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Implementation of a flowchart in emergency unit during the pandemic of COVID-19

Implementação de um fluxograma em unidade de pronto-atendimento durante a pandemia da COVID-19

Implementación de un diagrama de flujo en unidad de emergencia durante la pandemia de COVID-19

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Abstract

Objective: to describe the experience of the health team in the implementation of a flowchart in an Emergency Care Unit (ECU) during the COVID-19 pandemic. **Method:** descriptive study with experience report on the implementation of a flowchart of care during the COVID-19 pandemic, in a ECU in Ceará, Brazil, between March and July 2020, where around 116 professionals were involved, performing actions such as registration, risk classification, clinical evaluation and physical examination, immediate notification, collection of laboratory tests, collection of nasopharynx swab, hospitalization and insertion in the transfer regulation center, based on the Ministry of Health (MH). **Results:** the increase in cases of COVID-19 brought the need to reorganize the flow of care in health services and one of the strategies performed in the ECU occurred through the implementation of a flowchart that ensured agility in the dynamics of care provided to the user with respiratory symptoms, allowing clinical management and application of appropriate sanitary measures, as the MH governs, as well as the early diagnosis of cases of infection by the new coronavirus. **Conclusion and implications for the practice:** the implementation of the flowchart streamlined the identification of possible positive cases, reduced the time to start care for this patient, and the exposure of the patient and health professional.

Keywords: COVID-19; Emergency; Health Team; Unified Health System; Urgency.

Resumo

Objetivo: descrever a experiência da equipe de saúde na implementação de um fluxograma em Unidade de Pronto-Atendimento (UPA) durante a pandemia da COVID-19. **Método:** estudo descritivo com relato de experiência sobre a implementação de um fluxograma de atendimento durante a pandemia da COVID-19, em uma UPA no Ceará, entre os meses de março a julho de 2020, onde estiveram envolvidos em torno de 116 profissionais, realizando as ações do tipo: cadastro, classificação de risco, avaliação clínica, exame físico, notificação imediata, coleta de exames laboratoriais, coleta de *swab* de nasofaringe, internação e inserção na central de regulação de transferência, com base no Ministério da Saúde(MS). **Resultados**: o aumento dos casos da COVID-19 trouxe a necessidade de reorganizar o fluxo de atendimento nos serviços de saúde, e uma das estratégias realizadas nas UPAs, ocorreu por meio da implementação de um fluxograma que garantisse a agilidade na dinâmica da assistência prestada ao usuário com os sintomas respiratórios, permitindo o manejo clínico e a aplicação das medidas sanitárias adequadas, conforme rege o MS, bem como o diagnóstico precoce dos casos de infecção pelo novo coronavírus. **Conclusão e implicações para a prática:** a implementação do fluxograma agilizou a identificação de possíveis casos positivos, reduziu o tempo para o início do atendimento a este paciente, e a exposição do paciente e do profissional de saúde.

Palavras-chave: COVID-19; Emergência; Equipe de Saúde; Sistema Único de Saúde; Urgência.

Resumen

Objetivo: describir la experiencia del equipo de salud en la implementación de un diagrama de flujo en una unidad de atención de emergencia (UPA) durante la pandemia de COVID-19. **Método:** estudio descriptivo con relato de experiencia sobre la implementación de un flujograma de atención durante la pandemia de COVID-19, en una UPA en Ceará, entre marzo y julio de 2020, donde participaron alrededor de 116 profesionales, realizando acciones como registro, clasificación de riesgos, evaluación clínica y examen físico, notificación inmediata, recolección de pruebas de laboratorio, recolección de hisopado de nasofaringe, hospitalización e inserción en el centro de regulación de transferencia, basado en el Ministerio de Salud (MS). **Resultados**: el aumento de casos de COVID-19 trajo la necesidad de reorganizar el flujo de atención en los servicios de salud y una de las estrategias realizadas en las UPAs ocurrió a través de la implementación de un diagrama de flujo que aseguró agilidad en la dinámica de atención prestada al usuario con síntomas respiratorios, permitiendo el manejo clínico y la aplicación de medidas sanitarias adecuadas, como rige la MS, así como el diagnóstico precoz de los casos de infección por el nuevo coronavirus. **Conclusión e implicaciones para la práctica:**la implementación del diagrama de flujo agiliza la identificación de posibles casos positivos, reduce el tiempo para iniciar la atención de este paciente y la exposición del paciente y del profesional de la salud.

Palabras clave: COVID-19; Emergencia; Equipo de Salud; Sistema Único de Salud; Urgencia.

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INTRODUCTION

COVID-19 is a disease caused by the coronavirus (2019-nCoV or Sars-Cov-2), discovered in the month of December 2019 in Wuhan, China through samples taken from the respiratory tract of patients and which has a direct airborne transmission and/or hand contact on contaminated surfaces carrying the viruses to oronasal mucous membranes and/or eyes.[1]

The global numbers of confirmed cases and deaths are still of great concern. By June 10, 2022, there have been 532,201,219 confirmed cases of COVID-19 worldwide, and 6,305,358 deaths. Despite the fact that 11,854,673,610 doses of the vaccine had already been administered worldwide by that date. In Brazil, the number of confirmed cases already totals 31,315,777 and 667,647 deaths, with 49,614 new cases in the last 24 hours, which could bring more problems to the public health system in the event of new waves.[2]

In the midst of the pandemic era, health services worldwide had to overcome their shortcomings to adapt quickly and meet the demand for infected patients, while at the same time striving to maintain care for the chronically and acutely ill.[3]

In Brazil, specifically in the state of Ceará, to assist the most severe cases and manage the cases with mild symptoms, the emergency care units (ECU), which operate 24 hours a day, as intermediate units between Primary Care and hospitals, had to adapt so that suspected and the severe cases of COVID-19 were prioritized, reorganizing actions and procedures performed by professionals working in these locations.[4,5]

In this reorganization process in the health area, flowcharts were used, which are tools created by service managers based on guidelines contained in documents from national and international sources, to direct the work of all professionals who provide direct or indirect assistance to a patient, besides addressing the outbreak of the COVID-19 pandemic, considered a highly contagious disease that can be transmitted by asymptomatic people. Therefore, at the current moment, new workflows have to be elaborated and implemented in the health services, as a way to mitigate the cases, being considered confrontation plans to guide the care of suspected and confirmed people.[6]

Thus, implementing a flowchart in the ECU to care for the patient with respiratory symptoms, with suspected infection by COVID-19 was fundamental to diagnose and intervene early in positive cases, and, while ensuring health care by the Unified Health System (UHS), respecting the principles of universality, equity, and integrality. Furthermore, it is necessary to highlight the high number of deaths in the country, the safety of patients and health professionals during health care, the minimization of risks, and the adequate orientation to users to mitigate the aggravations of the disease.[7]

Thus, the study aims to describe the healthcare team's experience in implementing a flowchart in an ECU during the pandemic of COVID-19.

METHOD

This is a descriptive study, an experience report on the performance of the health team in the implementation of a flowchart for the clinical management of patients with respiratory symptoms during the pandemic, in one of the nine ECUs, located in the city of Fortaleza, Ceará. The service is linked to the State Health Secretariat and is managed by a Social Health Organization (SHO), through a management contract with the state government. It is a reference to the attendance of the general public, urgency, and emergency, under the sphere of UHS.

The service offers clinical, trauma, psychiatric, gynecological-obstetrical, urgency, and emergency care, referring to tertiary services, patients who need more complex exams/specialties/procedures, through the state or city bed regulation center.

Before the pandemic, the physical structure of the ECU was formed by: a reception, a waiting room, two rooms for Risk Classification (RC), three offices for adult medical care, two for child medical care, an adult medication room, a child medication room, an adult observation room, a suture room, an Electrocardiogram (ECG) room, an x-ray room, a laboratory collection, a child observation room, an adult observation room, and a red room. With the beginning of the pandemic, some spaces were readapted, among them, a private office was adapted for the care of patients with respiratory symptoms, and the adult and child observation was changed to an admission sector for severe patients.

As for the health team, it is now made up of a doctor and an additional nurse on each shift, thus being composed of seven doctors, five nurses, nine Nursing technicians, and two laboratory technicians, among others. The unit operates 24 hours a day. Each team, either being assistance or administrative, works 12-hour shifts.

Even before the pandemic began in the state, therefore, before the state decree on social isolation on March 19, 2020, representatives of the management and care direction, risk management, SHO consultant physicians, following international guidelines, according to the clinical protocols already issued by the WHO and MH, had been preparing a flowchart for the care of patients with respiratory symptoms and thus began, as an emergency, the implementation of this tool, considering that in Brazil there was not yet any type of systematized technology aimed for the patients with this profile, in ECUs.

As the number of patients assisted daily in the service is high, which usually causes crowding in the waiting room, the first initiative was to avoid such a situation, through daily training of all the service staff related to the implementation of the flowchart, as well as the use and disposal of Personal Protective Equipment (PPE), so that all steps of the flowchart were covered, aiming to ensure the agility of care and safety of patients and professionals. For this, the interdisciplinary health team developed an integrated, interdependent, and cohesive work.

The training sessions to start the implementation of the flowchart took place shortly after the state decree of March 19, 2020, from March 23 to 29, 2020. During that period, the teams

were instructed, by phone, to arrive two hours before their shift to participate in the explanation of the flowchart, as well as in a quick patient simulation process, in the unit's coordination room. These were supervised by the medical and Nursing coordinator, with the participation of 25 people, each shift, from both the health team and the administrative team, and lasted about two hours. At that time, the professionals had the opportunity to clarify their queries about the implementation of the flowchart, as well as to obtain the information related to the pandemic context.

The guidelines for conducting the training, as well as for the actions performed in the flowchart, were based on the ordinances issued, as a matter of urgency, by the MH. And, as the information was updated, they were passed on to the professionals of the service, via WhatsApp groups, by the medical and Nursing coordinators, with the guidelines to seek the coordination room, if there was the need for a greater understanding of what was passed on.

Flowchart description and implementation

The specific flowchart for clinical management of patients with respiratory symptoms during the pandemic is represented by Figure 1.

In the flowchart, the first and second steps begin with the patient registration at the reception desk, followed by an initial

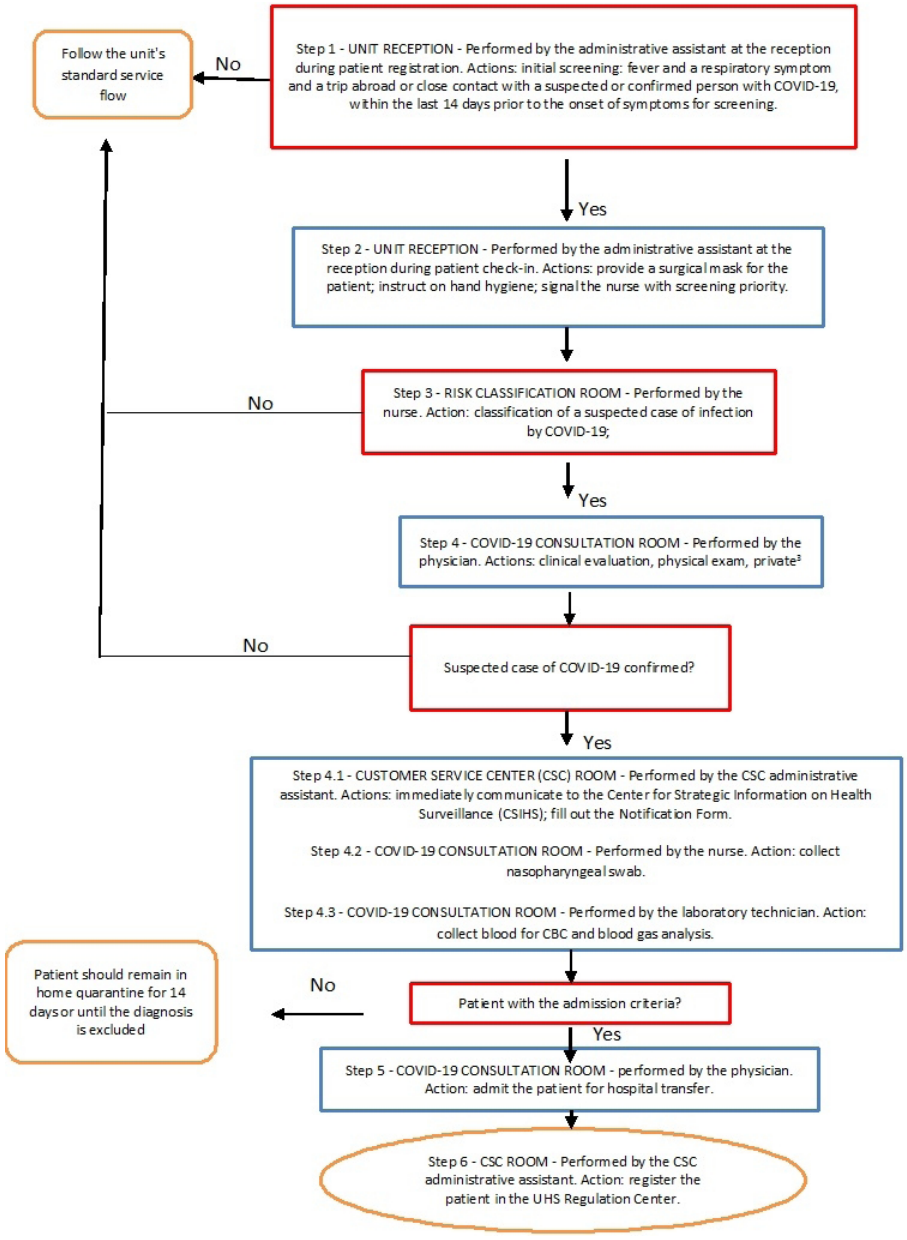

Figure 1. Specific flowchart for clinical management of patients with respiratory symptoms during the pandemic. Fortaleza – Ceará - Brazil, 2020.
Source: Elaborated by the author (2020).

triage from the administrative assistants. When the patient responded positively to the presence of the three criteria, the professional provided some specific guidelines and signaled to the RC professional as a priority for care.

The third step was performed by the nurse in one of the private rooms for the classification of the patient with respiratory symptoms. At that moment, a more detailed analysis was made, based on the patient's main complaint and the vital parameters verified. For the first confirmation, as a suspected case or not, and as a priority for medical care. It is noteworthy that the protocol used in this service is the International Manchester Triage System (MTS), which classifies patients into five levels of urgency and determines a maximum waiting time for each level, based on the evaluation of airway, breathing, circulation, and level of consciousness.[8] After the classification, when the criteria for the suspected case were not met, the unit's standard flow of care was used. When confirmed, the patient was referred to the COVID-19 private office.

In the fourth step, the physician would see the suspected patient. After the evaluation, when the definition of a suspected case was discarded, the unit's standard flow of care was followed. After the confirmation, some bureaucratic and clinical procedures were performed by the unit's administrative employee, laboratory technician, and medication room nurse, respectively (Steps 4.1, 4.2, and 4.3).

Lastly, when the patient evaluated by the physician still had the admission criteria (Steps 5 and 6), other bureaucratic procedures were performed and they remained hospitalized in the unit (adult or child observation), assisted by the health team until the state or municipal bed regulation center found a vacancy in a tertiary referral hospital/campaign hospital. As soon as the patient was transferred, a terminal cleaning was carried out at the site where they were placed.

It is worth noting that the following was considered a suspected case: for a traveller: fever and at least one sign or respiratory symptom, and a history of travel to a country with the sustained transmission or an area with local transmission within the last 14 days of onset of symptoms were considered suspicious cases for travelers; for close contacts: fever or at least one respiratory sign or symptom and a history of contact with a suspect or confirmed case of COVID-19 within the last 14 days of onset of symptoms; and for household contacts: contact with a confirmed case of COVID-19 infection and fever or at least one respiratory sign or symptom.[9]

On the other hand, the criteria for hospitalization are immunocompromised patients; with the diagnosis of lower respiratory tract infection with signs of severity; adolescent or adult with a Respiratory Rate (RR) higher than 30 respiratory incursions per minute (ripm), dyspnea, partial oxygen saturation lower than 90% in ambient air, cyanosis and organ dysfunction; children with the use of accessory musculature for breathing, inability or refusal to breastfeed or drink liquids, wheezing or stridor at rest, incoercible vomiting, sensory alteration (irritability or sleepiness), and convulsions. Also, the RR that denoted severity was, as follows: in children < 2 months: RR less than or equal to 60 ripm; in children > 2 months: RR greater than or equal to 50 ripm; in children one to five years old: RR greater than or equal to 40 ripm.[9]

Finally, it is important to emphasize that, initially, both the health and administrative teams had difficulties regarding the structural management of the flow, which was eased daily, after the whole team acquired skills in following the steps. Moreover, all the locations were well signposted as to their functionality; the whole team tried to maintain mutual help; and questions could also be answered with the Nursing and medical coordinators of the unit, facilitating the entire process.

RESULTS

Among the 13,088 consultations performed, 3,564 patients were diagnosed with COVID-19 infection from March to July 2020. A total of 314 patients were transferred to the tertiary hospitals. The number of deaths totaled 69. 340 RT-PCR tests were performed in this period. A significant number of patients were treated during the pandemic. It is noteworthy that, with a lower demand of users with clinical manifestations of other pathologies, the waiting time remained reduced, since the number of professionals who performed the care was maintained.

During the daily training sessions for the implementation of the flowchart, which took place for a week, always before the beginning of the day and night shifts, until the entire unit team was trained, the medical and Nursing coordinators simulated a hypothetical suspected case, going through the flowchart to be used. The coordinators answered the initial doubts that arose at that moment, and it was emphasized that the later ones could be answered at any time, by phone, through WhatsApp messages, or in the coordinators' room. In the end, one medical coordinator, one Nursing coordinator, 24 nurses, 32 nursing technicians, 16 administrative employees, and 42 physicians participated in the training, totaling 116 professionals.

It is important to highlight that, since the establishment of the COVID-19 pandemic by the WHO, the entry of any patient in the ECU was assisted from the administrative staff at the reception of the unit, through the nurse, properly dressed and designated for the risk classification of the suspect patient, to medical care and / or hospitalization due to the severity of the disease. In all sectors, there were private rooms prepared for this situation and, on each shift, a responsible team dressed according to the recommendations of the Brazilian Health Regulatory Agency (ANVISA).

This flowchart of initial care for the clinical management of patients with respiratory symptoms, established in the ECUs linked to the State of Ceará, was implemented by the entire health team and adapted, according to the WHO and MS updates, soon after the onset of cases of the disease in the city. The recognition of symptomatic patients, i.e., those with respiratory symptoms even before entering the health services premises, constituted an essential routine to reduce the exposure of patients and professionals, in addition to preventing the progression of the disease.[9]

DISCUSSION

Initially, it can be observed that task forces were necessary for healthcare units worldwide to reach the required levels of care for people affected by COVID-19. The experience reported here corroborates the knowledge that adaptations had to be made with decision-making in short periods of time and with the integration and qualification of health and administrative professionals, according to their different knowledge and specialties. Because both areas were essential for the success in the management of the flowchart; moreover the dimension of the importance the interdisciplinary health team's work stands out, essentially, when the main focus of its decisions is primarily based on the patient.[10]

Thus, the flowchart for clinical management of the patients with respiratory symptoms was consolidated as a tool of great value in the routine care of people suspected and/or infected by COVID-19 in ECUs. From this point of view, a significant number of people are seen every 24 hours in this service, and this place has an essential role in assisting the patient with the respiratory symptoms, helping to face/combat, in an emergency way, the outbreak of a disease that has challenged the health systems and professionals all over the world, due to the high number of deaths.[9]

Given the limited number of studies, the recommendations for patients assisted in urgency and emergency are preliminary, and the procedures are based on the governing bodies, WHO and MH, in clinical experience, and discussion of specialists and the multidisciplinary team, because, when searching for the articles on the use of flowcharts in urgency and emergency in the initial pandemic period, it was not possible to find journals that portrayed the subject. Therefore, some suggestions were outlined for the prioritization, treatment, and triage of patients whose condition reflected an immediate threat to the continuity of life, where the prognosis would be significantly altered by the delay in care.[11]

It is known that many lessons have been learned from the COVID-19 pandemic. However, it is essential that the health schools invest in Disaster Medicine because although SARS-CoV-2 will one day be less present among society, other pathogens will appear, just as all nature phenomena do, causing suffering in families and societies.[12]

In order to act quickly to promote the health of patients with suspected infection by COVID-19, at a time when public health, worldwide, did not have a specific antiviral treatment or effective vaccine, there was a great challenge to implement the flowchart for clinical management of this disease. Therefore, as it was a new illness for the community and the service at that moment, quick training on its clinical management, as well as a deepening of the knowledge related to the topic were essential, which was made easier by the dedication and importance of teamwork and the interest of each person in reading more about the documents related to the disease and its characteristics.[2]

The main purpose of the tools used in the application of the flowchart was to make the system more resolutive and effective by minimizing the delay in the flow, mitigating unnecessary queues, and also to comply with what is recommended in the doctrinal principles of UHS, having been of fundamental importance in this pandemic scenario, besides allowing the importance of teamwork focused on the best quality of care provided to the patient.

CONCLUSION AND IMPLICATIONS FOR PRACTICE

The report showed that the implementation of a flowchart in an ECU targeted to assisting patients with the respiratory symptoms, in the pandemic scenario, has speeded up the identification of possible positive cases, as well as reduced the time to start the this patient's care, also avoiding crowding in the service, providing safety to patients and greater protection for them and the health team.

The integration of the interdisciplinary team's work was fundamental, since each professional intervened according to his knowledge, and the technical differences or specialties were allied for decision making, with the objective of preventing, promoting, and recovering the health of patients assisted in urgency and emergency services.

Therefore, for the health team, participating in the implementation of technologies such as this one, applied to the reality of the urgency/emergency service, represented an opportunity to enrich and innovate their professional practice, given the management of patients with the infectious-contagious diseases in pandemic scenarios.

Among the limitations, is the impossibility of generalizing its results to other scenarios of care in ECU, either nationally or internationally, considering that the flowchart developed and applied translates the results that represent the report of a specific scenario, in an ECU, linked to the State of Ceará.

AUTHOR'S CONTRIBUTIONS

Design of the study. Regina Kelly Guimarães Gomes Campos. Samia Jardelle Costa de Freitas Maniva. Miguel Henrique da Silva dos Santos. Kirley Kethellen Batista Mesquita. Patrícia Neyva da Costa Pinheiro.

Data Collection. Regina Kelly Guimarães Gomes Campos. Samia Jardelle Costa de Freitas Maniva. Miguel Henrique da Silva dos Santos. Kirley Kethellen Batista Mesquita. Patrícia Neyva da Costa Pinheiro.

Data Analysis. Regina Kelly Guimarães Gomes Campos. Samia Jardelle Costa de Freitas Maniva. Miguel Henrique da Silva dos Santos. Kirley Kethellen Batista Mesquita. Patrícia Neyva da Costa Pinheiro.

Interpretation of results. Regina Kelly Guimarães Gomes Campos. Samia Jardelle Costa de Freitas Maniva. Miguel Henrique da Silva dos Santos. Kirley Kethellen Batista Mesquita. Patrícia Neyva da Costa Pinheiro.

Writing and critical revision of the manuscript. Regina Kelly Guimarães Gomes Campos. Samia Jardelle Costa de Freitas Maniva. Miguel Henrique da Silva dos Santos. Kirley Kethellen Batista Mesquita. Patrícia Neyva da Costa Pinheiro.

Approval of the article final version. Regina Kelly Guimarães Gomes Campos. Samia Jardelle Costa de Freitas Maniva. Miguel Henrique da Silva dos Santos. Kirley Kethellen Batista Mesquita. Patrícia Neyva da Costa Pinheiro.

Responsibility for all aspects of the content and integrity of the published article. Regina Kelly Guimarães Gomes Campos. Samia Jardelle Costa de Freitas Maniva. Miguel Henrique da Silva dos Santos. Kirley Kethellen Batista Mesquita. Patrícia Neyva da Costa Pinheiro.

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