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Research article

Validity of a scale of Latin American perception of fear and concern transmitted by the media during the pandemic (MED-LAT-COVID-19)

Luciana D. Garlisi-Torales [a,b,*], Telmo Raúl Aveiro-Róbalo [a,b], Renzo Felipe Carranza Esteban [c], Oscar Mamani-Benito [d], Martín A. Vilela-Estrada [e], Víctor Serna-Alarcón [e], Alexandra I. Kam-Artime [f], Sheila E. Garcia-Aldama [g], Dennis Arias-Chávez [h], J. Franco Rodriguez-Alarcón [i,j], Christian R. Mejia [k]

[a] Universidad del Pacífico, Asunción, Paraguay
[b] Federación Latinoamericana de Sociedades Científicas de Estudiantes de Medicina, Asunción, Paraguay
[c] Universidad San Ignacio de Loyola, Lima, Peru
[d] Universidad Peruana Unión, Juliaca, Peru
[e] Escuela Profesional de Medicina Humana, Universidad Privada Antenor Orrego, Trujillo, Peru
[f] Universidad Latina de Panamá, Panama, Panama
[g] Universidad Autónoma del Estado de México, México, Mexico
[h] Universidad Continental, Arequipa, Peru
[i] Facultad de Medicina Humana "Manuel Huaman Guerrero", Universidad Ricardo Palma, Lima, Peru
[j] Asociación Médica de Investigación y Servicios en Salud, Lima, Peru
[k] Translational Medicine Research Centre, Universidad Norbert Wiener, Lima, Peru

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ABSTRACT

Introduction: The pandemic has caused fear, especially due to the daily disseminated news; however, there is not an instrument to measure this fear in multiple realities.
Objective: To validate a scale for Latin American perception of fear and concern transmitted by the media during the pandemic.
Methodology: This is an instrumental study. The survey was based on an instrument which was pre-validated in Peru and submitted to 15 experts in almost 10 countries. Subsequently, thousands of people were surveyed in 13 Latin American countries, whose answers were used for descriptive statistics for validation.
Results: Confirmatory Factor Analysis (CFA) generated two re-specifications, where four items were eliminated from the original scale. With these changes, the global goodness of fit (absolute and incremental) were satisfactory (CFI = 0.978; TLI = 0.964; GFI = 0.976; AGFI = 0.949; RMSEA = 0.075 and RMR = 0.029). The first factor measures the media exaggeration (three questions); the second, the fear transmitted by the media (three questions); and the third, the fear transmitted by others different from the media (two questions). The Cronbach's alpha coefficient was higher than 0.70 for the scale and its factors.
Conclusion: The **MED-LAT-COVID-19** scale reported a good adjustment. It has eight items in three factors, which could be measured in an isolated way, or along with other tests that assess mental health in the current pandemic context.

1. Introduction

Since the report of the first case of coronavirus (COVID-19) in December, 2019, it has extended rapidly worldwide and it has been a threat for physical and mental health for all the population. In all the American continent, a million of confirmed cases and deaths have been reported because of this new virus [1, 2]. There has been much uncertainty about this disease since the beginning of the pandemic. In addition, it is in this context where the media's work is strengthened to keep the population informed about the evolution, the progress and the setbacks of this disease. This information has helped the population be informed about safety and protection measures. Additionally, it has

* Corresponding author.
E-mail address: danielagarlisi01@gmail.com (L.D. Garlisi-Torales).

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helped public officials with decision-making power to mitigate some adverse effects of the disease [3, 4].

However, some media have exaggerated the magnitude of the events, spread information without scientific basis about coronavirus etiology, prevention and even mentioned some "possible therapeutic solutions" [5, 6]. That generated information overload, called infodemic, such as rumors, conspiracy theories, and magical cures. All of them caused problems by promoting erroneous practices [7, 8]. This infodemic phenomenon and the easy access to information through different mass communication systems, such as social networks, blogs, virtual newspapers and other platforms has allowed the rapid dissemination of unstructured information that is difficult to process. This is why it has been reported that anxiety, fear, anger, irritability and other negative emotions have increased [1, 9, 10].

Other studies on this situation have been published through different academic articles and governmental reports of some countries [11, 12]. This is why instruments that measure the repercussion of the media in this pandemic were created. For example, the one validated in Peru was a scale of 12 items [13], but this can vary because of the way to perceive the news, the diversity of geopolitical contexts, the socio-cultural aspects and economic aspects, among others [14, 15]. Hence, the revalidation of this instrument, in a greater population in all Latin America, is very important so it can have a wider scope of the different socio-cultural realities of our continent. Therefore, the objective of this research was to validate a scale of Latin American perception of fear and concern transmitted by the media during the pandemic.

2. Methodology

2.1. Design

This is an observational, analytic, instrumental and cross-sectional study.

2.2. Participants

Through a non-probability sample, 6229 people answered the 12 questions that were in the initial test, which means that we had a participants/questions ratio of more than 500. The participants mainly came from Peru Chile, Paraguay, Mexico Bolivia, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Argentina and Venezuela. The majority of respondents were women (60.4%), with a median age of 21 years (interquartile range: 19–28 years), and the population was eminently urban, residing in large cities. A total of 651 surveys were excluded due to having one or more test questions unanswered.

2.3. Instrument

The initial survey (MED-COVID-19) was administered; it was made up of 12 items, which were constructed according to the most common forms of current dissemination of information. We took into account that each platform of the media has other possible sub-groups (for example, social networks include the news disseminated through Facebook, WhatsApp, YouTube, among others). But, in general, they summarize the most common means of obtaining data in the current pandemic. The scale was previously validated in Peru [13], and it was divided in three factors. The first measures the perception of "media exaggeration"; the second measures the "fear generated by the media"; and the last factor measures "health personnel, family and friends communication". Each factor had four questions. It is important to mention that each one of the questions could have five response options (Likert-type format: completely disagree, disagree, indifferent, agree and completely agree).

2.4. Procedure

The research project was approved by the Ethics Committee of the Universidad Privada Antenor Orrego (Bioethics Committee Resolution Number 0235-2020-UPAO). Firstly, the MED-COVID-19 scale was analyzed and reviewed by the research team. Then, the evidence of validity of content of the scale was analyzed, for which we requested expert judgment of 15 experts in different countries of Latin America (which were specialists, epidemiologists, teachers, in some cases with master's or doctorate's degrees as well as with some scientific publications). In this step, the relevance representativeness and clarity of the items were analyzed [16]. Subsequently, the scale was administered individually and collectively in their homes. This was performed in the two initial weeks of June through Google Forms. Before the application, the respondents were informed about the objective of the research and their approval or consent for participation, which was voluntary and anonymous, was requested.

2.5. Data analysis

It was done in stages. First, the content-based validity evidence was analyzed through Aiken's V coefficient (values greater than 0.70 indicate an acceptable level), which is weighted based on the evaluation of the 15 expert judges who analyzed the relevance, clarity and representativeness of the items of the MED-LAT-COVID-19 scale. Secondly, we found the standard deviation, skewness and kurtosis of the 12 items of the **MED-LAT-COVID-19** scale. Third, the confirmatory factor analysis (CFA) was applied, for which the structural equation modeling (SEM) was used according to the recommendations given by Hooper et al. (2008) [30] who reports that this technique allows testing a structural theory (internal structure of the original MED-COVID-19 scale) about a phenomenon (perception of fear and concern) using a confirmatory approach (hypothesis testing). In this step, we used the goodness of fit indexes, such as the comparative fit index (CFI), the Tucker-Lewis Index (TLI), the goodness of fit index (GFI), and the adjusted goodness of fit index (AGFI). In addition, we took into account the root mean square error of approximation (RMSEA) and the root mean square residual (RMR). The CFI, TLI, GFI, AGFI values were >0.90 and the RMSEA was ≤ 0.08 in order to have a good model adjustment. Finally, the scale reliability was estimated through the Cronbach's alpha coefficient.

To analyze the descriptive statistics of the MED-LAT-COVID-19 scale's items, we used the FACTOR Analysis program (version 10.1). For the CFA, we used the AMOS program (version 21.0) and to estimate reliability, we used SPSS statistical program (version 24.0).

3. Results

3.1. Validity

The results of relevance, representativeness and clarity of the Latin American Scale (**MED-LAT-COVID-19**) were obtained through Aiken's V coefficient. The 12 items received a favorable evaluation from the experts ($V > 0.70$). In regard to relevance, it was observed that Item 1 was the best assessed ($V = 1.00$; 95% CI 0.92–1.00) followed by Item 2 ($V = 0.98$; 95% CI: 0.88–1.00). With respect to representativeness, the best was also Item 1 ($V = 1.00$; 95% CI: 0.92–1.00), followed by Items 2, 3 and 11 ($V = 0.93$; 95% CI; 0.82–0.98). Regarding clarity, we could highlight Item 1 ($V = 0.96$; 95% CI: 0.85–0.99), followed by Item 3 and 11 ($V = 0.93$; 95% CI; 0.82–0.92). Similarly, we could observe that the values of the limit inferior (Li) of the 95% CI are appropriate ($Li > 0.59$) and all the values of

Table 1. Aiken's V coefficients for the items of the total **MED-LAT-COVID-19** scale.

Items	Relevance (N = 15)				Representativeness (N = 15)				Clarity (N = 15)			
	M	SD	V	95% CI	M	SD	V	95% CI	M	SD	V	95% CI
Item 1	3.00	0.00	1.00	0.92–1.00	3.00	0.00	1.00	0.92–1.00	2.87	0.35	0.96	0.85–0.99
Item 2	2.93	0.26	0.98	0.88–1.00	2.80	0.41	0.93	0.82–0.98	2.67	0.62	0.89	0.77–0.95
Item 3	2.80	0.56	0.93	0.82–0.98	2.80	0.41	0.93	0.82–0.98	2.80	0.56	0.93	0.82–0.98
Item 4	2.20	0.68	0.73	0.59–0.84	2.13	0.64	0.71	0.57–0.82	2.13	0.92	0.71	0.57–0.82
Item 5	2.40	0.99	0.80	0.66–0.89	2.47	0.99	0.82	0.69–0.91	2.27	1.03	0.76	0.61–0.86
Item 6	2.67	0.82	0.89	0.77–0.95	2.53	0.74	0.84	0.71–0.92	2.53	0.92	0.84	0.71–0.92
Item 7	2.60	0.74	0.87	0.74–0.94	2.53	0.74	0.84	0.71–0.92	2.33	0.82	0.78	0.64–0.87
Item 8	2.80	0.41	0.93	0.82–0.98	2.73	0.59	0.91	0.79–0.96	2.53	0.74	0.84	0.71–0.92
Item 9	2.33	0.98	0.78	0.64–0.87	2.33	0.82	0.78	0.64–0.87	2.33	0.82	0.78	0.64–0.87
Item 10	2.67	0.72	0.89	0.77–0.95	2.67	0.62	0.89	0.77–0.95	2.60	0.74	0.87	0.74–0.94
Item 11	2.80	0.56	0.93	0.82–0.98	2.80	0.56	0.93	0.82–0.98	2.80	0.56	0.93	0.82–0.98
Item 12	2.60	0.51	0.87	0.74–0.94	2.60	0.51	0.87	0.74–0.94	2.60	0.63	0.87	0.74–0.94

M: mean; SD: standard deviation; V: Aiken's V coefficient; 95% IC: 95% confidence interval of Aiken's V.

the V coefficient were statistically significant. Therefore, the **MED-LAT-COVID-19** scale evidenced validity based on the content. Table 1.

Next, the average of the scores obtained in each item (Mean), their average dispersion (Standard deviation), absence of balanced proportions (Asymmetry) and the degree of concentration presented by the values found (Kurtosis) have been determined. In this sense, it can be seen that item 3 has the highest average score (mean = 2.00) and item 9 the lowest (mean = 0.99). Regarding variability, item 2 shows the greatest dispersion (standard deviation = 1.25). The asymmetry and kurtosis of the twelve items of the **MED-LAT-COVID-19** scale are acceptable, since they do not exceed the range $> \pm 1.5$ [17]. Table 2.

3.2. Confirmatory factor analysis

Confirmatory factor analysis (CFA) of the **MED-LAT-COVID-1** scale in the Latin American population showed that the original factor structure of 12 items was distributed in three factors. The initial scale was not satisfactory as the adjusted goodness of fit indexes were lower than 0.90; in addition, the RMSEA and RMR were higher than 0.08, for which we proceeded to execute the technique of index modification. In the first re-specification, we eliminated items 11 and 9 and we found a variation in the adjusted goodness of fit indexes. However, it was still not satisfactory; thus, we continued with a second re-specification, where Item 8 and 3 were eliminated. Thus, we obtained an adequate factor structure model. The global adjusted goodness of fit indexes (absolute and incremental) were satisfactory for the analyzed factorial model; in this way, the CFI (Comparative Fit Index) indicates a good fit of the model since the value found 0.978 is higher than 0.90 and close to the recommended 1; the TLI (Tuker-Lewis Index) reveals a good fit by degrees of freedom of the proposed model, since the value found 0.96 is higher than 0.90 and close to the recommended 1; the GFI (Goodness of Fit Index) indicates that the variability explained by the model is optimal since the value 0.976 is above 0.90 and close to the recommended 1; the AGFI (Absolute Best Performance Index) indicates that the calculated model performs adequately, since the value 0.949 found is greater than 0.90 and close to the recommended 1. Finally, the RMSEA (approximation error) indicates that the calculated model has a good fit to the data, since the value 0.075 obtained is less than the recommended 0.08, and the RMR (mean square error rate) is very close to 0 (0.029) so the fit of the model is almost perfect. In summary, the model 2 (recalculated) reported a good adjustment and had eight items distributed in a three-factor structure (Figure 1). Moreover, the correlations among factors were significant ($p < 0,05$). Table 3.

Table 2. Mean, standard deviation, skewness and kurtosis of the **MED-LAT-COVID-19 scale.**

Items	Mean	SD	Skewness	Kurtosis
Item 1	1.839	1.207	0.199	-1.042
Item 2	1.880	1.253	0.058	-1.058
Item 3	2.004	1.239	0.035	-1.117
Item 4	1.719	1.187	0.198	-0.862
Item 5	1.761	1.090	0.248	-0.672
Item 6	1.620	1.085	0.200	-0.603
Item 7	1.645	1.026	0.322	-0.376
Item 8	1.524	1.023	0.232	-0.446
Item 9	0.994	1.003	1.053	0.690
Item 10	1.185	1.071	0.732	-0.146
Item 11	1.501	1.205	0.540	-0.694
Item 12	1.293	1.079	0.607	-0.308

SD: Standard deviation.

3.3. Reliability

It is observed that the Cronbach's alpha coefficient was higher than 0.70 for the scale and its factors, which indicated that the **MED-LAT-COVID-19** scale was reliable. Table 4.

4. Discusion

COVID-19 has already reported millions of deaths [18]. This is why the World Health Organization (OMS) [19] and the governments started to generate strategies to stop its spread [20]. As a result, the media have become the main source of truthful and understandable information. Unfortunately, this has not always occurred like this since a great number of information without scientific basis have been published, just as in other pandemic or catastrophic situations [21] Multiple reports about news disseminated by the media and social networks were erroneous, and generated fear and collective hysteria in the population [14, 22]. This is why our results are crucial, since they allow us to have a short instrument which is valid in multiple realities. This permits the evaluation of the perception of the reception of information reported by the most used media, including social networks and others that are currently important [23]. For this study, we take into account the current scenario of a public health emergency, where the information must come from adequate sources and provide calm through knowledge.

In this context, the validation of the MED-LAT-COVID-19 scale assesses the impact of the media on the perception of fear generated by the pandemic through three factors. The first factor, called "exaggeration of the mass media", evaluates the individuals' perception of the degree of

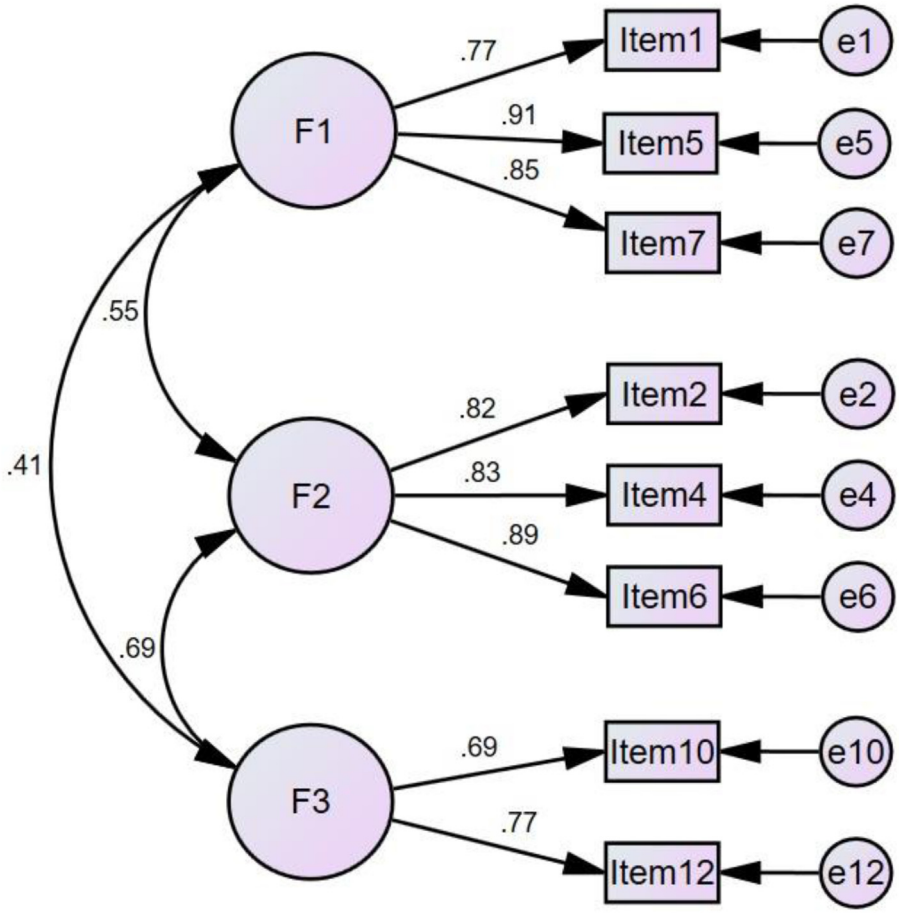

Figure 1. Model 2 of the **MED-LAT-COVID-19** scale.

Table 3. Adjustment indexes of the factor models of the **MED-LAT-COVID-19** scale.

Model	χ^2	df	p	CFI	TLI	GFI	AGFI	RMSEA	CMIN/DF	RMR
Original	3784.609	51	0,001	0878	0842	0869	0800	0135	74208	0091
1	1572.352	32	0,001	0941	0917	0926	0872	0109	49.36	0040
2	398963	17	0,001	0978	0964	0976	0949	0075	23468	0029

Table 4. Cronbach's alpha for the total **MED-LAT-COVID-19** scale and its factors.

Factors	Number of items	Cronbach's alpha	95% confidence intervals
Factor 1 Exaggeration of the mass media	3	0.86	0.86–0.87
Factor 2 Fear transmitted by the mass media	3	0.87	0.87–0.88
Factor 3 Fear transmitted by others different from the mass media	2	0.70	0.68–0.71
Total scale	8	0.86	0.85–0.86

veracity that can be attributed to the disseminated news by the traditional and virtual media, as television, magazines/newspaper and radio. This factor was assessed because sensationalist media can divert medical personnel's opinions from evidence-based practices and raise fears in the population [24]. On the other hand, the second factor, called "fear transmitted by the mass media" estimates fear sensation or uncertainty perceived by the participants when facing daily news. These items were considered based on studies that reported the development of fear and panic in some populations due to COVID-related news in the media [25]. Finally, the last factor, called "fear transmitted by others different from the media", considers and weighs the effect of relatives, friends or close contacts in the perception of severity or mildness of the health emergency. This was assessed because family, health care personnel and friends are reported to be the main influencers on the credibility of information related to COVID-19 [26].

Factor 1 and 2 determine the participants' perception of exaggeration of the media or yellow press about the COVID-19 emergency, such as the television, the radio, newspapers or the Internet. We have to take into account that, if this power the media has is well used, it can be key to reduce contagion and deaths. Thus, Basch et al. decided to determine the impact of YouTube on the communication of preventive attitudes against the pandemic. They put short advertising videos in the two most viewed videos of the platform (>125 and >355 million of views) and it could be observed that these were seen by most of the viewers without skipping them [27]. However, the harmful potential of the media and the way they present the news related to the pandemic can be extremely dangerous. Romer and Jamieson sought to determine the effect of conspiracy theories and fake news on the behavior of 1050 North American adults towards the pandemic. As a result, they found that those who believed in

conspiracy ideas had a lower probability of taking preventive measures, wearing masks and being vaccinated against COVID-19 [28].

Factor 3 evaluates the sensations perceived due to the information shared by people, friends, counselors or relative with respect to COVID-19. As addressed previously, the media plays an important role in the dissemination of fake news. However, these statements are reaffirmed by the inner circle of the individual that receives them. Hence, listening to conspiracy, fake or malicious news can sound logical, if there is lack of knowledge. Thus, if this news is reaffirmed by a group (such as relatives or friends), it can lead individuals to accept this information as facts without further verification. Thus, health professionals play a very important role in the correction of misinformation [29], and could help to reduce this collective fear sensation that is being caused.

The main limitation we had in this research was the selection bias. It happened because the countries that responded to our survey were selected by the authors themselves on the basis of members of associations and colleagues who were contacted to help administer the surveys. Hence, it was difficult to cover all the countries in Latin America. Despite the fact that the sample was not completely random, 13 out of the 20 countries that are part of Latin America participated in the survey and the sample size was considerable. Also, the collection of information took place on days of the pandemic and, being Latin American, probabilistic sampling was not used, therefore, the generalization of the results may be limited. Having mentioned that, we considered that the scale is valid and reliable to be administered in all Latin America. It is important to highlight that if other authors would like to administer it out of Latin America, they would have to adapt the scale according to the characteristics of their populations.

Another limitation we found is that future instrumental studies should explore the invariance of the measure with respect to sex, age, or country. As a recommendation it would be important to analyze the averages according to gender in order to know the perception of fear between men and women.

Considering the characteristics of the people, number of infections (impact of the pandemic) and ethnic diversity of the Latin American context, it is necessary to continue researching in more specific populations.

Finally, we can conclude that this scale is a valid, reliable and clear instrument and it is capable of measuring effectively the perception of fear and concern produced by the media in unfavorable contexts such as the COVID-19 pandemic.

We consider that the administration of the MED-LAT-COVID-19 scale is fundamental and recommend using it as a base to conduct diverse studies that seek to measure the concern caused by the media in the pandemic as well as in other catastrophic cases where these also play an important role. It is especially true if there is a need to have a scale shorter than the previous one [2], which could also be used in diverse realities, since it has an adequate validation process and can measure more situations/media outlets. Each study/research group can decide which scale is more convenient to apply, as well as consider if these require any revalidation process in their selected population.

Declarations

Author contribution statement

Luciana D Garlisi-Torales; Telmo Raúl Aveiro-Róbalo; Martín A. Vilela-Estrada; Víctor Serna-Alarcón; Alexandra I Kam-Artime; Sheila E Garcia-Aldama; Dennis Arias-Chávez; J Franco Rodriguez-Alarcón: Conceived and designed the experiments; Performed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Renzo Felipe Carranza Esteban; Oscar Mamani-Benito: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Christian R. Mejia: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data availability statement

Data will be made available on request.

Declaration of interest's statement

The authors declare no conflict of interest.

Additional information

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