 3	3–5	3.308	2.303
GFI	≥ 0.95	≥ 0.90	0.932	0.955
AGFI	≥ 0.95	≥ 0.90	0.887	0.955
CFI	≥ 0.97	≥ 0.95	0.947	0.971
RMSEA	≤ 0.05	0.05–0.08	0.088	0.066
NFI	≥ 0.95	≥ 0.90	0.926	0.950
TLI	≥ 0.95	≥ 0.90	0.929	0.960
IFI	≥ 0.95	≥ 0.90	0.947	0.971

Note. CMIN/df = chi-square divided by degrees of freedom; GFI = Goodness-of-Fit Index; AGFI = Adjusted Goodness-of-Fit Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; NFI = Normed Fit Index; TLI = Tucker–Lewis Index; IFI = Incremental Fit Index. Fit criteria were interpreted according to commonly accepted structural equation modeling guidelines (Hu & Bentler, 1999; Kline, 2016).

Table 4.

Distribution of item means and standard deviations for the turkish version of the hypoglycemic confidence scale (n=301)

Items	Not Confident at All n (%)	Slightly Confident n (%)	Somewhat Confident n (%)	Very Confident n (%)	Mean	SD
1	33 (10,96)	48 (15,95)	158 (52,49)	62 (20,60)	2,83	0,88
2	130 (43,19)	68 (22,59)	84 (27,91)	19 (6,31)	1,97	0,98
3	28 (9,30)	56 (18,60)	140 (46,51)	77 (25,58)	2,88	0,89
4	25 (8,31)	37 (12,29)	168 (55,81)	71 (23,59)	2,95	0,83
5	55 (18,27)	58 (19,27)	138 (45,85)	50 (16,61)	2,61	0,97
6	47 (15,61)	94 (31,23)	119 (39,53)	41 (13,62)	2,51	0,92
7	17 (5,65)	24 (7,97)	127 (42,19)	133 (44,19)	3,25	0,83
8	43 (14,29)	81 (26,91)	108 (35,88)	69 (22,92)	2,67	0,98
9	20 (6,64)	30 (9,97)	123 (40,86)	128 (42,52)	3,19	0,87

Table 5.

Distribution of item-total correlations of the hypoglycemic confidence scale (n=301)

	Item-Total Score Correlation	**Cronbach's Alpha if Item Deleted**
HIGO1	0,68	0,86
HIGO2	0,53	0,88
HIGO3	0,66	0,87
HIGO4	0,72	0,86
HIGO5	0,80	0,86

HIGO6	0,57	0,87
HIGO7	0,53	0,88
HIGO8	0,61	0,87
HIGO9	0,59	0,87
		General: 0,88

Table 6.

Main Themes and Sub-Themes of the Study

Main Themes	Sub-Themes
1. Feeling Safe	• *Taking Precautions* • *Hypoglycemic Confidence During Sleep* • *Hypoglycemic Confidence in Social Settings* • *Measuring Blood Glucose* • *Hypoglycemic Confidence When Alone*
2. Avoiding Serious Problems Related to Hypoglycemia	• *Trying to Balance Blood Glucose* • *Maintaining a Careful Diet* • *Trusting Healthcare Professionals* • *Experience and Confidence* • *Fear of Hypoglycemia*
3. Recognizing and Managing Hypoglycemia	• *Sensing the Onset of Hypoglycemia* • *Having Self-Confidence* • *Utilizing Technology* • *Keeping/Consuming Sugary Foods*
4. Continuing Life Despite the Risks of Hypoglycemia	• *Restriction of Daily Life* • *Impact of hypoglycemia on social life* • *Trying to Keep Blood Glucose Levels High* • *Experiencing Exhaustion* • *Receiving Education*
5. Confidence From and in Close Relatives to Manage Hypoglycemia	• *Family Members' Trust in the Individual* • *The Individual's Trust in Family Members*

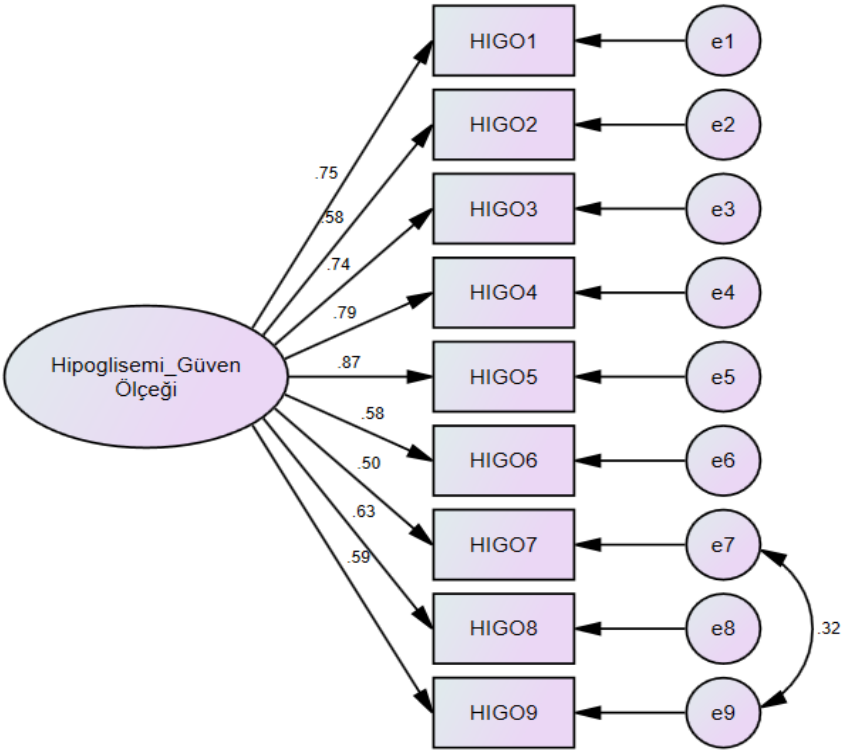

Figure 1. *Diagram of the Confirmatory Factor Analysis of the Hypoglycemic Confidence Scale*

Conflicts of interest

No conflicts of interest are declared by the author.

Author Contribution

Corresponding author Leyla Muslu & Fatma Betül Özdemir: Conceptualization, data refinement, research, methodology, original drafting, review, and editing

Nusret Yılmaz: Supervision, writing-reviewing and editing

Conflict of Interest Statement

This research has not received any specific grants from funding agencies in the public, commercial, or non-profit sectors.

Ethics Approval

In the writing process of the study titled **" Adaptation, validity and reliability of hypoglycemic confidence scale into Turkish: Mixed methods research**", scientific, ethical and citation rules were followed; It is committed by the author of this study that no falsification has been done on the data collected. It accepts that "Journal of Action Qualitative &; Mixed Methods Research and Editor" has no responsibility for all ethical violations that may be encountered, that all responsibility belongs to the authors and that the study has not been submitted to any other academic publication environment for evaluation.

Institutional review board (IRB) approval

Institutional Review Board (IRB) approval of this research was obtained from Akdeniz University ethics committee (Approval Date: 16.01.2019, No: 53).

Data Availability Statement

Anonymized data from this study can be used upon request, leylamuslu@akdeniz.edu.tr