



Ranked List of Effective Measures for COVID-19 Preparation in a Tertiary Care Hospital: A Garret Ranking Method Approach

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i35B31904

Editor(s):

- (1) Dr. S. Prabhu, Sri Venkateswara College of Engineering, India.
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- (3) Joko Slamet, Stkip Pgri Sidoarjo, Indonesia.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/69520>

Original Research Article

Received 01 May 2021

Accepted 05 July 2021

Published 07 July 2021

ABSTRACT

In the current times of COVID -19, most healthcare providers are struggling to ensure patient safety and keep the healthcare-associated infection under check. However, various measures are adopted by tertiary care hospitals to provide safe and effective healthcare services in the current pandemic situation. However, various healthcare professionals have different perceptions about the effectiveness of the measures adopted. The current study is carried out in a tertiary care hospital of Noida city of India, where a questionnaire containing demographic data and the measures adopted in the hospital were given to twenty-seven medical professionals to rate the measures following their effectiveness in times of COVID-19. The collected responses were analysed with the help of the Henry Garret Ranking Method. The analysis of the results revealed that the top three effective measures out of all the measures adopted by the hospital included spreading awareness about modes of transmission of infection (First Rank), Creation of isolation ward in the hospital for contagious diseases (Second Rank), providing adequate care in intensive care and high

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dependency unit in a systematic manner (Third Rank). This study provides a ready reckoned list arranged in the ranked order for the effective measures in times of COVID-19, from medical professionals' perspectives to all the healthcare institutions who are struggling to adapt to the COVID-19 requirements.

Keywords: Effective measures; COVID-19; garret raking method; health care; demographic data.

1. INTRODUCTION

Globally healthcare-associated infections have become a serious threat in the health care setting. According to the World Health Organization, there is a continuous incline in hospital-acquired infection rates in developing countries, which is nearly five times more than in developed countries.

To prevent or reduce hospital-acquired infections, one protocols or guidelines have to be followed in a particular sequential order. The hospital staff should stick to the particular order of guidelines to minimize infection spread [1]. This is also a fact that healthcare delivery is emotionally exhausting even in the normal times of functioning [2]. However, in times of COVID-19, where healthcare workers face the challenges of PPE shortages and lack of evidence-based medicines, maintaining employees' motivations has increased [3]. However, a lot of heterogeneity can be observed in the size and scope of tertiary care healthcare institutions in India [4]. Moreover, in the current pandemic of COVID-19, all the healthcare institutions have attempted to bring significant changes in the organization and process level to cater to the changed requirements [5]. One such measure is to allocate a maximum number of beds to the COVID-19 patients [6].

Furthermore, hospitals have to cater to the challenge of providing medical care to non-COVID-19 patients and maintaining a safe and infection-free environment for healthcare workers [7]. One such earlier study also suggests that the key measures for preventing infection control in the hospital settings can be creating negative pressure isolation rooms with real-time monitoring with the help of cameras and intervention when required [8]. However, there is a state of confusion among the healthcare providers about the effectiveness of the measures suggested for the COVID -19 situations [9]. This study measures adopted in a tertiary care hospital and to get the ranked order from the perspectives of the medical

professionals working in the COVID -19 hospitals [10].

1.1. Objective

The objective of the study is to estimate the preventive measures adopted in a tertiary care hospital and its ranks from medical professionals working in COVID 19 hospitals.

2. METHODOLOGY

2.1 Sample Size

The duty doctors, consultants, and Intensivists were the respondents [11]. A total of 27 medical professionals were given a questionnaire and based on the report ranking was performed.

2.2 Area

The study is carried out in a dedicated COVID-19 tertiary care private hospital of the Noida region.

2.3 Sampling Tools

The sampling tool used for the study was by a set of questionnaires framed in table 1. A list of the hospital's measures for the containment of healthcare-associated infection and improving employee safety and patient safety was prepared [12]. The questionnaire's face validity is ensured by getting it reviewed by the people in the administration department's senior roles [13]. The final list was given to the medical professionals involved in the care of COVID-19 patient's data shown in Table 1.

They were asked to rank the measures in terms of their effectiveness. A total of twenty-seven such responses were collected. The collected responses were evaluated with the help of the Garret Ranking Method. Garrett's technique is a collective sample of all the variations in terms of the hospital's measures [14]. This technique was used to evaluate the researchers' problems in the field of agriculture, banking, etc [15]. Using the algorithm, the respondents' orders of rank

are translated into percentages in the garret ranking system.

$$\text{Percentage Position} = (100 (R_{ij} - 0.5)) / N_j$$

Where R_{ij} = i^{th} variable rank by j^{th} person
 N_j = Number of Variables ranked by the person

This model is used to determine the most influential force on the respondent. Respondents were asked to rate the ten measures in order of priority, and the findings were translated into a percentage value using this process [16]. This technique has helped in solidifying the parameters for infection control in a healthcare

organization. The stages of the study are mentioned in Fig. 1.

The advantages of Garrett's technique, it is feasible, transparent, accredited by experts, and a neatly arranged protocol is circumscribing the essential parameters [17]. It is found to have superiority over simple frequency distribution.

The garret score for percent position for ten measures is shown in Table 2. Furthermore, the filled responses of the twenty-seven respondents for all the ten measures.

The identification of the ranks from the calculated average scores is shown in Table 3.

Table 1. List of identified measures

Measure Number	Measure Description
M1	Awareness about modes of transmission of infection
M3	Creation of isolation ward in the hospital for contagious diseases
M10	Providing adequate care in intensive care and high dependency unit in a systematic manner
M2	Training for Donning & Doffing of the PPE kits
M5	Proper management of Biomedical waste (BMW)
M6	Adequate sterilization of the material or equipment required.
M8	Identifying the patient etiology correctly.
M4	Linen management
M9	Effective communication with the Patient
M7	Creating a green pathway in the hospital for the patient attendant

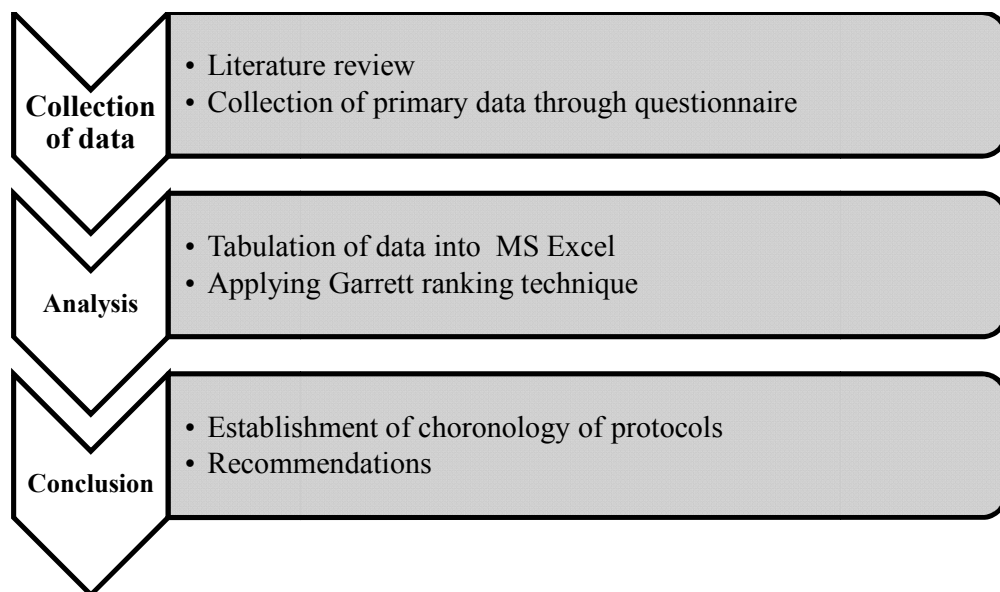


Fig. 1. Stages of study

Table 2. Different ranks have different percent position and garret value

Rank	Percent Position	Garret Value
1	5	82
2	15	70
3	25	63
4	35	58
5	45	52
6	55	48
7	65	42
8	75	36
9	85	29
10	95	18

Table 3. Ranks are calculated based on average score

Measures	Total	No. of respondents	Avg Score	Rank
M1	1553	27	57.51	1
M2	1478	27	54.74	4
M3	1531	27	56.70	2
M4	1197	27	44.33	8
M5	1351	27	50.03	5
M6	1321	27	48.92	6
M7	1016	27	37.62	10
M8	1292	27	47.85	7
M9	1180	27	43.70	9
M10	1527	27	56.55	3

3. RESULTS

The respondents' demographic analysis revealed that out of twenty-seven respondents, 41 percent of respondents were female, and 59 percent were males. The percentage of specialist doctors was 85. Moreover, most of them are senior consultants at different tertiary care hospitals. However, 12 percent of the doctors were practicing general medicine, and only three percent were in dentistry shown in Table 4.

The final ranking for all the measures is shown in Table 5 in ascending order.

The final rank of the analysis of the measure revealed that "awareness about the modes of transmission of infection" is rated as the most important measure followed by the measures such as "creation of isolation wards, "Providing adequate care in ICUs and HDU's." In the fourth rank, we had "Training for Donning & Doffing of the PPE kits" followed by "Proper management of Biomedical waste (BMW)," "Adequate sterilization of the material or equipment required," etc.

4. DISCUSSION

Even after the six months, since the first patient of COVID-19 was identified in India. Still, there is no clarity about the best practices for evidence-based management, risk factors, and risks of transmission, severity and attack rate, infectiousness timing, and intensity [11]. Moreover, some of the best measures at the institution level to curb the spread of COVID-19 include strict visitor control, charting of patients with respiratory infections, and Judicious and effective usage of personal protective equipment [13]. However, there are very limited studies which have studied dedicated COVID-19 hospital settings and tried to assess the effectiveness of the measures adopted [12] from the perspectives of the medical professional who were working there. From the perspective of medical professionals [14], "the awareness about the modes of the transmission" of COVID-19 is the most important and effective measure any hospital can adopt [15]. This finding also corroborates with the earlier work where it was found that only 62 percent of the respondents were aware that the transmission is via respiratory droplets.

Table 4. Demographic data of respondents

Sex	Male	Female	
Age Groups	15-30 years	31-45 years	46 years and above
Marital Status	Married	Single	
	93 %	7 %	
Education level	MBBS	Postgraduate	MDS
	15 %	82 %	3 %
Experience in the current organization	0-1 Year	2- 4 Years	4- 6 Years
	4 %	41 %	55 %

Table 5. Final rank of the identified measures

Measure Number	Measures	Rank
M1	Awareness about modes of transmission of infection	1
M3	Creation of isolation ward in the hospital for contagious diseases	2
M10	Providing adequate care in intensive care units in a systematic manner	3
M2	Training for Donning & Doffing of the PPE kits	4
M5	Proper management of Biomedical waste (BMW)	5
M6	Adequate sterilization of the material or equipment required	6
M8	Identifying the patient etiology correctly	7
M4	Linen management	8
M9	Effective communication with the Patient	9
M7	Creating a green pathway in the hospital for the patient attendant	10

Similarly, the measure "creation of isolation ward in the hospital for contagious diseases" came at second rank as the most effective measure. This finding is also valid as almost all the hospitals catering to corona infected patients have created isolation wards to prevent the cross-transmission of infection. Mostly the isolation rooms were based on negative pressure. The third rank, this is since the survival chances of the high-risk patients admitted in the ICU's depends upon the quality of care given in these units.

Moreover, earlier studies also suggest that hospitals should increase the number of ICU beds and also they should create ICU cohorts and triage areas for COVID-19 suspected patients. At the fourth rank, we had the measure "Training for Donning & Doffing of the PPE kits" this finding is not surprising as only in the times of COVID-19 the due consideration for PPE's has increased in India, despite that the staffs are not aware of the correct method of donning and doffing of the PPE's. This finding is supported by the earlier Indian study where it was found that only forty-five percent of the respondents were aware of the right method of applying a "mask. Lastly, at number five, we had "Proper management of Biomedical waste (BMW)," this factor is the most important factor for preventing

community spread from the hospitals, and with the increased usage of personal protective equipment's the number of biomedical wastes has also increased.

Moreover, improper and ineffective treatment of biomedical wastes can pose a serious threat of transmission. The traces of the coronavirus on plastics can lasts for 6.8 hours, and in these times, the demand for the PPE has increased by almost 40 percent. The same study also postulates that effective management of COVID waste is necessary to control the transmission.

The patients should take measures while in treatment during covid 19 infection is because the mild infection can sometimes be fatal if the biomedical wastes are not properly disposed and the health care workers though comes to treat with precaution measures the severity and transmission of the viral strain is especially very high and can make the person serious to fatal conditions.

5. CONCLUSION

The current study concludes that the hospitals catering healthcare services to the COVID-19 infected patients should take active measures to

spread awareness about the modes of transmission of COVID-19 to their healthcare workers. Hospital-acquired infections can impact the patient's health and the duration of recovery the patients. Moreover, those patients who require Intensive care, for instance, symptomatic cases of COVID-19, having high fever and difficulty in breathing, are at high risk and possess a higher risk of transmission. Several factors, which are responsible for the increased risk of transmission in the case of COVID-19, include reasons such as the higher impact on the upper respiratory tract and spread from "paucisymptomatic persons". In addition to that, creating an isolation ward with negative pressure provision and improvement of the Critical care services, with increased bed capacity, will improve the hospitals' effectiveness. Lastly, hospitals should be active and vigilant to ensure the effective treatment of the biomedical waste generated from the increased use of PPE gears in the COVID-19 situation.

6. LIMITATIONS

The study was carried out in a single healthcare setting. In the future, a multi-hospital setting with a larger sample size can be carried out.

FUTURE LEARNING

Multi hospital with more sample size has to be designed to carry out the measures throughout India.

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

Approved by the institutional ethical committee

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
<http://www.sdiarticle4.com/review-history/69520>