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Triage Strategies for COVID-19 Cases: A Scope Review

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Abstract

In the midst of the pandemic caused by the new coronavirus (SARS-CoV-2), researchers and governmental and non-governmental institutions are mobilizing to implement strategies to face cases of COVID-19. Aim: This study aimed to map the triage strategies for cases of COVID-19, with the purpose of identifying sources in the literature that make it possible to explore the understanding of the strategies in different contexts. A scope review was conducted with searches in the CINAHL Database, PubMed, LILACS and hand-search, considering studies carried out with users of health services and documents published by governmental and non-governmental institutions, between the years 2019 and 2020, resulting in 40 articles for full reading. To explore the key concept, thematic analysis was carried out at two levels: (1) triage strategies, (2) forms and experiences of triage. Five triage strategies were mapped: health services triage; digital triage by remote use of technologies; community triage; home visit triage and airport and port triage. The forms and experiences of mapped triages involved risk classification, diagnosis and definition of conducts or combined. The use of strategies with remote technological resources stands out, as well as the adaptation of existing scales with simple algorithms as a tendency.

Keywords

COVID-19, severe acute respiratory syndrome, pandemics, triage, diagnosis

- **What Do We Already Know About This Topic?**
  - We know that there are several types of screening being applied in the context of the pandemic, however this article compiles this information. However, digital screening was highlighted in this study.
- **How Does Your Research Contribute to the Field?**
  - In the pandemic COVID-19 scenario, it is imperative that triage strategies be developed, implemented and validated and their use incorporated into evidence-based practice.
  - Studies of this nature (category/type) have the potential to indicate elements for the construction of a protocol that synthesizes the best evidence based on experiences from different realities, with a view to contributing to coping with this unique moment of global health.

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- **What Are Your Research's Implications Towards Theory, Practice, or Policy?**
  - In practice, this work comes to potentiate the triage, because it makes a temporal survey of the triage since the beginning of the pandemic.

Introduction

Pneumonia cases of unknown origin that occurred at the end 2019 in the city of Wuhan, China, led to the suspicion of a new virus circulating among the population. Following the notification of these cases, the Chinese Center for Disease Control and Prevention (China CDC) identified a new virus, a member of the *Coronaviridae* family, currently known as SARS-CoV-2, the causative agent of COVID-19, a respiratory disease capable of inducing severe pulmonary complications.[1]

Concomitant with the identification of SARS-CoV-2, some strategies began to be implemented for the handling of the disease including the triage of suspected cases with laboratory diagnosis and treatment, as well as prevention and control of transmission. Among these strategies, the development and adoption of clinical protocols and therapeutic guidelines is noteworthy, with the purpose of supporting managers and health professionals in decision making, guaranteeing the quality and safety of the aid given, in addition to reducing economic impacts.[2]

As happened in previous experiences such as epidemics caused by the spread of SARS-CoV and MERS-CoV, an incentive for the development and dissemination of strategies in order to favor the prompt recognition of diseases and manage suspected cases has also occurred.[3] Since the beginning of the pandemic, the scientific community has been working to establish criteria for identifying cases of COVID-19. The World Health Organization (WHO), as the main agency specialized in health, has published general guidelines for nations to adapt them according to their epidemiological characteristics,[4] contributing with a significant volume of official documents and scientific publications.

In general, triage is an essential process for determining the severity of a disease and prioritizing emergencies with concomitant patient safety.[5] In particular, in the pandemic SARS-CoV-2 scenario, it is imperative that triage strategies be developed, implemented and validated and their use incorporated into evidence-based practice.

The systematization of evidence available in the literature about strategies for identifying and classifying cases of COVID-19 can support rapid decision-making by both managers and health professionals who work in the fight against the disease. Still, studies of this nature have the potential to indicate elements for the construction of a protocol that synthesizes the best evidence based on experiences from different realities, with a view to contributing to coping with this unique moment of global health.

In the presence of the pandemic which mobilizes researchers and health professionals to face the disease, the following question has emerged: What triage strategies for COVID-19 cases are available in the literature? To answer this question, the study aimed to carry out a scope review to map the triage strategies for COVID-19 cases, with the purpose of identifying experiences and recommendations that allow exploring the comprehension of disease associated with SARS-CoV-2 infection triage strategies in different contexts.

Method

Study Design

A scope review was conducted using the Joanna Briggs Institute manual as reference, with inclusion criteria according to the acronym PCC (Participants, Concept and Context)[6] and according to the Preferred Reporting Items for Systematic Reviews and checklist Meta-Analyzes Extension for Scoping Reviews/PRISMA-ScR.[7] The review was registered in the Open Science Framework and the study protocol can be accessed at https://osf.io/p8xet/.[8]

Search Strategies

Searches were carried out in the CINAHL Database, PubMed, LILACS databases and by hand-search, based on searches on the official websites of WHO, Center for Diseases Control and Prevention (CDC) and National Health Surveillance Agency (ANVISA), from Brazil, as well as from quotes from studies read in full. The search strategy was built from controlled (Medical Subject Headings [MeSH] and CINAHL Subject Headings) and uncontrolled descriptors considering the keywords "COVID-19" and "triage" and their variations (Appendix 1). The searches were conducted on 2 July 2020. The duration of the study was from April 2020 to October 2020.

The inclusion criteria for this review were as follow: studies with health service users, with no language limits, published between the years 2019 and 2020, a period that justifies the beginning of the global pandemic caused by SARS-CoV-2; concept: original studies and documents reported by governmental and non-governmental institutions that address triage strategies for COVID-19 cases; context: all scenarios, health, socio-cultural regardless of regions or countries.

The exclusion criterion were studies involving cells or animals, the use of drugs or tests with vaccines, review type studies, case reports and opinions, conference proceedings, editorials, interviews and studies not available in full.

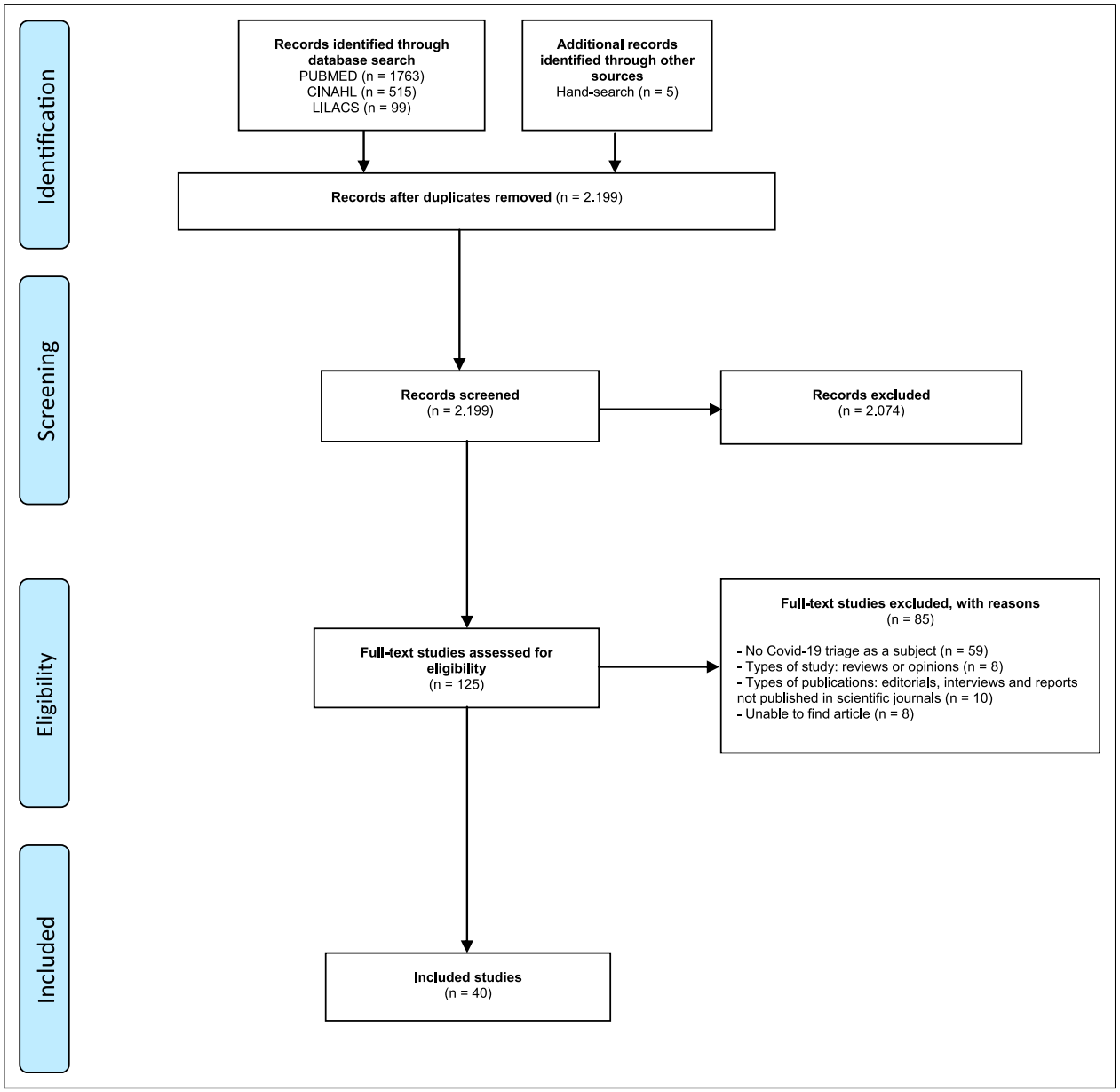

Figure 1. Flowchart of the selection phases of the included studies. Source. From: Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement.[9] For more information, visit www.prisma-statement.org.

Identification and Selection of Studies

Two groups of reviewers participated in the identification, triage and eligibility of the sources of evidence, independently: groups "A" (PHS, PA, FC, SB) and "B" (JA, PS, DP, SM). Disagreements were resolved by consensus.

Data Extraction and Analysis from the Included Studies

From the studies included for full reading, the following information was extracted: author, year, country of origin, study objectives, population/sample size (Participants), triage strategy/type of intervention/exposure (Concept), health scenario (Context) and results.

The synthesis of the results was done following the steps of the PRISMA-ScR[7] as shown in the Prisma Flowchart.[9] To explore the key concept and map the triage strategies, thematic analysis was carried out on two levels, the first level being triage strategies - key concept, context, participants and the second level, the mapping of the forms and triage experiences. The variables considered were: publication, country of origin, type, mapping of triage strategies, key

Table 1. Characteristics of the Evidence Sources Published Until on July 2, 2020.

Characteristics of sources of evidence (N=40)		Amount (%)
Publication month		
	January	1(2.5)
	February	5(12.5)
	March	11(27.5)
	April	13(32.5)
	May	4(10)
	June	3(7,5)
	July	2(5)
	No month	1(2.5)
Country of origin		
	Switzerland	4(10)
	United States	7(17.5)
	Brazil	5(12.5)
	United Kingdom	4(10)
	India	2(5)
	China	8(20)
	Italy	3(7.5)
	Korea	2(5)
	Canada	1(2.5)
	Iran	1(2.5)
	Singapure	1(2.5)
	Honduras	1(2.5)
	Guatemala	1(2.5)
Types of publications		
	Peer review articles	23(57.5)
	Policy paper[a]	17(42.5)

[a]Documents from governmental and non-governmental agencies.

concepts of approaches and context and population; the actions of which were directed to identify or mitigate cases of COVID-19.

Results

Selection of Sources of Evidence

2,382 records were identified, 183 of which were excluded as duplicates. A total of 2,199 records were submitted for selection triage by titles and abstracts, resulting in 2,074 excluded records and 125 full-text studies assessed for eligibility. After reading, 85 full-text studies were excluded for the reasons of subject: no COVID-19 triage as a subject (n = 59), types of study: reviews or opinions (n = 8), types of publications: editorials, interviews and reports not published in scientific journals (n = 10) and unable to find article (n = 8). After selection, a total of 40 included studies resulted in the synthesis of the evidence (Figure 1).

Characteristics of Sources of Evidence

In this overview, the studies included were published between the months of January and July 2020 (mean ≅ 5.57; standard deviation = 4.61364). The months of March and April had the highest number of publications, represented by 11 and 13 sources of evidence, respectively. In sequence, the month of February had 5 publications, the months of May, 4; June, 3; July, 2; January, 1 and 1 publication did not contain information regarding the month (Table 1).

Regarding the types of publications, 57.5% (23) studies were peer review articles and 42.5% (17) were documents (policy papers) published by governmental and non-governmental agencies (Table 1). Regarding the published articles, 47.8% (10) were observational studies and 52.2% (13) were experiences related. Among the documents that were found, 70.6% (12) were guidances/guidelines (policy papers), 23.5% (4) were SOP (Standard Operating Procedure) and 5.9% (1) were flowcharts. With regards to governmental and non-governmental agencies, these publications came from (national and local) governmental institutions, regulatory agencies (health surveillance), state health departments, medical societies, including international bodies such as WHO and CDC. In these, it is notable, in order of frequency, the countries of origin of the publications represented by China (8) United States (7), Brazil (5), Switzerland (4), the United Kingdom (4), Italy (3), India (2), Korea (2), Iran (1), Singapore (1), Honduras (1), Canada (1) and Guatemala (1) (Table 1).

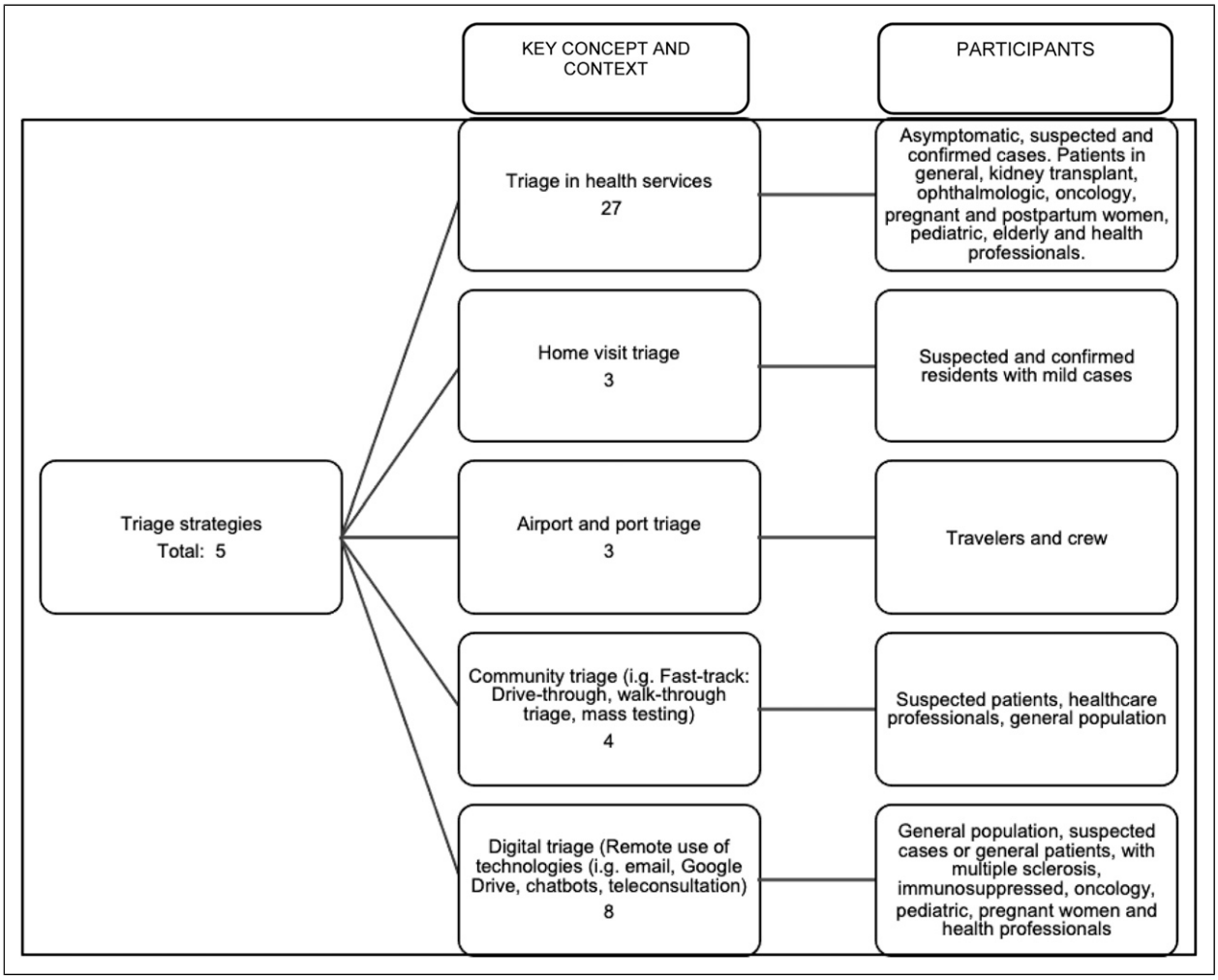

Figure 2. Representation of triage strategies for COVID-19 cases found in the included studies.

Triage Strategies

Five triage strategies for COVID-19 cases were mapped the 40 publications that were included (Figure 2). These strategies were the object of analysis in this scope review and they were mapped as a key concept, considering the context in which they were inserted and the participants (population) whom the action addressed.

Triages in health services were done by clinical evaluation in primary, secondary and tertiary care, involving a long-stay institution for the elderly. For these strategies, it is noted that questionnaires and scales were used, such as the Brescia-COVID Respiratory Severity Scale (BCRSS)/Algorithm, Identify-Isolate-Inform (3I) Tool, and Early Warning Score (EWS).[10-12]

Home visit triage strategies involved clinical assessments and testing for patients suspected cases and risk assessment for confirmed cases.[13,14]

In airport triage strategies, clinical assessments were observed with interviews and individual temperature measurement with referral flows, both carried out on board and on the ground.[15,16]

With respect to the triage involving the mass population (eg drive-through, walk-through, mass testing), theses were carried out in a fast-track system with the syndromic approach of influenza syndromes with the indicator symptoms disease associated with SARS-CoV-2 infection, as a way of ensuring the agility of professionals and the population involved.[17,18]

The remote use of digital technologies was also identified, such as e-mails sending and approaches via Google Drive, chatbots and teleconsultations, as a way of avoiding displacements, clarifying doubts and guiding the population in general or refer patients to health services. health at its different levels and specialties, such as the strategies cited by Bonavita et al[19] and Espinoza et al,[20] with strategies aimed at people with multiple sclerosis and immunosuppressed people and children, respectively.

In this perspective, it became evident that the concept of triage used in the studies is homogeneous regardless of the strategies and aims at the classification or organization of the flow for care that involves clinical evaluation, testing and referrals.

The strategies differed in the specificity of the context in which different instruments and flow of greater or lesser complexity are used, as well as the group involved, which combines both the general population, where the triage strategies directed to the community is used, as also the fast-track system by means of drive-through or private care in health services, aimed at people with flu syndrome or other strategies aimed at specific groups such as pregnant women.[21,22]

Forms of Triage

From the publications identified as forms of triage strategies, three categories emerged.

The first was triage for risk identification, which assembles studies that describe the criteria for classifying the risk of infection for SARS-CoV-2 in various health services.[19,23] The second refers to triage for diagnosis, consisting of studies that present epidemiological characteristics of signs and symptoms, laboratory tests, by image, considered as criteria for the definition of suspected and confirmed cases in different populations and levels of care.[17,19] The third category concerns triage to define proceedings, according to the health status of individuals defined as suspected or confirmed cases.[10,14]

In the synthesis of the experiences, reports on triage strategies at varying levels of complexity were put together from some countries, considering the definition of the flow of care for suspected and confirmed cases, the offering mass triage, telemarketing strategies and the use of digital tools.[13,19] However, the diagnostic criterion were not explicit in all studies.

It is noteworthy that there are publications that cover strategies that involve one or more types of triage, as well as being included in the reported experiences, given the range of information contained in them.

Triage for Risk Classification

The studies in this category include medium and high complexity services, such as neurology,[19] ophthalmology[23,24] and hospital care.[25]

Four studies classify users as low risk and high risk for SARS-CoV-2 infection,[24-26] considering medical history, signs and symptoms and epidemiological characteristics. This initial classification defined the flow of user assistance in health services, including referrals with the purpose of diagnosing COVID-19 cases.

Triage for Diagnosis

The most common epidemiological characteristics of these studies are described as recent trips to other high-risk countries/areas,[20,21] within the last two weeks, residing in a high-risk for contamination area,[27,28] contact with suspected or confirmed cases of COVID-19[21] and occupation.[29,30]

As for the determining signs and symptoms for the diagnosis of disease associated with SARS-CoV-2 infection, fever,[17,19] respiratory symptoms such as nasal congestion, runny nose,[19,28] cough or dry cough, labored breathing,[19,21] sneezing,[28] shortness of breath,[11,29] nasal flaring,[26,31] rhonchi, decreased breath sounds, dullness to percussion, improvement or worsening of the vocal fremitus,[29] sputum production, falling saturation,[21,32] intercostal retractions,[31] persistent pressure on the chest and cyanosis on the lips or face.[32]

Other signs and symptoms have been mentioned, for example, of decreased/loss of smell and/or taste,[17,19] sore throat,[19,30] diarrhea,[14,19] fatigue,[27,28] abdominal discomfort,[28] headache[28,32] and general malaise.[33]

As for laboratory tests for the definition of contamination by SARS-CoV-2, the RT-PCR with sample obtained by naso and/or oropharyngeal swab stands out[27,34] and serology for IgG IgM.[32,35] Other tests, for example, of inflammatory indicators of coagulation function, biochemical tests,[26,28] as well as imaging tests, such as pulmonary ultrasound,[36] radiography and chest tomography.[28,37]

Triage for the Definition of Procedure

In this triage category, clinical-therapeutic approaches procedures are observed,[10,27] including traditional Chinese medicine,[27,28] guidelines for suspected cases[14,27] and orientation for home health service care.[27,38]

Triage Experiences

Ten studies report the experience of triage strategies, for example the studies of Bonavita et al[19] and Mark et al,[13] however in these experience reports, no validation proposals were observed.

Discussion

The SARS-CoV-2 pandemic sparked a race by national and international health agencies to develop strategic preparedness and response plans that could describe public health measures to quickly mitigate the spread of SARS-CoV-2. In this context, developing triage protocols for diagnosis, risk classification and decision-making in addressing the phenomenon in order to lighten the load on health services and to optimize care to the population has become elementary.

From the first cases, WHO worked together with its partners and specialists to better understand the transmission of the virus, populations at risk, clinical spectrum of the disease and the most effective forms of tracking and interrupting the transmission chain by drawing up contingency plans and strategic action guides in order to internationally operationalize the handing of SARS-CoV-2.[36]

Concomitantly, the academic community made efforts and partnerships so that evidence could quickly be produced and disseminated worldwide. To this end, several journals provided open access and created the Fast Tracking system in their scope of submission. In this scenario, a large volume of publications about SARS-CoV2 is assessed, with a focus on the present review, in particular as is noted in the increase during the months of March and April.

The majority (≅76%) of publications were of the type documents reported by governmental and non-governmental agencies (eg guidances/guidelines) and limited to reports of triage experiences, becoming evident the reduced production of empirical studies related to triage protocols, and given the emergency situation of the pandemic, none pointed to the use of tested protocols that showed the validity and reliability of its application. It could be stated that the absence of robust research has been one of the greatest challenges for evidence-based medicine.[39]

Due to the pandemic's progress, it was imperative for clinical practices to be based on quick decision making, backed by clinical judgments and experiences lived in similar situations or indicated by experts, in a multi and interprofessional approach that directed towards the forms of prevention, risk classification, control, diagnosis, treatment of COVID-19 and post-COVID-19 follow-up. To this end, the development of guidelines for clinical practice and public health policies were developed concomitantly, by means of new protocols or adapted from other respiratory diseases, making evident the limitation of methodological studies that resulted in the validation of these protocols.

The findings indicate that the tracking strategies carried out in the context of health services, as well as those with the use of technological resources for teleconsultations and variations of internet resources at different levels of health care were the most used means. Screening in health services together with Digital Screening aimed to offer efficient care to minimize the overload of infrastructure, supplies and qualified personnel.[10-12,21,23,27,30,34,35,37]

The remote use of technologies was prominent in screening strategies for COVID-19. Various types of technologies employed have been developed for this purpose. It is noteworthy that there has been an advance in this type of health care that can even be implemented in health services even after the pandemic due to its practicality and speed in patient attendance.[19,20,30,32,34,38]

Given the wide production that can be observed on the subject, it is recommended that the literature be continuously reviewed and that in subsequent stages, researchers discover through methodological studies, the validity and reliability of these instruments, scale and other tools, as a way of sustaining and expand evidence-based practice in the approach to COVID-19 cases.

Conclusion

This scoping review mapped the different triage strategies for cases of COVID-19, becoming evident in its key concept the dimensions in forms, types (purpose) of triage, taking action directed towards individual people, family and community in different contexts of health care.

In summary, five screening strategies were identified for COVID-19 cases: health services triage; digital triage by remote use of technologies; community triage; home visit triage; airport and port triage, and the forms and experiences of mapped triages involving risk classification, diagnosis and definition of conducts or combined. Furthermore, the use of strategies with remote technological resources stood out, as well as the adaptation of existing scales with simple algorithms as a tendency.

Finally, the mapping brought sustainable elements to understand the forms, purposes and scope of the triage strategies adopted during the pandemic, which can be implemented at different levels of health care. In its content, it also helped to subsidize the construction of protocols and guidelines for health services.

Studies of this nature have the potential to indicate elements for the construction of protocols for diseases associated with SARS-CoV-2 infection and, in addition, this review offers a historical contribution showing how countries initially organized themselves to face this unprecedented pandemic crisis.

Declaration of Conflicting Interests

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Appendix 1.

Search strategy by databases.

Pubmed: ("Coronavirus"[MeSH Terms] OR "Coronavirus"[All Fields] OR "Coronaviruses"[All Fields] OR "Coronavirus Infections"[MeSH Terms] OR "Coronavirus Infections"[All Fields] OR "Coronavirus Infection"[All Fields] OR "COVID-19 [Supplementary Concept]"[All Fields] OR "2019 novel coronavirus disease"[All Fields] OR "COVID19"[All Fields] OR "COVID-19 pandemic"[All Fields] OR "SARS-CoV-2 infection"[All fields] OR "2019 novel coronavirus infection"[All Fields] OR "2019-nCoV infection"[All Fields] OR "coronavirus disease 2019"[All Fields] OR "coronavirus disease-19"[All Fields] OR "2019-nCoV disease"[All Fields] OR "COVID-19 virus infection"[All Fields] OR "COVID-19 testing"[All Fields]) AND ("Triage"[MeSH Terms] OR "Triage"[All Fields] OR "Triages"[All Fields] OR "Protocol"[All Fields] OR "Protocols"[All Fields] OR "Screening"[All Fields] OR "Screenings"[All Fields] OR "Diagnosis"[MeSH Terms] OR "Diagnosis"[All Fields] OR "Diagnoses"[All Fields] OR "Diagnoses and Examinations"[All Fields] OR "Examinations and Diagnoses"[All Fields] OR "diagnosis [Subheading]"[All Fields] OR "Diagnostic Screening Programs"[MeSH Terms] OR "Diagnostic Screening Programs"[All Fields] OR "Diagnostic Screening Program"[All Fields] OR "Classification"[MeSH Terms] OR "Classification"[All Fields] OR "Classifications"[All Fields] OR "Health Policy"[MeSH Terms] OR "Health Policy"[All Fields] OR "Health Policies"[All Fields])

Cinahl: (MH "Coronavirus") OR (MH "Coronavirus Infections") OR (MH "SARS Virus") OR "covid-19" AND (MH "Triage") OR "triage" OR (MH "Protocols") OR "protocol" OR (MH "Health Screening") OR "screening" (MH "Diagnosis") OR "diagnosis" OR (MH "Classification") OR "classification" OR "appraisal" OR (MH "Patient Assessment") OR "assesment" OR (MH "Health Policy") OR "health policy" OR (MH "Policy and Procedure Manuals")

LILACS: "coronavirus" or "coronavirus infections" or "infecciones por coronavirus" and "triage" or "triaje" or "triagem"