



ORIGINALES

Validation of a nursing scale for assessing teachers' attitudes to diabetes care

Validación de una escala enfermera para evaluar las actitudes del profesorado en la atención diabética

Davinia Heras-Sevilla¹

Laura Armas-Junco²

María Fernández-Hawrylak¹

Laura Alonso-Martínez³

¹ Department of Educational Sciences, Faculty of Education of the University of Burgos. Spain.

² Department of Educational Sciences, Faculty of Education of the University of Oviedo. Spain.
armaslaura@uniovi.es

³ Nurse. Assistant Professor in the Area of Nursing. Department of Health Sciences, Faculty of Health Education of the University of Burgos. Burgos. Spain.

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ABSTRACT:

Objective: To validate the Inventory of Teachers' Negative Attitudes towards the Care of Students with Diabetes Mellitus type 1 (INAPAD) and to study its reliability using Cronbach's Alpha and McDonald's Omega coefficients.

Methods: This study describes the design and validation process of the INAPAD nursing scale in a sample of 382 teachers in the stages of Early Childhood Education, Primary Education, Compulsory Secondary Education, Baccalaureate and Vocational Training in a Spanish province. In order to validate the INAPAD, its reliability has been studied using Cronbach's Alpha and McDonald's Omega Coefficients. Hence, the construct validity has been evaluated through exploratory factor analysis by principal components and varimax rotation.

Results and conclusion: The findings obtained inform the viability of the INAPAD to be used as an effective instrument for the diagnosis of prejudice or predisposition of educators towards the care of learners with type 1 DM and for the prediction of the success of psycho-pedagogical measures and of the care for children and adolescents with diabetes.

Keywords: Child Health; Chronic Disease; Diabetes Mellitus Type 1; Health Education; Spain; Teacher Training and Validation Study (source: MeSH, NLM).

RESUMEN:

Objetivo: Validar el Inventario de Actitudes Negativas del Profesorado hacia la Atención del Alumnado con Diabetes Mellitus tipo 1 (INAPAD) y estudiar su fiabilidad mediante los coeficientes Alfa de Cronbach y Omega de McDonald.

Material y método: Este estudio describe el proceso de diseño y validación de la escala enfermera INAPAD en una muestra de 382 docentes en las etapas de Educación Infantil, Educación Primaria,

Educación Secundaria Obligatoria, Bachillerato y Formación Profesional en una provincia española. El INAPAD pretende valorar diversas dimensiones actitudinales sobre la atención educativa al alumnado con Diabetes Mellitus tipo 1, incidiendo tanto en el perfil docente y profesional del profesorado, como en las características y necesidades específicas de este alumnado. Por su parte, la validez de constructo se ha evaluado mediante análisis factoriales exploratorios por componentes principales y rotación varimax.

Resultados y Conclusión: Los resultados obtenidos informan de la viabilidad del INAPAD para ser utilizado como un instrumento útil para el diagnóstico del prejuicio o predisposición del profesorado hacia la atención del alumnado con DM tipo 1 y, por ende, para predecir el éxito de las medidas psicopedagógicas y los cuidados del niño y adolescente con diabetes.

Palabras clave: Educación en Salud; Enfermedad Crónica; España; Estudio de Validación; Diabetes Mellitus Tipo 1; Formación del Profesorado y Salud del Niño (fuente: DeCS, BIREME).

INTRODUCTION

Diabetes Mellitus (DM) is a serious and complex chronic disease that occurs when the pancreas does not produce enough insulin or when the body does not effectively use the insulin it produces^(1,2). It is a serious global health problem, with a high mortality and morbidity rate, and sufferers require hospitalisation more than twice as often as the general population, a figure that rises in older people⁽³⁾.

Diabetes Mellitus (DM) type 1 is a chronic degenerative metabolic disease due to the destruction of insulin-producing beta cells^(4,5).

It is estimated that 425 million people are currently living with DM worldwide⁽⁶⁾. By 2040, 10.4% of the world's population (642 million) is expected to have DM⁽⁷⁾. The incidence of diabetes has quadrupled in the last 30 years, in 1980 108 million people had diabetes and in 2014 it has risen to 422 million⁽⁸⁾. In addition, 95% of diabetes cases are type 2; it is more common in older people and is largely the result of physical inactivity. It is expected to be the seventh leading cause of death by 2030⁽³⁾.

Approximately 10% to 15% of school students in Spain have chronic health conditions, with diabetes being one of the most frequent due to the high incidence of new cases among students each year⁽⁹⁾. It is usually type 1, and it is estimated that 1,200 new cases occur each year among children under 14 years of age, with 17,221 Spanish children and adolescents (under 19 years of age) affected⁽¹⁰⁾. In Spain it is the second most common chronic disease, the prevalence in people over 14 years of age has increased from 4.1% in 1993 to 7% in 2014⁽¹¹⁾ and 10.3% of the population aged between 20 and 79 years is considered to be living with this disease⁽¹⁰⁾.

Due to this high incidence, there is a high likelihood that teachers will have students with type 1 DM in their classrooms during the course of their teaching practice, so they should ensure their full participation in all school activities⁽⁹⁾.

Several research studies in Spain report limitations in including students with type 1 DM in the school context and highlight the need to address this area of improvement in chronic or long-term illnesses neglected in schools, related to the lack of school nurses in learning environments⁽¹²⁻¹⁵⁾.

The aim of this study is to describe the design and construction process of the Inventory of Teachers' Negative Attitudes towards the Care of Students with Diabetes Mellitus type 1 (INAPAD). The aim is to provide a standardised instrument that allows

us to know the opinion and predisposition of teachers in the care and assumption of responsibilities for the effective inclusion of students with this type of chronic disease. It should be remembered that similar work has already been carried out among health staff and families^(12,16). This addresses the need to develop this type of research in schools, giving a voice to education professionals⁽¹⁴⁾.

MATERIAL AND METHODS

The sample was drawn from 68 schools of different educational stages in Burgos capital and province (Spain), using quota sampling⁽¹⁷⁾. Despite the non-probabilistic nature of this type of sampling, the sample obtained can be considered representative of the population being examined, given its size and the random way in which the subjects were selected. In this sense, the advance data provided by EDUCAbase (from the Ministry of Education and Vocational Training and the Ministry of Science, Innovation and Universities) show that in the 19/20 academic year in Burgos capital and province, 4836 teachers of EI, EPO, ESO, Bach and FP were counted, so that a sample size equal to or greater than 356 will allow a confidence level of 95% and a margin of error of 5%.

The final sample consists of 382 teachers aged between 23 and 64 years (M=42.8, SD=9.7 (Table 1).

Table 1. Sample characteristics

	<i>Frequency</i>	<i>Percentage</i>
Sex (n = 381)		
Male	135	35,43
Woman	246	64,57
Educational stages (n = 382)		
Pre-school and/or Primary Education	214	56,02
Secondary Education: ESO, Bach and FP	168	43,98
Environment (n = 382)		
Urban (Aranda de Duero, Burgos, Miranda de Ebro)	272	71,20
Rural	110	28,80
Ownership of centre (n = 382)		
Public	228	59,69
Concerted	154	40,31
Teaching experience with students with type 1 DM (n = 382)		
Yes	209	54,71
No	173	45,29
Tutor of students with type 1 DM (n = 377)		
Yes	93	24,67
No	284	75,33

Instrument and or techniques

A school nursing scale has been constructed *ad hoc* to determine the attitudes of teachers towards the educational and care needs of students with type 1 DM, in the

absence of instruments of these characteristics in the educational field. To this end, we have taken into account similar research and studies^(14,18), and recommendations from health and educational experts with experience in the care of children with type 1 DM.

The subject of the study was type 1 DM in schools in Burgos capital and province. A questionnaire was designed specifically for the research, adapting some items from a quality of life survey used in the Endocrinology and Nutrition Service of the HUBU, and from other instruments used in previous studies by the Diabetes Foundation^(12,13). Prior to its administration, a pilot group was asked to complete it in order to assess its content and functioning (an educational advisor, two teachers from the Hospital Classroom, a teacher from a school with students with type 1 DM, a nurse and a doctor from the Endocrinology and Nutrition Service of the Hospital de Burgos who adjusted the information on infant-juvenile DM), and some linguistic aspects were modified for the final version.

The INAPAD scale consists of 25 items referring to five attitudinal dimensions (D): D1. Teachers' self-perception of their skills and abilities related to the disease; D2. Attitudes related to the participation and inclusion of students with type 1 DM; D3. Attitudes towards learning and performance of learners with MD type 1; D4. Appreciation of teachers' professional responsibilities and competences; and D5. Awareness, interest and knowledge of type 1 MD.

It is a Likert-type scale, with five response alternatives of ordinal measurement from 1 to 5, where 1 expresses total disagreement with the proposed statement and 5 the highest degree of agreement. Of the 25 items, items 1, 2, 6, 8, 9, 11, 12, 14, 21 and 25 are reverse items, reflecting favourable attitudes towards the care of students with diabetes. For further analysis they need to be recoded by reversing the values (**Table 2**). A high score on the scale would indicate higher levels of unfriendly attitudes towards the care of students with type 1 DM.

Table 2. Inventory of Teachers' Negative Attitudes towards the Care of Students with Type 1 Diabetes Mellitus (INAPAD)

NO.	Dimension	Item
1*	D1	The interpretation of the results of the glucometer (glucose meter) is straightforward.
2*	D1	As a teacher, I am trained to care for students with type 1 diabetes.
3	D3	I believe that the disease affects the levels of attention paid in class by students with type 1 diabetes.
4	D2	Students with type 1 diabetes should be discouraged from participating in sporting activities.
5	D4	I am concerned about the legal responsibility of caring for students with type 1 diabetes in the classroom.
6*	D5	The school should provide explanatory talks for all students about diabetes.
7	D4	It is difficult to cater for students with health problems in the classroom.
8*	D5	It is essential to know basic information about diabetes.

9*	D1	feel able to inject insulin to students with diabetes.
10	D4	The care of students with type 1 diabetes is beyond my competence.
11*	D2	Students with diabetes can take part in the same extracurricular activities as their peers.
12*	D3	The academic performance of students with diabetes is similar to that of their peers.
13	D4	In order to provide adequate care for students with type 1 diabetes, it is necessary to have the presence of a technical assistance assistant.
14*	D3	Students with type 1 diabetes achieve the same learning as their peers.
15	D3	Students with type 1 diabetes feel ashamed of their disease.
16	D1	I am unable to respond to emergency situations arising from Type 1 diabetes.
17	D5	The disease affects the family life of students with diabetes.
18	D2	Students with type 1 diabetes should attend specialised educational institutions.
19	D3	Students with type 1 diabetes have greater difficulty in memorising content.
20	D4	It is dangerous to have students with health problems in the classroom.
21*	D5	Teachers of students with diabetes should have written information on the symptoms and steps to take in case of hyper- or hypoglycaemia.
22	D3	Students with diabetes have greater difficulty concentrating.
23	D5	It is advisable to conceal the illness of this type of pupil.
24	D1	I am concerned about the administration of insulin to students with diabetes.
25*	D2	Students with type 1 diabetes can play the same games as their peers.

**Reverse items*

We have opted for a non-experimental, cross-sectional research study, since the aim is to carry out an initial exploration of the different items (variables) that make up the scale⁽¹⁹⁾.

In a first phase, an initial proposal of 30 items was formulated. In a second phase, after a pilot test with a group of teachers (n=10), the scale was reduced to 25 items. In some cases, the wording of those statements that could affect the accuracy of the ratings was modified, due to difficulties in understanding their content, either because they contained more than one aspect of analysis in the same question, or because they used complex or unclear expressions.

Finally, the scale was administered to 450 teachers. For the analysis and validation of the scale, only those cases in which the entire scale was completed, i.e. all 25 items, were selected. Therefore, the final sample is composed of 382 teachers from the different educational levels mentioned above. The actions used to guarantee ethical principles in sampling and data collection, such as obtaining informed consent, were also included.

To determine the accuracy and coherence of the scale, measures of reliability and internal consistency were applied to the INAPAD, mainly Cronbach's alpha and McDonald's omega⁽²⁰⁾. Likewise, its validity was studied by carrying out exploratory factor analysis (EFA) by principal components and varimax rotation with Kaiser normalisation, omitting loadings of less than 0.4. It is worth highlighting the adequate sample size for this analysis, as it is more than 10 times the number of variables or items, specifically N=15.3k (21).

RESULTS

Reliability and internal consistency of the scale

The INAPAD has excellent reliability ($\alpha=0.816$; $\Omega=0.855$) for the set of variables. Likewise, the Spearman-Brown coefficient of unequal length yields a high degree of positive inter-item correlation of $r=0.780$, confirming the reliability of the scale.

The reliability study of the different dimensions shows the adequacy of the scale design. D1 ($\alpha=0.739$; $\Omega=0.831$) and D2 ($\alpha=0.765$; $\Omega=0.845$) showed good reliability; D3 ($\alpha=0.641$; $\Omega=0.784$;) and D4 ($\alpha=0.662$; $\Omega=0.823$) acceptable reliability and D5 ($\alpha=0.537$; $\Omega=0.745$) improved reliability.

The item-total linear correlation coefficients report the existence of correlations higher than 0.30 in 18 of the 25 items ($r \geq 0.311$), and correlations lower than this value in 7 items ($r \leq 0.247$) (**Table 3**). These results point to the convenience of reviewing the operability of items 3, 6, 8, 15, 17, 21 and 23, most of which correspond to D5, as evidenced by the reliability found in this dimension. It was decided, however, to work in parallel with the original scale (INAPAD-25) and with the scale resulting from the elimination of the 7 items (INAPAD-18), which will have 4 dimensions. The aim is to study the feasibility of maintaining D5, testing the model proposed in the design, as well as to assess the fit of the reduced version.

Table 3. Means and variances of the INAPAD-25, item-total correlation coefficients and α

Item	M	Var.	CI-T	A	Item	M	Var.	CI-T	α
1/D1	54,82	105,65	0,37	0,809	14/D3	55,54	105,26	0,54	0,804
2/D1	53,87	10,32	0,53	0,801	15/D3	54,78	107,35	0,25	0,814
3/D3	54,23	108,07	0,16	0,819	16/D1	54,23	102,36	0,43	0,805
4/D2	55,16	104,41	0,46	0,805	17/D5	53,59	111,24	0,04	0,823
5/D4	53,65	103,25	0,36	0,809	18/D2	55,59	105,78	0,40	0,808
6/D5	55,05	11,23	0,11	0,819	19/ D3	55,18	103,49	0,42	0,806
7/D4	54,08	103,79	0,37	0,808	20/D4	55,00	103,32	0,42	0,806

8/D5	55,56	109,27	0,23	0,814	21 /D5	55,70	11,28	0,19	0,815
9/D1	53,95	102,86	0,31	0,813	22/D3	54,71	103,59	0,40	0,807
10/D4	54,31	102,27	0,43	0,806	23/D5	55,69	109,34	0,21	0,814
11/D2	55,28	104,03	0,51	0,804	24/D1	54,03	10,95	0,45	0,804
12/D3	55,28	104,37	0,47	0,805	25/D2	55,39	104,84	0,48	0,805
13/D4	54,11	102,51	0,40	0,807					

IQ-T: Item-total correlation.

α = Cronbach's alpha (deleted item).

M = scale mean (deleted element).

Var. = scale variance (deleted item).

The INAPAD-18 has a higher reliability than the original scale ($\alpha=0.834$; $\Omega=0.871$). Similarly, the Spearman-Brown coefficient of unequal length yields a higher positive inter-item correlation of $r=0.813$, confirming the excellent reliability of the reduced scale. The item-total linear correlation coefficients report correlations higher than 0.30 ($r \geq 0.33$) for all items, being higher than 0.40 for 12 of the 18 items ($r \leq 0.41$) (**Table 4**).

Table 4. Means and variances of the INAPAD-18, item-total correlation coefficients and α .

Item	M	Var.	CI-T	α	Item	M	Var.	CI-T	A
1/ D1	40,19	81,38	0,39	0,827	13 /D4	39,48	78,68	0,41	0,826
2/D1	39,24	76,50	0,55	0,818	14/D3	40,91	81,67	0,52	0,824
4/D2	40,53	80,51	0,46	0,824	16/D1	39,60	78,39	0,45	0,824
5/D4	39,02	78,51	0,41	0,827	18/D2	40,96	82,17	0,38	0,828
7/D4	39,45	79,89	0,38	0,828	19/D3	40,54	80,41	0,38	0,828
9/D1	39,32	78,10	0,36	0,831	20/D4	40,37	79,85	0,41	0,826
10/D4	39,68	78,04	0,46	0,824	22/D3	40,08	81,10	0,33	0,831
11/D2	40,65	80,29	0,51	0,822	24/D1	39,40	76,44	0,51	0,821
12/D3	40,65	81,21	0,43	0,826	25/D2	40,76	81,08	0,48	0,824

IQ-T: Item-total correlation.

α = Cronbach's alpha (deleted item).

M = scale mean (deleted element).

Var. = scale variance (deleted item).

Validity of the original scale, INAPAD-25

Prior to factorisation, Bartlett's test of sphericity and the calculation of the Kaiser, Meyer and Olkin's measure of sampling adequacy (KMO) were applied. The results obtained in the sphericity test ($\chi^2=2477.287$, $g/300$, $p=0.0001$) reveal an adequate fit of the model. The high value of the KMO test (0.821) indicates the relevance of the matrix to be factored. The AFE returns, however, a factorial solution composed of seven factors, differing from the initial scale design. This solution explains 57.8% of the total variance. However, in addition to a high number of factors, two of them are composed of a reduced number of items (**Table 5**). On the other hand, the factorial solution is not convenient, as there are items that correlate with several factors. All this indicates the convenience of discarding the initial model (INAPAD-25) and carrying out the construct analysis on the reduced version of the scale.

Table 5. INAPAD-25 rotated component matrix.

Item	Dimension	Component						
		1	2	3	4	5	6	7
11	D2	0,790						
25	D2	0,720						
14	D3	0,715		0,337				
4	D2	0,610						
12	D3	0,588		0,515				
18	D2	0,453				0,377		
2	D1		0,767					
16	D1		0,697					
1	D1		0,663					
9	D1		0,591					
24	D1		0,586		0,407			
3	D3			0,798				
22	D3			0,796				
19	D3	0,345		0,532				
5	D4				0,657			
20	D4				0,613			
10	D4		0,433		0,566			
7	D4				0,549			
23	D5					0,732		
21	D5					0,661		
15	D3					0,511		
6	D5						0,801	
8	D5						0,741	
17	D5							0,734
13	D4				0,413			0,514

Validity of the reduced scale, INAPAD-18

The results obtained for the 18-item scale in Bartlett's test of sphericity and in the KMO index show a good fit of the model ($\chi^2=1901.902$, $gl=153$, $p=0.0001$) and, therefore, the relevance of the matrix to be factored (0.851). The AFE returns a factorial solution composed of four factors. These factors explain 53.3% of the total variance (**Table 6**), and are very close to the initial design without taking into account D5, since it has been suppressed.

Table 6. INAPAD-18 rotated component matrix.

Items	Dimension	Component			
		1	2	3	4
2	1	0,749			
6	1	0,693			
9	1	0,664			
1	1	0,629			
24	1	0,535		0,506	
11	2		0,792		
25	2		0,713		
4	2		0,672		
18	2		0,501		
20	4			0,655	
5	4			0,616	
13	4			0,598	
7	4			0,581	
10	4	0,414		0,561	
22	3				0,802
19	3				0,771
12	3		0,422		0,670
14	2		0,564		0,576

The resulting component matrix is adequate, although four items correlate above 0.40 in two factors. The factor structure obtained is largely in line with the initial design, with excellent reliability for each of the factors that make up a dimension or subscale of this instrument (Table 7).

Table 7. Structure of the INADAP-18 instrument after exploratory factor analysis.

Factor	INADAP-18 items	α	Ω	Correspondence with the initial design	Final dimension (Sub-scale-F)
F1	1, 2, 9, 16 y 24	0,739	0,831	Total, with the D1	Teacher's self-perception of their skills and capacity in relation to the disease
F2	4, 11, 18 y 25	0,720	0,828	Partial, with D2 (without item 14)	Attitudes towards participation and inclusion of students with type 1 DM
F3	5, 7, 10, 13 y 20	0,662	0,823	Total, with the D4	Views on professional responsibility and competences in the care of students with type 1 DM
F4	12, 14, 19 y 22	0,765	0,860	Partial, with D3 (adding item 14)	Attitudes towards learning and performance of students

Correlations between dimensions, original scale and downscaled scale

The results obtained show the existence of a very high correlation between the INAPAD-25 and the INAPAD-18 ($r=0.966$, $p=0.0001$), which evidences the relevance of the application of the latter for the same purposes for which the original scale was designed (**Table 8**). Likewise, the existence of an excellent degree of correlation between the INAPAD-18 and its four subscales is confirmed. In this sense, the correlation found between the INAPAD-18 and factors F1, F2, F3 is excellent ($r \geq 0.743$, $p=0.0001$), while the correlation found with factor F4 is very good, although lower ($r=0.665$, $p=0.0001$). The results obtained between the different factors reveal correlations between all of them, although mostly of a moderate nature. Thus, F1 has a medium correlation with F2 ($r=0.350$, $p=0.0001$), a correlation close to 0.50 with F3 ($r=0.498$, $p=0.0001$) and an improvable, although very significant correlation with F4 ($r=0.225$, $p=0.0001$). In the case of F2, adequate correlations were found with F3 and F4 ($r \geq 0.406$, $p=0.0001$). The correlation between F3 and F4 is close to 0.30 ($r=0.259$, $p=0.0001$). The fourth factor is the one that obtains the lowest levels of correlation with the rest of the factors. The relationship and interdependence of the different dimensions that make up this instrument is evident.

Table 8. Pearson correlations between the components or subscales and the INAPAD scales.

	F1	F2	F3	F4	INAPAD-18	INAPAD-25
F1	1					
F2	0,350**	1				
F3	0,498**	0,406**	1			
F4	0,225**	0,496**	0,259**	1		
INAPAD-18	0,743**	0,743**	0,755**	0,665**	1	
INAPAD-25	0,722**	0,714**	0,738**	0,632**	0,966**	1

* $p \leq 0,05$, ** $p \leq 0,01$

DISCUSSION

Type 1 DM is a chronic disease that affects lifestyle. In this sense, not only the patient has to cope with the situation, but also the family and the surrounding environment are affected. Coordination and communication between the family, health staff and the educational centre must be fluid, in order to better understand each situation and adopt the necessary psycho-pedagogical measures⁽³⁾. The aim is to combine education and health care in relation to sick pupils, attending to the special educational needs and care needs derived from type 1 DM in order to promote the integral development and social inclusion of the child^(4,9).

The lack of knowledge about the disease reveals the need to expand teacher training, as well as to explore attitudes, knowledge, fears, opinions and concerns about the care and inclusion of these students⁽²²⁾. To this end, this article has analysed the psychometric properties of the INAPAD.

The results obtained reveal a lack of operability of the original design of the scale. It is remarkable how the items included in the fifth dimension (D5. Awareness, interest and knowledge of type 1 DM) have a low item-total linear correlation. This may be mainly due to the informative nature of the statements of these items. For example, item 6 (The school should offer explanatory talks for all students about diabetes) reflects an opinion that can be shared indifferently by people with a lot and people with little knowledge about the inclusion of students with type 1 DM. Furthermore, the INAPAD-25, despite having a high KMO sample adequacy measure index, obtains an inadequate factor solution. Therefore, the original design of the scale, consisting of 25 items, should be discarded.

The findings of this study confirm the viability of the scale reduced to 18 items (INAPAD-18), both for its psychometric properties and for the high correlation with the original scale. Firstly, the excellent reliability of the instrument stands out, both for the INAPAD-18 as a whole ($\alpha=0.834$; $\Omega=0.871$) and for each of its subscales: F1) Teachers' self-perception of their skills and ability in relation to the disease ($\alpha=0.739$; $\Omega=0.831$); F2) Attitudes towards participation and inclusion of students with type 1 DM ($\alpha=0.720$; $\Omega=0.828$); F3) Opinions on responsibility and professional competences in the care of students with DM ($\alpha=0.662$; $\Omega=0.823$); F4) Attitudes towards learning and performance of students with diabetes ($\alpha=0.765$; $\Omega=0.860$). Also noteworthy is the adequate item-total linear correlation shown by the 18 items that make up the scale.

With respect to the AFE, not only are satisfactory values found in Bartlett's test of sphericity and in the KMO index, but also an adequate factorial solution is obtained with a high correspondence with the original design. On the other hand, as already indicated, the correlations found between the different subscales and the INAPAD-18 reinforce the validation of the INAPAD-18, demonstrating its viability and the interdependence of the different subscales of which it is composed.

The statistical tests applied have allowed us to find adequate levels of validity and reliability in the INAPAD. Nevertheless, it is essential to replicate the statistical analysis of this construct in new studies with participants from other geographical locations, or using other already validated scales related to inclusion as a comparative measure, such as the Inclusive Self-Adaptation Scale⁽²³⁾, the Educational Inclusion Questionnaire (CIE)⁽²⁴⁾, the Inclusion, Diversity and Equity Opinion Questionnaire for Educational Guidance Teachers (IDEC-O)⁽²²⁾ or the Questionnaire for Future Secondary School Teachers on Perceptions of Attention to Diversity^(18, 26). It is considered essential to extend the study of teachers' knowledge and skills on diabetes in general, type 1 DM in particular, and care for students with chronic diseases⁽²⁷⁻³⁰⁾. Future lines of research are proposed to further analyse these aspects, as well as to design and validate a specific scale on knowledge and skills related to the disease. The latter is of particular scientific interest, given the difficulties encountered in the validation of D5. It is proposed to extend the items referring to this dimension, based on the work of Gómez et al. and Asenjo and Oblitas^(25,26), and to subsequently test its psychometric properties.

CONCLUSION

This study has successfully validated the INAPAD school nursing instrument. The reliability of the INAPAD was assessed using Cronbach's Alpha and McDonald's

Omega coefficients, demonstrating its internal consistency and reliability as a measurement instrument. Exploratory factor analyses support the construct validity of the INAPAD, achieving the stated objectives and confirming its ability to assess various attitudinal dimensions related to the educational care of students with type 1 diabetes mellitus.

The results obtained support the usefulness of the INAPAD as an effective tool to diagnose teachers' bias or predisposition towards the care of students with type 1 DM. This instrument not only provides insight into the teaching and professional profile in relation to the specific characteristics and needs of students with diabetes, but also offers valuable information for predicting the success of psycho-pedagogical measures and care for children and adolescents with diabetes. INAPAD represents a valuable resource for improving the care and education of students with type 1 diabetes mellitus in the school setting, providing a solid basis for the design and implementation of effective nursing strategies to promote the health and well-being of these students. This study lays the foundation for future research in school nursing and the continued development of health education interventions aimed at optimising the care and inclusion of children and adolescents with diabetes in the educational setting.

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