

## Knowledge about COVID-19 in Young Limeños University Students

Dennis Arias-Chávez<sup>1</sup>; Julio E Postigo-Zumarán<sup>2</sup>; Yanina Gallardo-Lolandes<sup>3</sup>; José Valqui – Oxolón<sup>4</sup>

<sup>1</sup>Universidad Continental, Arequipa, Perú.

<sup>1</sup>darias@continental.edu.pe

<sup>1</sup><https://orcid.org/0000-0003-1500-8366>

<sup>2</sup>Universidad Continental, Arequipa, Perú.

<sup>2</sup>jpostigo@continental.edu.pe

<sup>2</sup><https://orcid.org/0000-0002-7954-0127>

<sup>3</sup>Universidad César Vallejo.

<sup>3</sup>yanina.lolandes2803@gmail.com

<sup>3</sup>ORCID: 0000-0003-4389-9514

<sup>4</sup> Universidad Cesar Vallejo.

<sup>4</sup>aguilajova@gmail.com

<sup>4</sup><https://orcid.org/0000-0003-0849-9080>

### Abstract

*Millions of cases of people infected with the Covid-19 virus in the world have been reported today, so knowing about its implications is vitally important not only to prevent contagion, but also to combat the fake news that is created about this virus. Therefore, this study aims to determine the level of knowledge about coronavirus in young limeños university students in 2020. The study was descriptive of non-experimental design. An online questionnaire evaluating the level of knowledge, previously validated by factorial analysis, was applied as an instrument. The exhibition consisted of 700 young university students from the first academic cycles between the ages of 16 and 25 (350 male and 350 female) from five universities in the city of Lima. The results show an average level of knowledge with 60%, followed by a low level with 20.4% and a high level with only 19.6%. This study is the first to investigate informational aspects related to Covid-19 and some associated socio demographic characteristics among the university population of an important city in Latin America.*

**Key-words:** Level of Knowledge, Young University Students, Covid-19, Lima.

### 1. Introduction

Coronaviruses are a family of viruses that cause a variety of serious lung diseases that, if not properly diagnosed and treated, can lead to death. The first of this family was identified in

Guangdong, China, in the form of pneumonia that later resulted in respiratory failure. In the beginning, its contagion occurred from human-animal contact and then occurred from human-human (Gohel et al., 2021). In 2012 another member of the coronavirus appeared in Saudi Arabia called MERS-CoV whose symptoms were similar to sars-coV although with a much higher mortality rate than the other variants.

In December 2019, a variant of the coronaviruses was reported in the Chinese city of Wuhan. It was called a form of new coronavirus-2019 and the disease was called Covid-19, from being a public health emergency to declaring it in March 2020 as a pandemic by the World Health Organization (WHO). Since then until the first months of 2021, nearly 109, 463, 210 contagions and more than 2, 416,661 deaths worldwide have been reported (Google News, 2021).

With regard to the form of covid-19 contagion, studies have found that direct contact and exposure to respiratory droplets are the main causes of covid-19 infection (Gralinski and Menacheri, 2020; WHO, 2020). The incubation period in the body of the virus is 2 to 14 days within which symptoms such as fever, cough, shortness of breath, chest pain or pressure, fatigue among others (Backer et al., 2020; Guan et al., 2020; Lauer et al. 2020; Singhal, 2020;). For this reason several countries have taken measures to protect this population such as social isolation and the follow-up of a number of precautions such as constant hygiene. However, any measure

Measures to prevent contagion include constant hand washing, the use of masks, covering your mouth and nose when sneezing or coughing, avoiding hand or other gesture involving contact, and keeping the distance of people showing symptoms of the disease (WHO, 2020). While Covid-19 tends to be severe, the population most at risk of perishing from the disease are older people with underlying comorities. Currently vaccines are available to prevent and control Covid-19, thus replacing treatments with medicines such as chloroquine, hydroxychloroquine, among others (Cascella et al., 2020; Sanders et al., 2020).

The information available on the new coronavirus is plentiful. Scientific production on this disease has been on the rise and it is increasingly the means that have taken on the commitment to report on the progress of the pandemic through spaces for the dissemination of public health issues that help people stay informed about progress in the control and prevention of Covid-19. However, communication flows about the disease have been altered by the proliferation of false information circulating through social networks, lists, blogs, among many other platforms that arise with the web 2.0. This overexposure to information has been called "infoxation".

While the media has a massive reach, it is citizens who must acquire informational skills that allow them to differentiate true information from false information. The ability to locate, access, evaluate, ethically use and share information in a world mediated by information technologies is not easy to acquire, and this is where academic sectors such as university students, given their preparation, are responsible, not only to read and communicate reliable information about the disease around them, to combat beliefs and false news about its contagion, its causes, etc. Thus, this sector of the population becomes a provider of truthful information that contributes to informing or raising awareness of the community, so students must have basic knowledge about the characteristics of the disease, symptoms, and prevention of Covid-19 in order to clear up the doubts that exist about this disease and combat the myths created because of the false information circulating on social networks that seem to have greater arrival to the population which at the same time can lead to overestimate or underestimate the consequences of this disease (Arias-Chávez et al., 2020; Ruiz Mamani et al., 2020). Public knowledge assessment is also important for identifying gaps and strengthening ongoing prevention efforts. Therefore, this study aims to determine the level of knowledge about coronavirus in young limeños university students in 2020.

## **2. Literature review**

In the scientific literature there are publications related to the level of knowledge on coronavirus worldwide. These include, for example, the study of Gohel et al. (2020) who evaluated knowledge and perception about Covid-19 in medical students and related health sciences in India. Another relevant study is Pal et al. (2020) on knowledge, attitudes and practices towards Covid-19 among young Indian adults with Type 1 Diabetes Mellitus diabetes. It also highlights the study of alkan et al. (2020) on the level of knowledge and perceptions about Covid-19 in last-year medical students in Turkey. Gao et al.'s study (2020) on attitude and knowledge among physician students and non-medical students towards SARS-CoV-2 infection at a Chinese university. Also the study of Labban et al. (2020) on the level of awareness and knowledge about the Covid-19 pandemic among Syrians. Karijo et al.'s study (2020) on knowledge, attitudes, practices and the effects of COVID-19 on health-seeking behaviors among Kenyan youth. TheHager et al. study (2020) on knowledge, attitude and perceptions towards the 2019 coronavirus pandemic conducted in Africa. Gómez et al. (2020) who conducted a quasi-experimental study on the level of knowledge about COVID-19 in 415 patients of the population belonging to the office 5 of the Policlinic José Martí of the Municipality Gibara, Holguin, Cuba. Hatabu et al. (2020) who evaluated knowledge, attitudes and

practices (KAP) towards Covid-19 among university students in Japan. Mahmood et al. (2020) who assessed a random population of 1000 Pakistanis of all ages on attitudes, perception and knowledge through an online questionnaire; and Bekele et al. (2020) who conducted a cross-cutting study of PubMed, HINARI and Scopus on knowledge, attitudes and impact of Covid-2019.

This is the first study on knowledge about Covid-19 in an important population such as Peruvian university students. The findings of this study are expected to provide useful information to policy and education leaders and other stakeholders. Findings can also inform the academic community about new public health interventions, awareness raising, and policy-making to combat the disease.

### **3. Ethical considerations**

Given the public health situation in the country and the world, this study adapted its data collection processes following the health emergency measures indicated by the relevant health institutions. To do this, the lifting of the information was carried out using the virtual format, which avoids any type of physical contact and that is recommended in isolation situations. In addition, each of the students who were part of the study gave their verbal consent after indicating that their participation is voluntary and anonymous.

### **4. Materials and Method**

This study is descriptive in that it aims to assess the level of knowledge about Covid-19 in young limeños university students. It is a cross-cutting or transactional study because the information is given at a single moment. The composition of the population was 7,200 students, of whom a sample of 700 subjects (350 male and 350 female) was extracted between the ages of 16 and 24 years (average of 19.21 and standard deviation of 2.33) from the first cycle of five (5) universities in the city of Lima Metropolitana. The instrument applied was an adaptation of the Brief Scale for the Measurement of Basic Knowledge about Coronavirus (hereinafter KNOW-P-COVID-19), designed by Mejía et al. (2020) to evaluate basic knowledge about coronavirus. The validation process was carried out through a pilot test with a sample of 100 young university students. Reliability, its validity of content and construct are evaluated in order to update it and adapt it to the university context. As for its validity of content, the instrument underwent the evaluation of 10 health professionals, as well as 2 experts in university teaching. The KNOW-P-COVID-19 consists of 10 items with four (4)

nominal alternatives. For this research, the correct answer was rated with 2 points and 0 points to the other incorrect alternatives.

The instrument was applied through a digital form created in *Google Forms* and applied by teachers from the five universities where this research was carried out. The agreed implementation time was 10 minutes.

## 5. Results

This section presents the results obtained after the collection and processing of the information. First, the results of the psychometric analysis are presented whose purpose was to establish the level of reliability of the instrument as well as its validity of construct. After presenting this data, the descriptive results are shown which will allow us to draw baring and conclusions about the objective set.

## 6. Psychometric analysis of KNOW-P-COVID-19

The psychometric analysis of KNOW-P-COVID-19 (see table 1) concludes that the items have homogeneity indices ranging from .228 (item 7) to .566 (item 3) being these significant as they exceed the minimum values set by criterion Kline (2000) which is 0.20, so it can be said that the instrument items in the studied population have correct homogeneity rates. The reliability coefficient was obtained using the internal consistency method, with a Cronbach alpha of .709 calculated. The 10 items on the scale were taken as the basis. It can therefore be concluded that KNOW-P-COVID-19 adapted for young university students has acceptable reliability.

Table 1. Confiability of KNOW-P-COVID-19 in young people

	M	D E	ritc
What is the route by which the new coronavirus (COVID-19) can be transmitted?	2,13	,812	,296
How long is the incubation time or when do COVID-19 symptoms develop?	3,53	,627	,296
What are the most common symptoms of a person who has COVID-19 infection?	1,63	1,107	,566
What is the probability of dying (mortality rate) from COVID-19 in the general population?	2,69	1,032	,316
Of the following alternatives, in which group is the COVID-19 mortality rate highest?	2,60	,651	,236
What treatment should be given to a person who has initial COVID-19 infection?	2,21	,856	,505
What is the diagnostic method used to confirm a COVID-19 infection?	2,36	,938	,228
Which of the following measures is most effective at preventing COVID-19?	3,04	,602	,270
What would be most appropriate to do if you suspect coVID-19 infected?	2,76	,767	,281
What alternative treatments could be used if you became infected with COVID-19?	1,95	1,038	,506

Note. n-100, ritc-Corrected item-test mappings.

The construct validity of KNOW-P-COVID-19 (see table 2) was obtained through exploratory factor analysis. Kaiser-Meyer-Olkin's index was .614, demonstrating that the instrument has explanatory potential. While Bartlett's sphericity test is significant as the Chi-square of 217,386 and  $p < .05$ , demonstrating that it is relevant to perform a factorial analysis with the resulting data. Finally, exploratory factor analysis through the main components method establishes the formation of two factors that explain 42.30% of the entire variance. This makes it possible to conclude that the KNOW-P-COVID-19 adapted for young university students has an optimal validity of construct.

Table 2. KNOW-P-COVID-19 construct validity through exploratory factorial analysis

	Factor	
	1	2
What is the route by which the new coronavirus (COVID-19) can be transmitted?		,283
Of the following alternatives, in which group is the COVID-19 mortality rate highest?		,361
Which of the following measures is most effective at preventing COVID-19?		,207
What is the probability of dying (mortality rate) from COVID-19 in the general population?	,218	
How long is the incubation time or when do COVID-19 symptoms develop?	,397	
What treatment should be given to a person who has initial COVID-19 infection?	,630	
What is the diagnostic method used to confirm a COVID-19 infection?	,299	
What are the most common symptoms of a person who has COVID-19 infection?	,750	
What would be most appropriate to do if you suspect COVID-19 infected?	,392	
What alternative treatments could be used if you became infected with COVID-19?	,758	

Note. Extraction method: minimum unweighted squares. Rotation method: Promax with Kaiser normalization.

Psychometric analysis yielded positive results for the sample studied, which match those obtained by Mejía et al. (2020) in which two items on the short scale for measuring the level of basic knowledge about Coronavirus received a favourable assessment from experts (Aiken  $V > 0.70$ ); all lower limit (Li) values of 95% CI are appropriate ( $Li > 0.59$ ) and all coefficient V values were statistically significant. In Exploratory Factor Analysis (AFE), the KMO Coefficient is 0.690 and the p-value of the square chi. Unlike the study of Mejía et al., the present focused on validating the questionnaire in a specific population: young university students, and not in a much more general audience.

## 7. Descriptive analysis

After assessing the validity of the scale, it was applied to 700 young university students in Lima, Peru. Correct answers were graded with 2 points and incorrect answers with 0 points. After obtaining the data, the results were added in order to obtain a maximum value of 20 and a minimum of 00. These results were categorized into three levels, considering the vigesimal scale of grades:

0 to 10: low

11 to 15: medium

16 to 20: stop.

Table 3 shows the overall results obtained by item:

Table 3. Overall results by item

	Wrong		Right	
	Fi	%	Fi	%
What is the route by which the new coronavirus (COVID-19) can be transmitted?	34	4,9	666	95,1
How long is the incubation time or when do COVID-19 symptoms develop?	499	71,3	201	28,7
What are the most common symptoms of a person who has COVID-19 infection?	12	1,7	688	98,3
What is the probability of dying (mortality rate) from COVID-19 in the general population?	594	85,0	105	15,0
Of the following alternatives, in which group is the COVID-19 mortality rate highest?	103	14,7	597	85,3
What treatment should be given to a person who has initial COVID-19 infection?	124	17,7	576	82,3
What is the diagnostic method used to confirm a COVID-19 infection?	329	47,0	371	53,0
Which of the following measures is most effective at preventing COVID-19?	69	9,9	631	90,1
What would be most appropriate to do if you suspect COVID-19 infected?	156	22,3	544	77,7
What alternative treatments could be used if you became infected with COVID-19?	568	81,1	132	18,9

Of the 10 items considered, the youth responded correctly to 7 while 3 were not adequately answered. As regards overall results by sex (see table 4), equality at the middle level can be demonstrated in both sexes; however, at the high level of knowledge, males and bass predominate, women.

Table 4. Rgeneral sex pardons

		Sex			
		Female		Male	
		Fi	%	Fi	%
Level of knowledge	High	54	15,4	83	23,7
	Middle	210	60,0	210	60,0
	Under	86	24,6	57	16,3

With regard to overall age outcomes (see table 5), there may be greater knowledge (low level) in 18-year-olds and greater knowledge (high level) in 21-year-olds. The highest average level is reflected in 22-year-old college students.

Table 5. Rgeneral pardons by age

	Level of knowledge					
	High		Middle		Under	
	Fi	%	Fi	%	Fi	%
16	15	25,0	39	65,0	6	10,0
17	35	19,8	106	59,9	36	20,3
18	23	14,3	97	60,2	41	25,5
19	10	11,8	56	65,9	19	22,4
20	15	25,4	32	54,2	12	20,3
21	15	30,6	25	51,0	9	18,4
22	7	15,6	31	68,9	7	15,6
23	10	25,6	20	51,3	9	23,1
24	7	28,0	14	56,0	4	16,0

Finally, Table 6 shows the overall results at which the average level is observed as the highest.

Table 6. Overall variable results

		Fi	%
Level of knowledge	High	137	19,6
	Middle	420	60,0
	Under	143	20,4

## 8. Discussion

Epidemics and pandemics are a periodic phenomenon. Lack of knowledge often leads to a carefree attitude toward the problem, which can negatively affect the preparedness to face the challenges involved in combating it. The impacts of these public health phenomena are often intense, negatively impacting the mental well-being of a given population. This is research that evaluates for the first time the level of knowledge about Covid-19 exclusively in university students of the



Peruvian capital, so the results cannot be compared with those of any other similar research done in Peru.

Overall, the descriptive results obtained show that there is an average level of knowledge about the disease, a worrying result if respondents are considered to be young people who have a higher cultural level than any other sector of the population. At the international level, the results can be compared with others obtained in similar populations in other countries. In his study of 860 senior medical students from six faculties located in six geographical regions of Turkey, he determined that the level of knowledge and perceptions towards Covid-19 in this sector was moderate, as only 34.2% of participants had a high level of knowledge. In this same line is the study of Pal et al. (2020) on knowledge, attitudes and practices towards Covid-19 among young Indian adults with type 1 diabetes Diabetes Mellitus, which showed that about 80% of respondents had average knowledge about the disease. Also noteworthy is the study by Labban et al. (2020) which concluded that most of the participant's ifrivers showed moderate knowledge about Covid-19. Age, education and occupation were the only significant factors that improved the level of knowledge. A worrying finding, which coincides with this study, was the one presented by Unicef in its survey of young people in Latin America and the Caribbean (2020) in which it determined that only a third of respondents choose all the right answers when asked how Covid-19 is transmitted. More worrying is the fact that approximately one-third of the 10,500 young people surveyed in the region believe they are not at risk of contracting the disease. The survey was conducted in 31 Latin American and Caribbean countries via SMS, confirming a lack of knowledge about covid-19 symptoms, prevention and transmission, including among the most digitally literate young people. The final report concludes that only 44% of young people surveyed felt that they were "generally" informed about the virus.

In contrast to these results, the Gohel et al. study (2020) which found that more than 80% of the Indian students analyzed had adequate knowledge about the disease, as well as expressing a positive perception of existing prevention measures to reduce contagion. Also note the results obtained by Gao et al. (2020) which showed that about 90% of Chinese students surveyed expressed an optimistic attitude towards the situation of the Covid-19 pandemic as well as a high knowledge of the disease. The Karijo et al. study (2020) in which 2153 young people were surveyed in 47 counties in Kenya identified a considerably high level of knowledge of Covid-19 symptoms, preventive strategies and sources of information on the pandemic. The findings suggest that messaging campaigns should focus on reaching clear risk groups. Hatabu et al. (2020) resaltan that knowledge, attitudes and practices (KAP) towards Covid-19 are related to people's adherence to government

measures. The study evaluated the KAP towards Covid-19 among college students in Japan. This research concludes that the general KAP of the university students studied was high, as the respondents showed knowledge on how to avoid enclosed spaces, crowded areas, and near-situations, far from the young people analyzed in this study who only reached the middle level on related topics on forms of contagion, symptoms, risks, vulnerable groups, treatments and preventive measures to contract the virus. Bekele et al. (2020) found, after conducting a literature review study, that most of the articles concluded that the level of knowledge and attitude is about covid-19 was high. Their study suggests that the mental effect of coronavirus disease should be studied in general, and each country should implement the strategy to combat the disease to increase prevention levels. This disagrees with this research whose level I only get to regulate, this being worrying as it would be one of the possible causes of self-medication and civil disobedience shown by much of the Peruvian and Latin American youth (Gallo, 2020).

An important study to highlight is that of Gómez et al. (2020) who carries a program of educational intervention on the Covid-19 aimed at a sector of the Municipality Gibara, Holguin in Cuba. Their results concluded that the educational strategy on the knowledge of the pandemic was effective, as they achieved an adequate level of knowledge in almost all of the intervened population. The level of knowledge referred by respondents, at the start and end of the programme, increased from 23.4% to 95.4%. These results demonstrate the importance of implementing diversified information and training programmes on Covid-19 by the entities responsible for public health in the country. This is also corroborated in Pakistan by Mahmood et al. (2020), where the 2000 participants of all ages who were part of the study had a good understanding of the disease and a positive attitude towards protective measures. The Government and the public in this country have been implementing effective measures to improve information channels; however more awareness-raising campaigns and knowledge on safe interventions remain needed to combat the spread of disease.

This study was limited to having been conducted only in university students in the Peruvian city of Lima, which should be taken with caution for research that attempts to extrapolate its results to other similar populations. However, considering the size and variety of the sample, this could be used in cities with similar realities, also considering the high statistical power found, these results being generalized to the entire university population of that city.

Despite unprecedented national measures to combat the outbreak, the success or failure of these efforts depends heavily on public accuracy. It is in this context that the level of knowledge plays

a key role in avoiding biased and alarming deceptions and news. Specifically, this should manifest itself in young people, considering their negative and light-hearted attitude towards the virus. Researchers conclude that these results differ globally with other findings as shown. These differences are negative as they highlight the lack of knowledge about the disease that can lead not only to young people making wrong choices, but also to drag them into their environment.

The causes of this phenomenon are varied and which is in the hands of specialists from various areas to continue with new research that reveals the problem and counteracts it. The questionnaire responses have been partial or uncorrected and are in these topics that should be influenced by webinars, brochures and educational campaigns to improve understanding and correct myths about Covid-19.

Finally, Table 6 shows the overall results at which the average level is observed as the highest.

## 9. Conclusions

The questionnaire used focuses on determining the level of knowledge on Covid-19 in three specific aspects: symptoms, treatments, diagnosis and preventive measures. General results indicate that university students have average or regular knowledge about the disease.

In terms of results by sex, the data show equality in the level of knowledge in both groups; however, comparing the levels obtained, it is the males who have a high level of knowledge (23.7%); where in women, the predominant level is low (24.6%).

With regard to age outcomes, the data show that the low level is concentrated in 18-year-olds, the average level in 22-year-olds and the high level in 21-year-olds.

## References

- Arias-Chávez, D., Postigo-Zumarán, J. E. & Cangalaya-Sevillano, L. M. (2020). Perception of the information transmitted by the media about covid-19 and its relationship with the fatalism caused by the pandemic in university students in the city of Lima. *Nuances: Estudos sobre Educação*, 31. 10.32930/nuances.v31i0.8329
- Backer, J., Klinkenberg, D., Wallinga, J. (2020). Incubation period of 2019 novel coronavirus (2019-nCoV) infections among travellers from Wuhan, China, *Euro Surveill.*, 25(5), 2000062. <https://doi.org/10.2807/1560-7917.ES.2020.25.5.2000062>
- Bekele, F., Sheleme, T., Fekadu, G. & Bekele, K. (2020). Patterns and associated factors of COVID-19 knowledge, attitude, and practice among general population and health care workers: A systematic review. *SAGE Open Medicine*, 8, 1-10. <https://doi.org/10.1177/2050312120970721>

- Çalışkan, F., Mıdık, O., Baykan, Z., Şenol, Y., Çınar Tanrıverdi, E., İfakat Tengiz, F. & Gayef, A. (2020). The knowledge level and perceptions toward COVID-19 among Turkish final year medical students. *Postgrad Med*, 132(8), 764-772. 10.1080/00325481.2020.1795486
- Cascella, M., Rajnik, M., Cuomo, A., Dulebohn, S. & Di Napoli, R. (2020). Features, evaluation and treatment coronavirus (COVID-19). *StatPearls* [Internet]. <https://www.ncbi.nlm.nih.gov/books/NBK554776/>
- Gallo, C. (26 de agosto de 2020). Los jóvenes son “los principales impulsores” del Covid-19 en América Latina. *France 24*. <https://www.france24.com/es/20200825-jovenes-principales-impulsores-covid19-america-ops>
- Gao, Z., Ying, S., Liu, J., Zhang, H., Li, J. & Ma, C. (2020). A cross-sectional study: comparing the attitude and knowledge of medical and non-medical students toward 2019 novel coronavirus, *Journal of Infection and Public Health*, 13(10), 1419-1423. <https://doi.org/10.1016/j.jiph.2020.06.031>
- Gohel, K., Patel, P., Shah, P., Patel, J., Pandit, N. & Raut, A. (2021). Knowledge and perceptions about COVID-19 among the medical and allied health science students in India: An online cross-sectional survey. *Clinical Epidemiology and Global Health*, 9, 104-109. <https://doi.org/10.1016/j.cegh.2020.07.008>
- Gómez, J., Diéguez, R., Pérez, M., Tamayo, O. & Iparraguirre, A. (2020). Evaluation of the level of knowledge about COVID-19 during the survey in the population of a doctor's office. April 16, 59 (277), e925. [http://www.rev16deabril.sld.cu/index.php/16\\_4/article/view/925](http://www.rev16deabril.sld.cu/index.php/16_4/article/view/925).
- Google News. (16 de febrero de 2021). *Coronavirus (Covid-19)*. <https://news.google.com/covid19/map?hl=es-419&gl=PE&ceid=PE%3Aes-419>
- Gralinski, L.E. & Menachery, V. D. (2020). Return of the coronavirus: 2019-nCoV. *Viruses*, 12(2), 135. <https://doi.org/10.3390/v12020135>
- Guan, W. J., Ni, Z. Y. & Hu, Y. (2020). Clinical characteristics of coronavirus disease 2019 in China. *N Engl J Med.*, 382(18), 1708–1720. <https://doi.org/10.1056/nejmoa2002032>
- Hager E., Odetokun, I. A., Bolarinwa, O., Zainab, A., Okechukwu, O. & Al-Mustapha, A. I. (2020). Knowledge, attitude, and perceptions towards the 2019 Coronavirus Pandemic: A bi-national survey in Africa. *PLoS ONE*, 15(7), e0236918. <https://doi.org/10.1371/journal.pone.0236918>
- Hatabu, A., Mao, X., Zhou, Y., Kawashita, N., Wen, Z., Ueda, M., Takagi, T. & Tian, Y. (2020). Knowledge, attitudes, and practices toward COVID-19 among university students in Japan and associated factors: An online cross-sectional survey. *PLOS ONE* 15(12), e0244350. <https://doi.org/10.1371/journal.pone.0244350>
- Karijo, E., Wamugi, S., Lemanyishoe, S., Njuki, J., Boit, F., Kibui, V., Karanja, S. & Abuya, T. (2020). Knowledge, attitudes, practices, and the effects of COVID-19 on health seeking behaviors among young people in Kenya. *Research Square* (Preprint). 10.21203/rs.3.rs-34861/v1
- Kline, P. (2000). *The handbook of psychological testing* (2da ed.). Routledge.
- Labban, L., Thallaj, N. & Labban, A. (2020) Assessing the Level of Awareness and Knowledge of COVID 19 Pandemic among Syrians. *Arch Med*, 12. 10.36648/1989-5216.12.3.309
- Lauer, S. A., Grantz, K. H., Bi, Q., Jones, F. K., Zheng, Q., Meredith, H. R., Azman, A. S., Reich, N. G., & Lessler, J. (2020). The Incubation Period of Coronavirus Disease 2019 (COVID-19) From

Publicly Reported Confirmed Cases: Estimation and Application. *Annals of internal medicine*, 172(9), 577–582. <https://doi.org/10.7326/M20-0504>

Mahmood, S., Hussain, T., Mahmood, F., Ahmad, M., Majeed, A., Beg, B. M. & Areej, S. (2020). Attitude, Perception, and Knowledge of COVID-19 Among General Public in Pakistan. *Front. Public Health*, 8, 602434. <https://doi.org/10.3389/fpubh.2020.602434>

Mejía, CR, Rodríguez-Alarcón, JF, Carbajal, M., Sifuentes-Rosales, J., Campos-Urbina, AM, Charri, JC, Garay-Ríos, L., Al-Kassab-Córdova, A., Mamani- Benito, O., & Apaza-Tarqui, EE (2020). Validation of a short scale to measure the level of basic knowledge about Coronavirus, Peru (KNOW-P-COVID-19). *Kasmera*, 48 (1), e48106042020. <https://doi.org/10.5281/zenodo.3827988>

Pal, R., Yadav, U., Grover, S., Saboo, B., Verma, A. & Bhadada, S. (2020). Knowledge, attitudes and practices towards COVID-19 among young adults with Type 1 Diabetes Mellitus amid the nationwide lockdown in India: A cross-sectional survey. *Diabetes Research and Clinical Practice*, 166. <https://doi.org/10.1016/j.diabres.2020.108344>

Ruiz Mamani, P. G., Morales-García, W. C., White, M. & Márquez-Ruiz, M. S. (2020). Properties of a scale of concern about COVID-19: exploratory analysis in a Peruvian sample. *Med Clin.*, 155 (12), 535–537. <https://doi.org/10.1016/j.medcli.2020.06.022>

Sanders, J. M., Monogue, M. L., Jodlowski, T. Z. & Cutrell, J. B. (2020). Pharmacologic treatments for coronavirus disease 2019 (COVID-19): a review. *J Am Med Assoc.*, 323(18), 1824–1836. <https://doi.org/10.1001/jama.2020.6019>

Singhal, T. A. (2020). Review of coronavirus disease-2019 (COVID-19). *Indian J Pediatr.*, 87(4), 281–286. <https://doi.org/10.1007/s12098-020-03263-6>

Unicef. (June 04, 2020). COVID-19: A third of young people in Latin America and the Caribbean believe they are not at risk, according to new UNICEF surveys. <https://www.unicef.org/lac/comunicados-prensa/covid-19-un-tercio-de-los-jovenes-en-ALC-cree-que-no-esta-en-riesgo>

World Health Organization (WHO). (6 de abril de 2020). *Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations*. <https://www.who.int/publications-detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations>