

# A Cross -Ectional Survey on Knowledge, Attitude and Practices of Physical Therapists Towards Covid-19 Pandemic

HIRA SHAUKAT<sup>1</sup>, ANAM ZAFAR<sup>2</sup>, HAFIZ RANA MUHAMMAD ARSLAN<sup>3</sup>, LUBNA ZAFAR<sup>4</sup>, FATIMA JAFAR<sup>5</sup>, FAIZAN UR REHMAN<sup>6</sup>

<sup>1</sup>(BSPT, tDPT) Department of Allied Health Sciences University of South Asia Cantt Campus Lahore, Pakistan

<sup>2</sup>(BSPT, tDPT) Department of Allied Health Sciences University of South Asia Cantt Campus Lahore, Pakistan

<sup>3</sup>(DPT, MPH) Department of Allied Health Sciences University of South Asia Cantt Campus Lahore, Pakistan

<sup>4</sup>(DPT, tDPT) Boston Physiotherapy and Wellness Clinic Lahore, Pakistan

<sup>5</sup>(DPT, MSPT) Department of Allied Health Sciences University of South Asia Cantt Campus Lahore, Pakistan

<sup>6</sup>(DPT, MSPT) HOD at Synergy Physiotherapy Clinic

Corresponding author: Hafiz Rana Muhammad Arslan, Email [arslan.physio@gmail.com](mailto:arslan.physio@gmail.com), Cell No. +923360703557

## ABSTRACT

**Objectives:** The purpose of this study was to determine the number of physiotherapists who interrupted their services because of the COVID-19 pandemic and to verify the procedures adopted by the physiotherapists who are still working.

**Methods:** It was a Cross sectional study. Study Setting was University of South Asia, Lahore. Data was collected through self-administered questionnaire. Physiotherapists working in Government and Private Hospitals in Lahore were recruited. Data was collected from October 2020 to November 2020. Non-probability Convenient sampling technique was used to recruit participants in study. Sample size of 241 Participants was calculated by using an online calculator (Raosoft, Inc. 2004) with 5% margin of error, 95% confidence level and population of 462 physiotherapists working in Lahore in various Government and Private Hospitals

**Results:** Out of 210 participants, males were 154 (73%) while females were 56 (27%). 37 (18%) were working in government hospitals while 173 (82%) were working in private setups. 14 (7%) were holding only undergraduate degree while 196 (93%) were post graduate. 28 (13%) were having up to 4 years of clinical experience working as physiotherapist, 65 (31%) were having up to 8 years of experience while 117 (56%) were having up to 12 years of clinical experience. When asked about Source of information on COVID-19, 16 (8%) chose Official international health organization sites and media, 18 (9%) chose Official government sites and media e.g. Ministry of Health Pakistan, 121 (58%) chose News Media e.g. TVs, radios, Magazines, Newspapers, 52 (25%) chose Social Media e.g. WhatsApp, Facebook, Twitter, Instagram while 2 (1%) chose journals and only 1 participant (.5%) chose others source of information.

**Conclusion:** The distribution of Attitude, Knowledge, and Practice is the same across categories of source of information on COVID-19.

**Keywords:** COVID-19, Coronavirus disease, Knowledge, Attitude, Practice

## INTRODUCTION

Coronavirus Disease aka COVID-19 is a viral tsunami prevailing every continent that is caused by a virus known as novel human coronavirus (SARS-CoV-2) that was previously known as COVID-19 (1). This pandemic came to limelight when was reported in December 2019 and January 2020 in Wuhan china with patients presenting with viral pneumonia. Cause of spread of this pneumonia of unknown etiology was being linked with the Huanan Seafood Wholesale Market when was reported initially but it is now evident that human-to-human transmission is culprit behind massive spread of this pandemic (2). As of 21<sup>st</sup> November 2020, worldwide number of cases are around 5.7 million and death toll has reached to 1.37 million. According to latest statistics, USA, India and Brazil are countries on top in terms of highest number of diagnosed cases of COVID-19 (3).

According to latest statistics of this viral disaster in Pakistan given by of ministry of health Pakistan are 371,508 confirmed cases and death toll is 7603 persons, while 328931 persons have recovered. Sindh province has 161028 cases, Punjab province has 113457 cases, KPK province has 43730 cases, Islamabad has 16699 cases, Baluchistan has 16699 cases while Azad Jammu & Kashmir & Gilgit Baltistan has 5911/4506 cases (4)

symptoms of patients presenting with covid-19 include high grade fever, sore throat, fatigue, body pain, head ache, chills with persistent tremors, dry cough, Shortness of breath, loss of smell and loss of taste, conjunctivitis, discoloration of fingers and toes(5). Suspected agent is A coronavirus SARS-CoV-2 in the genus BETACORONAVIRUS. Coronaviruses are enveloped viruses having single-stranded RNA enveloped viruses with ability to mutate (6). These corona viruses were initially considered by scientists after a previous epidemic of severe acute respiratory syndrome (SARS) back in 2003 (SARS) (7). To date, no specific treatment has been suggested but scientists are in impatient efforts to develop successful therapeutic drug (8). To minimize spread of this viral tsunami, WHO recommendations embrace repeated hand washing, maintenance of social distancing, avoidance of visiting crowded places, avoiding touching the eyes, nose, and mouth. WHO recommendations stress to practice respiratory hygiene through covering nose and mouth with a face mask in daily routine (9). Persons in middle and older adulthood, persons with obesity, hypertensive, ischemic heart disease and diabetic patients are at more risk of having complications followed by increased risk to death. (10)

Physiotherapy is largest profession in the area of rehabilitation and they are health care professionals (11) who are not only indulged in multidisciplinary team in dynamic process of clinical decision making & and plan of care but they are specialists who can restore physical functions and can maximize functional ability of body leading to enhancing quality of life of a person (12). Along with other health care professionals working in clinical settings, physiotherapists are at an increased risk of exposure as well to this ongoing pandemic (13). With other symptomatic approach of treatment of COVID-19, respiratory therapy is also beneficial not only in acute phase in ICUs, in ward patients but also along post COVID-19 rehabilitation(14) (15). Recommendations for physical therapy management of acute phase of COVID-19 has been developed by The World Confederation for Physical Therapy, WCPT (16). Currently immense health education programs are running globally aimed at improving covid-19 knowledge among general public & health care workers to enhance primary prevention of COVID-19. Such practices will be helpful to hold optimistic attitudes and maintain appropriate practice towards prevention of spread of COVID-19 across the globe. Therefore, this study was aimed to assess how much physiotherapists are knowledgeable about COVID-19. Does they hold positive attitude towards COVID-19? Does physiotherapists have appropriate & preventive practices in their daily routine towards COVID-19?

## METHODS

It was a Cross sectional study. Study Setting was University of South Asia, Lahore. Data was collected through self-administered questionnaire. Physiotherapists working in Government and Private Hospitals in Lahore were recruited. Data was collected from October 2020 to November 2020. Non-probability Convenient sampling technique was used to recruit participants in study. Sample size of 241 Participants was calculated by using an online calculator (Raosoft, Inc. 2004) with 5% margin of error, 95% confidence level and population of 462 physiotherapists working in Lahore in various Government and Private Hospitals (17). Male & female Physical Therapists and graduate students doing supervised internships were added. Physiotherapy students and physiotherapists currently not affiliated with any of clinical settings were excluded. Participant's details and data confidentiality was maintained at every level. Data was collected through KAP questionnaire that was adapted from a study done by Olum et al. after taking permission of respected author (18). KAP tool was comprised of four sections. Section I had demographic data with 6 questions including age, gender, academic qualification, place of working, working experience and sources of information on COVID-19. Section II had 11 multiple choice questions to assess knowledge, each correct answer carried one point. Section III had 5 questions to assess attitudes with likert scale items; strongly disagree, disagree, not sure, agree, strongly agree. 1-5 respectively for each response. Section IV had 5 questions to assess Practices that was also using likert scale items; Always, occasional, never. 1-3 respectively for each response. IBM SPSS (Statistical Package for Social

Science) version 21.0 was used for entry and analysis of collected data.

**Reliability:** Reliability of the items was assessed using inter-item correlation, item-total correlation and internal consistency. 0.7 value was considered a benchmark for acceptable cronbach's alpha coefficient to include a particular sub-scale in the final study. Item-total correlation and inter-item correlation was applied to examine the homogeneity of scale. A coefficient less than 0.3 stipulates no contribution to the overall scale; whereas, a coefficient greater than 0.7 shows redundancy.

**Validity:** To check validity, EFA (Exploratory factor analysis) was performed. Method of extraction like principle component analysis coupled with Varimax rotation was used to calculate EFA. The benchmark for EFA was eigenvalue (>1), total variance explained and scree plot. 0.4 was considered cut-off point for identifying factors. The study tool comprised of 4 sections, one of which aimed to explore demographic characteristics of the participants while the remaining were aimed to explore knowledge, attitude, and practices of physiotherapists regarding COVID-19.

## RESULTS

### Socio-demographic characteristics of the participants:

According to results of the study, mean age of participants of study was  $34.38 \pm 6.493$  years. Out of 210 participants, males were 154 (73%) while females were 56 (27%). 37 (18%) were working in government hospitals while 173 (82%) were working in private setups. 14 (7%) were holding only undergraduate degree while 196 (93%) were post graduate. 28 (13%) were having up to 4 years of clinical experience working as physiotherapist, 65 (31%) were having up to 8 years of experience while 117 (56%) were having up to 12 years of clinical experience. When asked about Source of information on COVID-19, 16 (8%) chose Official international health organization sites and media, 18 (9%) chose Official government sites and media e.g. Ministry of Health Pakistan, 121 (58%) chose News Media e.g. TVs, radios, Magazines, Newspapers, 52 (25%) chose Social Media e.g. WhatsApp, Facebook, Twitter, Instagram while 2 (1%) chose journals and only 1 participant (.5%) chose others source of information.

**Instrument reliability and validity:** Overall, the value of Cronbach's alpha was 0.76 which indicated good reliability analysis and good internal consistency of scale. Internal consistency was analyzed for 3 subscales related to 3 factors extracted from EFA. Inter-item correlation for all items was in range between 0.3 to 0.7; whereas, item-total co-relation was greater than 0.3 for each item. Bartlett's Test of Sphericity ( $P < 0.01$ ), Kaiser Meyer-Okin test (0.81), and correlation-matrix ( $> 0.3$ ) was used to assess the sustainability of the 21 item scale before subjecting it to principal component analysis which approved factorability for further factor analysis. varimax rotation technique was applied to rotate 3 factors based on conceptual consideration, total variance explained, eigenvalues of greater than one, and scree plot as shown in figure. These three factors were named as knowledge, attitude, and practice.

A Cross -Ectional Survey on Knowledge, Attitude and Practices of Physical Therapists Towards Covid-19 Pandemic

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Attitude is the same across categories of source of information on COVID-19.	Independent samples Krushkal Wallis Test	.775	Retain the null hypothesis.
2	The distribution of practice. total is the same across categories of source of information on COVID-19.	Independent samples Krushkal Wallis Test	.669	Retain the null hypothesis.
3	The distribution of Knowledge. total is the same across categories of source of information on COVID-19	Independent samples Krushkal Wallis Test	.689	Retain the null hypothesis.

Table I. Descriptive Statistics of age

	N	Minimum	Maximum	Mean	Std. Deviation
Age	210	23	51	34.38	6.493

Table II. Descriptive Statistics of other demographic variables

Demographic Variables	Frequency(N)	Percentage
Gender		
Male	154	73.3
Female	56	26.7
Place of work		
Government setup	37	17.6
Private setup	173	82.4
Highest Qualification		
Undergraduate degree	14	6.7
Postgraduate degree	196	93.3
Experience		
1-4 years	28	13.3
5-8 years	65	31.0
9-12 years	117	55.7
Source of information on COVID-19		
Official international health organization sites and media	16	7.6
Official government sites and media e.g. Ministry of Health Pakistan	18	8.6
News Media e.g. TVs, radios, Magazines, Newspapers	121	57.6
Social Media e.g. WhatsApp, Facebook, Twitter, Instagram	52	24.8
Journals	2	1.0
Others	1	.5

Table III. Knowledge, Attitude and Practices of physical therapists towards COVID-19 pandemic

Knowledge	True (N)	True %	False (N)	False %	I don't know (N)	I don't know %
The main clinical symptoms of COVID-19 are						
Cough	200	95				
Fever	208	99				
Sore throat	149	71				
Runny nose	156	75				
Myalgia (muscle pain)	203	97				
Diarrhea	27	13				
Headache	161	77				
Smell disturbance	156	74				
Confusion	14	7				
Sneezing	185	88				
There is currently no effective cure for COVID-19, but early symptomatic and supportive treatment can help most patients recover from the infection	203	97	7	3	-	-
Not all persons with COVID-19 will develop severe cases. Only those who are elderly, have chronic illnesses, and are obese are more likely to be severe cases.	108	51	101	48	1	.5
Eating or contacting wild animals would result in the infection by the COVID-19 virus.	7	3	193	92	10	5
Persons with COVID-2019 cannot transmit the virus to others when a fever is not present.	4	2	203	97	3	1
The COVID-19 virus spreads via respiratory droplets of infected individuals.	189	90	21	10	-	-
Wearing general medical masks can prevent one from acquiring infection by the COVID-19 virus.	198	94	12	6	-	-
It is not necessary for children and young adults to take measures to prevent the infection by the COVID-19 virus.	1	.5	209	99.5	-	-
To prevent the infection by COVID-19, individuals should avoid going to crowded places such as bus parks and avoid taking public transportations.	207	99	3	1	-	-
Isolation and treatment of people who are infected with the COVID-19 virus are effective ways to reduce the spread of the virus.	209	99.5	1	.5	-	-
People who have contact with someone infected with the COVID-19 virus should be immediately isolated in a proper place. In general, the observation period is 14 days.	210	100	-	-	-	-

Attitude	SD (N)	SD %	D (N)	D %	NS (N)	NS %	A (N)	A %	SA (N)	SA %
Brown race is protective towards COVID-19 disease.	40	19	153	73	5	2	12	6		
Wearing a well-fitting facemask is effective in preventing COVID-19.	-	-	-	-	1	.5	190	91	19	9
Using a hand wash can prevent you from getting COVID-19.	-	-	-	-	-	-	190	91	20	9
When a patient has signs and symptoms of COVID-19, I can confidently participate in the management of the patient.	43	21	155	74	10	5	2	1	-	-
Pakistan is in a good position to contain COVID-19.	6	3	155	74	25	12	19	9	5	2

## DISCUSSION

With the rise of 2020, COVID-19 has changed the global dimensions of all universal sectors including economical, educational, social, health etc. across the globe. To cope with this viral tsunami has become so far a massive challenge for all the stake holders (19) (20). Health care workers are leading this war with a great zeal and deal and are direct and indirect prey of this viral tsunami. As they are at frontline in this war, so probability of being victim is very much higher in health care worker as compare to general public. (21). Studies related to knowledge, attitude and practices of health care workers practices about COVID-19 is new topic of interest of researchers now a days.(13) (18) who are engaged in performing their role of home and community based services during pandemic COVID-19. (22). To the best of my acquaintance, studies related to knowledge, attitude and practices of physiotherapists were not in literature except one study that measured 23 that's why this study was planned and conducted successfully.

Regarding main clinical symptoms of COVID-19, out of 210 participants of study, 99% participants of study chose fever as one of main symptom, 95% participants considered cough, 97% participants considered myalgia, 88% participants think sneezing as one of main clinical symptom of COVID-19. Headache was chose by 77% participants of study. 75% answered runny nose, 74% think that smell disturbance is also one of symptom of COVID-19. 71% think that sore throat is one of main clinical symptoms while only 13% participant think that diarrhea is also one of main symptom of COVID-19 and confusion was considered by only 7% participants.

97% participants think that although there is no proven treatment for this viral tsunami but symptomatic treatment can be helpful in managing symptoms of COVID-19. 51% participants believed that persons with chronic illnesses, elderly and obese persons are at major risk of developing complications followed by COVID-19. Only 3% participants believed that COVID-19 could be transmitted through contact or eating wild animals while 92% labelled this statement as false. Only 2% participants believed that COVID-19 patient could not transmit virus to others if he or she is not having fever while 97% participants considered this statement false. 90% participants had knowledge that COVID-19 spread via respiratory droplets of patient suffering from COVID-19 while 10% participants answered that COVID-19 can be spread through other ways. 94% participants think that through wearing medical masks, spread of COVID-19 can be prohibited while 6% participants were not agree with this statement. Similar results were found in a study conducted by Ng et al in 2020. (25)

99.5 % participants categorized this statement as false statement that preventive measures are not necessary for children & young adults. 99% participants think that crowded place have to be avoided to minimize probability of acquiring COVID-19. 99.5 participants think that COVID-19 patients must be isolated in order to minimize spread of this viral pandemic. Mean value of knowledge obtained after computing questions asking knowledge towards COVID-19 was  $13.70 \pm 0.724$ . 99% participants were having sufficient knowledge about COVID-19 while 1% were not having sufficient knowledge. As majority of the physiotherapists had sufficient knowledge about this pandemic COVID-19 which is in line with findings of study conducted on Health care workers in Uganda and another study conducted on Health care workers about COVID-19 working at a city of Vietnam. (24)

When asked about attitude of physiotherapists towards COVID-19, 73% participants were disagree with the statement that brown race is protective towards this pandemic. 6% were agree with this statement while 19% were strongly disagree with this statement. 91% participants were agree & 9% were strongly agree with the statement that a well-fitting facial mask has effective role in prevention of spread of COVID-19. Similarly 91% participants were agree that hand washing has also pre-emptive role & can lessen likelihood of spread of COVID-19. Only 1% were agreed to participate in the management of patient suffering from COVID-19. When asked about is Pakistan in a good position to contain COVID-19 then according to results, 9% were agree with this statement, 12% were not sure about it. 74% were disagree from this statement while 3% were strongly disagree with it.

Mean value of attitude towards COVID-19 was  $10.96 \pm 1.273$ . According to results of study 25% participants showed positive attitude when asked about COVID-19 while 75% were showing negative attitude. Same attitude was found in study conducted by olum et al. in Uganda's Makerere University Teaching Hospitals on health care workers. 18

Similarly mean value of questions asking about practice towards COVID-19 was  $1.90 \pm 0.545$ . 92% participants were having good practice towards COVID-19 while 8% participants were having poor practice towards prevention of COVID-19. Such high value of good practice was also observed in studies conducted by olum et al. in Uganda's Makerere University Teaching

Hospitals on health care workers, as well in another study by Alfahan et al. on coronaviruses. (26)

When asked about visit to crowded place, 84% said with never. 14 % responded with occasional. When asked about wearing a mask when dealing with patient all of the

participants were practicing it. This is highest result found in any study and can be attributed to wide spread campaign regarding primary prevention of COVID-19. 97% responded about refraining from hand shaking while meeting others. Which is slightly lower than study by Olum et al in which it was 99%. (18)94% were always washing their hands before and after handling each and every patient. When asked about avoiding patient with suspected COVID-19 symptoms, none of the participant was willing, this can be attributed due to global COVID-19 phobia now a days. These results were totally opposite to study conducted by Olum et al in which it was 55%.(18)

Such studies must be cherished to conduct as outcomes of such studies can be effective in developing steps towards improving Knowledge level of physiotherapists towards COVID-19 so that, they also can proficiently play part in primary & secondary prevention of COVID-19 as an integral component of health care setup.

## CONCLUSION

The health care workers are working very hard towards providing the best available evidence based care to the patients especially to patients with positive COVID-19. However, the distribution of Attitude, Knowledge, and Practice is the same across categories of source of information on COVID-19. There was a very little difference among the physiotherapists concerning their Knowledge, Attitudes and Practices. This little difference was not statistically significant.

## REFERENCES

- Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med.* (2020) 382:727– 33. doi: 10.1056/NEJMoa2001017
- Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics inWuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med.* (2020) 382:1199–207. doi: 10.1056/NEJMoa2001316
- [https://www.worldometers.info/coronavirus/?utm\\_campaign=homeAdvegas1?](https://www.worldometers.info/coronavirus/?utm_campaign=homeAdvegas1?)
- <https://covid.gov.pk/>
- <https://www.ncbi.nlm.nih.gov/mesh/2050205>
- Annan A, Baldwin HJ, Corman VM, Klose SM, Owusu M, Nkrumah EE, Badu EK, Anti P, Agbenyega O, Meyer B, Oppong S. Human betacoronavirus 2c EMC/2012–related viruses in bats, Ghana and Europe. *Emerging infectious diseases.* 2013 Mar;19(3):456.
- Guan Y, Zheng BJ, He YQ, Liu XL, Zhuang ZX, Cheung CL, et al. Isolation and characterization of viruses related to the SARS coronavirus from animals in southern China. *Science.* 2003;302:276–8. doi: 10.1126/science.1087139 [PubMed] [CrossRef] [Google Scholar]
- Wiersinga WJ, Rhodes A, Cheng AC, Peacock SJ, Prescott HC. Pathophysiology, transmission, diagnosis, and treatment of coronavirus disease 2019 (COVID-19): a review. *Jama.* 2020 Aug 25;324(8):782-93.
- Deng SQ, Peng HJ. Characteristics of and public health responses to the coronavirus disease 2019 outbreak in China. *Journal of clinical medicine.* 2020 Feb;9(2):575.
- Muniyappa R, Gubbi S. COVID-19 pandemic, coronaviruses, and diabetes mellitus. *American Journal of Physiology-Endocrinology and Metabolism.* 2020 May 1;318(5):E736-41. [https://www.who.int/hrh/statistics/Health\\_workers\\_classification.pdf](https://www.who.int/hrh/statistics/Health_workers_classification.pdf)
- Thomas P , Baldwin C , Bissett B , Boden I , Gosselink R , Granger CL , Hodgson CL , Jones AYM , Kho ME , Moses R , Ntoumenopoulos G , Pary SM , Patman S , van der Lee L ( 2020 ) : Physiotherapy management for COVID-19 in the acute hospital setting. Recommendations to guide clinical practice . Version 1.0 , published 23 March 2020 . *Journal of Physiotherapy* [ Links ]
- Tamang N, Rai P, Dhungana S, Sherchan B, Shah B, Pyakurel P, Rai S. COVID-19: A National Survey on Perceived Level of Knowledge, Attitude and Practice among Frontline Healthcare Workers in Nepal.
- Simonelli C, Paneroni M, Fokom AG, Saleri M, Speltoni I, Favero I, Garofali F, Scalvini S, Vitacca M. How the COVID-19 infection tsunami revolutionized the work of respiratory physiotherapists: an experience from Northern Italy. *Monaldi Archives for Chest Disease.* 2020 May 19;90(2).
- Lazzeri M, Lanza A, Bellini R, Bellofiore A, Cecchetto S, Colombo A, D'Arosca F, Del Monaco C, Gaudello G, Paneroni M, Privitera E. Respiratory physiotherapy in patients with COVID-19 infection in acute setting: a Position Paper of the Italian Association of Respiratory Physiotherapists (ARIR). *Monaldi Archives for Chest Disease.* 2020 Mar 26;90(1).
- Schaeffer R , Mendenhall W , Ott L , Gerow K . *Elementary Survey Sampling .* ( 7th ed). Boston : Brooks/Coles ; 2011 [ Links ]
- <http://www.raosoft.com/samplesize.html> [Accessed on: August 29, 2020]
- Olum R, Chekwech G, Wekha G, Nassozi DR, Bongomin F. Coronavirus Disease-2019: Knowledge, Attitude, and Practices of Health Care Workers at Makerere University Teaching Hospitals, Uganda. *Frontiers in Public Health.* 2020 Apr 30;8:181.
- Kassema, J. J. COVID-19 outbreak: is it a health crisis or economic crisis or both? Case of African Countries. *SSRN Electr J.* (2020) 9:4–14. doi: 10.2139/ssrn.3559200
- McKibbin WJ, Fernando R. The global macroeconomic impacts of COVID- 19: seven scenarios. *SSRN Electr J.* (2020) 20–24. doi: 10.2139/ssrn.3547729
- MedScape. In Memoriam: Healthcare Workers Who Have Died of COVID-19. (2020). Available online at: [www.medscape.com/viewarticle/927976](http://www.medscape.com/viewarticle/927976) (accessed April 06, 2020).
- Falvey JR, Krafft C, Kornetti D. The essential role of home-and community-based physical therapists during the COVID-19 pandemic. *Physical therapy.* 2020 Jul;100(7):1058-61.
- Minghelli Beatriz, Soares Ana, Guerreiro Andreia, Ribeiro Antoine, Cabrita Carolina, Vitoria Carlos et al . Physiotherapy services in the face of a pandemic. *Rev. Assoc. Med. Bras.* [Internet]. 2020 Apr [cited 2020 Nov 23]; 66( 4 ) : 491-497. Available from: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S010442302020000400491&lng=en](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S010442302020000400491&lng=en). Epub June 15, 2020. <https://doi.org/10.1590/1806-9282.66.4.491>.
- Giao H, Han NTN, Van Khanh T, Ngan VK, Van Tam V, Le An P. Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City. *Asian Pacific J Trop Med.* 13:3–5. doi: 10.4103/1995-7645.280396
- Ng K, Poon BH, Kiat Puar TH, Shan Quah JL, Loh WJ, Wong YJ, et al. COVID-19 and the risk to health care workers: a case report. *Ann InternMed.* (2020). doi: 10.7326/L20-0175. [Epub ahead of print].
- Alfahan A, Alhabib S, Abdulmajeed I, Rahman S, Bamuhair S. In the era of corona virus: health care professionals' knowledge, attitudes, and practice of hand hygiene in Saudi primary care centers: a cross sectional study. *J Commn Hospital Int Med Perspect.* (2016) 6:32151. doi: 10.3402/jchimp.v6.32151
- Minghelli B, Soares A, Guerreiro A, Ribeiro A, Cabrita C, Vitoria C, Nunes C, Martins C, Gomes D, Goulart F, Santos RM. Physiotherapy services in the face of a pandemic. *Revista da Associação Médica Brasileira.* 2020 Apr;66(4):491-7.