Appendix 1

Methodological appendix

This appendix aims to explain the methods that we carried out to develop the framework included in the article. They consisted in three well-defined stages: 1) identifying the research question; 2) literature review; and 3) elaborating the conceptual framework, which are detailed below.

Identifying the research question

This first stage was conducted between April and June of 2020 and involved several researchers on social epidemiology from the Public Health Agency of Barcelona, and the collaboration of the Institut for Primary Health Care Research (IDIAP Jordi Gol). The purpose was to form a working team and define the scope of the conceptual framework to develop. One of the concerns of the team was to identify and highlight the social determinants of the unequal and unfair distribution of the COVID-19 at the beginning of the pandemic, although other topics such as the social, economic and health consequences of the epidemic or the consequences of the measures adopted by the governments were proposed as well.

Finally, the team agreed that focusing on the determinants of the inequities on the distribution of COVID-19 was the most appropriate target at that moment, when public health agencies and administrations needed tools to understand the reasons of this unequal distribution in order to implement effective intersectoral actions to address the crisis. Thus, the research question was: Which are the social determinants of the inequities in the distribution of COVID-19?, and How are they related?

Literature review

Then, we carried out a narrative review of the literature to identify and select the references to answer the research questions and to base the conceptual framework.[1,2] The review process included the search strategy, the selection process and the sorting of the gathered information.

Search strategy

We conducted a general search in October 2020 to identify those papers which answered our research questions in PubMed. Then, the search was updated until December 2020. The syntaxes (and reference terms) was ("inequalities"[Title/Abstract] OR "inequities"[Title/Abstract] OR "disparities"[Title/Abstract]) AND ("covid-19"[Title/Abstract] OR "coronavirus"[Title/Abstract]) (1184 results).

After having read the general articles and following the framework on social determinants of health from the World Health Organization and the Spanish Commission to Reduce Socioeconomic Inequalities in Health, we carried out specific searches as well, in order to identify the relationship between intermediate social determinants and the unequal distribution of COVID-19. Dates and electronic database were the same aforementioned. Syntaxes are detailed below:

- Work and employment conditions: ("inequalities"[Title/Abstract] OR "inequities"[Title/Abstract] OR "disparities"[Title/Abstract]) AND ("covid-19"[Title/Abstract] OR "coronavirus"[Title/Abstract]) AND ("work* condition*"[Title/Abstract] OR "employment"[Title/Abstract]).

- Income and economic resources: ("inequalities"[Title/Abstract] OR "inequities"[Title/Abstract] OR "disparities"[Title/Abstract]) AND ("covid-19"[Title/Abstract] OR "coronavirus"[Title/Abstract]) AND ("income"[Title/Abstract] OR "wage"[Title/Abstract] OR "economic resources"[Title/Abstract] OR "salary"[Title/Abstract]).

- Housing: ("inequalities"[Title/Abstract] OR "inequities"[Title/Abstract] OR "disparities"[Title/Abstract]) AND ("covid-19"[Title/Abstract] OR "coronavirus"[Title/Abstract]) AND ("housing"[Title/Abstract] OR "dwelling*"[Title/Abstract]).

- Residential environment: ("inequalities"[Title/Abstract] OR "inequities"[Title/Abstract] OR "disparities"[Title/Abstract]) AND ("covid-19"[Title/Abstract] OR "coronavirus"[Title/Abstract]) AND ("neighborhood"[Title/Abstract] OR "neighbourhood"[Title/Abstract] OR "residential environment"[Title/Abstract]).

- Mobility and transport system: ("inequalities"[Title/Abstract] OR "inequities"[Title/Abstract] OR "disparities"[Title/Abstract]) AND ("covid-19"[Title/Abstract] OR "coronavirus"[Title/Abstract]) AND ("transport"[Title/Abstract] OR "transport system*"[Title/Abstract] OR "mobility"[Title/Abstract] OR "commuting"[Title/Abstract]).

- Education: ("inequalities"[Title/Abstract] OR "inequities"[Title/Abstract] OR "disparities"[Title/Abstract]) AND ("covid-19"[Title/Abstract] OR "coronavirus"[Title/Abstract]) AND ("education*"[Title/Abstract]).

- Caregiving work: ("inequalities"[Title/Abstract] OR "inequities"[Title/Abstract] OR "disparities"[Title/Abstract]) AND ("covid-19"[Title/Abstract] OR "coronavirus"[Title/Abstract]) AND ("caregiv*"[Title/Abstract] OR "caregiving work"[Title/Abstract] OR "domestic work"[Title/Abstract]).

- Social capital, social support and community network: ("inequalities"[Title/Abstract] OR "inequities"[Title/Abstract] OR "disparities"[Title/Abstract]) AND ("covid-19"[Title/Abstract] OR "coronavirus"[Title/Abstract]) AND ("social capital"[Title/Abstract] OR "social support"[Title/Abstract] OR "community network*"[Title/Abstract] OR "social cohesion"[Title/Abstract]).

Selection process

Once the scientific articles had been identified, a quick screening by title was carried out to discard those that clearly do not correspond to the field of health inequities or social determinants of health and COVID-19. After the first rapid screening, the articles were reviewed by title and abstract to continue with the selection process. Finally, a full-text reading of all articles that pass the screening of the previous stage was performed. All this process was carried out by two authors (HV and CB).

The criteria used for the selection process were defined for general papers on inequities and COVID-19, and for each of the intermediate determinants described above are as follows:

For the general search:

1. Reviews or theoretical papers published until December 2020.
2. Papers must inform about social determinants of COVID-19 and/or inequities in the COVID-19 distribution.
3. From middle and high-income countries.
4. Written in English or Spanish.

For each of the intermediate determinants of COVID-19:

1. Reviews, theoretical or empirical papers published until December 2020.
2. Papers must inform about the relationship or effects of the aforementioned intermediate determinants on incidence or mortality by COVID-19 and their distribution.
3. From middle and high-income countries.
4. Written in English or Spanish.

The Rayyan - Intelligent Systematic Review software was used for the article selection process.[3]

Sorting of the gathered information

Regarding general articles, we identified 1,184 papers of which 44 were selected. We added one article from manual search (identified in main articles' references). Among them, 57,8% were about racial inequities in COVID-19, while 24,4% were about general issues on COVID-19 inequities. The majority of the articles came from USA (64,4%), and 72,4% of them focused on racial inequities and COVID-19.

Regarding specific searches on intermediate determinants, we identified 443 papers of which 126 were selected. We added 21 articles from manual search (identified in main articles' references and reported in Table I). Among these 147, 20,4% were related to *income and economic resources*, 17,7% were related to *residential environment* and a 14,3% were related to *housing.* The least frequent intermediate determinants were *caregiving work* (6,8%) and *transport and mobility* (8,2%).

It is important to note that, after the selection process, we identified 170 articles if we add up the total number of documents found for each topic, to which we added 22 articles identified from manual search (Table I). However, among these 192 articles there were those that were included in more than one topic, so the actual number of unique articles identified was 170.

Table I

Identified and selected articles by topic.

	Nº of identified articles	Nº of selected articles	Nº of included articles from main references	Nº of total selected articles
General search	1184	44	1	45
Specific searches				
Work and employment conditions	38	12	4	16
Income and economic resources	144	30	0	30
Housing	45	17	4	21

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Residential environment	27	25	1	26
Mobility and transport system	21	9	3	12
Education	134	13	3	16
Caregiving work	13	9	1	10
Social capital, social support and community	21	11	5	16

Once the articles had been selected, they were classified following the general schema from the framework on social determinants of health from the World Health Organization. Thus, two initial main categories were established: 1) structural determinants of the unequal distribution of COVID-19; and 2) intermediate determinants of the unequal distribution of COVID-19. From this point, the research team was divided into smaller working groups and started a critical discussion on the gathered evidence.

Elaborating the conceptual framework

In order to meet this final stage, the first author (HV) proposed a first draft of the framework based on the framework on social determinants of health from the World Health Organization and the Spanish Commission to Reduce Socioeconomic Inequalities in Health, and after a general reading of the available literature. Then, we carried out an iterative process to organise and relate the information to improve the initial proposal, where each small team went deeper into some of the dimensions of the framework and shared their conclusions with the others.

Those critical discussions led to a final framework that adds new elements which may improve the original one in which we are based on. Those elements are: 1) the oppression systems; 2) the relationship between measures adopted by governments to tackle the pandemic and the structural and intermediate determinants; and 3) the role of communication in COVID-19 inequities.

References

1. Baumeister RF, Leary MR. Writing narrative literature reviews. Rev Gen Psychol. 1997;1:311-20.

2. Berman J, Smyth R. Conceptual frameworks in the doctoral research process: a pedagogical model. Innov Educ Teach Int. 2015;52:125-36.

3. Ouzzani M, Hammady H, Fedorowicz Z, et al. Rayyan — a web and mobile app for systematic reviews. Syst Rev. 2016;5:210.