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Contingency plans for health surveillance in the COVID-19 pandemic: analysis of compliance in a network of public teaching hospitals

Planos de contingência para a vigilância em saúde na pandemia da COVID-19: análise de conformidades em uma rede de hospitais públicos de ensino

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ABSTRACT

Introduction: In December 2019, China was plagued by coronavirus disease (COVID-19), a disease caused by the new coronavirus, SARV-CoV-2. Due to the high contagion power, the World Health Organization declared a Public Health Emergency of International Importance on January 30, 2020. In March of the same year, more than 100 countries had registered cases of the new disease; thus, due to geographical spread, the World Health Organization declared COVID-19 pandemic. **Objective:** To evaluate the adherence of public teaching hospitals to a Contingency Plan Model for Human Infection by the New Coronavirus published by the central management of a public company. **Method:** Descriptive-analytical study, using the model developed and published as a guiding document for adapting the contingency plan of each of the hospitals in the study**. Results:** After two evaluations of the plans, 36 (94.7%) hospitals showed compliance greater than 70.0%, with four (10.5%) of them showing 100% compliance with the model. Hospitals' average adherence to the model increased from 82.3% in the first evaluation, to 91.3% in the second evaluation, a percentage increase equal to 11.0%. All hospitals in the study maintained or increased their adherence percentages. **Conclusions:** The research demonstrated the potential of the model to guide institutions in preparing their plans. Considering the positive results of this experience and the historical scarcity of hospital beds, especially those with ventilatory support, it is recommended that Brazilian health authorities can invest time and resources in the preparation of guiding documents that assist managers in reorganizing hospitals and response in crisis situations.

KEYWORDS: Contingency Plans; Coronavirus Infections; Public Health Surveillance; Health Management

RESUMO

Introdução: Em dezembro de 2019, a China foi assolada pela *coronavirus disease* (COVID-19), doença causada pelo novo coronavírus, o SARV-CoV-2. Devido ao alto poder de contágio, a Organização Mundial de Saúde declarou Emergência de Saúde Pública de Importância Internacional em 30 de janeiro de 2020. Em março do mesmo ano, mais de 100 países haviam registrado casos da nova doença, assim, devido à disseminação geográfica rápida, a Organização Mundial de Saúde declarou pandemia da COVID-19. **Objetivo:** Avaliar a adesão de hospitais públicos de ensino a um Modelo de Plano de Contingência para Infecção Humana pelo Novo Coronavírus publicado pela gestão central de uma empresa pública. **Método:** Estudo descritivo-analítico, utilizando o modelo elaborado e publicado como documento orientador para adequações do plano de contingência de cada um dos hospitais do estudo. **Resultados:** Após duas avaliações dos planos, 36 (94,7%) hospitais apresentaram conformidade superior a 70,0%, sendo que quatro (10,5%) deles apresentaram 100,0% de conformidade com o modelo. A média de adesão dos hospitais ao

modelo cresceu de 82,3% na 1ª avaliação, para 91,3% na segunda avaliação, um aumento percentual igual a 11,0%. Todos os hospitais do estudo mantiveram ou aumentaram seus percentuais de adesão. **Conclusões:** A pesquisa demonstrou a potencialidade do modelo em orientar as instituições na elaboração e aprimoramento dos seus planos. Considerando os resultados positivos dessa experiência e a escassez histórica de leitos hospitalares, especialmente aqueles com suporte ventilatório, recomenda-se que as autoridades sanitárias brasileiras possam investir tempo e recursos na elaboração de documentos orientadores que auxiliem gestores na reorganização e resposta dos hospitais em situações de crise.

PALAVRAS-CHAVE: Planos de Contingência; Infecções por Coronavírus; Vigilância em Saúde Pública; Gestão em Saúde; Unidades Hospitalares

INTRODUCTION

In December 2019, China was plagued by the coronavirus disease (COVID-19), caused by the new coronavirus, SARV-CoV-2.[1] Because of its high contagion power, the World Health Organization (WHO) declared a Public Health Emergency of International Importance (PHEIC) on January 30, 2020. In March of the same year, more than 100 countries had already reported cases of the new disease and, therefore, due its rapid geographical spread, WHO declared that COVID-19[2,3] was a pandemic.

In Brazil, the first confirmed case of COVID-19 occurred on February 26, 2020. The number of cases increased very quickly and Brazil reached alarming numbers in the following months, with 2,419,091 confirmed cases and 87,004 deaths on July 26, five months after confirmation of the first case.[4] The Brazilian Ministry of Health declared a Public Health Emergency of National Importance (ESPIN) as a result of COVID-19 in February 2020.[5]

Because of the infectivity of SARV-CoV-2 and the lack of drugs or immunizers capable of stopping the progress of the disease, non-pharmacological measures were adopted, including hand hygiene, the use of masks, and social distancing,[6] of which the latter has been identified as the most effective measure to curtail the disease and, therefore, flatten the epidemiological curve of COVID-19.[7,8]

The rapidity with which the new infectious agent spread to the various continents and its virulence prompted immediate responses from health systems around the world. From this perspective, several hospital services created contingency plans (CPs) with organizational guidelines to be followed by the institutions in response to the new pandemic scenario.[9,10] CPs address the possible occurrence of a predictable calamity and estimate the evolution and intensity of its effects if conditions remain variable. Thus, the expectation was that the plans could help the reorganization and response of health services to better use physical, technological, and human resources to face the new disease.[11]

An effective hospital response includes: (1) continuity of essential services; (2) coordinated implementation of priority actions; (3) clear and precise internal and external communication; (4) rapid adaptation to growing demands; (5) effective use of scarce resources; and (6) a safe environment for patients and healthcare professionals.[12]

Seeking to adapt to this new reality and to ensure the proper functioning of its services, a Brazilian public company launched a document called Contingency Plan Model (CPM) for Human Infection with the New Coronavirus. The document aims to help managers of hospitals administered by the company to find answers in a timely manner to the COVID-19 pandemic.[13] This initiative corroborates with healthcare compliance, since standardization and compliance with predetermined standards are associated with improved service quality.[14]

In this sense, it is important to explain that, prior to the process of drafting the CPM by the central management, the hospitals of the network submitted preliminary versions of their individual CPs (ICP) to the central management working group (WG). This material was analyzed by the central management and used to build the CPM. The CPM was prepared based on legislation, standards, and good practices described in the literature. After the central management model was finished, workshops were held with hospitals to discuss and validate the document. These actions are part of the collective construction methodology of the CPM with the intent of enhancing the initiative and increasing the hospitals' compliance with the document.

The objective of this study was to evaluate the compliance of 38 Brazilian hospitals with a CPM for Human Infection with the New Coronavirus published by the central management. From the perspective of healthcare compliance, these data are collected to verify how the institutions planned to face the pandemic. This study also intended to compare the results found here with the data available in the current scientific literature.

METHOD

Type of study

This is a descriptive-analytical study on the CPM that was prepared and published as a guiding document to improve the adequacy of the public hospital network in the context of the COVID-19 pandemic.

Since it is a freely accessible document in the public domain, its analysis by society is advisable. Spink[15] defended that public documents are social products, and their analysis is important for the recognition of strategies that lead to changes, albeit

slow, of organization models and institutional stances. The disclosure of this study demonstrates part of the efforts of public hospitals to face COVID-19.

Population

The study population consisted of 38 teaching hospitals in the Unified Health System (SUS), managed by a Brazilian public company. The hospitals involved in this study came from 23 of the 27 Brazilian states and they have all been working to face the COVID-19 pandemic with suspected and confirmed cases of the disease.

The study hospitals have different sizes, ranging from approximately 50 beds to more than 400 beds. Most of them are medium-sized, that is, they have an average of 250 beds. Specialized hospitals also participated in the study, including four maternity hospitals.

Data collection

The data collection process was carried out in nine stages:

Stage 1 – Preparation of the draft of the CPM for Human Infection with the New Coronavirus (January and February 2020). The ICPs sent by the hospitals of the study were read by the WG, which found that the documents did not have enough information to guide the reorganization of the services and optimize the installed capacity to deal with suspected and confirmed cases of COVID-19. Therefore, the most relevant parts of each CP were highlighted. After this analysis, the WG read CPs for Human Infection with the New Coronavirus or documents dealing with hospital responses to the pandemic published by other institutions, like the Special Operations Center (COE) of the Ministry of Health, the Government of Portugal, and the Lean Project in Emergencies, also from the Brazilian Ministry of Health. In addition, a literature search was performed for the following terms: Contingency Plans, Natural Disasters and Pandemics (*Planos de Contingência, Desastres Naturais e Pandemias*, in Portuguese). After reading the main retrieved texts, the CPM Draft for Human Infection with the New Coronavirus was prepared.

Stage 2 – Validation Workshop of the CPM for Human Infection with the New Coronavirus (March 2020). The draft document was sent to the sectors responsible for the quality management of each hospital. They shared the draft document with the other members of the COE of the hospitals involved. Each hospital in the study was instructed to form a COE right at the beginning of the pandemic. The COE is a temporary body responsible for the full management of the emergency situation, that is, it provisionally changes the hierarchical structure of the institution and takes charge of the decisions during this period. The care teams must promptly accept the decisions made by the body. After the analysis of the COE, quality professionals were invited to present their analysis and considerations about the document. This validation of the proposal took place in a Virtual Workshop on Microsoft Teams. It lasted three days and had about 250 attendants, who were divided into six thematic groups, each led by a member of the WG.

The workshop started with the presentation of the initial proposal of the document to all participants. After that, the representatives were divided into thematic groups: (1) access to health services, (2) human resources, (3) health surveillance, infection prevention and control, (4) increased response capacity, (5) logistics of supplies and support services, (6) communication and training. During the first two days, the groups made contributions to the document under the leadership of the WG representative. On the third day, each group presented their proposed changes to the draft. The WG quality professionals met and organized the contributions of the participants to finalize the CPM for Human Infection with the New Coronavirus.

Stage 3 – Publication of the CPM for Human Infection with the New Coronavirus (April 2020). The document was made available to the leaders of each hospital in the study. All were instructed to review their ICPs according to the parameters of the CPM. In addition to defining the minimum topics that should be addressed, the CPM had a brief explanation of each topic and indications for completion, including examples of images, flowcharts, templates of tables and charts.

The quality professionals of each hospital should forward the new version of the document to the quality sector participating in the WG. A period of 15 days was set for the submission of the hospital's document after the publication of the CPM.

Step 4 – Analysis of the compliance of the hospitals' CPs with the CPM (May and June 2020). The plans were received by the WG and randomly assigned for analysis. Each of them compared the received document with the CPM. To document the evaluation, there was a checklist on which each evaluated aspect of the CP was presented as an item (Chart).

The checklist had 68 items and should be completely filled out at each evaluation. When the item was fulfilled, it received a score equal to two; when partially fulfilled, a score equal to one; and unfulfilled items received a score equal to zero. From this, the result of a hospital CP's compliance with the CPM was determined. The numerator considered the number of points referring to the fulfilled items and the denominator had the number of possible points in the items of the CPM.

Step 5 – Publication of the ranking of hospitals according to their percentage of compliance with the CPM (June 2020). Documents containing the percentage of compliance with each item were made available to hospital leaders. In addition, individual documents were sent to each hospital informing whether or not they complied with each item of the CPM. Considering the hospitals that did not fulfill all the items of the plan, a new deadline of ten days was established for adaptation.

Step 6 – Receipt of the updated version of the hospitals' CPs (July 2020). The revised documents were again submitted by the quality department of each hospital to the WG. There was a new assignment of plans to the team of analysts, with a new analysis according to the methodology.

Chart. Description of the items present in the Contingency Plan Model. Brasília, 2020.

1	Strategic approach to epidemiological surveillance	35	Support measures for critical utilities (water, electricity, internet, etc.) - support from external services
2	Follow-up of inpatients - reference professionals for COVID-19 cases	36	Measures to reduce the steps of decision-making processes
3	Adaptation of flows	37	Monitoring compliance with the actions described in the plan - method and responsible parties
4	Daily operational analyses	38	Monitoring of professionals on leave
5	Expansion areas for new beds	39	Levels of activation of the Contingency Plan
6	Suspended elective activities	40	Isolation/cohort standards for immunocompromised patients - additional protective measures
7	Performance of the hospital and insertion in the Health Care Network (RAS)	41	Case reporting and monitoring
8	Increase in service capacity - forecast	42	Pact agreement and positioning in state and municipal actions
9	Contingency plan evaluation - updatees and continuous improvement	43	Roles and responsibilities of professionals
10	Training of intensive care teams	44	Care profile
11	Training of non-care teams	45	External communication plan
12	Training of professionals on COVID-19	46	Infection prevention and control plan
13	Special Operations Center (COE)	47	Premises for the design of the Contingency Plan
14	Internal communication - flows	48	Infection prevention and control - hygiene and cleaning
15	Continuity of essential health services	49	Forecasting of reference and counter-reference units
16	Care of medical records	50	Provision of training for professionals admitted during the pandemic
17	Hospital description	51	Provision of exclusive care teams to deal with suspected and confirmed cases of COVID-19
18	Management guidelines for health products and drugs	52	Hospital professionals who are part of risk groups
19	Screening and risk classification teams	53	Skilled professionals to care for critically ill patients
20	Hospital particularities	54	Adapted screening and risk classification protocol for COVID-19
21	Estimated supplies - increased need	55	Relocation of care and administrative teams
22	Bed opening estimates	56	Reallocation of human resources - risk groups
23	Equipment estimates (ventilators, monitors, beds, infusion pumps, etc.)	57	Available human resources - total
24	Strategies to increase installed capacity - relocation of beds	58	Reference and counter-reference - responsible for triggering and flows
25	Structuring of rapid response teams	59	Responsible for activating the different levels of the CP
26	Sample collection and processing flow	60	Mental health and well-being of patients and professionals
27	Access flows to internal units	61	Outsourced support services - need for amendments
28	Physical access flows to the entrance door	62	Support services - availability
29	Flows and rules for companions	63	Laboratory services - availability
30	Workforce needed to increase planned capacity	64	Risk classification system for inpatients
31	Management of Personal Protective Equipment (PPE)	65	Incident management system
32	Isolation/cohort for suspected and confirmed patients - description of flows and areas	66	Internal transportation
33	Logistics and management of essential supplies	67	Different screening and risk classification for COVID-19 suspects
34	Body management	68	Epidemiological surveillance - active search

Source: Prepared by the authors, 2020.

Step 7 - Publication of the ranking of hospitals according to the percentage of compliance with the Model (August 2020). Hospital leaders received a new document with compliance percentages, in addition to documents with individual results. All hospitals were instructed to update and continually improve their contingency plans.

Data analysis

The evaluation of the fulfillment of each of the items followed a scoring model based on the literature:[16] 0- did not fulfill, 1- partially fulfilled, and 2- fulfilled. Thus, the frequency of each score was computed and divided by the number of respondent units to determine the performance of each item of the CPM. For example, 37 hospitals delivered their plans. As for the item of "strategic approach to epidemiological surveillance", the following result was achieved: frequency of "0": 1, frequency of "1": 7, frequency of "2": 29. Thus, the performance of each item was obtained by dividing the count (frequency) of "0", "1" and "2" by the number of responding hospitals: 1/38, 7/38 and 29/38, multiplied by 100, resulting (in this example) in: 2.7% not fulfilled, 18.9% partially fulfilled, and 78.4% fulfilled. To facilitate the analysis, considering that 38 hospitals participated in the study, each item could receive a maximum score of 76 points per evaluation, which was equal to 100%. The sum of the scores of the two evaluations is equal to 152 points.

The first evaluation was completed in June 2020, while the second evaluation was completed in August 2020. The same checklist was used in both evaluations.

The percentage of compliance with the CPM per hospital unit was used to describe the acceptance of the model proposed by the WG and the quality of the hospitals' plans. The percentage of fulfillment of each item was used to describe the existing compliance between the items contained in the CP and the reality of the hospitals in the study.

The study is in accordance with the Brazilian ethical parameters for research and with Resolution n. 510, of April 7, 2016, of the National Health Council (Conep). The public nature of the data exempts researchers from approval by the Research Ethics Committee (CEP) for its use.

RESULTS

The results related to the fulfillment of the items of the CPM shared with the hospitals have shown that, considering the score of the two evaluations, the items with the highest rate of fulfillment (88.0%) were: adaptation of flows, particularities of the hospital, physical access flows to the entrance door, infection prevention and control—hygiene and cleanliness of the environments, and incident management system. In contrast, the score of the following items was the lowest in the sum of the two evaluations: provision of exclusive care teams to deal with suspected and confirmed cases of COVID-19 (66.0%), structuring of rapid response teams (67.0 %), CP evaluation—continuous updating and improvement (70.0%), daily operational analyses (71.0%), and strategies to increase the installed capacity—relocation of beds (72.0%) (Table).

The survey of compliance with the items of the CPM has shown different percentages of compliance with each of them in the two evaluations.

In the first evaluation, the items with the highest score and percentage of compliance (79.0%) were: adaptation of flows, description of the hospital, particularities of the hospital, estimate of equipment, physical access flows to the entrance door, and infection prevention and control—hygiene and cleanliness of the environments.

In the second evaluation, which happened after the WG's feedback with the items that needed improvement, the highest percentages of compliance (97.0%) occurred in items different from the first evaluation, namely: hospital performance and insertion in the Health Care Network (RAS), agreement on the role and positioning of state and municipal initiatives, roles and responsibilities of the professionals, incident management system.

We noticed that the percentages of compliance in the second evaluation were higher than in the first evaluation. This demonstrates that the feedback given by the WG was positive and that hospitals were able to prepare a more mature document according to the model.

Regarding the items of the CPM with the lowest percentages of compliance with the first evaluation, the following stood out: structuring of rapid response teams (39.0%), provision of exclusive care teams to deal with suspected and confirmed cases of COVID-19 (41.0%), daily operational analyses (43.0%). In the second evaluation, the lowest scores were found int the following items: adaptation of flows (59.0%), evaluation of the contingency plan—updating and continuous improvement (62.0%), structuring of rapid response teams (62.0%), and measures to support critical functions (63.0%).

The only item that had the lowest scores in the two evaluations was Item 25 – Structuring of rapid response teams (RRTs). Veiga et al.[16] stated that the creation of RRTs within health institutions has increased together with the interest in improving the quality of care, since these teams are formed to reduce the number of cardiac arrest events (CPA) outside intensive care units (ICUs).

During the COVID-19 pandemic, the number of patients who needed ICU beds tended to increase, since the complications of the disease, including respiratory failure, required ventilatory support, which usually happens in intensive care beds. The structuring of RRTs was a strategy pointed out by the WG to optimize the care for patients with complications in regular beds, however, hospitals struggled to describe this type of initiative in their contingency plans.

Considering the evolution of their performance from the first to the second evaluation, the items that had the greatest increases in compliance percentages were: isolation/cohort for suspected and confirmed patients—description of flows and areas, and hospital professionals in risk groups, with a difference of 34 points (31.0%). In addition to them, the items of care with medical records, structuring of rapid response teams, rules for isolation/cohort for immunocompromised patients—additional protective measures and provision of training for

Table. Description of the items present in the contingency plan, score obtained and percentage of fulfillment for each item. Brasília, 2020.

ITEM	1st Evaluation		2nd Evaluation		Sum of evaluations		Difference between evaluations	
	N	%	N	%	N	%	N	%
1	47	62.0	65	86.0	112	74.0	18	24.0
2	50	66.0	69	91.0	119	79.0	19	25.0
3	60	79.0	73	96.0	133	88.0	13	17.0
4	43	57.0	64	84.0	107	71.0	21	27.0
5	57	75.0	73	96.0	130	86.0	16	21.0
6	57	75.0	67	88.0	124	82.0	10	13.0
7	57	75.0	74	97.0	131	86.0	17	22.0
8	54	71.0	71	93.0	125	82.0	17	22.0
9	44	58.0	62	82.0	106	70.0	18	24.0
10	53	70.0	69	91.0	122	81.0	16	21.0
11	50	66.0	69	91.0	119	79.0	19	25.0
12	54	71.0	70	92.0	124	82.0	16	21.0
13	57	75.0	72	95.0	129	85.0	15	20.0
14	54	71.0	70	92.0	124	82.0	16	21.0
15	58	76.0	70	92.0	128	84.0	12	16.0
16	49	64.0	72	95.0	121	80.0	23	31.0
17	60	79.0	72	95.0	132	87.0	12	16.0
18	48	63.0	70	92.0	118	78.0	22	29.0
19	47	62.0	65	86.0	112	74.0	18	24.0
20	60	79.0	73	96.0	133	88.0	13	17.0
21	48	63.0	64	84.0	112	74.0	16	21.0
22	58	76.0	69	91.0	127	84.0	11	15.0
23	60	79.0	70	92.0	130	86.0	10	13.0
24	45	59.0	64	84.0	109	72.0	19	25.0
25	39	51.0	62	82.0	101	67.0	23	31.0
26	52	68.0	69	91.0	121	80.0	17	23.0
27	54	71.0	68	89.0	122	80.0	14	18.0
28	60	79.0	73	96.0	133	88.0	13	17.0
29	53	70.0	71	93.0	124	82.0	18	23.0
30	52	68.0	72	95.0	124	82.0	20	27.0
31	49	64.0	65	86.0	114	75.0	16	22.0
32	44	58.0	68	89.0	112	74.0	24	31.0
33	51	67.0	67	88.0	118	78.0	16	21.0
34	58	76.0	73	96.0	131	86.0	15	20.0
35	49	64.0	63	83.0	112	74.0	14	19.0
36	53	70.0	70	92.0	123	81.0	17	22.0
37	50	66.0	69	91.0	119	79.0	19	25.0
38	55	72.0	73	96.0	128	84.0	18	24.0
39	54	71.0	71	93.0	125	82.0	17	22.0
40	44	58.0	67	88.0	111	73.0	23	30.0
41	59	78.0	71	93.0	130	86.0	12	15.0
42	57	75.0	74	97.0	131	86.0	17	22.0
43	58	76.0	74	97.0	132	85.0	16	18.0

continues

continuation

ITEM	1st Evaluation		2nd Evaluation		Sum of evaluations		Difference between evaluations	
	N	%	N	%	N	%	N	%
44	56	74.0	70	92.0	126	83.0	14	18.0
45	53	70.0	66	87.0	119	79.0	13	17.0
46	56	74.0	68	89.0	124	82.0	12	15.0
47	54	71.0	73	96.0	127	84.0	19	25.0
48	60	79.0	73	97.0	133	88.0	13	18.0
49	50	66.0	70	92.0	120	79.0	20	26.0
50	44	58.0	67	88.0	111	73.0	23	30.0
51	41	54.0	59	78.0	100	66.0	18	24.0
52	44	58.0	68	89.0	112	74.0	24	31.0
53	51	67.0	70	92.0	121	80.0	19	25.0
54	55	72.0	68	89.0	123	81.0	13	17.0
55	45	59.0	65	86.0	110	73.0	20	27.0
56	46	61.0	66	87.0	112	74.0	20	26.0
57	56	74.0	73	97.0	129	86.0	17	23.0
58	50	66.0	70	92.0	120	79.0	20	26.0
59	51	67.0	71	93.0	122	80.0	20	26.0
60	55	72.0	72	95.0	127	84.0	17	23.0
61	53	70.0	70	92.0	123	81.0	17	22.0
62	51	67.0	65	86.0	116	77.0	14	19.0
63	51	67.0	70	92.0	121	80.0	19	25.0
64	52	68.0	72	95.0	124	82.0	20	27.0
65	59	78.0	74	97.0	133	88.0	15	19.0
66	50	66.0	70	92.0	120	79.0	20	26.0
67	56	74.0	71	93.0	127	84.0	15	19.0
68	56	74.0	72	95.0	128	85.0	16	21.0

Source: Prepared by the authors, 2020.

professionals admitted during the pandemic, also increased by approximately 30.0% in compliance.

Although item 25 had low percentages of compliance in both evaluations, its performance in the second evaluation improved significantly in comparison with the first evaluation.

Still comparing the results of the two evaluations, the items with the smallest differences were: suspended elective activities and estimated new beds, with a 13.0% increase in both. It is worth mentioning that the 68 items had a higher percentage of compliance in the second evaluation when compared to the first.

The research has shown that only three (7.9%) of the 38 hospitals had CPs in full compliance with what was recommended by the WG in the first evaluation after the CPM, while six hospitals (15.8%) did not achieve compliance in any of the items, and 27 hospitals (71.0%) had an adequacy equal to or greater than 70.0%.

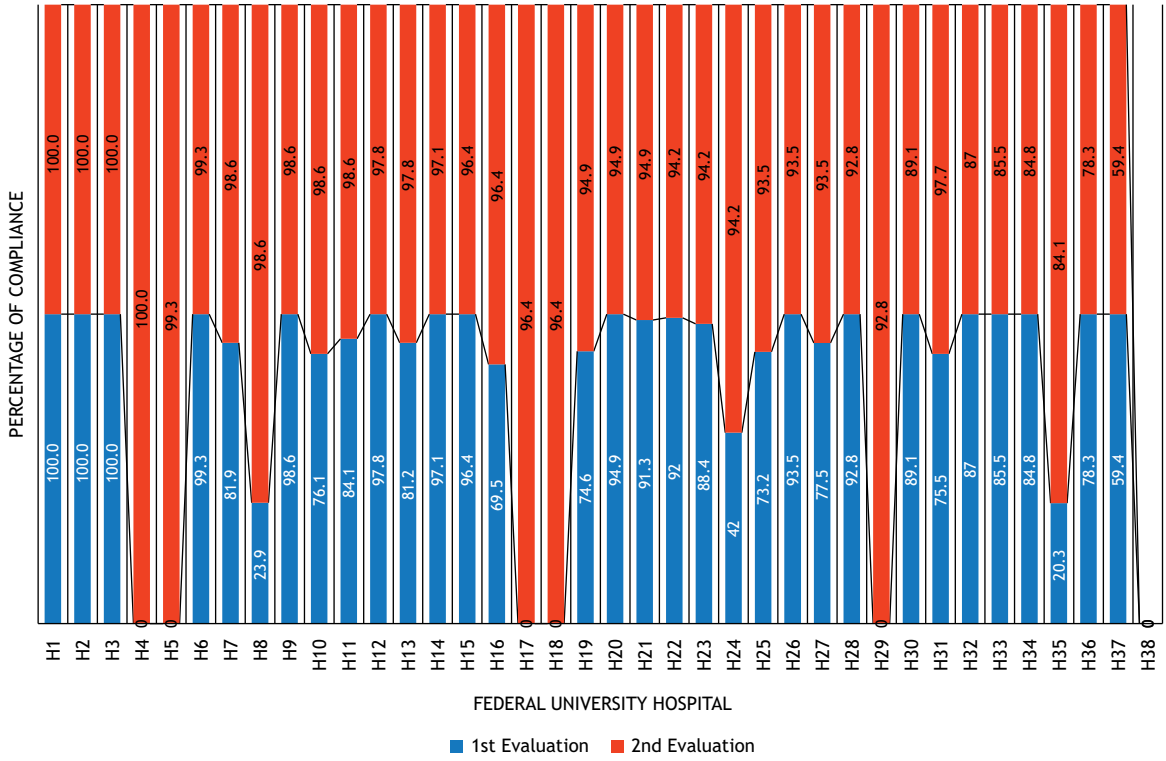
In the second evaluation, four (10.5%) hospitals achieved full compliance and only one (2.6%) continued with zero compliance, whereas 36 (94.7%) achieved compliance equal to or greater than 70.0% (Figure). Only one hospital did not present a CP in any of the evaluations.

The average compliance of hospitals with the CPM was 82.3% in the first evaluation and 91.3% in the second, a percentage increase of 11.0%.

All hospitals in the study maintained or increased their compliance percentages in the second evaluation when compared with the first.

DISCUSSION

The CP for Human Infection with the New Coronavirus is a preparatory document for managers that aims to support the expansion of the hospital's capacity in an organized, integrated, and staggered way. That is, it intends to help adjust hospital processes for situations in which there is a disproportion between the need for resources and the existing resources and, with this, help assist and save as many lives as possible.[17] The creation of a normative



Source: Prepared by the authors, 2020.

Figure. Percentage of compliance by hospital in the first two evaluations after the publication of the Contingency Plan Model (CPM). Brasília, 2020.

document that has the potential to standardize actions in a specialized assistance network has the goal of improving care, as well as enhancing the monitoring and surveillance process, thus allowing comparability and the proposition of measures for adjustments considering the particularities of each institution.

In this sense, the analysis of the items with the highest scores in the two evaluations reveals that, in the first, the items with the highest compliance were related to adjustments and internal information of the hospital, whereas in the second, the items with the highest scores are about the relationship of the hospital with other institutions, be it other health services of the RAS, Ministry of Health, local managers or others. This can be understood as an improvement in the applicability of the CP, since more complex processes, involving several players, were then improved.

The production of a document like the CP is essential to redefine the work process of hospital institutions, since, in situations of catastrophes or substantial emergencies, as is the case of the COVID-19 pandemic, no health service is capable of assisting all those affected alone. Therefore, the integration between those who make up the RAS is mandatory. The CP defines the profile of the patients who will be treated, by whom, where, when and why. It also refers the patients who will not be treated there, specifying the referral form, the facilities, the responsible persons, and the reasons.

Based on the national model, Brazilian states have come up with their own CPs.[18] A study carried out in the Northeast region evaluated the plans and found that they followed the recommendations of the model made available by the Ministry of Health. They also had similar document organization and programmed actions to be carried out to curtail COVID-19.[19,20]

During the COVID-19 pandemic, Brazil's National Health Surveillance Agency (Anvisa) recommended that all health services designed and implemented a CP with strategies and policies to face the SARS-CoV-2 pandemic, including the management of human and material resources.[21]

The WG team of managers of the of the public company under study determined in January 2020 that each hospital should design its CP. Before the work started, there were virtual meetings to guide them as to the content of the plans considering national, state, and municipal documents. The first versions that were sent preceded the published CPM. They were analyzed according to the parameters agreed by the same team responsible for the model, with some of the items that would make up the final CPM.

The analysis of the plans at that time showed that most of them did not have minimum information to guide the reorganization of the work process. Therefore, those plans did not follow the rules, laws, and good practices presented during the meetings, which raised the need to create an explanatory model to be followed. Considering that a simple template would not be enough, the healthcare compliance methodology was incorporated into the initiative for further evaluation of the effects enabled by the publication of the CPM on the hospitals' ICPs.

The sector responsible for quality management carried out a survey of the laws and standards applicable to the management of COVID-19. The sector also searched the literature on the topic of contingency plans. The number of papers on the topic was limited. Prior to the COVID-19 pandemic, there was a negligible number of Brazilian studies in this area. This demonstrated the lack of concern of health institutions about publishing studies on how to prepare for large-scale crises and catastrophes, which weakens risk management in these circumstances.

It is worth mentioning that the CPM validation workshop was the first online workshop with the participation of all 38 hospitals. The use of the Microsoft Teams® application enabled good interaction between the participants. The feedback about this workshop format for the WG's quality service, in charge of its coordination, was positive. Cordeiro[22] stated that the crisis produced by the COVID-19 pandemic was an opportunity for learning and using new tools, which enabled and strengthened educational and collective construction processes.

In general, the versions of the CPs before and after the Model demonstrated that the documents were more comprehensive and complied with more standards and laws regarding hospital preparedness for COVID-19 after the Model. This confirms that the plan model enhanced the performance of the hospitals involved in the context of healthcare compliance.

Healthcare compliance determines that, in addition to providing the guiding document, it is of the utmost importance to have professional training for its preparation and execution, as well as periodic monitoring of the results, so that the compliance rates achieved are not influenced by the team's tiredness and subsequent demotivation.[14]

A study by Salguero-Caparrós et al.[23] concluded that several factors may lead to non-compliance, including lack of prior knowledge and understanding of laws and standards, in addition to scare financial resources. In addition, the study highlighted that self-regulation is a powerful strategy for increasing compliance, as long as it is done in a collaborative and non-punitive manner. Shea et al.[24] and Lingard et al.[25] argued that indicators should be created and used in audits for the prior and constant detection of non-compliance and to establish a culture of permanent evaluation in companies.

The joint construction process revealed that small, medium and large-sized hospitals struggled to prepare comprehensive documents that addressed various intra and extra-institutional activities. The WG is already planning to resume this work on a permanent basis, with the design of CPs for catastrophes and emergencies with periodic updates at least every two years. Ferentz et al.[26] analyzed CPs for disaster management and found that the information there was superficial and unclear, which hinders the applicability and real usefulness of these documents in crisis situations. Another important point highlighted by the authors was the fact that not everyone involved in the execution of the plan was familiar with it, and those who were aware of the document did not keep up with its updates. This indicates the need to train the groups that will carry out the work and emphasizes the importance of raising awareness about the CPs inside and outside the institutions.

Although there is no national model for hospitals, two documents were released by the Ministry of Health to guide this preparation process. These documents were used to prepare the CPM discussed in this study: the National Contingency Plan for Human Infection with the new Coronavirus COVID-19,[19] published in February 2020, focused on health system actions in general, and the Lean Project in emergencies: Hospital Response Plan for COVID-19, with guidelines aimed at preparing the expansion of the hospital's capacity to face the crisis brought about by the pandemic.[18]

Although the above mentioned documents were of high quality, the preparation of the CPM required much broader research on the subject, demonstrating that the existence of a national model of CP could have optimized the organization of the response of hospital institutions to the increased demand resulting from the ESPIN statement.[5] The CPM has some complementary items that range from admission, treatment, and discharge to cases of referral to other health units.

When we examine the percentages of compliance with the CPM, we notice that the item with the lowest score in the sum of the two evaluations, "provision of exclusive assistance teams to deal with suspected and confirmed cases of COVID-19", is related to the definition of a cohort of professionals to work in the areas of care for suspected and confirmed cases of the disease. This confirms the difficulty faced by many hospitals in the selection of healthcare professionals in the cohort areas, which is an important measure to control the spread of SARS-CoV-2. It is, however, difficult to implement, especially due to the worldwide crisis in the supply of personal protective equipment (PPE). The cohort of professionals is a concept hitherto little known and rarely applied in healthcare services, although it has been strengthened after the release of Anvisa's Technical Note,[21] which highlighted its importance.

Two other items that had low compliance in the evaluations were related to CP evaluation (updating and continuous improvement and daily operational analyses), which reinforces the need for a strategy to foment a culture of evaluation in healthcare institutions in order to inform the decision-making process. A routinely updated data set can provide practical support to the leaders' choices, thus improving risk management and the identification of the most critical items.[27]

The limitations presented in the study are related to the evaluation of the CPs, since it is not possible to confirm the execution of the actions provided for in the documents. Thus, the non-fulfillment of an item is limited to the absence of related content in the evaluated material, but not to the execution of the action in the hospital. Non-compliance with the item was inferred when the hospital did not present any information about it in the plan.

CONCLUSIONS

The emergence of COVID-19 and the speed with which the virus spread to several countries have created countless challenges to health services, from the organization of assistance in a timely manner for effective response to the challenge of organizing and strengthening the RAS.

This research demonstrated the importance of preparing guiding documents for hospital institutions, such as a CPM, aimed at improving the management of public health emergencies. This initiative could be adopted by health authorities to assist other Brazilian hospitals in the reorganization of their work processes, similarly to what happened with the hospitals involved in this study.

Thus, this manuscript evaluated the compliance of 38 public teaching hospitals with a CPM to face the COVID-19 pandemic published by a WG formed by professionals from central management. The study has shown that, after the CPM was published, the hospitals reported some progress in relation to the fulfillment of all the items that made up the model. This highlights the importance of actions aimed at compliance assessments and how these assessments can assist leaders in the management of hospital institutions.

Based on the results of this study, the quality sector intends to produce an even more comprehensive CPM focused on risk management in crisis situations. This document should be adopted by the 38 hospitals, with continuous and periodic updates.

Items with less compliance, like the application of a cohort of professionals in the areas of care for cases of COVID-19, have been addressed in virtual meetings with hospital managers.

Considering the positive results of this experience and Brazil's long-standing scarcity of hospital beds, especially beds with ventilatory support, it is recommended that Brazilian health authorities invest time and resources in the design of a CPM that provides hospital managers from all over the country with the necessary guidelines for the reorganization of their institutions in times of emergency.

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Authors' Contribution

Silva GO – Conception and planning (study design), data acquisition, analysis and interpretation, and writing of the manuscript. Bezerra INM – Data acquisition, analysis and interpretation, and writing of the manuscript. Cunha LMM, Silva TBM, Bezerra INM – Data acquisition, analysis and interpretation. Sasso MAD, Piuvezam G – Conception and planning (study design). Piuvezam G, Malaguti R – Writing of the manuscript. All authors approved the final draft of the manuscript.

Conflict of Interest

The authors report that there is no potential conflict of interest with peers and institutions, nor political or financial conflicts in this study.