ORIGINAL ARTICLE

Impact of Level of Knowledge, Attitude, Practice, Perceived Barriers and Risk Perception on COVID-19 and Infection Control on Residency Training among Physical Medicine and Rehabilitation Trainees in the Philippines

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ABSTRACT

Introduction. In compliance with the COVID-19 infection control guidelines outlined by the Center for Disease Control and the World Health Organization, non-urgent and non-essential services have been postponed in most healthcare institutions in the Philippines, including medical training institutions wherein responses and strategies for the residency program vary. These changes may impact the trainees' knowledge, skills, and attitudes on their training. Specifically, most services were halted indefinitely in Physical Medicine and Rehabilitation (PM&R). Some resident trainees were deployed to treat COVID-19 patients not as PM&R residents but as generalists to augment the number of medical front-liners.

Objective. To determine the PM&R residents' COVID-19 risk preparedness in terms of relevant knowledge, attitudes, practice, and perceived barriers, and to describe the impact of COVID-19 on residency training.

Methods. In this descriptive cross-sectional survey, the population consisted of a sample of PM&R residents from the six training institutions in the Philippines. A 15-20-minute web-based assessment tool was used to gather the following: participant characteristics; level of awareness and knowledge of residents towards COVID-19; risk preparedness through risk perception, knowledge, and attitudes regarding COVID-19; and impact of COVID-19 on residency training.

Results. A total of 62 PM&R residents participated in the study. The majority were female and aged at least 30 years. The respondents had the following mean scores: 12.84 out of 14 for knowledge (interpreted as good), 9.16 out of 35 for attitude (interpreted as positive), and 5.65 out of 6 for practiced adherence to COVID-19 and infection control measures in their respective institutions (interpreted as good). The most commonly cited barriers to COVID-19 infection control included overcrowding in the emergency room (95%), lack of knowledge about the mode of transmission of the disease (92%), and limitation of infection control resources (92%). The majority reported that the main impact of the pandemic on PM&R residency training included the lack of clinical exposure to cases and procedures.

Conclusion. The study provided local baseline data on the PM&R residents' level of COVID-19 risk preparedness and the perceived impact of the pandemic on their training. The study results may help the faculty plan for program improvement measures amid the changing COVID-19 landscape.

Key Words: COVID-19, physical medicine and rehabilitation, residency

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INTRODUCTION

On March 12, 2020, a pandemic was declared due to the serious public health risk posed by the coronavirus disease 2019 (COVID-19).[1] Healthcare institutions, including those that offer medical specialty training programs, follow the World Health Organization (WHO) guidelines on infection control measures wherein significant restructuring of usual relevant standard operating procedures had to be done.[1,2] Despite available policies, the implementation of unprecedented risk management procedures largely depended on stakeholders' precautionary behaviors and communication strategies (e.g., authorities, the general public).[3,4] Precautionary behaviors are influenced by one's level of preparedness, which includes knowledge of COVID-19 and relevant infection control guidelines. One study involving dentists in Jordan reported general awareness of COVID-19 symptoms, mode of transmission, infection control measures, but with limited understanding of proper precautionary measures to protect the dental staff and patients. The authors recommended that national and international guidelines be released and adequately implemented by regional and local dental associations to ensure all practitioners are well-informed.[5]

Apart from restructuring the standard operating procedures of medical institutions in rendering their services, institutions with residency training programs also had to modify their programs to maintain their standards. Various institutions employed different strategies. For instance, at the Philippine General Hospital (PGH), a COVID-19 referral center, elective procedures were suspended for a time and in-person outpatient consultations and other non-urgent services, including rehabilitation. Some of the medical and paramedical staff, including those from the Department of Rehabilitation Medicine, had to be re-assigned to other areas in the hospital to perform COVID-19-related duties. Telemedicine was also widely adopted. Such changes were constantly evolving throughout the pandemic, while the readiness of the stakeholders remained largely unknown. Hence, there was a need to determine stakeholders' preparedness and risk perceptions, particularly healthcare providers, amid the fluid COVID-19 situation.

The disruption of training-related activities influences the constantly changing COVID-19 landscape on medical residency training.[6,7] In response, an orthopedic program at the Emory University School of Medicine developed a five-pronged strategy that included the following: 1) patient and provider safety, 2) uninterrupted necessary care, 3) system sustainability, 4) adaptability, and 5) preservation of vital leadership structures.[8] It was recommended that training institutions step up to the challenge of balancing clinical work, surgical training, didactics, and academic responsibilities while complying with infection control guidelines.[8]

A similar challenge is applicable in Physical Medicine and Rehabilitation (PM&R). For instance, various PM&R national associations worldwide had to reinforce infection control advisories while attending to patients through telerehabilitation or limited in-person encounters.[9,10] Locally, an interim guideline was released by the Philippine Academy of Rehabilitation Medicine (PARM) at the height of the pandemic.[11] As of this writing, there are no published reports on assessing the impact of COVID-19 on training specifically for PM&R based on searches done through PubMed and HERDIN from April 2020 to August 2020 using the following search terms: "COVID-19," "coronavirus," "physical medicine and rehabilitation," "residency," "rehabilitation medicine," and "physical and rehabilitation medicine."

Previous studies presented lessons from previous epidemics like the Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome - Coronavirus (MERS-CoV), and Ebola. They highlighted the importance of risk preparedness for medical trainees.[12] By evaluating the perceived impact of the epidemic on training and risk preparedness, policy adjustments in training programs could be made as needed. Hence, this present study aimed to determine the PM&R residents' COVID-19 risk preparedness in terms of relevant knowledge, attitudes, practice, and perceived barriers and describe the impact of COVID-19 on PM&R residency training in the Philippines.

METHODS

This cross-sectional study was conducted from September to November 2020, involving residents, regardless of year level, from the six training institutions in PM&R in the Philippines, namely, (1) Ospital ng Makati, (2) PGH, (3) Philippine Orthopedic Center, (4) St. Luke's Medical Center – Quezon City, (5) University of Santo Tomas Hospital, and (6) Veteran's Memorial Medical Center. The inclusion criteria were as follows: bona fide PM&R residents, including chief residents, in training mentioned above institutions; voluntary informed consent to participate in the study; and the capacity to voluntarily access an online survey. The exclusion criteria were fellows in training, residents on leave from training, and no internet access.

The sample size was calculated using Slovin's formula based on the total number of PM&R residents in all training institutions at the time of the study (N=72). The sample size (n) was 61 computed at a 95% confidence interval, distributed across all training institutions. Random sampling was employed to recruit potential respondents.

Study Instrument

A questionnaire measuring COVID-19-related knowledge, attitude, practice, and perceived barriers was used. It consisted of two parts and was administered using an encrypted web-based survey platform (SurveyMonkey™). The first part was based on the validated and reliable (Cronbach alpha=0.77) questionnaire developed by Saqlain et al.. It comprised five sections (Demographics, Knowledge,

Attitude, Practice, and Perceived Barriers) as described below.[13] Meanwhile, the second part comprised open-ended questions on residency training during the pandemic and its impact on knowledge, skills, and attitudes of PM&R residents. The questions were based on a preliminary survey with PM&R residents in the study institution.

Awareness and knowledge regarding COVID-19

The questions that evaluated the present awareness and knowledge of PM&R residents regarding COVID-19 included the following: the virus, incubation period, symptoms, measures to avoid contagion, risk factors, and modes of transmission. The respondents were also asked about the most critical COVID-19 topics they wished to know more about and how they would like to access them. This part of the questionnaire consisted of 14 items answerable by "Yes," "No," or "I don't know." Each correct answer was given 1 point. The sum of points ranged from 0 to 14, wherein scores ≤10 were interpreted as having poor knowledge, while >10 represented good knowledge.

Attitudes towards COVID-19

Examples of questions that evaluated the attitudes of PM&R residents towards COVID-19 included perceptions about wearing personal protective equipment (PPE) and isolation of infected patients. This part of the questionnaire comprised seven items answerable by a 5-point Likert scale as follows: "Strongly Agree" (1 point), "Agree" (2 points), "Neutral" (3 points), "Disagree" (4 points), or "Strongly Disagree" (5 points). The sum of points ranged from 7 to 35, with lower scores indicating favorable attitudes towards COVID-19.

COVID-19-related practice

The questions on COVID-19-related practice evaluated how adherent the PM&R residents were to infection control guidelines. This part of the questionnaire included six items answerable by "Yes" (1 point), "No" (0 point), or "Sometimes" (0 point). The sum of points ranged from 0 to 6, wherein a score of 5 or 6 demonstrated good practice, while any score less than 5 indicated poor practice or observance of COVID-19 precautionary measures. Furthermore, the perceptions of respondents about barriers to infection control were assessed using a seven-item tool with each question answerable by a 5-point Likert scale as follows: "Strongly Agree," Agree," "Neutral," "Disagree," and "Strongly Agree." The responses were recorded as frequencies and percentages.

Study Procedure and Data Analysis

Approval from the University of the Philippines Manila Research Ethics Board (UPMREB Registration No. 2020-505-01) and imprimatur from the Philippine Board of Rehabilitation Medicine (PBRM) were secured. The PM&R residents from the different training institutions in the Philippines were invited to participate in the study through invitation letters sent to their respective department chairs. The entire questionnaire took approximately 15 to 20 minutes to answer online on SurveyMonkey®. All data collected were anonymized.

Stata/MP version 16 was used for data processing and analysis. Continuous variables were presented as means and standard deviations (SD), while categorical variables were presented as frequencies and percentages. Continuous data were analyzed using an independent t-test, while categorical data were analyzed using Fisher's exact test. Simple logistic regression analysis with Firth's correction bias was used to examine good knowledge and practice determinants. Simple linear regression analysis was used to examine the determinants of attitude. P-values ≤0.05 were considered statistically significant. Qualitative data on the impact of COVID-19 on training were subjected to content analysis, wherein related responses were grouped and tallied.

RESULTS

Sixty-two (62) out of 72 residents accomplished the online survey (response rate: 86.1%). The majority were at least 30 years old and female. Approximately 26% of the respondents came from a COVID-19 referral center.

COVID-19 Risk Preparedness of PM&R Residents

Most of the respondents had good knowledge about COVID-19 (mean: 12.84, range: 9 - 14). The respondents' attitudes towards COVID-19 infection control had a mean of 9.16 (range: 7 – 16), interpreted as positive or favorable. The respondents had good practice of COVID-19 infection control as demonstrated by a mean of 5.65 (range: 4 – 6). One participant was found to have poor knowledge about COVID-19, while six had a poor practice of COVID-19 infection control (Table 1). There were no significant differences in terms of COVID-19-related knowledge, attitude, and practice across sex, age groups, and training in a COVID-19 referral center (p>0.05) (Table 2). The most common barriers to COVID-19 infection control were found to be the following: overcrowding in an emergency room (95%), lack of knowledge about the mode of transmission of the disease (92%), and limited infection control equipment (92%).

Table 1. COVID-19 risk preparedness of PM&R residents (n = 62)

Components	Overall Scores
Knowledge score, mean ± SD	12.84 ± 0.93
Good knowledge, n (%)	61 (98)
Poor knowledge, n (%)	1 (2)
Attitude score, mean ± SD	9.16 ± 2.46
Practice score, mean ± SD	5.65 ± 0.66
Good practice, n (%)	56 (90)
Poor practice, n (%)	6 (10)

Table 2. Determinants of COVID-19 knowledge, attitude, and practice (n = 62)

Determinants	Good knowledge[a]		Positive attitude[b]		Good practice[a]	
	OR (95% CI)	p-value	Beta (95% CI)	p-value	OR (95% CI)	p-value
Age, years						
≤30	Ref	Ref	Ref	Ref	Ref	Ref
>30	1.48 (0.06-37.99)	0.812	-1.20 (-2.51-0.11)	0.073	0.86 (0.17-4.47)	0.863
Sex						
Female	Ref	Ref	Ref	Ref	Ref	Ref
Male	2.55 (0.10-65.13)	0.571	-0.03 (-1.30-1.23)	0.958	1.56 (0.31-7.99)	0.591
Center						
Non-COVID-19 referral	Ref	Ref	Ref	Ref	Ref	Ref
COVID-19 referral	1.09 (0.04-28.05)	0.959	0.12 (-1.32-1.56)	0.868	5.30 (0.28-99.47)	0.265

Ref: Reference category; [a] Simple logistic regression analysis with Firth penalized correction; [b] Simple linear regression analysis.

Impact of COVID-19 on PM&R residency training

For the first open-ended question, "describe how much has COVID-19 changed your residency training," most of the responses revolved around three common themes: 1) decreased patients, hence, fewer cases seen and fewer procedures done (43 similar responses, ~69%); 2) shift of training activities to online conferences and didactics with less time for in-person teaching sessions (n=9, ~15%); and 3) shift to telerehabilitation for service and training (n=10, ~16%).

As a consequence of decreased caseloads, one participant answered that their graduation from the training program was put on hold because they could not meet the expected case requirements.

For the second question, "does your institution deploy you to man a COVID ward as a general practitioner and not as a PM&R resident," 25 (~40%) answered yes. Among those deployed, 14 answered that they felt anxious, upset, and apprehensive about doing COVID-19-related tasks. In contrast, eight respondents did not mind being re-assigned to another unit but instead perceived it as a challenge. Three respondents felt helpless and uncertain.

All respondents reported that there was a restructuring of training activities, such as online classrooms, didactics, and teleconsultations. When asked, "were rehabilitation medicine services interrupted or suspended," 29 (~47%) answered no. Nonetheless, some reported services restrictions to online consultations, postponement of elective procedures, and non-acceptance of inpatient referrals and outpatients. Meanwhile, 24 (~39%) claimed that all services continued to be offered in their respective institutions.

When asked, "how do you feel about seeing non-rehabilitation medicine patients," 14 (~23%) reported that the question was not applicable for them. In comparison, 13 (~21%) answered that they felt duty-bound to do so, and 12 (~19%) said that they were anxious, stressed, and afraid primarily due to the possibility of mismanaging patients. Some felt either saddened or challenged.

Lastly, for the question, "how is your institution taking care of you (food, clothing, PPE, shelter, remuneration)," all respondents answered that their institution was doing their best to provide essential needs, especially PPE.

DISCUSSION

The COVID-19 risk preparedness of PM&R residents in the Philippines was evaluated in this study by assessing relevant knowledge, awareness, attitudes, and perceived barriers related to COVID-19 and infection control. The study revealed that the residents generally had adequate COVID-19 risk preparedness as evidenced by their excellent level of knowledge and awareness about COVID-19, positive attitudes towards infection control, and good practice of relevant guidelines. Their good level of preparedness could be attributed to months of ongoing close monitoring of COVID-19 and evolving infection control protocols across all training institutions. As early as April 2020, the PARM released an interim guideline on the practice of the specialty during and after the COVID-19 crisis that could have helped prepare the different training institutions to respond to COVID-19 and to resume their operations safely.[11]

Because the COVID-19 pandemic is still prevalent and with measures to control it evolving, responses of residency training institutions vary regionally and globally in trying to maintain learning competencies while adhering to infection control guidelines and balancing service and training. Efforts to address the impact of the pandemic on training have constantly been evolving per training institution. For instance, at the PGH, a two-part webinar series dedicated to innovation and transformation of medical education during the pandemic was conducted. The first part was dedicated to residency training. Strategies on overcoming the challenges during COVID-19 were discussed, and a call was made to enhance the residency training programs to include community-oriented medical education and innovations like virtual learning and teleconsultations. Representatives from Singapore and Malaysia also discussed the same problems encountered, but they had different strategies and responses, with Singapore already including virtual reality in medical education and training, and Malaysia devising schemes for

in-person exposures for undergraduates, interns, and trainees to clinical cases on a small-scale batch-per-batch system.[14]

In a study done by Li et al. in 2020, COVID-19 preparedness of ophthalmologists was enhanced by employing risk-mitigation strategies divided into three populations of interest: 1) strategies to protect the public; 2) protection of the patients; and 3) guidance for the healthcare providers through infection control advisory measures. By working with the WHO and Center for Disease Control (CDC), the authors were able to recommend practice protocols to improve the preparedness of the practitioners while acknowledging that strategies are evolving rapidly to develop expert panel subspecialty guidelines to stratify the urgency of in-person examination.[15] They also explored per-country strategies and found that practices indeed varied, thereby recommending the need for a network of international ophthalmology partners in developing evidence-based consensus on risk-mitigation protocols. Locally, the PARM's COVID-19 interim guidelines could have contributed to the residents' adequate preparedness and response.[11]

Despite having good risk preparedness for COVID-19, the residents still identified issues that seemed to have affected their training. The residents reported that apart from managing non-rehabilitation medicine patients as medical relievers in the COVID-19 wards due to the closure of outpatient clinics and interruption of services, the situation has affected their training, particularly in terms of exposure to clinical cases and procedures. The majority of those who participated stated that their institution also deployed their department as medical relievers in COVID-19 wards and that there were feelings of anxiety and fear about treating patients of other departments instead of being trained for PM&R. Nonetheless, there were some who felt challenged and were understanding of the situation as the main reason for re-deployment was due to lack of human resources especially during the COVID-19 crisis. The residents did acknowledge that they felt that the training institutions were doing their best to attend to their needs like PPE and even remunerations, such as hazard pay. Meanwhile, the Professional Regulation Commission (PRC) of the Philippines reiterated that the main challenges of residency training institutions during the pandemic included meeting the competencies for graduation and board certification (e.g., completion of the required caseloads), interruption of the structured clinical learning environment, suspension of elective diagnostic and treatment procedures, re-deployment of trainees, and reconfiguration of hospitals to cater to COVID-19 patients.[14] At PGH, it was noted that only 13 out of 16 departments had residents who would be able to graduate in December 2020, with the surgical-related departments being most affected as virtual learning and online conferences were not adequate to prepare the trainees for actual practice.

Specific to PM&R, a series of webinars were organized by the International Society of Physical and Rehabilitation Medicine (ISPRM) to learn about the current situations of PM&R across different countries as to threats, risks, opportunities, strategies, and areas for research. In the Philippines, there was reported interruption of the PM&R training program specifically at PGH, a COVID-19 referral center, which saw a significant drop in the number of cases for both inpatient referrals and outpatient cases.[16] As a response, the Department of Rehabilitation Medicine at PGH restructured its residency program by shifting to the virtual learning and consultation environments through telerehabilitation. Before actual telerehabilitation sessions, the residents received relevant orientation, crash courses, webinars, and case simulations. As an integral part of residency training, research was also affected by challenges in in-person data collection and meeting the sample size. Hence, study amendments were done to shift to online data collection, COVID-related research, or studies on telerehabilitation.

Further studies are recommended to explore the impact of COVID-19 infection control guidelines on residency training through the perspective of a public health model. The questionnaire used in this study could be validated in future research.

CONCLUSION

This study provided baseline information on how the COVID-19 pandemic impacted PM&R residency training in the Philippines. The respondents generally had good COVID-19 risk preparedness.

Statement of Authorship

Both authors contributed in the conceptualization of work, acquisition and analysis of data, drafting and revising and approved the final version submitted.

Author Disclosure

Both authors declared no conflicts of interest.

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REFERENCES

1. World Health Organization website [Internet]. [cited 2020 Apr 26]. Available from: https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/3/who-announces-covid-19-outbreak-a-pandemic
2. Department of Health website [Internet]. [cited 2020 Apr 26]. Available from: https://www.doh.gov.ph/2019-nCoV
3. Brug J, Aro AR, Richardus JH. Risk Perceptions and Behaviour: Towards Pandemic Control of Emerging Infectious Diseases. Int J Behav Med [Internet]. 2009 Mar 6 [cited 2020 Apr 24];16(1):3–6. Available from: http://link.springer.com/10.1007/s12529-008-9000-x
4. Khan F, Amatya B. Medical Rehabilitation in Pandemics: Towards a New Perspective. J Rehabil Med [Internet]. 2020 [cited 2020 Apr 26];0. Available from: https://www.medicaljournals.se/jrm/content/abstract/10.2340/16501977-2676
5. Khader Y, Al Nsour M, Al-Batayneh O, Saadeh R, Abbas H, Alfaqih M, et al. Dentists' Awareness, Perception, and Attitude Regarding

COVID-19 and Infection Control: A Cross-Sectional Study among Jordanian Dentists. 2020.
6. Residency in a pandemic: How COVID-19 is Affecting Trainees | American Medical Association [Internet]. [cited 2020 Apr 24]. Available from: https://www.ama-assn.org/delivering-care/public-health/residency-pandemic-how-covid-19-affecting-trainees
7. Ferrel MN, Ryan JJ. The Impact of COVID-19 on Medical Education. Cureus [Internet]. 2020 Mar 31 [cited 2020 Apr 24];12(3). Available from: https://www.cureus.com/articles/29902-the-impact-of-covid-19-on-medical-education
8. Schwartz AM, Wilson JM, Boden SD, Moore TJ, Bradbury TL, Fletcher ND. Managing Resident Workforce and Education during the COVID-19 Pandemic. JBJS Open Access [Internet]. 2020 [cited 2020 Apr 24];5(2):e0045. Available from: http://journals.lww.com/10.2106/JBJS.OA.20.00045
9. COVID-19 [Internet]. [cited 2020 Apr 24]. Available from: https://www.aapmr.org/news-publications/covid-19
10. Journal of Rehabilitation Medicine - Editorial: Covid–19 and Physical and Rehabilitation Medicine - HTML [Internet]. [cited 2020 Apr 24]. Available from: https://medicaljournals.se/jrm/content/html/10.2340/16501977-2679
11. Montes J, Bundoc J, Leochico C, Mojica J, Ignacio S, Rey-Matias R, et al. Philippine Academy of Rehabilitation Medicine: Interim Algorithm and Guidelines on the Practice of Rehabilitation Medicine during and after COVID-19 National Health Crisis. Philippine Academy of Rehabilitation Medicine. 2020.
12. Smith RD. Responding to Global Infectious Disease Outbreaks: Lessons from SARS on the Role of Risk Perception, Communication and Management. Soc Sci Med [Internet]. 2006 Dec [cited 2020 Apr 24];63(12):3113. Available from: http://www.ncbi.nlm.nih.gov/pubmed/16978751
13. Saqlain M, Munir MM, Rehman SU, Gulzar A, Naz S, Ahmed Z, et al. Knowledge, Attitude, Practice, and Perceived Barriers among Healthcare Professionals Regarding COVID-19: A Cross-Sectional Survey from Pakistan. medRxiv [Internet]. 2020 Apr 20 [cited 2020 May 2];2020.04.13.20063198. Available from: https://www.medrxiv.org/content/10.1101/2020.04.13.20063198v2
14. Jose S, Bahyah S, Kow A, Cueto J, Padilla C, Chiong C. Virtual International Conference on Medical Education in the Pandemic Part 1: COVID-19 and Residency Training. [Webinar], 9 October 2020, https://www.youtube.com/watch?v=l-h2I_dX5hQ_
15. Li J, Shantha J, Wong T, Chodosh J, Yeh S, Ting D. Preparedness among Ophthalmologists: During and beyond the COVID-19 Pandemic. 2020 March 31 [cited 2020 November 20]. Available from: https://www.aaojournal.org/article/S0161-6420(20)30319-5/fulltext
16. Leochico CFD, Mojica JAP, Rey-Matias RR, Supnet IS, Ignacio SD. Role of Telerehabilitation in the Rehabilitation Medicine Training Program of a COVID-19 Referral Center in a Developing Country. American Journal of Physical Medicine & Rehabilitation, Jun 2021; 100(6):526-532. DOI: 10.1097/PHM.0000000000001755.