



# VALIDATION OF SCALE OF LIFESTYLE CHANGES DURING QUARANTINE IN A POPULATION OF UNIVERSITY STUDENTS IN LIMA, PERU

VALIDACIÓN DE ESCALA DE CAMBIOS EN LOS ESTILOS DE VIDA DURANTE EL PERIODO DE CUARENTENA EN UNA POBLACIÓN DE ESTUDIANTES UNIVERSITARIOS DE LIMA, PERÚ

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## ABSTRACT

**Introduction:** University students have been forced to change their habits due to quarantine for COVID-19 pandemic. **Objective:** To develop a validation scale to know the changes in lifestyles during quarantine in university students from Lima, Peru. **Methods:** Cross-sectional, observational, analytical study. 549 university students of human medicine and psychology from two private universities in Lima were surveyed virtually. Construct validity, reliability, and ranges/categories were performed to rate lifestyle. **Results:** The final scale was made up of 25 items. Bartlett's sphericity test was significant (3514.19,  $gl = 300$ ,  $p < 0.001$ ), and the Kaiser-Meyer-Olkin sample size adequacy indicator was adequate (0.845). The four thematic areas were changes to 1) Eating habits; 2) Harmful habits; 3) Physical activity, and 4) Use of the media. In a Likert-type ordinal measurement scale, the results were confirmed through the Factor Analysis program, obtaining a KMO of 0.80 (reliable) and the significant Bartlett sphericity test (5528.8;  $p < 0.001$ ;  $gl = 300$ ), confirming the existence of 7 components that explain 63% of the variance. **Conclusion:** This scale gathers the psychometric properties to be considered a useful, valid, and reliable instrument to measure said changes in students of health sciences careers, being necessary to validate it prospectively in other careers and countries.

**Key words:** Life style; Students; Validation study (source: MeSH NLM).

## RESUMEN

**Introducción:** Los estudiantes universitarios se han visto obligados a cambiar sus hábitos debido a la cuarentena por la pandemia COVID-19. **Objetivo:** Desarrollar una escala de validación para conocer los cambios en los estilos de vida durante la cuarentena en estudiantes universitarios de Lima, Perú. **Métodos:** Estudio transversal, observacional, analítico. Se encuestaron a 549 universitarios de medicina humana y psicología de dos universidades privadas de Lima de forma virtual. Se realizó la validez de constructo, la fiabilidad y los rangos/categorías para calificar el estilo de vida. **Resultados:** La escala final quedó conformada por 25 reactivos. La prueba de esfericidad de Bartlett fue significativa (3514,19,  $gl = 300$ ,  $p < 0,001$ ) y el indicador de adecuación del tamaño de muestra Kaiser-Meyer-Olkin fue adecuado (0,845). Las cuatro áreas temáticas fueron cambios con respecto a 1) Hábitos alimenticios; 2) Hábitos nocivos; 3) Actividad física; y 4) Uso de medios de comunicación. Al ser una escala de medición ordinal tipo Likert, se procedió a confirmar los resultados a través del programa Factor Analysis obteniendo un KMO de 0.80 (confiable) y la prueba de esfericidad de Bartlett significativa (5528,8;  $p < 0,001$ ;  $gl = 300$ ), confirmando la existencia de 7 componentes que explican el 63% de la varianza. **Conclusión:** Esta escala reúne las propiedades psicométricas para ser considerado un instrumento útil, válido y fiable para medir dichos cambios en estudiantes de carreras de ciencias de la salud, siendo necesario validarlo en forma prospectiva en otras carreras y países.

**Palabras clave:** Estilo de vida; Estudiantes; Estudio de validación (fuente: DeCS BIREME).

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## INTRODUCTION

The presence of Covid-19, a type of coronavirus that emerged in Wuhan, China, has become the main public health problem globally<sup>(1)</sup>. Although its fatality rate reaches 3 - 5% in most cases, the ease with which it spreads can raise the number of infected to the point of saturating and collapsing health systems<sup>(2)</sup>.

Several countries, including Peru, have taken measures, such as social distancing and mandatory social isolation (quarantine), to prevent the massive spread of the disease, imposing on the population to remain in their homes, and with high restriction measures to move through the streets<sup>(3,4)</sup>.

People's inability to carry out their daily activities has directly impacted their lifestyles<sup>(5-7)</sup>. Thus, the physical condition can be reduced, promoting a sedentary lifestyle<sup>(8)</sup>; changes in eating patterns, due to difficulty, either due to difficult access or economic reasons; sleep patterns, emotional and physical factors, or even the consumption of harmful habits. These changes are unfavorable; it can have some long-term effects on cardiovascular diseases<sup>(9)</sup>.

A population quite susceptible to these changes is university students, because they are forced to adapt to new forms of learning and compulsory social isolation. All this added to the fact that they are a group that presents a high prevalence of anxiety and depressive disorders, with a more significant presence of anxiety disorders during the first years of study<sup>(10-13)</sup>.

This research is sought through the design and validation of a scale to determine the students' lifestyles during this period of compulsory confinement. Therefore, this study aims to develop a validation scale to know the changes in lifestyles during the quarantine period in a population of university students in Lima, Peru.

## METHODS

### Design and study areas

The study was developed as a cross-sectional, observational, analytical. For this, 549 university students of the Human Medicine and Psychology majors from two private universities in Lima, Peru, were surveyed during the third week of May 2020. The survey was carried out virtually. Construct validity, reliability, and later the ranges and categories were determined to qualify the participants' lifestyle.

### Population and sample

With a total medical student population of 1000 subjects, and an expected proportion of 50%, with a sample size of 398 subjects, a statistical precision of 3% is obtained. In psychology students with a total of 600 subjects, and an expected proportion of 50%, with a sample size of 151 subjects, a statistical precision of 6% is obtained.

### Variables and instruments

The researchers developed the questionnaire, grouped into 4 areas, dimensions, or domains aimed at measuring the construct of lifestyle changes during quarantine: food consumption, physical activity, consumption of harmful habits (alcohol and cigarettes), and use of media, multiple choice.

The questionnaire's questions were initially adapted from the National Questionnaire on nutritional, biochemical, socioeconomic, and cultural indicators conducted in 2005 by the National Center for Food and Nutrition of the National Institute of Health. Thus, the instrument's design had a Likert-type scale for the answer options, except if it was asked in a binary way.

The first version of the questionnaire had 27 questions grouped into 4 areas, dimensions, or domains to measure the construct.

For the domain "food consumption," which to know, the changes were placed four alternatives: increased (1), decreased (2), did not change (3), and does not consume (4).

For the domain 'physical activity', a question was asked to determine whether or not there were changes in quarantine: it increased (1), decreased (2), did not change (3), and did not perform any type of physical activity (4).

In the 'harmful habits' domain, only one type of question was asked, for smoking and alcohol consumption. In both, it was based on whether it increased (1), decreased (2), did not change, since they smoke/drink alcohol the same as before (3), and do not smoke/drink (4).

Finally, in the 'media' domain, changes in the use of the internet, radio, and television were considered. In both, it was based on whether it increased (1), decreased (2), did not change (3), and did not use some of these means, respectively (4).

## Procedures

### *The preliminary and exploratory phase*

First, the research group was formed in charge of the literature review focused on validation and lifestyle changes. After reviewing questionnaires in international databases (Pubmed, ScienceDirect, Scielo, and Google Scholar), the questionnaire was constructed based on the questions that were considered the most pertinent.

### *Final phase*

The final adjustments were made, and the final version of the questionnaire was structured to be applied to measure changes in the lifestyle of human medicine and psychology students. Subsequently, the psychometric evaluation and multivariate analysis were carried out to demonstrate the instrument's construct validity to determine the final number of questions to include.

### **Statistical analysis**

First, a preliminary exploration was carried out with the SPSS-IBM 26.0 software, to evaluate the previous conditions to execute the construct validity, such as evaluating the correlation matrix if most item-total correlations exceed the value of 0.3. Also, the Kaiser Meyer Olkin (KMO) statistic and the Bartlett sphericity test were determined. Regarding the construct validity of the measurement instrument, the statistical technique of exploratory factor analysis (FA) was used. The possible resulting factors were extracted using the Varimax rotation principal components analysis and a total cumulative

variance greater than 50%. To demonstrate the instrument's reliability, Cronbach's alpha coefficient was calculated considering a higher value of 0.8 as an indicator of consistency. As it was a Lickert-type ordinal measurement scale, the results were confirmed through the Factor Analysis V10 program, obtaining results similar to those achieved by the SPSS.

### **Ethical aspects**

The ethics committee approved the study of the Faculty of Human Medicine of the Universidad Ricardo Palma.

## RESULTS

The scale was made up of 27 indicators distributed in four thematic areas. The four thematic areas were 1) Eating habits, which was produced using 21 items that presented the changes to the subject's diet; 2) Harmful habits, through 2 items that indicated the changes made regarding smoking and alcohol habits; 3) Physical activity, through 1 item; and 4) Use of the media, which sought, through 3 items, to know the changes regarding the uses of the media.

The original instrument's reliability analysis was carried out using the SPSS-IBM v26.0 statistical package, using the internal consistency test through a Cronbach's alpha analysis, the item-total correlation. The squared correlation (explained variance) with the scale items; and the reliability value if any item was eliminated, the results showed a Cronbach's alpha of 0.81 (qualified as acceptable) (Table 1).

**Table 1.** First reliability analysis of the “Scale of Changes in Lifestyles during the Quarantine”.

	Mean	Total correlation of elements corrected	Cronbach's Alpha if the element has been suppressed
Changes made in his diet regarding the consumption of Chicken	2.71	,412	,809
Changes you made in your diet regarding the consumption of Red meat and derivatives	2.41	,350	,812
Changes you made in your diet regarding the consumption of fish and / or shellfish	2.55	,263	,816
Changes you made in your diet regarding the consumption of Eggs	2.71	,441	,808
Changes you made in your diet regarding the consumption of Rice	2.53	,543	,804
Changes you made in your diet regarding the consumption of Vegetables	2.68	,444	,808
Changes you made in your diet regarding the consumption of Tubers (Potato, sweet potato, cassava, olluco, etc.)	2.58	,493	,806
Changes you made in your diet regarding the consumption of Beans (Beans, chickpeas, pallares, etc.)	2.67	,469	,807
C Changes you made in your diet regarding the consumption of Fruits	2.81	,430	,809
Changes you made in your diet regarding the consumption of Dairy (Milk, yogurt, cheese)	2.60	,512	,805
Changes you made in your diet regarding to the consumption of Coffee	2.33	,337	,813
Changes that you made in your diet regarding the consumption of Fried foods	2.56	,419	,809
Changes that you made in your diet regarding the consumption of Bread and / or toast	2.61	,517	,805
Changes you made in your diet regarding the consumption of Noodles	2.39	,524	,806
Changes you made in your diet regarding the consumption of Margarine/butter	2.25	,415	,809
Changes you made in your diet regarding the consumption of Sugar	2.34	,517	,806
Changes you made in your diet regarding the consumption of Salt	2.34	,540	,806
Changes you made in your diet regarding the consumption of fast foods (By delivery)	2.19	,215	,818
Changes that made in their diet regarding the consumption of Sweets / desserts	2.54	,366	,812
Changes you made in your diet regarding the consumption of soft drinks and / or processed beverages	2.25	,319	,814
Changes you made in your diet regarding the consumption of nutritional supplements (vitamins and / or minerals)	1.86	,236	,818
Your consumption during the quarantine regarding cigarettes	1.12	,028	,820
Your consumption during the quarantine regarding Alcohol	1.35	,061	,821
Your physical or sports activity during the quarantine ...	2.81	,023	,828
Regarding the use of the media - Television	2.02	,079	,822
Regarding the use of the media - Radio	1.80	-,010	,824
Regarding the use of the media - Internet	2.90	,097	,819

**Table 2.** Internal validity analysis using the Kaiser-Meyer-Olkin index of the “Scale of Changes in Lifestyles during the Quarantine”.

	Components							
	1	2	3	4	5	6	7	8
Changes made in your diet regarding the consumption of Chicken	,320			,522				,316
Changes you made in your diet regarding the consumption of Red meat and derivatives				,705				
Changes you made in your diet regarding the consumption of fish and / or shellfish.				,730				
Changes you made in your diet regarding the consumption of Eggs	,533							
Changes that you made in your diet regarding the consumption of Rice	,476	,504						
Changes that you made in your diet regarding the consumption of Vegetables	,705							
Changes that you made in your diet regarding the consumption of Tubers (Potato, sweet potato, cassava, olluco, etc. )	,666							
Changes you made in your diet regarding the consumption of Beans (Beans, chickpeas, pallaes, etc.)	,667							
Changes you made in your diet regarding the consumption of Fruits	,735							
Changes you made in your diet regarding the consumption of Dairy Products (Milk, yogurt, cheese)	,589							
Changes that you made in your diet regarding the consumption of Coffee	,305			,355				
Changes that you made in your diet regarding the consumption of Fried foods		,400	,429					
Changes that you made in your diet regarding the consumption of bread and / or toast	,358	,461						-,333
Changes you made in your diet regarding the consumption of Noodles		,603						
Changes you made in your diet regarding the consumption of Margarine/butter		,568	,389					
Changes you made In your diet regarding the consumption of Sugar		,788						
Changes you made in your diet regarding the consumption of Salt		,776						
Changes you made in your diet regarding the consumption of fast foods (By delivery)			,746					
Changes you made in your diet regarding consumption of Sweets / desserts			,751					
Changes you made in your diet regarding the consumption of Sodas and / or processed beverages			,761					
Changes you made in your diet regarding the consumption of Nutritional Supplements (Vitamins and / or minerals)			,372					,333
Its consumption during the quarantine regarding Cigar						,819		
Its consumption during the quarantine regarding Alcohol						,782		
Its physical or sports activity during the quarantine							,854	
Regarding the use of the media - Television					,769			
Regarding the use of the media - Radio					,833			
Regarding the use of the media - Internet								,839

**Table 3.** Second reliability analysis of the “Scale of Changes in Lifestyles during the Quarantine”.

	Mean	Total correlation of items corrected	Cronbach's Alpha if the item has been suppressed
Changes made in their diet with respect to the consumption of Chicken	2.71	,416	,803
Changes you made in your diet regarding the consumption of Red meat and derivatives	2.41	,345	,807
Changes you made in your diet regarding the consumption of Fish and / or seafood	2.55	,252	,811
Changes you made in your diet regarding the consumption of Eggs	2.71	,444	,802
Changes you made in your diet regarding the consumption of Rice	2.53	,551	,797
Changes you made in your diet regarding the consumption of Vegetables	2.68	,440	,802
Changes you made in your diet regarding the consumption of Tubers (Potato, sweet potato, cassava, olluco, etc.)	2.58	,492	,799
Changes you made in your diet regarding the consumption of Beans (Beans, chickpeas, pallares, etc.)	2.67	,480	,800
Changes you made in your diet regarding the consumption of Fruits	2.81	,417	,803
Changes you made in your diet regarding the consumption of Dairy products (Milk, yogurt, cheese)	2.60	,508	,799
Changes you made in your diet regarding Consumption of Fried Food	2.56	,430	,803
Changes made in your diet regarding the consumption of Bread and / or toast	2.61	,522	,798
Changes you made in your diet regarding the consumption of Noodles	2.39	,534	,799
Changes you made in your diet regarding the consumption of Margarine / butter	2.25	,416	,803
Changes you made in your diet regarding the consumption of Sugar	2.34	,527	,799
Changes you made in your diet regarding the consumption of Salt	2.34	,545	,799
Changes you made in your diet regarding the consumption of fast foods (By delivery)	2.19	,199	,814
Changes you made in your diet regarding the consumption of Sweets / desserts	2.54	,353	,806
Changes you made in your diet regarding the consumption of Soda and / or beverages processed drinks	2.25	,299	,809
Its consumption during the quarantine regarding Cigar	1.12	,021	,815
Its consumption during the quarantine regarding Alcohol	1.35	,070	,815
Its physical or sports activity during the quarantine...	2.81	,010	,825
Regarding the use of the media - Television	2.02	,088	,817
Regarding the use of the media - Radio	1.80	-,005	,819
Regarding the use of the media communication - Internet	2.90	,106	,814

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**Table 4.** Presentation of the final scale "Scale of Changes in Lifestyles during the Quarantine".

	Component						
	1	2	3	4	5	6	7
Changes that you made in your diet regarding the consumption of Chicken	,394			,503			
Changes that you made in your diet regarding the consumption of Red meat and derivatives				,718			
Changes you made in your diet regarding the consumption of Fish and / or shellfish				,745			
Changes you made in your diet regarding the consumption of Eggs	,565						
Changes you made in your diet regarding the consumption of Rice	,524	,474					
Changes that you made in your diet regarding the consumption of Vegetables	,697						
Changes that you made in your diet regarding the consumption of Tubers (Potato, sweet potato, cassava, olluco, etc.)	,676						
Changes that you made in your diet regarding the consumption of Beans (Beans , chickpeas, lima beans, etc.)	,686						
Changes you made in your diet regarding the consumption of Fruits	,696						
Changes you made in your diet regarding the consumption of Dairy (Milk, yogurt, cheese)	,578						
Changes that re Alized in his diet regarding the consumption of Fritters		,363	,456				
Changes made in his diet regarding the consumption of Bread and / or toast	,383	,440					-,397
Changes made in his diet regarding the consumption of Noodles	,305	,583					
Changes you made in your diet regarding the consumption of Margarine / butter		,573	,390				
Changes you made in your diet regarding the consumption of Sugar		,786					
Changes you made in your diet regarding the consumption of Salt		,782					
Changes you made in your diet regarding to the consumption of fast(By delivery) foods			,766				
Changes you made in your diet regarding the consumption of Sweets / desserts			,758				
Changes you made in your diet regarding the consumption of Soft drinks and / or processed beverages			,767				
Your consumption during the quarantine in Regarding cigarettes						,813	
Their consumption during the quarantine regarding Alcohol						,798	
Their physical or sports activity during the quarantine...							,871
Regarding the use of the media - Television					,800		
Regarding the use of the media - Radio					,725		
Regarding the use of the media - Internet					,448		

Extraction method: analysis of main components.  
 Rotation method: Varimax with Kaiser normalization.  
 The rotation has converged in 6 iterations.



The grouping of the items obtained through the Varimax orthogonal rotation, evidenced the presence of 7 components that explain 56.47% of the variance and that are distributed as follows:

- Component 1: Consumption of eggs, rice, vegetables, tubers (potato, sweet potato, yucca, olluco, etc.), beans (beans, chickpeas, lima beans, etc.), fruits, and dairy products, explaining 9.430% of the variance and obtaining the reliability of 0.48.
- Component 2: Consumption of bread and/or toast, noodles, margarine/butter, sugar, salt, reaching 5.955% of the variance, and a reliability of 0.61.
- Component 3: Consumption of fried foods, fast foods (for delivery), sweets/desserts and soft drinks, and/or processed beverages, explains 5.316% of the variance and a reliability of 0.29.
- Component 4: Consumption of chicken, red meat, derivatives, and fish and/or shellfish explains 21.605% of the variance and reaches a reliability of 0.42.
- Component 5: Use of communication media: television, radio, and internet that explains 4.401% of the variance and obtains 0.036 of reliability.
- Component 6: Harmful habits: Cigarette and alcohol consumption, explaining 5.022% of the variance, and obtaining a 0.04 reliability.
- Component 7: Physical or sports activity that explains 4.750% of the variance and reaches 0.01 reliability.

In a Likert-type ordinal measurement scale, the results were confirmed through the Factor Analysis program, obtaining a KMO of 0.80 (reliable) and the significant Bartlett sphericity test (5528.8;  $p < 0.001$ ;  $gl = 300$ ), confirming the existence of 7 components that explain 63% of the variance.

Annex 2 presents the comparison between the results obtained through Pearson's correlation and the analysis of the final items' polychoric correlations.

Finally, within the results we find in our survey of changes, we would like to present the three variables that had the greatest differences. In the first place, regarding the use of the media, it was found that 91% of those surveyed had greater use of the internet. In second place, regarding the consumption of alcohol and cigarettes, half of those surveyed

indicated a decrease in consumption, while only 2% and 3%, respectively, claim to have increased their consumption. Finally, for physical activity, 65% of respondents indicate a decrease in this during the time of quarantine.

## DISCUSSION

The presence of the pandemic in the world forced most countries, including Peru, to take mandatory social isolation measures, which has caused versatility in the way of life of the population.

Therefore, it is important to know about the changes that have been caused in lifestyles, especially in the university student population. In addition to adapting to this confinement, they must adjust to the new modality of distance learning. They spend several hours in front of a screen, modifying much more how they carried out their daily activities. Precisely, knowing about these changes will allow us to make decisions based on evidence and intervene in this population, to contribute to the development of healthy lifestyles.

The development and validation are an instrument that measures this change is necessary and important. It should be noted that no tool measures instead in a stage like the one we are in, since most measure the lifestyle per se, but not if it would produce significant changes after a singular situation. After the analysis, this has proven to be useful to be used as a tool for evaluating university students' lifestyles from the careers of health sciences, particularly medicine and psychology.

The choice of the domains of food consumption, physical activity, consumption of harmful habits (alcohol and cigarettes), and use of the media are justified based on other studies that have evaluated lifestyles, which have been supported at the statistical level. The internal consistency of the instrument evaluated using Cronbach's alpha was 0.81, an acceptable value. In turn, the subdivision's presence into 7 components that explain 56.47% contrasts well with the division in lifestyles in other studies. They have precisely evaluated the importance of these in a time of change like this<sup>(14-17)</sup>. The validation of a survey aimed at mental impact was not carried out, because there are already tools that evaluate these changes, the same with changes in dream patterns. However, it would be important to quantify them through another study.

Finally, for the changes found, we can point out



that these changes were minimal with respect to diet, which is similar to the results found in other studies<sup>(18,19)</sup>. However, with respect to the media, although for radio and television, the changes have not been important, if it was for the internet, where almost all respondents indicated greater use of the internet during social isolation. This is related to students' activities now carry out to virtual classes, and social communication, which now depends mainly on the internet<sup>(20,21)</sup>.

About cigarettes and alcohol, we can find a group that is not the majority, but is resistant to change, who claims to have increased their consumption; Although we cannot quantify exactly how much this increase is, it is striking. The responses to this finding may be due to some students' need to depend on some of these habits to combat some states such as anxiety, which is highly prevalent in this population, as some studies affirm<sup>(22,23)</sup>. And finally, in terms of physical activity, social isolation does not allow many to mobilize as they did previously, added to the sedentary lifestyle found in students due to lack of time<sup>(24-26)</sup>.

For all those mentioned above, we consider that instrument can be considered a useful tool for screening and obtaining a baseline for interventions to improve the lifestyle of Health Sciences students.

Among the limitations of the study, we can mention some aspects. First, consider the selection bias, due to the selection of students from the two universities' health science careers in Lima, Peru. Although it is not possible to make a complete inference to

the country's entire university population, it must be considered that the students' characteristics, especially those that are part of the health sciences, are very similar. Second, other lifestyle characteristics have not been thoroughly evaluated, even within the studied domains; However, the chosen patterns have been those of greater consistency. This is to avoid making a prolonged instrument, which causes other types of bias related to the respective filling time.

## CONCLUSION

This instrument to measure lifestyle changes meets the psychometric properties to be considered a useful, valid, and reliable instrument to measure these changes in students of health sciences careers, being necessary to validate it prospectively in other careers and countries.

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**Conflict of interest:** The authors participated in the genesis of the idea, project design, data collection and interpretation, analysis of results, and preparation of the manuscript of this research work.

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