THE APPRAISAL OF SELF-CARE AGENCY SCALE AND ITS RELATION TO HEALTH BEHAVIORS AND CONDITIONS IN OLDER ADULTS

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Abstract

The objective of this work was to contribute to the study of the validity of the "Appraisal of Self-care Agency Scale" (ASA scale) in older adults and to analyze its association with health-related behaviors and conditions. A questionnaire was constructed and applied to 165 elderly residents of Michoacán, Mexico. A confirmatory factor analysis of the scale's one-dimensional model was carried out, and also an analysis of internal consistency, as well as an analysis of the relationship with other variables based on group comparisons, exploring the effect of the elimination of inverse items. Overall, the reduced scale performed better although the one-dimensional model maintained a limited fit in the confirmatory factor analysis. Internal consistency was satisfactory in both scales (α coefficient= .806 and .826, respectively). In addition, some important group comparisons were identified with anthropometric measurements. In conclusion, tests were found supporting the validity of the ASA scale in older adults, although more evidence is still needed regarding its construct and criterion validity.

KEYWORDS: *self-care, health promotion, behaviors, healthy lifestyle, health status, aged.*

Resumen

Este trabajo tuvo por objetivo contribuir en el estudio de la validez de la "Escala de valoración de la capacidad de autocuidado" (escala ASA) en adultos mayores y analizar su asociación con conductas y condiciones relacionadas con la salud. Se construyó un cuestionario y se aplicó a 165 adultos mayores residentes de Michoacán (México). Se realizó un análisis factorial confirmatorio del modelo unidimensional de la escala, así como un análisis de consistencia interna, así como un análisis de relación con otras variables basado en comparaciones de grupos, explorando el efecto de la eliminación de ítems inversos. La escala reducida tuvo mejor desempeño en general, aunque el modelo unidimensional mantuvo un ajuste limitado en el análisis factorial confirmatorio. La consistencia interna fue satisfactoria en ambas escalas (Coeficiente α= 0,806 y 0,826, respectivamente), además se identificaron algunas comparaciones de grupo importantes con

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mediciones antropométricas. En conclusión, se encontraron pruebas que apoyan la validez de la escala ASA en adultos mayores, aunque continúa pendiente generar más evidencia en cuanto a su validez de constructo y criterio.

PALABRAS CLAVE: *autocuidado, promoción de la salud, conducta, estilo de vida saludable, estado de salud, adulto mayor.*

Introduction

In Mexico, the health of the elderly is a very important issue for health policies and systems, since this population can be considered vulnerable in various aspects. Regarding health, this population is more vulnerable both to communicable diseases (CD) and chronic non-communicable diseases (NCDs). This becomes important in the context of the demographic and epidemiological transition that the country is experiencing, which leads to high economic implications for individuals, their families, health systems and society (Gómez-Dantés *et al.*, 2016; Kuri-Morales, 2011; Lozano *et al.*, 2014; Omran, 1971).

According to the socio-ecological model, in the adoption of healthy behaviors, several contextual factors may come into play at higher levels than the individual and the immediate social environment, such as those related to the educational system, the health system and the political, economic and social structure (Bronfenbrenner, 1977; McCormack, Thomas, Lewis and Rudd, 2017). This can be particularly important in countries like Mexico, which has a fragmented health system that implies the existence of a mosaic of health service delivery systems, depending of the persons' employment status and payment capacity. Briefly, the public system is subdivided into two large sectors: that aimed at the population with formal employment through social Security schemes, being the most important the Instituto Mexicano del Seguro Social [Mexican Social Security Institute] (IMSS); and that aimed at the population without formal employment, mainly in charge of of the Secretaría de Salud [Ministry of Health] (SSA) through the Instituto de Salud para el Bienestar [Institute of Health for Well-being] (INSABI) and the Servicios Estatales de Salud [State Health Services] (SESA), although there are other schemes such as the IMSS-Bienestar program (González-Block et al, 2020).

Based on the results of the Encuesta Nacional de Salud y Nutrición [National Health and Nutrition Survey] (ENSANUT) (National Institute of Public Health [INSP], 2020), it has been identified that great challenges persist in older adults in terms of nutritional and health conditions. In particular, the high prevalence of NCDs such as diabetes, hypertension and dyslipidemias in this age group stands out. Likewise, great challenges have been identified in terms of the quality of the health system's response to these health problems, reflected through various indicators of aspects such as carrying out preventive actions, timely medical diagnosis, patients' self-care, and the control of these health conditions; that also present significant inequalities and inequities associated with sociodemographic, socioeconomic and cultural factors (Campos, Hernández, Pedroza, Medina, &

Barquera, 2018; Flores-Hernández *et al.*, 2015; Rojas *et al.*, 2018; Salinas, Manrique, de la Cruz, & Rivera, 2019; Villalobos *et al.*, 2019).

With this background, the importance of promoting the involvement or commitment of older adults in taking care of their own health has been emphasized, that is, their capacity for self-care regarding the adoption of healthy behaviors and habits based on evidence to maintain or improve their health conditions (Barello, Graffigna, & Savarese, 2014; Battersby *et al.*, 2010; Weinger, Beverly, & Smaldone, 2014). These actions could also allow better results in terms of costs from different perspectives (for the patient, the health system, or society).

There are several conceptual and instrumental approaches to self-care from different disciplines (Richard & Shea, 2011; Van De Velde *et al.*, 2019; Wilkinson & Whitehead, 2009). One of the most notable theoretical developments is the self-care deficit theory, which is framed in general nursing theory and defines the term "self-care agency" as the ability of people to participate in their own care (Orem, 2001). This theory has allowed the development of various instrumental approaches in various countries around the world (Matarese, Lommi, & De Marinis, 2017; Muñoz, Cabrero, Richart, Orts, & Cabañero, 2005).

One of these approaches is the "Appraisal of Self-care Agency Scale" (ASA Scale), initially developed in English and Dutch and proposed as a 24-item scale for generic use. Later it has been adapted to other languages including Spanish (Evers, Isenberg, Philipsen, Senten, & Brouns, 1993). However, it has not been possible to clearly define the underlying dimensions, which is why it has been recommended to consider them as one-dimensional. Some works have contributed in this field, such as the definition of a shorter version of 15 items in three dimensions (Sousa *et al.*, 2010) which, although its validity has been analyzed in other countries and languages (Alhambra-Borrás, Durá-Ferrandis, Garcés-Ferrer, & Sánchez-García, 2017; Guo *et al.*, 2017), the content validity could be compromised in addition to keeping inverse items, which are not currently recommended (Vigil-Colet, Navarro-González, & Morales-Vives, 2020). Furthermore, there is limited validity evidence based on the relationship with other variables.

The first Spanish version was developed and studied in Mexico (Gallegos, 1998) and later, this version was adapted in Colombia, keeping three inverse items (Manrique & Velandia, 2009; Velandia & Rivera, 2009). This version has also been studied in other Latin American countries such as Chile and Costa Rica (Espinoza *et al.*, 2020; Leiva, Cubillo, Porras, Ramírez, & Sirias, 2016a, 2016b). However, like the versions in other languages, the dimensions of the scale have not been clearly identified, in addition, they have limited evidence of validity based on other variables relationships.

The objective of this work is to study the psychometric properties of the one-dimensional model of the Spanish version of the ASA Scale, as well as to analyze its relationship with other variables (behaviors and health-related conditions) in Mexican older adults, exploring the performance of a short version based on the elimination of inverse items.

Method

Participants

The questionnaire was applied to 165 older adults. Table 1 shows the sociodemographic characteristics, health-related behaviors (protective and risky) and health conditions of the people interviewed. In the sample, the majority were women and the predominant age category was 60-70 years. Regarding affiliation to health institutions, the majority were affiliated with the services of the Secretaria de Salud de Michoacán (SSM). Regarding health-related behaviors, about half stated that they never exercised. In addition, some participants were identified who reported consuming alcoholic beverages and smoking. Regarding the health conditions related to metabolic diseases, taking the body mass index (BMI) as an indicator, the vast majority of the participants were in pre-obesity and obesity conditions. Furthermore, in terms of risk levels identified based on waist circumference, a high proportion of the participants were identified as being at high risk. Important proportions of the sample declared having NCDs (hypertension and diabetes).

Table 1
Characteristics of the participants (*N*= 165)

Variable	*n*	%
Socio-demographic characteristics		
Sex		
Female	114	69.1
Male	51	30.9
Age		
60-65	58	35.2
66-70	47	28.5
71-75	28	17.0
76-80	17	10.3
> 80	15	9.1
Level of educational attainment		
No basic education	39	24.2
Primary	64	39.8
Secondary	18	11.2
High school or technical degree	17	10.6
Bachelor's degree	23	14.3
Civil status		
Single	72	44.2
With a partner	91	55.8
Health service affiliation[a]		
Ministry of Health of Michoacán (SSM)	94	61.8
Mexican Social Security Institute (IMSS)	40	26.3
Institute of Security and Social Services for State Workers (ISSSTE)	17	11.2
Other	1	0.7

Variable	*n*	%
Health behaviors		
Frequency of physical exercise		
Never	70	49.6
Once a week	10	7.1
Two or three times a week	27	19.1
Daily	34	24.1
Alcohol consumption		
Yes	30	18.2
No	135	81.8
Smoke		
Yes	18	10.9
No	147	89.1
Health conditions		
Body Mass Index (BMI)[b]		
Low weight (≤ 18,49)	3	2.0
Normal (18,50 - 24,99)	28	18.8
Pre-obesity (25,00 - 29,99)	63	42.3
Obesity (>30,00)	55	36.9
Waist circumference		
< 80 cm	14	8.5
81-85 cm	9	5.5
86-90 cm	19	11.5
91-95 cm	34	20.6
96-100 cm	31	18.8
> 100 cm	44	26.7
Hypertension		
Yes	81	50.3
No	80	49.7
Diabetes		
Yes	49	31.2
No	108	68.8
Self-perception of physical health status		
Bad	20	12.5
Regular	78	48.8
Good	62	38.8
Self-perception of mental health status		
Bad	10	6.2
Regular	57	35.2
Good	95	58.6
Depression		
Yes	44	29.7
No	104	70.3

Notes: The SSM is one of the State Health Services (SESA) and provides health care to the State of Michoacán population without formal employment); the IMSS and ISSSTE are social security schemes aimed at provide health services for people with formal employment. BMI= Kg/m^2

Instruments

  a) *Appraisal of Self-care Agency Scale* (ASA) (Evers *et al.*, 1993). A slight modification of the Spanish version adapted in Colombia was used (Manrique & Velandia, 2009). This version is made up of 24 items that evaluate the frequency in which self-care activities are carried out at four levels: 1= never, 2= almost never, 3= always, and 4= almost always; It is worth mentioning that three items have an inverse sense (items 6, 11 and 20) and the score on this scale has a minimum of 24 and a maximum of 96.

  b) *Ad hoc questionnaire for the exploration of behaviors and health conditions of the elderly*. This questionnaire included ten items to gather information regarding the following: 1) healthy behaviors, specifically the frequency with which older adults performed physical exercise at four response levels (1= never, 2= once a week, 3= two or three times a week, and 4= daily); 2) risk behaviors, specifically, the consumption of alcohol and tobacco was asked at two response levels (1= Yes, 2= No); 3) health conditions, it was asked about previous diagnoses of NCDs (diabetes, hypertension) and mental illnesses (depression); and 4) the perception of the respondents regarding their state of physical and mental health in three response levels (1= Bad, 2=Regular, and 3= Good).

  c) To measure body weight, an analog scale (Taurus, Obeliz, capacity 130 kg) was used.

  d) To measure height, a wall stadiometer (SECA 206, capacity 220 cm) was used.

  e) To measure the waist circumference, an anthropometric tape with millimeter precision (SECA 201) was used.

Procedure

  An observational cross-sectional study was carried out. The study population was older adults residing in Morelia, Michoacán, Mexico and assigned to the Group of Older Adults (GAM) organized by the Secretaría de Salud de Michoacán [Ministry of Health of Michoacán] (SSM) to participate in recreational and health promotion activities. A sample of participants was obtained by convenience. Using this approach, an event was organized for the GAM. This event was held in November 2015 and took place at the Urban Health Center "Dr. Juan Manuel González Ureña", which is a primary-care services center of the SSM.

  The questionnaire was given to the participants in printed form to be filled out by them in a private place. Help was provided to participants upon request. After solving the questionnaire, their waist circumference, body weight, and height were taken using the aforementioned instruments.

  From weight and height measurements, the body mass index (BMI) was calculated. With this information, comparison groups were obtained considering the following obesity categories based on BMI (Kg/m^2): low weight ($\leq$ 18.49),

normal (18.50-24.99), pre-obesity (25.0-29.99), and obesity (>30.00). Besides, six groups of waist circumference were obtained.

Prior to fieldwork, the research protocol was approved by the Ethics Committee of the Facultad de Enfermería, Universidad Michoacana de San Nicolás de Hidalgo (Approval number: CIB / FacEnf / 036/2015).

Data analysis

The distribution of the scale items was analyzed through descriptive statistics of mean and standard deviation, as well as shape indicators such as skewness and kurtosis.

It was performed a confirmatory factor analysis (CFA), through which the one-dimensional model of the ASA scale was tested using the weighted least square mean and variance (WLSMV) as estimation method, which considers the ordinal nature of the items. As for fit indices of the one-dimensional model, the chi-square statistic (χ^2, fit criterion $p>$ .05); the comparative fit index (CFI; acceptable fit criterion> .95); the standardized root mean square residual (SRMR; acceptable fit criterion < .05 and optimal < .08); and the root mean square error of approximation (RMSEA; acceptable fit criterion < .07) were obtained. As an approach to assessing the reliability of the ASA scale, internal consistency was analyzed by Cronbach's alpha.

Descriptive statistics were made of the scores obtained with the original ASA scale (24 items) as well as a reduced version (21 items) based on the elimination of inverse items. The Kolmogorov-Smirnov and Shapiro-Wilk statistical tests were performed to test the normality of the distribution of the global score of both scales in the sample (IBM, 2018; Sprent & Smeeton, 2001).

The analysis of the relationship of the ASA scale with other variables was carried out mainly through comparison of groups. Statistical significance analysis of the comparison of groups was performed through non-parametric statistical tests (Sprent & Smeeton, 2001). For this latter, in the comparison of self-care capacity in two groups, the median test (MT) and the Mann-Whitney U test (UMW) were used. In more than two groups, the median test (MT) and the Kruskal Wallis test (KWT) were used for groups of nominal categories and the Jonckheere-Terpstra test (JTT) for groups of ordinal categories. Likewise, the relationship with other variables was analyzed through effect size calculations, using Cohen's *d* for the comparison of two groups and the η^2 for the comparison of three or more groups (Dominguez-Lara, 2018).

For data analysis, the SPSS v. 25 for the management of the information collected, descriptive analysis, internal consistency, and comparison of groups. To perform the CFA analysis, the RStudio program was used, using the *psych*, *semTools*, *lavaan*, and *semPlot* packages.

Results

Self-care ability

The descriptive results of the scores obtained for each item of the ASA scale are shown in Table 2.

Table 2
Descriptive statistics of the ASA Scale items in the participants

Item	M	SD	Asymmetry	Kurtosis
1. As circumstances change, I make adjustments to maintain my health	2.98	0.78	-0.81	0.79
2. I check to see if the activities I normally do to stay healthy are good	3.04	0.67	-0.89	2.00
3. If I have trouble moving or getting around, I manage to get help	2.41	1.07	-0.09	-1.30
4. I can do what is necessary to keep the environment where I live clean	3.14	0.43	0.33	4.45
5. First, I do whatever it takes to stay healthy	3.05	0.62	-1.11	3.48
6. I think I lack the necessary strength to take care of myself as I should*	2.30	1.19	0.22	-1.49
7. If I want, I can find ways to take care of my health and improve the level of health I have now	3.09	0.62	-0.83	2.56
8. I change how often I shower to stay clean	2.90	0.78	-0.84	0.82
9. I make changes to my food to maintain my appropriate weight	2.85	0.91	-0.81	-0.01
10. When there are situations that affect me, I handle them so that they do not affect my way of being	3.03	0.74	-0.95	1.44
11. I think about exercising and getting some rest during the day, but I don't have time to do it*	2.68	1.03	-0.46	-0.92
12. When I need help, I can turn to my old friends	2.68	0.93	-0.67	-0.42
13. I can get enough sleep in order not to feel tired	2.89	0.85	-0.76	0.25
14. When they give me guidance on my health, I ask them to clarify what I do not understand	2.96	0.71	-1.18	2.28
15. I examine my body to see if there is any change	2.88	0.79	-0.91	0.86
16. I have been able to change deeply ingrained habits in order to improve my health	2.90	0.78	-0.91	0.94
17. When I need to take a new medicine, I turn to my health professional for information about side effects	2.86	0.83	-0.99	0.75
18. I am able to take steps to prevent my family and I from being in danger.	3.07	0.54	-1.11	5.37
19. I am able to evaluate how well what I do helps me to stay healthy	2.95	0.62	-1.35	3.71
20. Because of my daily activities, it is very difficult that I have time to take care of myself*	2.48	1.10	-0.11	-1.32
21. If my health is affected, I can get information to know what to do ...	3.02	0.69	-1.13	2.49

Item	M	SD	Asymmetry	Kurtosis
22. If I can't take care of myself, I seek help	2.87	0.76	-1.11	1.41
23. I can set aside some time for myself	2.95	0.65	-1.32	3.29
24. Despite my limitations in moving, I am able to take care of myself as I like	2.98	0.65	-1.17	2.95

Note: *Items with inverse sense.

The results of the factor loads obtained in the CFA are shown in Table 3. In the 24-item ASA scale, items 6, 8, 11, and 20 showed low factor loads (<0.300). Considering the current recommendations, it was proposed to eliminate the items with inverse loads (6, 11, and 20) to remain as a reduced scale of 21 items, whose factorial loads were higher than the previously mentioned criterion (except for item 8).

Table 3

Standardized factor loads obtained with the CFA of the one-dimensional model for the original and reduced ASA scales

Item	ASA Scale - original (24 items)	ASA Scale - reduced (21 items)	Item	ASA Scale - original (24 items)	ASA Scale - reduced (21 items)
1	.605	.603	13	.331	.337
2	.613	.611	14	.738	.735
3	.404	.397	15	.607	.609
4	.340	.338	16	.577	.580
5	.464	.471	17	.650	.656
6	**.246**	-	18	.763	.763
7	.375	.370	19	.626	.633
8	**.274**	**.260**	20	**.250**	-
9	.518	.520	21	.581	.577
10	.341	.347	22	.441	.432
11	**.188**	-	23	.580	.586
12	.409	.413	24	.614	.614

Notes: ASA= Appraisal of Self-care Agency. Factor loads were obtained with the one-dimensional model of the original and reduced ASA (without releasing covariances between item errors). Results indicating low factor saturation (<0.300) are shown in bold.

The results of the fit indices obtained for both scales in the CFA are shown in Table 4. Compared with the original ASA (24 items), the reduced ASA (21 items) presented better fit indices. In addition, the addition of two covariances between items errors allowed these indices to improve in both scales so that the best fit was obtained with the reduced ASA considering the covariance between item errors. The elimination of inverse items also allowed a slight improvement in Cronbach's alpha, for the original ASA scale it was .806, while for the reduced ASA scale it was .826.

Table 4

Fit indices obtained in the CFA for the one-dimensional model of the original and reduced ASA scales

Scale	Item error covariances	χ^2	df	CFI	SRMR	RMSEA
ASA Scale -original (24 items)	None	472.61***	252	0.839	0.102	0.073
	e6-e20 / e14-e21	447.57***	250	0.856	0.098	0.069
ASA Scale - reduced (21 items)	None	378.36***	189	0.858	0.099	0.078
	e14-e21 / e15-e16	355.12***	187	0.874	0.096	0.074

Notes: ASA= Appraisal of Self-care Agency. Only the two main covariances between item errors were considered. ***$p< 0.001$.

Regarding the descriptive statistics of the global scores obtained for both scales, for the 24-item ASA scale the following were obtained: $M= 68.95$, $SD= 8.24$, asymmetry= -0.57 and kurtosis= 2.48; while for the 20-item ASA scale the following were obtained: $M= 61.48$, $SD= 7.43$, Asymmetry= -0.57 and Kurtosis= 3.05. The values obtained for skewness and kurtosis seem to show that they have slightly left-loaded and leptokurtic distributions. The inferential normality tests carried out showed statistically significant values ($p< .001$) for both scales and in both statistical tests (SW, KS), so it is inferred that the scale scores are not normally distributed in the population.

The results regarding the relationship analysis between the scores obtained with both ASA scales with health-related behaviors and conditions are shown in Table 5. The relationship pattern with other variables was similar in both scales. Regarding the relationship with health behaviors, no statistically significant comparison of groups was found ($p> .05$); however, for the descriptive comparison based on effect sizes, results were found that could be considered important, mainly in the comparisons of smoking and alcohol consumption groups ($d> 0.100$).

Regarding the relationship of the scores obtained with both ASA scales with health conditions, a statistically significant comparison of groups ($p< .05$) was found with the waist circumference (JTT test). Furthermore, in the comparison by BMI categories, although it was not statistically significant ($p> .05$), in the descriptive comparison based on effect sizes a result was found that can be considered important ($\eta^2 > 0.040$).

Table 5
Relationship of the ASA Scale with health behaviors and conditions in the participants (n= 165)

Variables		n	%	ASA Scale -original (24 items)				ASA Scale -reduced (21 items)			
				M	SD	p	Effect size	M	SD	p	Effect size
Health behaviors											
Frequency of physical exercise	Never	70	49.6	68.61	9.72	0.257 (MT) 0.242 (KWT) 0.474 (JTT)	η²= 0.017	60.97	8.68	0.965 (MT) 0.505 (KWT) 0.403 (JTT)	η²= 0.016
	Once a week	10	7.1	70.90	9.04			63.50	8.13		
	Two or three times a week	27	19.1	67.44	4.17			60.78	4.31		
	Daily	34	24.1	70.29	7.35			62.71	5.94		
Alcohol consumption	Yes	30	18.2	70.33	8.04	0.521 (MT) 0.409 (UMW)	d= 0.206	62.17	7.28	0.985 (MT) 0.749 (UMW)	d= 0.112
	No	135	81.8	68.64	8.28			61.33	7.48		
Smoke	Yes	18	10.9	66.39	10.08	0.222 (MT) 0.085 (UMW)	d= -0.349	58.72	9.23	0.107 (MT) 0.104 (UMW)	d= -0.420
	No	147	89.1	69.26	7.97			61.82	7.14		
Health conditions											
Body Mass Index (BMI)	Low weight	3	2.0	81.00	1.00	0.233 (MT) 0.068 (KWT) 0.100 (JTT)	η²= 0.051	71.33	2.52	0.138 (MT) 0.080 (KWT) 0.142 (JTT)	η²= 0.042
	Normal	28	18.8	69.86	6.52			62.61	5.85		
	Pre-obesity	63	42.3	69.43	8.34			61.71	7.35		
	Obesity	55	36.9	67.91	9.00			60.76	8.16		
Waist circumference category	< 80 cm	14	8.5	69.69	4.21	0.805 (MT) 0.522 (KWT) **0.045 (JTT)**	η²= 0.037	62.00	3.29	0.406 (MT) 0.266 (KWT) **0.022 (JTT)**	η²= 0.050
	81-85 cm	9	5.5	70.11	8.37			63.89	7.52		
	86-90 cm	19	11.5	70.84	6.31			63.42	6.95		
	91-95 cm	34	20.6	69.79	6.61			61.94	4.89		
	96-100 cm	31	18.8	68.77	8.27			61.39	7.51		
	> 100 cm	44	26.7	66.41	10.82			58.89	9.66		

Variables		n	%	ASA Scale -original (24 items)				ASA Scale -reduced (21 items)			
				M	SD	p	Effect size	M	SD	p	Effect size
Hypertension	Yes	81	50.3	68.75	8.57	0.237 (MT)	d= -0.057	61.15	7.39	0.583 (MT)	d= -0.098
	No	80	49.7	69.23	8.13	0.558 (UMW)		61.89	7.64	0.684 (UMW)	
Diabetes	Yes	49	31.2	68.71	8.30	0.081 (MT)	d= -0.071	61.35	7.18	0.872 (MT)	d= -0.055
	No	108	68.8	69.31	8.40	0.409 (UMW)		61.76	7.70	0.758 (UMW)	
Self-perception of physical health status	Bad	20	12.5	66.25	12.63	0.055 (MT)	η²= 0.018	58.60	11.60	0.112 (MT)	η²= 0.023
	Regular	78	48.8	69.79	7.73	0.169 (KWT)		62.22	6.61	0.142 (KWT)	
	Good	62	38.8	68.71	7.33	0.826 (JTT)		61.48	6.86	0.778 (JTT)	
Self-perception of mental health status	Bad	10	6.2	65.30	13.66	0.154 (MT)	η²= 0.015	57.70	13.10	0.130 (MT)	η²= 0.026
	Regular	57	35.2	68.58	9.36	0.226 (KWT)		60.74	8.43	0.138 (KWT)	
	Good	95	58.6	69.52	6.82	0.457 (JTT)		62.28	5.89	0.129 (JTT)	
Depression	Yes	44	29.7	69.23	8.53	0.497 (MT)	d= 0.037	61.52	7.98	0.965 (MT)	d= -0.010
	No	104	70.3	68.92	8.16	0.935 (UMW)		61.60	7.37	0.707 (UMW)	

Notes: MT= median test; UMW= Mann-Withney U test; KWT= Kruskal Wallis test (1 factor); JTT= Jonckheere-Terpstra test. Values in bold show those considered statistically significant (*p*< .05).

Discussion

This section presents some final reflections on the findings and the methodological approach of the study, identifying opportunities for future studies.

Regarding the CFA, it was not possible to meet the criteria of a good fit of the model. This could be because the ASA scale was considered as one-dimensional, following the recommendations of the scale developers (Evers *et al.*, 1993). It is worth mentioning that since its development, the ASA scale has shown a complex factorial structure that has prevented the characterization of the identified dimensions, except for some proposals that have generated shorter versions of the scale that could compromise the integrity of its content (Sousa *et al.*, 2010).

In the case of the Spanish version of the ASA scale used in this study, as for the versions in other languages, the dimensions have not been clearly identified and it has been suggested to consider the scale as one-dimensional (Espinoza *et al.*, 2020; Leiva *et al.*, 2016a, 2016b; Manrique & Velandia, 2009). In this study, through the CFA of the one-dimensional model, a factorial structure different from that observed in other age groups such as adolescents and older adults was found (Espinoza *et al.*, 2020; Manrique & Velandia, 2009). In addition to recommendations from the literature mentioned before (Vigil-Colet *et al.*, 2020), the results of this study suggested the elimination of inverse items to have a reduced ASA scale of 21 items, which showed a better performance.

Regarding the evaluation of internal consistency, the global Coefficient α obtained with the 24-item ASA scale (0.806) was higher than that obtained in a study carried out in Colombia with older adults (0.689) (Manrique & Velandia, 2009), but lower than the achieved in a study carried out in Costa Rica in adults (0.840) (Leiva *et al.*, 2016b, 2016a) and the obtained in a study carried out in Chile in adolescents (0.880) (Espinoza *et al.*, 2020). However, the reduced ASA scale of 21 items proposed in this study allowed to improve this coefficient (0.826).

Regarding the other variables relationship analysis based on comparison of groups, it was observed that the scores obtained with both scales behave in a similar way, which was reflected through descriptive indicators (effect sizes) and inferential statistical tests (non-parametric). It is important to say that the comparison of groups carried out can be considered as an analysis of *discriminant validity* (known groups) since it seeks to identify whether the scale scores change in these groups.

In the other variables relationship analysis carried out from an inferential approach, only one comparison of groups was statistically significant (waist circumference), while the descriptive approach based on the analysis of effect sizes managed to show several associations of the ASA scale with health behaviors and conditions, highlighting the analysis by BMI groups. The comparison of groups with the latter and waist circumference stand out because these health indicators (actually risk factors for NCDs) were evaluated in an objective and directly observable way, independently of the participants' responses and perceptions, where many factors can induce bias.

As opportunities for further studies, the following are identified: 1) to explore in more detail the factorial structure of the ASA scale towards the development of a structure that preserves its properties in different demographic groups, or look at the possibility of developing more clearly defined scales for each group (particularly the older adults), that can better meet the adjustment criteria in the CFA; 2) in the study of other variables relationships, it is important to explore the *criterion validity* through the association or correlation with other scales or objective indicators of healthy or risky behaviors, as well as health conditions, including, in addition to the variables integrated in this study others that may be important in older adults, such as the feed quality, physical exercise quality, rest quality, etc; and 3) explore *construct validity* through the correlation with known scales of self-care-related constructs such as health literacy, self-efficacy, empowerment, and health-promoting or risky behaviors attitudes scales.

This study contributes to generating evidence that supports the use of the ASA scale in older adults. However, it is important to generate more evidence in this field to generate tools that can be used in research, as well as clinical and public health practices.

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