Master of Public Health

Master de Santé Publique

Use of Interviewer-Administered Telephone Surveys during Infectious Disease Outbreaks, Epidemics, and Pandemics:
A Scoping Review

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List of acronyms

AFRO	WHO African Region
AMRO	WHO Region of the Americas
COVID-19	Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)
HIC	High-Income Country
EMRO	WHO Eastern Mediterranean Region
EURO	WHO European Region
HCP	Healthcare Professional
IVS	Interactive Voice Response
LMIC	Low- and Low-Middle-Income Country
RAD	Reactive Auto Dialer
RDD	Random-Digit Dialing
SEARO	WHO South-East Asia Region
SMS	Short Message Service
WHO	World Health Organization
WPRO	WHO Western Pacific Region

Abstract

Introduction: Emergence of modern technology and digitalization has influenced public health research, including data collection methods. The existing literature describes telephone as a useful tool whereby qualitative and quantitative data can be gathered remotely, particularly when traditional face-to-face methods are inappropriate or unfeasible. This scoping review aims to identify characteristics, challenges, and strengths of interviewer-administered telephone surveys conducted in the time of infectious disease outbreaks, epidemics, and pandemics.

Methods: Studies using a single data collection method of interviewer-administered telephone surveys targeting anyone at least 18 years old and conducted during infectious disease outbreaks were identified via database searches. There was an addition of supplemental documents examined while developing the protocol. No limit on publication year was set. Two independent reviewers screened and selected relevant studies. Data extraction was performed by one reviewer and verified by the other reviewers. To present the findings, descriptive and content analyses were performed.

Results: This scoping review identified 70 studies published between 2003 and 2022, 57.1% of which have been conducted in the time of COVID-19. Interviewer-administered telephone surveys are most frequently carried out in China (32.9%) and the United States (11.4%). Regardless of infectious disease, individual adults (48.6%) are the most frequently targeted population, and the most common study design was quantitative descriptive (50.0%). Studies published between 2003 and 2010 used only landlines. The first study which completely relied on mobile phones was published in 2016. The use of cell phones is growing, especially in LMICs. The most recurrent topics throughout the included studies were related to vaccines, mental health, and behaviors. Some common and continuing challenges, such as exclusion of people without access to telephone and absence of non-verbal communication, were found. Methodological details were missing in many studies.

Conclusion: This modality seems particularly suitable for local studies targeting specific groups with the availability of demographic and socioeconomic data as a reference thereby the degree of representativeness and accuracy of the results can be well estimated. To make better use of interviewer-administered telephone surveys, researchers are encouraged to detail their methods and techniques devised to tackle their challenges.

Key words: Infectious Disease Outbreak; Interview; Public Health Crisis; Remote Data Collection; Telephone

Introduction

Public health research and data collection. Public health intends to ameliorate the health status of the public or individuals as a whole.[1] To achieve this goal of protecting and improving population health, the scope of public health includes responding to infectious diseases,[2] and research is crucial when preparing for and responding to infectious disease outbreaks.[3] Examples of infectious disease which recently emerged as outbreaks include 2009 influenza A (H1N1), Ebola virus disease, and Zika virus.[4] Depending on the objectives and available resources and while accommodating the local context and restrictions, public health researchers choose data collection methods, such as surveys, questionnaires, interviews, observations, and focus group discussions.

The exponential development and expansion of modern technology has influenced the way public health research is conducted and data is obtained. For instance, mobile and wireless technologies serve as a communication means to connect health institutions with individuals, such as call centers, appointment reminders, databases and platforms providing educational and professional contents, and monitoring and surveillance.[5] Applications and even combination of these technologies are becoming more common. For example, a recent study in Burkina Faso shows that a toll-free call service together with an interactive voice server can be used to "strengthen health system responsiveness in one of the world's poorest countries."[6]

Remote data collection during infectious disease outbreaks. Digitalization has enabled remote data collection, which is particularly relevant during infectious disease outbreaks, when traditional face-to-face modalities are inappropriate, unfeasible, or suspended. For example, the SARS-Cov-2 (COVID-19) pandemic seems to have appeared as an obstacle which forces researchers to avoid physical contacts. Many countries have implemented measures such as physical distancing, lockdowns, and travel restrictions to contain the virus. A lot of public health researchers respond to these measures by shifting from face-to-face to remote data collection to continue their research.[7] A number of activities in non-COVID-19 related research have been interrupted and suspended, and many studies have taken alternative methods, including remote data collections by telephone and online conferences, into consideration.[8] Particularly during lockdowns, researchers were obliged to collect data remotely, and even after a series of confinement, remote data collection methods continue to be used for convenience. When COVID-19 is present, there is a need for remote data collection providing information related to pandemic response and other problems in public health.[9]

Data collection by telephone. Among several tools allowing remote data collection, telephones are especially useful. Telephone interviews permit gathering qualitative and quantitative data from informants at some distance or without sufficient time for in-person contacts with researchers.[10] The use of mobile phones is appropriate when quick data collection is required without incurring heavy expenses as well as when classic face-to-face interviews are not feasible.[11] The COVID-19 pandemic is a good example during which in-person methods need to be avoided. Indeed, there are studies to examine the impact of COVID-19 in different countries by using mobile phones to gather data.[12] Furthermore, telephone surveys are effective "for research topics in which the temporality and social context within which the questions are being asked (and answered) is especially important, such as data collection conducted in the immediate aftermath of an epidemic outbreak or natural disaster."[13] Despite technical challenges, telephone can play an important role in contact tracing as well, but in this type of interventions, there is a lack of adaptation to accommodate the needs of subgroups, such as low literacy, language barriers, and disabilities.[14]

Interviewer-administered telephone surveys. Although face-to-face interviews has been the norm in health care research, qualitative interviews through video, telephone, and online meeting tools can be reliable alternatives and also practical when including people who would otherwise be excluded because of physical distance or potential harms and dangers, such as in the context of war and the spread of infectious diseases.[15] Telephone surveys involving interaction between live interviewers and informants (hereinafter interviewer-administered telephone surveys) can contribute to gathering in-depth, qualitative data. For example, while being less expensive or time consuming, this modality enables clarification and tends to have higher response rates.[16] Unlike self-administered surveys, probing and informal conversations are possible in phone-based interviews. While some might find interviews less convenient when they do not wish to continue, respondents tend to have more freedom in answering questions during interviews. Considering the high and growing mobile phone penetration rates, cell phones are likely to keep playing an important role.

It is worth mentioning another strength of phone-based interviews. This method easily allows interviewers to develop rapport and build trust.[17] Good interviewers can not only establish rapport with the participants but also ask detailed, complex, qualitative questions which sometimes need explanation.[18] Establishing rapport and trust is specifically important in international public health studies given the gap between low- and low-middle-income countries (LMICs) and high-income countries (HICs) regarding moral standards in public health research. In many cases, because LMICs are more vulnerable and exposed to

infectious diseases,[19] HICs fund and carry out studies in LMICs. Informants from resource-scarce nations may feel vulnerable due to the poverty, widespread illiteracy, and linguistic barriers.[20] It seems easier to establish rapport and trust in live interaction, and therefore interviewer-administered telephone surveys are a useful remote data collection method, which can accommodate the specific needs in international public health research.

Furthermore, choosing the most appropriate language strategy is ethically crucial for both gathering representative data and making sure participants comprehend the study, including why they are invited.[21] In many LMICs, several languages and dialects, which often differ from region to region within a country, are spoken.[22] Telephone surveys administered by multilingual interviewers with knowledge of local cultures can not only facilitate communication between informants and interviewers in a more personal and direct manner but also contribute to minimizing miscommunication and misunderstanding.

Rationale. Despite the convenience and suitability during epidemics and pandemics, there is limited literature on interviewer-administered telephone surveys. Existing reviews found during an initial search of MEDLINE, the Cochrane Database of Systematic Reviews, and Joanna Briggs Institute (JBI) Evidence Synthesis cover a limited range of related topics. For instance, a review illustrates challenges in telephone survey research, such as contacting informants, response rates, as well as accuracy and consistency of responses.[23] Another review looks at remote data collection in LMICs.[24] More specifically, a scoping review mentions the telephone as a tool to include people from a broader range of socioeconomic backgrounds in sub-Saharan Africa.[25] More broadly, the impacts of electronic data collection tools like smartphones and tablets on data quality and cost-effectiveness in interviewer-administered surveys are also studied.[26] Interactive voice response (IVR), "a telephone interviewing technique in which the human speaker is replaced by a high-quality recorded interactive script to which the respondent provides answers by pressing the keys of a touch telephone," is also systematically reviewed.[27] Mentioning applications on smartphones and tablets, different modes of survey delivery are also reviewed.[28] In terms of response rates of postal and electronic questionnaires, a variety of methods, including incentives, telephone follow-ups, as well as SMS and postcard reminders, are compared and reviewed.[29]

These reviews touch upon telephone surveys and remote data collection methods, but no review is dedicated to interviewer-administered telephone surveys. It is unclear in what context and how this remote data collection method is used in the time of infectious disease outbreaks during which classic face-to-face methods are not appropriate.

Objectives. The objective of this scoping review is to identify and map characteristics in interviewer-administered telephone surveys when an infectious disease outbreak/epidemic/pandemic is present in the existing literature. The following research question was formulated: What are some main characteristics of interviewer-administered telephone surveys during infectious disease outbreaks, epidemics, and pandemics in the literature? The following additional questions are set to explore the methods and implementation challenges in interviewer-administered telephone surveys:

- Where are interviewer-administered telephone surveys conducted?
- At what scale and during which infectious disease outbreak have these surveys been performed?
- What methods are used to draw a sample?
- What techniques are devised to ensure representativeness of these surveys?
- What are common topics investigated with this remote data collection method?

Methods

Protocol and registration

Whereas a systematic review often addresses a precise question,[30] a scoping review aims to investigate "how research is conducted on a certain topic or field" as well as to identify characteristics of studies.[31] The review questions are in line with the purpose of a scoping review, and therefore this type of review was considered appropriate for this research.

With support from VR and LT, SA drafted a protocol based on the JBI Manual for Evidence Synthesis for scoping reviews.[32] The Arksey and O'Malley's methodological framework[33] was also referred to when performing this scoping review. The final version of the protocol was made available on the 17th of June in 2022 at protocols.io (https://www.protocols.io/; DOI: dx.doi.org/10.17504/protocols.io.36wgq7poyvk5/v1). The Preferred Reporting Items for Systematic Review and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR)[34] guidelines were followed to write this scoping review and report the results.

Eligibility criteria

As recommended by the JBI for scoping reviews, the PCC (Population/Participants, Concept, Context) framework was used to identify eligibility criteria.

Population/Participants. This review included telephone surveys distributed to and responded by adults, anyone at least 18 years old, during which human interviewers asked questions to informants at the time of an infectious disease outbreak, epidemic, or

pandemic. There is no universally agreed age to be considered adults. The World Health Organization (WHO), for instance, defines an adult as a person aged 19 years or older.[35] However, in many countries, anyone over 18 years old is considered an adult,[36] and most of the studies found during an initial search include adult participants aged 18 or older. It is also assumed that children are not enrolled in surveys without their parents' or guardians' consent. Therefore, this review included studies targeting people at least 18 years old.

Concept. Telephone surveys, including both landline and mobile phones, were included. This review was limited to studies which relied on the single method of interviewer-administered telephone surveys. Thus, studies using any of the following methods were excluded as these are self-administered and/or in-person: face-to-face, IVR, short message service (SMS), self-administered questionnaire, web on mobile phone and personal computer.[37] In addition, studies using telephone only as a means to send reminders and monitor patients were excluded.

Context. This review focused on telephone surveys during infectious disease outbreaks, epidemics, and pandemics. According to Gordis, epidemic is "the occurrence in a community or region of a group of illnesses of similar nature, clearly in excess of normal expectancy, and derived from a common of from a propagated source," and pandemic is a global epidemic.[38] While having the same meaning as epidemic, outbreak often refers to "a more limited geographic area."[39] Presence of infectious disease outbreaks/epidemics/pandemics can be described as a context in which conducting face-to-face contacts are deemed inappropriate or unfeasible. Therefore, this scoping review included the telephone surveys whose data was collected during infectious disease outbreaks, epidemics, and pandemics.

Information sources and search

SA conducted an initial limited search of MEDLINE and found the text words in relevant articles as well as Medical Subject Headings (MeSH) terms.[40] Using these words, SA drafted and refined the search strategy in accordance with feedback from a librarian at École des Hautes Études en Santé Publique (EHESP). SA also received support from LT while developing the search strategy. The final strategy can be found in Appendix 1.

To identify potentially relevant studies, PubMed and EBSCO (Academic Search Premier) were searched in April 2022. No limit was set for the year or month of publication, and the search did not exclude grey literature on EBSCO. At the time of the search, no language limit was set, but due to the reviewers' language proficiency, studies were excluded if not written in English, French, Spanish, and Japanese. Covidence is a web-based platform,

which allows reviewers to import citations, identify duplicates, screen documents independently and easily, and upload as well as store references online.[41] This platform was chosen to facilitate this scoping review and to enable the reviewers to work remotely in an efficient way. The final search results were exported into Covidence, and duplicates were removed automatically as well as manually while two reviewers (SA and MB) were evaluating the publications. During the initial search, SA identified potentially relevant documents, which were not also found during the database search. These supplemental studies were also screened and assessed for eligibility.

Selection of sources of evidence

To enhance consistency, SA and MB discussed the inclusion and exclusion criteria prior to and during the screening stge. SA and MB resolved disagreements at each stage of the selection procedure through discussions with support from VR. The supplemental studies manually added by SA were also reviewed and confirmed by SA and MB that they were relevant and should be included.

Data charting process and items

Using Microsoft® Excel 16.61.1, SA drafted a data extraction form, which was reviewed by BA, EB, AF, and VR. This form was continuously updated as needed, and the final version can be found in Appendix 2. Although it was possible to extract data on Covidence, Excel was used due to its flexibility which allowed SA to update the data extraction form more easily. After SA extracted data, BA, EB, AF, and VR and verified it for accuracy. The extracted data includes on general information and study details as explained below.

General information. In accordance with the JBI Manual for Evidence Synthesis,[42] the following general information was charted: author(s), year of publication, title, journal, origin, purpose, study design, and sample size. In addition, each of the included documents was given a study ID (#1-70), which is used to refer to specific cases. #67-70 were the supplemental studies manually retrieved in addition to the studies identified through the database search (#1-66).

In this scoping review, origin means the country in which the telephone survey was performed. Study design was determined based on the Mixed Methods Appraisal Tool (MMAT) version 2018,[43] and further information such as sampling methods was also extracted as part of study details. Sample size signifies the number of observations used in

the final analysis. For mixed methods studies, the sum of the numbers of participants included in all methods or stages was calculated as the sample size.

Study details. Alongside the general information, key findings related to the review questions were extracted. Each item is explained below.

The scale of each included study was assessed and sorted as follows:
- **International**: international studies are those using data collected in multiple countries.
- **National**: these are the studies whose data were deemed to be nationally representative. Moreover, studies without setting no geographical limitations to draw samples were put in this group.
- **Regional**: studies in which data was collected from multiple states/prefectures were included in this category.
- **Local**: when studies used data from a single state or prefecture, they are labeled as local surveys.

The target population of all studies was reviewed and categorized into 5 types:
- **Adult individuals**: when a study is interested in the general population, or anyone at least 18 years old in accordance with the eligibility criteria, its target population was labeled as adult individuals. Examples are Hong Kong residents at least 18 years old, and community-dwelling Korean adults.
- **Patients**: when the survey focuses on patients regardless of the disease, its target population was categorized as patients. Examples are heart and lung transplant patients, urological patients, adults newly diagnosed with TB, and individuals at least 65 years old with at least one chronic disease.
- **HCPs**: when a study targets HCPs (healthcare professionals) like healthcare providers, medical practitioners, and other hospital staff, its target population was labeled as HCPs.
- **Households**: when the study is designed to collect household-level data, its target population was considered households. When a study was put in this group, the sample size was the number of households included in the final analysis.
- **Other**: those which do not fall into any of the categories above were labeled as other. Examples are farmworkers, the elderly, home care workers, (pregnant) women, public health policy makers, public informational officers. In addition, combinations of the above-mentioned groups (adult individuals and patients, adult individuals and HCPs, patients and HCPs, and so on) were also put in this target population group.

Infectious diseases prevalent at the time of data collection were extracted. When the data was collected during different outbreaks for a single study, all relevant infectious diseases were noted. Data collection periods in days, during which phone surveys were conducted, were also extracted. When the precise duration was not mentioned, a data collection period was calculated. When the exact dates of data collection were not available, following rules were applied:

- Early in a month, or at beginning of a month: it was assumed that the data collection started or ended on the fifth of the month.

- Midmonth, or in the middle of a month: it was assumed that the data collection started or ended on the fifteenth of the month.

- Late in a month, or at the end of a month: it was assumed that the data collection started or ended on the twenty-fifth of the month.

- None of the information above was available, but only months (start and end months) are written: it was assumed that the data collection started and ended on the fifteen of the months. For example, if the data was collected between January and March 2022, the duration is 60 days.

- Only a single month (no specific start or end date) is mentioned as a data collection period: the entire month was considered the data collection period. For example, if the data is collected in April 2022, the duration is 30 days. If the data is collected early/mid/late in the month, the duration is considered 10 days.

- Series/rounds/waves of surveys in one study: for a repeated or longitudinal study, when it was possible to calculate the duration of each wave/round, the sum of the data collection periods of all waves/rounds was calculated and used as its data collection duration.

The type of telephone used in each study was examined and categorized as follows:

- **Landline**: surveys using exclusively or largely home landlines, fixed lines, and residential telephones were categorized into the landline group.

- **Mobile**: if the data was collected solely or predominantly by mobile phones, including smartphones, studies belong to the mobile group.

- **50-50**: In case the ratio of the 2 types of telephone (landline and mobile phones) was one to one, the phone type of the study was coded as 50-50.

- **Not Specified**: When the telephone type is not specified, or both types were used but the share of each type is not mentioned, it was considered that the phone type of the study is not specified.

When recording sampling methods, SA followed an article, "Sampling Methods in Research Methodology; How to Choose a Sampling Technique for Research."[44] This scoping review

paid attention to techniques specific to telephone surveys, such as random-digit dialing (RDD) and computer-assisted telephone interviewing (CATI) as these techniques are mentioned in multiple documents found during the initial search. RDD is "a method of probability sampling that provides a sample of households, families, or persons via a random selection of their telephone numbers."[45] CATI signifies "all computer-aided aspects of telephone interviewing" which "both hardware requirements (including telephony systems) and software," and sometimes "CATI systems use a single integrated piece of software that controls the sample the questionnaire, and the dialing; other systems combine elements from multiple vendors to take advantage of some specializations."[46] If RRD or CATI, or other phone specific features like SMS to send reminders, was used, it was also noted.

The number of languages spoken by interviewers during the telephone surveys as well as the number of interviewers who performed the surveys were also recorded. For the language, even if it was possible to presume which language was used in certain cases (for instance, a single center study in a country where there is one single official language), unless explicitly described, the language spoken by the interviewers was recorded as not specified. When incentives were provided to participants, the type of incentives (airtime, cheque, voucher etc.) and the value in US dollars were extracted to enable comparisons among different incentives. When no information related to incentives was found, it was considered that there was no incentive in that study.

Length indicates the duration of the telephone survey/interview session in minutes. The range of duration (for example, the interviews took between 10 and 30 minutes) in each include study was first sought. If the range was not found, the average (followed by "av.") or median (followed by "md.") length was extracted. The longest length (followed by "max.") was recorded if no other information was available. There were studies involving multiple steps such as follow-ups or using mixed methods like qualitative and quantitative methods. For these studies, if different length for each step/method was specified, the length for each step was extracted. In case any relevant information was not found, it was recorded as not specified.

Critical appraisal of individual sources of evidence

We appraised neither methodological quality nor risk of bias of the included studies. This is consistent with guidance for conducting a scoping review.[47] Furthermore, unlike systematic reviews, which "aim to produce a critically appraised and synthesised result/answer to a particular question,"[48] the purpose of this scoping review is to produce an overview of the evidence. Hence, critical appraisal of individual sources of evidence was considered

unnecessary. However, the MMAT was employed to determine the study design of each included study although the quality or the ratings of included studies were not presented in this scoping review.

Synthesis of results

The reporting of this scoping review was guided by PRISMA-ScR,[49] and the Checklist can be found in Appendix 3. The included studies were grouped by WHO region, infectious disease, target population type and phone type to detect trends and elaborate on details, such as sample size and sampling methods. Recurring topics in purposes were also identified.

LMICs and COVID-19 were chosen as sub-themes for more focused analyses. The choice of LMICs as a sub-theme was because of their increased vulnerability and exposure to infectious diseases, coupled with specific challenges in these countries, notably resource scarcity like the absence of stable internet as well as lack of consideration for literacy, linguistic diversity, and local cultures. Moreover, LMICs were of interest to the authors of this scoping review, which was expected to provide some insights for their future studies. The COVID-19 pandemic, the most recent public health crisis, was also selected as a sub-theme under which some in-depth analyses were performed.

Results

Selection of sources of evidence

Identification of studies via databases. 526 potentially relevant studies were identified via 2 databases, EBSCO and PubMed, on the 5th of April in 2022. 110 duplicates were removed in total. 107 were removed automatically on Covidence, and 3 were identified as duplicates by SA and MB during the screening stage and manually removed. Titles and abstracts of the remaining 416 studies were screened by SA and MB, 270 of which did not meet the inclusion criteria and therefore were considered irrelevant. SA and MB assessed 146 full-text studies for eligibility and resolved disagreements through online discussions on Zoom. The full-text assessment resulted in including 66 studies in this scoping review. There were 4 reasons for which the studies were excluded.

- **Wrong data collection method**: data collection methods in addition to or other than interviewer-administered telephone survey were used; and/or telephone was not clearly stated as a data collection tool.
- **Wrong period**: the data was not collected during an infectious disease outbreak/epidemic/pandemic; studies in which the data collection started during an

infectious outbreak and ended a few months after the end of outbreak were also considered acceptable and included.

- **Wrong population**: people aged 17 or younger were interrogated by interviewers; and/or age is not mentioned in the inclusion/exclusion criteria. Studies in which parents or caregivers participate on behalf of their children were included.
- **Wrong language**: the content is not written in English, French, Spanish, or Japanese.

Identification of studies via other methods. Prior to and during the initial search to develop the protocol, SA read some documents and materials detailing some studies conducted by other authors of this scoping review to brainstorm. After having decided to focus on interviewer-administered telephone surveys, SA identified 4 studies potentially relevant to this scoping review from the documents reviewed to brainstorm. These 4 studies were not found in the database search described above. To supplement the database searches, these 4 studies were also screened by SA and MB. After verifying that the studies met the eligibility criteria, SA and MB added them to this scoping review.

A chart presenting the full screening process was created following the PRISMA flow diagram,[50] and this chart can be found in Appendix 4.

Characteristics of sources of evidence

Stata 17.0 Basic Edition was used for the descriptive analyses, and a copy of the data extraction form was used to take notes and to analyze the content, such as study objectives and challenges. This scoping review included 70 interviewer-administered telephone surveys published between 2003 and 2022 from all over the world. Among these studies, the smallest sample size was 11 (#1), and the largest was 31332 (#17). The median was 810.

Figure 1 shows the distribution of the included studies by year of publication. The number of publications jumped dramatically during the COVID-19 pandemic. Appendix 5 shows the distribution of the included studies by year of publication in HICs (upper-middle-income countries were included in HICs) and LMICs. Using the WHO's regional distribution grouping and the World Bank's classification by income, further analyses were performed to observe trends. BMC Infectious Diseases was the most frequently chosen journal, in which 6 (8.6%) of the 70 included studies have been published, followed by Emerging Infectious Diseases (4 studies, 5.7%), BMC Public Health (3 studies 4.3%), and PLOS Neglected Tropical Diseases (3 studies 4.3%).

There are only 3 mixed methods study (#53, #67, #70). The data collection process in #53 comprises 2 stages. The researchers performed "an initial qualitative scoping exercise" involving telephone interviews with 19 informants first and then a telephone survey of 407 participants in Papua New Guinea.[51] Therefore, the total sample size was 426. The total sample size of #67 was 637: 607 respondents answered the quantitative telephone survey, and 30 informants participated in the nested qualitative interviews in Senegal. Similarly, for #70, the quantitative telephone survey phase included 813 participants, and the nested qualitative interview phase had 30 informants in Senegal.
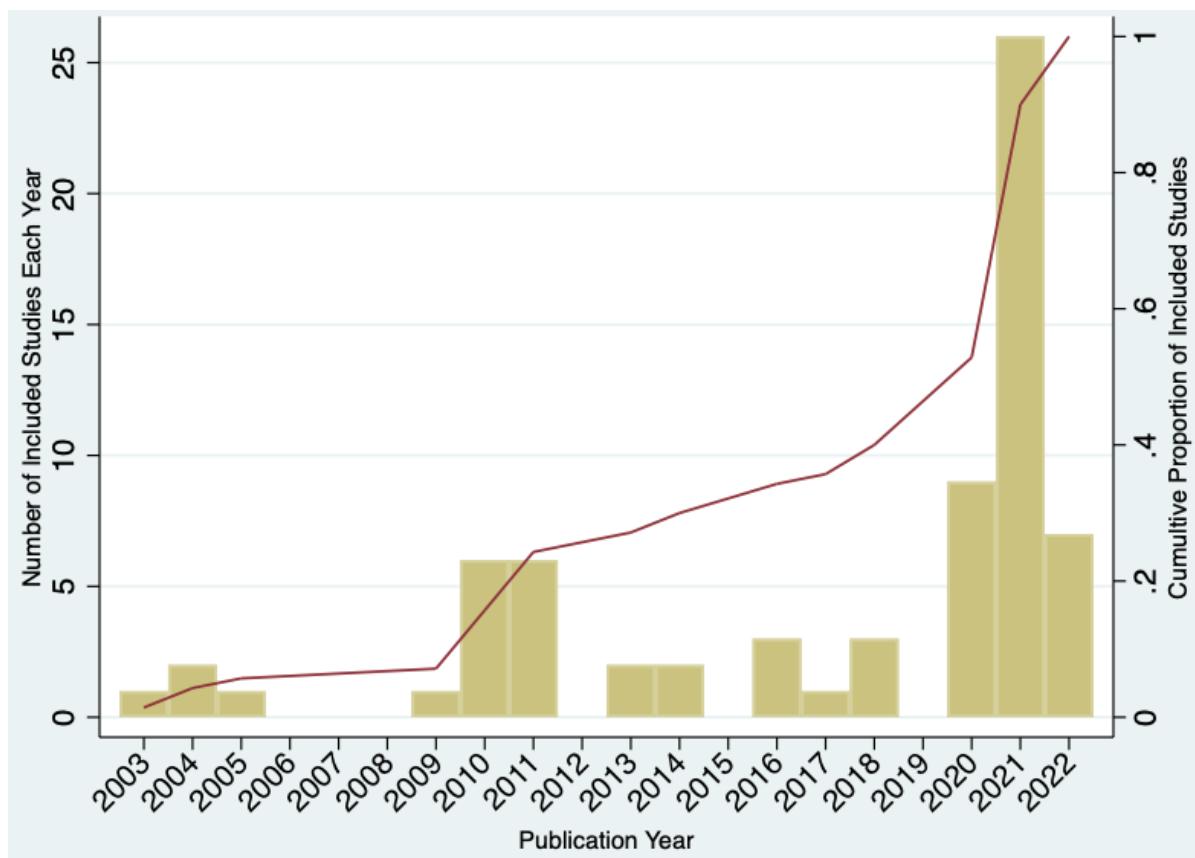
Figure 1. Distribution of included studies by year of publication (n = 70)

In terms of the phone type, in #54 both landline and mobile phones were used to survey 1968 participants in total in the United States, 455 of whom were surveyed via fixed phones (23.1%), and the remaining 1513 informants answered the survey by cell phone (76.9%). Since cell phones are dominant, the phone type of #54 was categorized as mobile.

Concerning the duration, in #47 the data was collected during 4 different infectious disease outbreaks (Chikungunya in Réunion in April 2006 as well as in French Guiana in April 2015, Dengue in Martinique in September 2010, and Zika in French Guiana in June 2016), but only the month of each outbreak is written, and therefore the data collection period was

calculated as 120 days (one month per outbreak, and 4 waves in total). In #14, 9 monthly interview rounds are performed in Puerto Rico, and only the month of each round is mentioned in the article. Thus, the duration was calculated as 270 days.

Regarding the scale, 35 studies were labeled as local surveys. Examples include single center studies (#1 in Nigeria, #10 in Italy, #41 in France, #57 in Singapore). Other examples are studies performed in Hong Kong (#9, #13, #17, #26-30, #33-36, #42, #63-65), Wuhan (#11), Taiwan (#12), Shanghai (#18), Hubei (#38), as well as the States of Tennessee (#22) and New York (#24). There were 22 regional studies, and an example is #21, which uses data gathered from several hospitals in different states/prefectures in Sri Lanka. Similarly, although no specific locations are mentioned, #8 and #58 were labeled as regional studies, as it is noted that the data comes from one region in each country, Italy and Turkey, respectively. Based on an assumption that NGO staff members who participated in this study are likely to come from different regions in the United Kingdom, #49 was also categorized as a regional study. Twelve studies are considered national surveys, including #39, in which Facebook advertising was used to recruit a nationally representative sample in Australia, as well as #15, in which severe Alpha 1-Antitrypsin Deficiency (AATD) patients are recruited from Italian Registry of Severe AATD.

There are some articles using the same telephone survey datasets, and they were treated as separate studies and not merged in this scoping review. Four studies (#59-62) use the same data collected in Malaysia, whose sample size and data collection duration were identical. Part of the data used in #27 in China is also used in #28. Likewise, data collected in China for #13 is also used in 3 other studies in the same country (#33-35).

Results of individual sources of evidence

A full list of all the included studies in this scoping review can be found in Appendix 6. When the data was not found, it was recorded as "NS" (not specified). To make the list readable, a separate list for the titles are purposes is made available in Appendix 7.

Synthesis of results

The origin of the included studies was classified according to the WHO regional distribution groups[52] to see geographical trends as well as the World Bank's classification by income[53] to focus on LMICs, where resources tend to be scarce, and more challenges are present particularly during infectious disease outbreaks.

WHO regional distribution and infectious disease (n = 70). Among all the included studies, 33 were found in Western Pacific Region (WPRO). In China, 23 studies were found, 9 of which were surveys during the COVID-19 pandemic, and 8 during the H1N1 pandemic. Fourteen out of the 23 studies in China have been carried out in Hong Kong. Another remark in WPRO is that 4 studies have been conducted during the H1N1 outbreak in Malaysia. In European Region (EURO), 13 surveys were found. Whereas 4 studies have been performed during the COVID-19 pandemic in Italy, the same number of surveys have been conducted in different infectious disease outbreaks (COVID-19, H1N1, Zika, Chikungunya, Dengue) in France. It is noteworthy that among the 4 studies in France, 3 studies (#16, #47, #56) took place in overseas France (French Guiana, Réunion, and Martinique) and only 1 study in metropolitan France (#41). Ten studies were found in Region of the Americas (AMRO), 8 of which are in the United States, during different infectious disease outbreaks (3 during the COVID-19 outbreak, 2 during H1N1, 2 during Zika, and 1 during seasonal flu). In African Region (AFRO), 10 surveys were found. Nice studies were conducted during the COVID-19 crisis, 1 of which (#55) collected the data when both COVID-19 and Ebola were present. The remaining 1 was study performed during an outbreak of Ebola in Burkina Faso, Ethiopia, and Nigeria, and this was the only international survey (#4) included in this scoping review. Two studies in Eastern Mediterranean Region (EMRO) have been conducted during the COVID-19 pandemic. Similarly, in South-East Asia Region (SEARO), 2 surveys have been carried out during the COVID-19 outbreak. A summary table is available in Appendix 8. Figure 2 is a world map by the number of included studies in each country.

Infectious disease and target population (n = 70). As many as 40 out of 70 telephone surveys included in this scoping review have been carried out during the COVID-19 pandemic. Seventeen studies took place during the H1N1 pandemic, 1 of which compared social-cognitive factors on personal hygiene practices during both the H1N1 and H15N1 outbreaks in Hong Kong (#34). Adult individuals were the most frequently surveyed group (34 studies) across all the infectious disease outbreaks. During the H1N1 pandemic, followed by households (3 studies), adult individuals (13 studies) were the most frequently targeted group. Likewise, the same number of studies (13 studies) during the COVID-19 pandemic surveyed adult individuals. However, in the time of COVID-19, patients (10 studies) and HCPs (7 studies) were also frequently studied, and these 2 target population types were surveyed only during the COVID-19 pandemic. A summary table can be found below (Table 1).

WHO regional distribution, phone type and target population (n = 70). Although the phone type was not specified in most of the studies, it is noteworthy that mobile phones were

often used in AFRO (7 studies). Contrarily, landlines were frequently used in WPRO (20 studies), 15 of which are surveys in China (13 in Hong Kong). Seventeen of these 20 landline studies in WPRO target adult individuals, and the remaining 3 survey households. Across all the infectious diseases, there are 10 surveys targeting patients, 7 of which were found in EURO. Among 7 surveys targeting HCPs, 5 were also found in WPRO. A summary table is available below (Table 2).

The Number of Interviewer-Administered Telephone Surveys during Infectious Disease Outbreaks/Epidemics/Pandemics published between 2003 and 2022 by countries
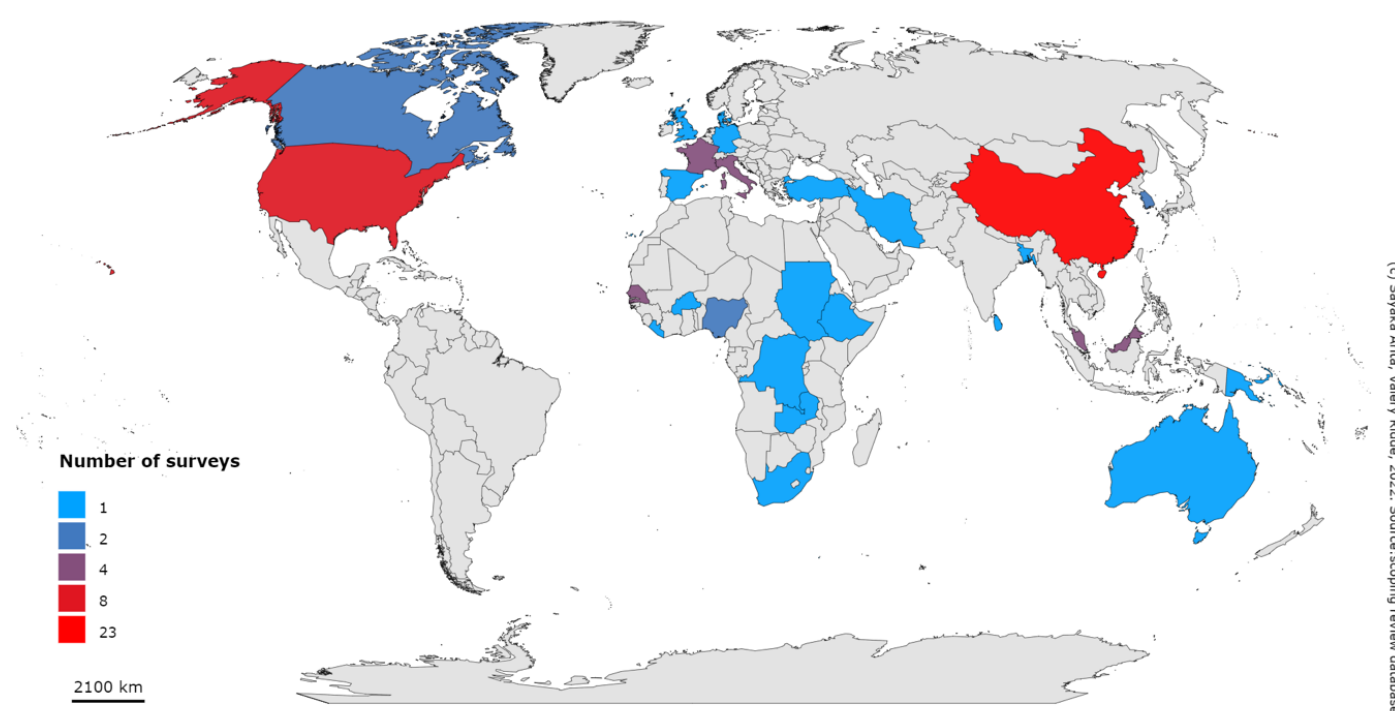
Figure 2. Number of interviewer-administered telephone surveys during infectious disease outbreaks/epidemics/pandemics published between 2003 and 2022 by country

	Adult Individuals	Patients	HCPs	Households	Other	Total
COVID-19	13	10	7	1	8	39
H1N1	13	0	0	3	0	16
SARS	3	0	0	0	0	3
Zika	1	0	0	0	2	3
Ebola	0	0	0	1	1	2
Seasonal Flu	1	0	0	1	0	2
Chikungunya, Dengue, Zika	1	0	0	0	0	1
COVID-19, Ebola	0	0	0	0	1	1
Dengue	1	0	0	0	0	1
H1N1, H5N1	0	0	0	1	0	1
H7N9	1	0	0	0	0	1
Total	34	10	7	7	12	70

Table 1. Infectious disease and target population (n = 70)

LMICs (n = 14). In the 70 included studies, there were 14 studies conducted in LMICs. The majority (13 studies) were carried out during the COVID-19 pandemic, 1 of which was conducted in the Democratic Republic of Congo (#55) where Ebola was also prevalent at the same time. Two surveys were published in 2020 (#52 in Iran, #44 in Zambia), and 8 studies were published in 2021 in the following locations: Bangladesh (#3), Democratic Republic of Congo (#55), Nigeria (#1), Papua New Guinea (#53), Senegal (#69), Sri Lanka (#21), Sudan (#2) as well as Burkina Faso, Ethiopia, and Nigeria (#4). Three studies in Senegal were published in 2022 (#67, #68, #70). One study was realized during an outbreak of Ebola in Liberia in 2016 (#25). A summary table can be found in Appendix 9.

		Adult Individuals	Patients	HCPs	Households	Other	Total
AFRO	Mobile	3	1	1	2	0	7
	Not Specified	1	0	0	0	2	3
AMRO	Landline	1	0	0	0	0	1
	Mobile	1	0	0	0	0	1
	Not Specified	1	0	1	1	5	8
EMRO	Not Specified	0	0	0	0	2	2
EURO	50-50	1	0	0	0	0	1
	Not Specified	1	7	0	1	3	12
SEARO	Mobile	1	0	0	0	0	1
	Not Specified	0	1	0	0	0	1
WPRO	Landline	17	0	0	3	0	20
	Mobile	1	0	1	0	0	2
	50-50	2	0	0	0	0	2
	Not Specified	4	1	4	0	0	9
	Total	34	10	7	7	12	70

Table 2. WHO regional distribution, phone type and target population (n = 70)

Table 3 shows the sample size of each sampling method accompanied by the scale. Simple random sampling was the most commonly used method across all the countries, but in LMICs, purposive and quota sampling was used more often than simple random sampling.

Sampling Method	Sample Size (Min.~Max., Median)	International	National	Regional	Local	Total
Purposive	11~139, Md: 17	0	0	1	2	3
Quota	558~813, Md: 607	0	3	0	0	3
Purposive, snowball	89~426, Md: 257.5	0	1	1	0	2
Simple random	905~1845, Md: 1375	0	1	1	0	2
Simple random, quota	637~843, Md: 740	0	2	0	0	2
Stratified	1000~10797, Md: 5898.5	1	0	1	0	2
Total		1	7	4	2	14

Table 3. Sampling method and sample size of surveys in LMICs (n =14)

Among the 14 surveys in LMICs, there are 4 qualitative studies (#1, #2, #21, #44). These 4 studies demonstrated some similarities. First, 3 of these 4 studies (#1, #2, #21) highlight a

common challenge of not being able to capture participants' body language, gestures, and non-verbal expressions. In addition, these 4 studies concern more focused populations (#1: HCPs; #21, #44: patients; and #2: adult individuals and patients). The length for #2 (40-70 minutes) and #44 (45-60 minutes) was longer than #21 (20-30 minutes). While being the longest among these 3 studies, #2 recognizes fatigue of participants. Furthermore, #1 and #2 discuss the possibility that the findings might not be generalized.

Across all the included studies, there were 3 mixed methods studies (#53, #67, #70), all found in LMICs. These 3 studies shared a strength of conducting interviews in local languages (#53: Tok Pisin; #67, #70: French, Diola, Wolof, Sérére, Pulaar, Soninké). Furthermore, a relatively large number of surveyors (#53: 8 interviewers; #67, #70: 5 interviewers) performed interviews in these 3 studies.

There are 6 quantitative descriptive studies carried out in LMICs (#3, #4, #25, #52, #68, #69). Except #52, all the studies took advantage of techniques unique to telephone surveys. #3 and #4 used CATI, and in #25, potential respondents were informed of the study and asked if they would agree to participate via SMS. In #68 and #69, in addition to text messages and RDD, a Reactive Auto Dialer (RAD) was utilized "to trigger calls in automatic and optimized way."[54] Appendix 10 summarizes these challenges and strengths of qualitative, quantitative descriptive, and mixed methods studies.

Some studies in LMICs showed a few commonalities in their purposes. For instance, acceptability appeared in 3 studies. #2 examines "acceptability and feasibility of strategies to shield the vulnerable during the COVID-19 outbreak" in Sudan and highlights that building rapport was difficult and that acceptability was "a new concept of which the majority of study participants had no prior knowledge."[55] #68 and #70 both explore the acceptability of the Senegalese government measures against COVID-19, and a challenge commonly mentioned in these studies was that informants' socio economic variables were hard to collect or verify.[56]

COVID-19 (n =40). Out of the 70 included studies, there are 40 surveys conducted during the COVID-19 pandemic. Both the smallest (#1: 11 participants) and largest (#17: 31332 participants) sample sizes were found among these 40 studies. #55 was carried out when not only COVID-19 but also Ebola was present as discussed earlier, and this study was included in the below analyses under this sub-theme of COVID-19. Among these 40 surveys conducted during the COVID-19 pandemic, 18 were local studies. Among these 18 local studies, there were 7 qualitative and another 7 quantitative descriptive studies. A table

describing the study design and the scale of studies conducted in the time of COVID-19 can be found below (Table 4).

Study Design	International	National	Regional	Local	Total
Qualitative	0	1	5	7	13
Quantitative randomized	0	0	0	1	1
Quantitative non-randomized	0	1	4	3	8
Quantitative descriptive	1	5	2	7	15
Mixed methods	0	3	0	0	3
Total	1	10	11	18	40

Table 4. Sampling method and scale of surveys during the COVID-19 pandemic (n = 40)

There are 13 qualitative studies during the COVID-19 pandemic, 6 of which target HCPs. The sample sizes of these qualitative studies targeting HCPs are the smallest among all the included 70 studies (#1: 11 participants, #11: 15 participants, #31: 18 participants, #32: 15 participants, #38: 13 participants, #66: 12 participants). Other than #66 whose objective is to "explore Chinese GP trainees' career perspectives,"[57] these studies targeting HPCs had similar purposes of investigating HCPs' experiences. #11 and #31 investigate specifically about nurses' experiences whereas the themes for #1 (healthcare workers' experiences) and #38 (health-care providers' experiences) were more general. #32 focuses physicians' perceptions and experiences.

Some commonalities in subjects were found in these COVID-19 studies. Four studies examine impacts and effects of COVID-19. #4 investigates "the effects of COVID-19 on the healthcare system from the perspectives of … healthcare providers and community members" in Burkina Faso, Ethiopia, and Nigeria.[58] #7 assesses "the impact of the SARS-CoV-2 outbreak on the personal hygiene and expectations in heart and lung transplant recipients" in Italy.[59] #17 looks at "the attenuated impact of reported avoidance behaviours adherence on the transmission of COVID-19" in Hong Kong.[60] #40 describes "the impact of the COVID-19 pandemic on … [healthcare] … clients, aides, and agency managers" in the United States.[61] #43 focuses on "the mental health and economic impact of the COVID-19 pandemic on Latino farmworkers in California."[62] #55 examines "the socioeconomic impact across two high-profile disease [Ebola and COVID-19] outbreaks that affected [households and small businesses] in North Kivu" in the Democratic Republic of Congo. Other similarities in purposes are discussed further below.

Purposes and challenges. A few recurring topics were commonly found across all the included studies. Seven studies (#6, #20, #22, #26, #63, #67, #69) concern vaccines, in which the following 4 challenges were repeatedly identified.

- **Generalizability (n = 4)**: four studies highlight generalizability as a challenge. #6, which investigates "at-risk population's intention to vaccinate against seasonal influence" during the COVID-19 pandemic, recognizes that the findings might not be generalizable because the study was performed in a specific part of Spain.[63] In #26, the authors acknowledge a "unique" experience of SARS in Hong Kong, due to which the findings "may not be applicable to the situations in other countries" although the linkage between the SARS experience and acceptability of H1N1 vaccination is not clearly discussed.[64] #63, exploring COVID-19 vaccine hesitancy, recognizes volunteer bias, which was "unavoidable" despite the "efforts … made to improve the representativeness of samples to the population including making phone calls during and beyond working hours and generating phone numbers for landline and mobile at a 1:1 ratio."[65]

- **Exclusion (n = 3)**: three studies mention exclusion of certain groups. In #20, 2 groups of participants, high-risk and non-high-risk groups, were asked about H1N1 "vaccination coverage" as well as "motivation and barriers to vaccination" in South Korea.[66] In this study, only the elderly and chronic disease patients were considered being at high risk, and other groups, such as pregnant women and healthcare workers were not put in the high-risk group.[67] In #22, which looks into seasonal flu vaccination, participants in Tennessee were exclusively contacted by landline telephone. As a result, those without access to fixed phones were excluded.[68] Contrarily, #67 only included mobile phone users in Senegal, and the authors point out that "the most marginalized populations" were not included in this research on "factors associated with hesitancy toward the COVID-19 vaccine."[69]

- **Self-reporting (n = 3)**: reliance on self-reporting was mentioned in 3 studies. In #20, "chronic medical conditions and [H1N1] vaccination status" were reported by the participants themselves, and the results showed an "overestimated" vaccination rate in chronic medical conditions.[70] #22 points out that "[a]ssessment of [seasonal flu] immunization status was based on self-report," which was deemed "reliable" and "commonly used."[71] In #63, "the [COVID-19] vaccine hesitancy responses were self-reported," and this hesitancy or even willingness to be vaccinated might not reflect the actual vaccine status.[72] This is similar to another challenge (intention) explained below.

- **Intention (n = 3)**: lastly, authors of 3 studies argue that intentions and hesitations might differ from behaviors. #26 "could only document the willingness of people to accept vaccination against influenza A/H1N1, which may not necessarily reflect their actual behaviour."[73] Similarly, in #63, as already discussed above, "[r]espondents reported having vaccine hesitancy may not necessarily translate to no vaccine

update, while respondents reported likely, very likely, or certain to take COVID-19 vaccines may still delay taking the vaccines."[74] Likewise, #69, a cross-sectional survey in Senegal, specifies that "declarations [of intent to participate in a vaccine trial] … are sometimes different from behaviors."[75]

Mental health and psychological effects were also seen across all the infectious disease outbreaks. Anxiety is examined in 3 studies (#13, #18, #41). Psychological responses are assessed in three studies (#27, #45, #60). #36 addresses psychological distress, and #61 studies fear and psychosocial impact. As discussed earlier, #43 investigates mental health.

Many studies focus on specific behaviors. Three studies (#9, #33, #35) discuss protective behaviors. Preventive behaviors are examined in 6 studies (#12, #13, #14, #20, #28, #46). Avoidance behaviors appear in 3 studies (#17, #18, #27). Two studies address precautionary behaviors (#36, #56). #61 assess not only protective but also avoidance behaviors.

Discussion
Summary of evidence
This scoping review found 70 interviewer-administered telephone surveys conducted during infectious disease outbreaks, epidemics, and pandemics. These studies were published between 2003 and 2022. The findings demonstrated that interviewer-administered telephone surveys have been frequently carried out in China and the United States. Despite the concentration in these 2 countries, the included studies were scattered, especially in Europe, Africa, and Asia. This phenomenon suggests the suitability of this remote data collection method during infectious disease outbreaks regardless of the geographical location or income level. However, there were only 14 (20%) studies conducted in LMICs out of all the 70 included studies, and the most frequently used sampling methods in these countries were purposive and quota, which were different from the most common sampling method in HICs (simple random). These findings imply technical and financial obstacles that prevent sufficient research in LMICs, where infectious diseases are more prevalent.

While over 50% of the 70 included studies have been performed during the COVID-19 pandemic, more than 20% have been carried out during the H1N1 outbreak. Adult individuals (48.6%) were the most studied population across all the infectious disease outbreaks. However, 18 out of the 40 studies performed in the time of COVID-19 target HCPs and/or patients. This corresponds to the acute interest in HCPs and healthcare systems affected by the COVID-19 crisis, which has upset and revealed the existing fragile health sector all over the world.[76] It has been reported that HCPs have experienced a variety

of challenges, such as lack of preparation, protocol, information, preventive equipment, in addition to "stress, anxiety, fear, helplessness, hopelessness, anger, and stigma,"[77] and these aspects characterize the COVID-19 pandemic as distinct from other infectious disease periods. This scoping review seems to have grasped the particulars during the most recent public health emergency. Moreover, this change in the target population from the general public to more specific groups of people appears to imply that interviewer-administered telephone surveys are useful to understand not only epidemiological aspects of infectious diseases, like incidence, prevalence, and mortality, but also other dimensions of public health.

Notably, vaccine hesitancy and metal health, important aspects of public health, were recurrent themes in several infectious disease outbreaks. These topics might be seen as sensitive and therefore hard to discuss face-to-face for certain people. Thus, it is possible that this remote data collection method, even though not always being voluntarily chosen under the presence of infectious diseases, works well to study certain topics. Anonymity, thanks to which respondents might be more willing to provide sensitive information, is an advantage of this data collection method.[78] Furthermore, interviewer-administered telephone surveys allow probing and clarification, and this strength is particularly practical for research needing in-depth, qualitative data. However, researchers should keep in mind that short sessions (no longer than about 20-30 minutes[79]) are recommended to minimize informants' fatigue[80] when using this remote data collection method for qualitative research, which tends to involve lengthy interviews. To avoid participants' financial burdens, it is recommended that researchers either use toll-free numbers or offer financial compensation especially when targeting the disadvantaged.

Across all the infectious disease outbreaks, fixed telephone lines were the dominant phone type, albeit gradually diminishing in HICs and not being used in LMICs. However, among the 14 studies in LMICs, 7 studies entirely relied on mobile phones to contact informants. This trend in the phone type aligns with the expansion of network coverage and affordability of mobile phones, thanks to which cell phone ownership is increasing in LMICs.[81] Nevertheless, as highlighted in some studies, it is important to consider who are included in and excluded from telephone surveys. Whereas some argue that mobile phones can be useful to reach harder-to-reach sub-groups,[82] others assert that the most marginalized, including those without stable signal or any form of telephone, are often excluded.[83] When investigating or attempting to include the most disadvantaged or people without telephone in rural areas, researchers can distribute affordable cell phones to the selected respondents[84] although this solution requires ethical, technical, and financial consideration.

Unlike online questionnaires, which can also reach a large number of people, informants do not need to be literate or have internet access to answer telephone surveys, and this is another strength, particularly relevant to public health research in LMICs. However, many studies lack sufficient information on languages spoken by interviewers. The biggest number of languages spoken by interviewers was 6 in 3 studies in Senegal. This implies some room for improvement to accommodate linguistic diversity in LMICs. Moreover, little information about techniques unique to telephone surveys, like CATI, RAD, RDD and SMS, was available in the included studies. Hence, researchers are encouraged to detail their methods and share their knowledge to ameliorate this remote data collection method in LMICs.

At the same time, there are individuals with several cell phone subscriptions, particularly in some LMICs.[85] This complex situation makes it difficult to accurately estimate the degree of representativeness and the characteristics of (non-)respondents. Thus, in addition to demographic information, public health researchers are encouraged to collect informants' socio-economic factors, which are not always easy to obtain and verify in LMICs. When socio-economic variables cannot be gathered, or when relatively recent, reliable data, like censuses, is not accessible as a reference, researchers might need to consider narrowing down the target population, rather than trying to achieve a nationally representative sample of the general public. Having a narrower target population would enable researchers to estimate representativeness of their samples more accurately, thereby the reliability of their data would also be ensured.

Another advantage is the existence of various established sampling methods to acquire large, representative samples. This is particularly important for quantitative descriptive studies, the most prevalent study design among the 70 included studies, to perform statistical analyses. Behaviors are commonly examined by interviewer-administered telephone surveys during different infectious disease outbreaks, and this indicates the suitability of this remote data collection method in research when quick data collection is required or when the context in which such research is done is important (for instance, in the context of public health crises). However, researchers should be aware of bias due to self-reporting and careful when setting study objectives and formulating survey questions.

Limitations

To make this scoping review feasible, studies using multiple or hybrid data collection methods like online questionnaires and meetings in addition to interviewer-administered surveys were excluded although these methods are becoming ubiquitous. Furthermore, only 2 databases were searched, and all the included studies were published in English.

However, the diverse journals and origins of the included sources should provide findings in harmony with the results which could have been obtained from a broader set of sources.

Conclusions

This scoping review identified 70 interviewer-administered telephone surveys conducted during infectious disease outbreaks, epidemics, and pandemics. Despite the concentration in China and the United States, this remote data collection method has been used in 27 countries. The included studies were published between 2003 and 2022, and an exceptional increase in the number of publications was recorded during the COVID-19 pandemic in not only HICs but also LMICs.

Lessons learned. Even during the latest pandemic, weaknesses and challenges of this data collection modality repeatedly found in the available literature continue to exist. Examples are absence of non-verbal expressions, exclusion of people without access to telephone, and potential inaccuracy of information due to self-reporting. This scoping review also discovered that researchers do not always specify methodological details, especially languages spoken by the interviewers, the number of interviewers, and the phone type. Furthermore, the use of techniques to enhance the efficiency, such as RAD, RDD, and SMS, was relatively limited. Thus, it is recommended that researchers specify operational details to improve and make better use of interviewer-administered telephone surveys.

Implications of the findings for future research. Despite the continuing challenges mentioned above, the findings show a broad range of subjects, not only quantitative topics like incidence rates and vaccination coverage, but also qualitative themes like perspectives, experiences, and motivation. Besides, the more specific population groups such as patients and HCPs are targeted lately. This might indicate promising possibilities of this data collection modality, whose strengths include anonymity, convenience, and possible optimization with digital technologies and techniques. Interviewer-administered telephone surveys appear to be especially practical for local studies aiming to collect data on sensitive topics, for which self-reporting would not be a problem, from specific population groups with access to telephone during infectious disease outbreaks. Contrarily, this data collection method is probably not suitable when assessment of excluded people's characteristics and acquisition of a recent and reliable reference is difficult, or when a high degree of accuracy of the collected data is needed. Under this circumstance, the degree of representativeness cannot be precisely measured, and consequently a high level of data accuracy cannot be guaranteed. Researchers should assess the context of their research to determine if this data collection modality is the most effective and appropriate to achieve their objectives.

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Appendix 1: Search strategy

Databases	PubMed *EBSCO (Academic Search Premier)*

Dimensions of search terms

1.	Survey modality of interest:
	Interviewer-administered telephone
	surveys
		1 = ((1.1 AND 1.2) OR 1.3)
		1.1 'telephone*' OR 'cellular phone*' OR 'phone*' OR 'cell phone*'
		      OR 'mobile phone*' OR 'mobile telephone*'
		
		1.2 'survey*' OR 'interview*' OR 'cross-sectional survey*' OR
		      'longitudinal survey*'
		
		1.3 'interviewer-administered survey*' OR 'interviewer administered
		      survey*' OR 'computer-assisted telephone interviewing' OR
		      'computer assisted telephone interviewing'

AND		

2.	Context of interest:
	Communicable disease outbreaks
		2 = (2.1 AND 2.2)
		2.1 'outbreak*' OR 'epidemic*' OR 'pandemic*'
		
		2.2 'infectious disease*' OR 'communicable chronic disease*' OR
		      'communicable infectious disease*' OR 'infectious illness' OR
		      'infectious virus*'

Appendix 2: Data extraction instrument

Basic information	*Description*
Authors	*When co-authored, corresponding author(s)followed by "et al."*
Year of Publication	
Title	
Journal	*Journal in which the study is published*
Origin	*Country/countries in which the data is collected*
Purpose	
Sample Size	*Number of observations included in the final analysis*
Study Design	*Categories based on Mixed Methods Appraisal Tool**
Details	
Scale	*International, national, regional, or local*
Target Population	*Adult individuals, HCPs, patients, households, or other*
Duration	*Data collection period in days*
Infectious Disease	*Infections disease(s) present during data collection*
Telephone Type	*Landline, mobile, 50-50, or not specified*
Sampling Method	*When RDD or CATI is used, followed by an asterisk (*)*
Language	*Number of languages spoken by interviewers*
Length	*Length of telephone survey/interview in minutes*
Interviewer	*Number of interviewers who conducted telephone surveys*
Incentive	*Type of incentive (voucher, airtime etc.) and the value in USD*

*Studies will be categorized in accordance with Mixed Methods Appraisal Tool (MMAT), version 2018.[86] There are five designs: 1) qualitative, 2) quantitative randomized controlled trials, 3) quantitative non-randomized, 4) quantitative descriptive, and 5) mixed methods.

Appendix 3: PRISMA-ScR Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	5
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	8
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	9
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	9
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	9-10
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	10-11
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	10-11
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	11
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	11-14
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	11-14
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	14-15
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	15
RESULTS			

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	15-16
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	16-18
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	NA
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	18
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	18-25
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	25-27
Limitations	20	Discuss the limitations of the scoping review process.	27
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	28
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	2

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

Appendix 4: Screening process

Identification of studies via databases

Identification

Records identified from databases:
- PubMed (n = 273)
- EBSCO (n = 253)

Duplicates removed:
- Automatically (n = 107)
- Manually (n = 3)

Screening

Records retrieved (n = 526)

Title and abstract screening (n = 416)

Studies irrelevant (n = 207)

Full-text assessment (n = 146)

Studies excluded:
- Wrong data collection method (n = 46)
- Wrong period (n = 20)
- Wrong population (n = 12)
- Wrong language (n = 2)

Included

Studies included in review (n = 66)
Included supplemental studies (n = 4)

Identification of studies via other methods

Records identified during the initial search (n = 4)

Records retrieved (n = 4)

Title and abstract screening (n = 4)

Full-text assessment (n = 4)
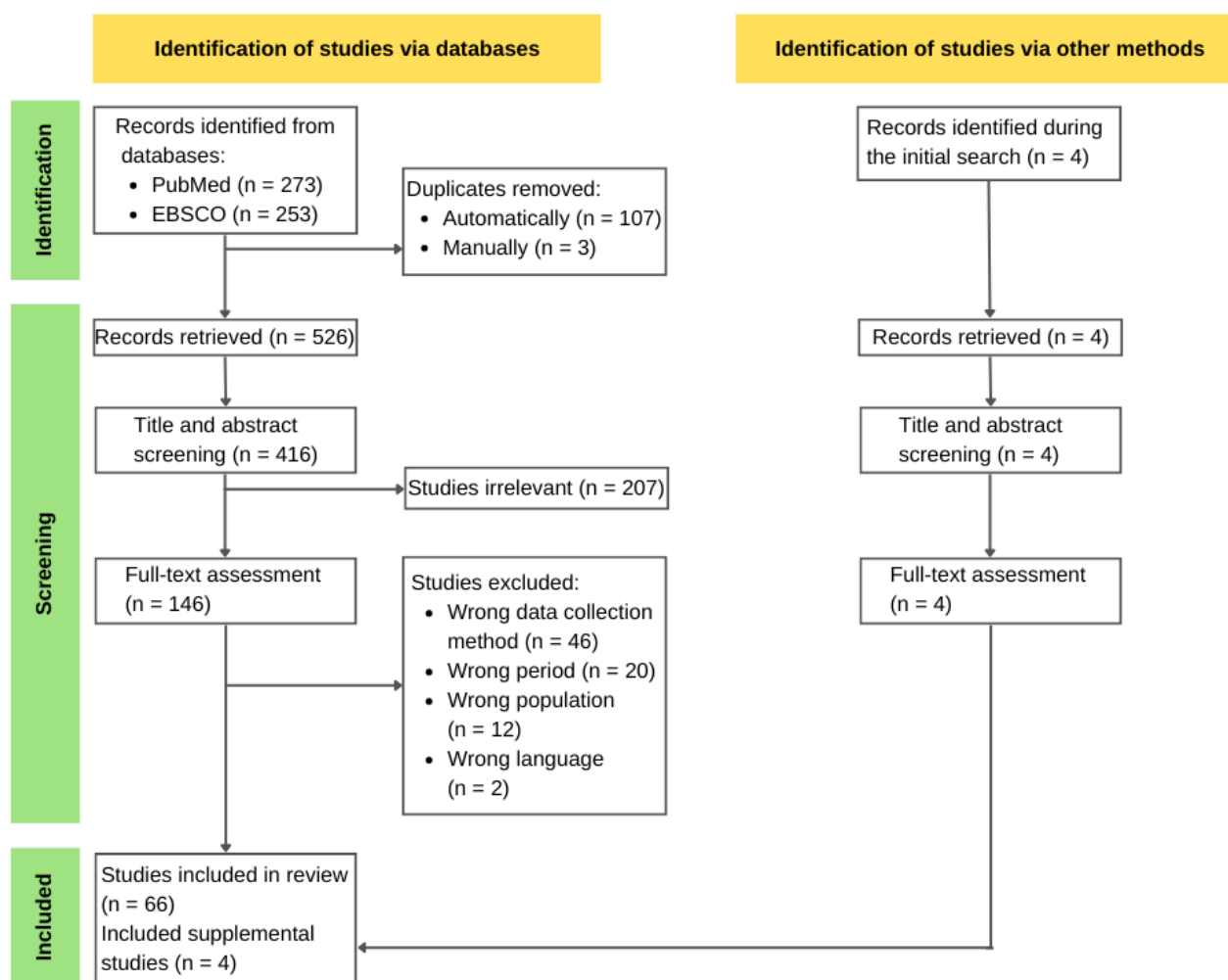
Appendix 5: Distribution of included studies in HICs and LMICs
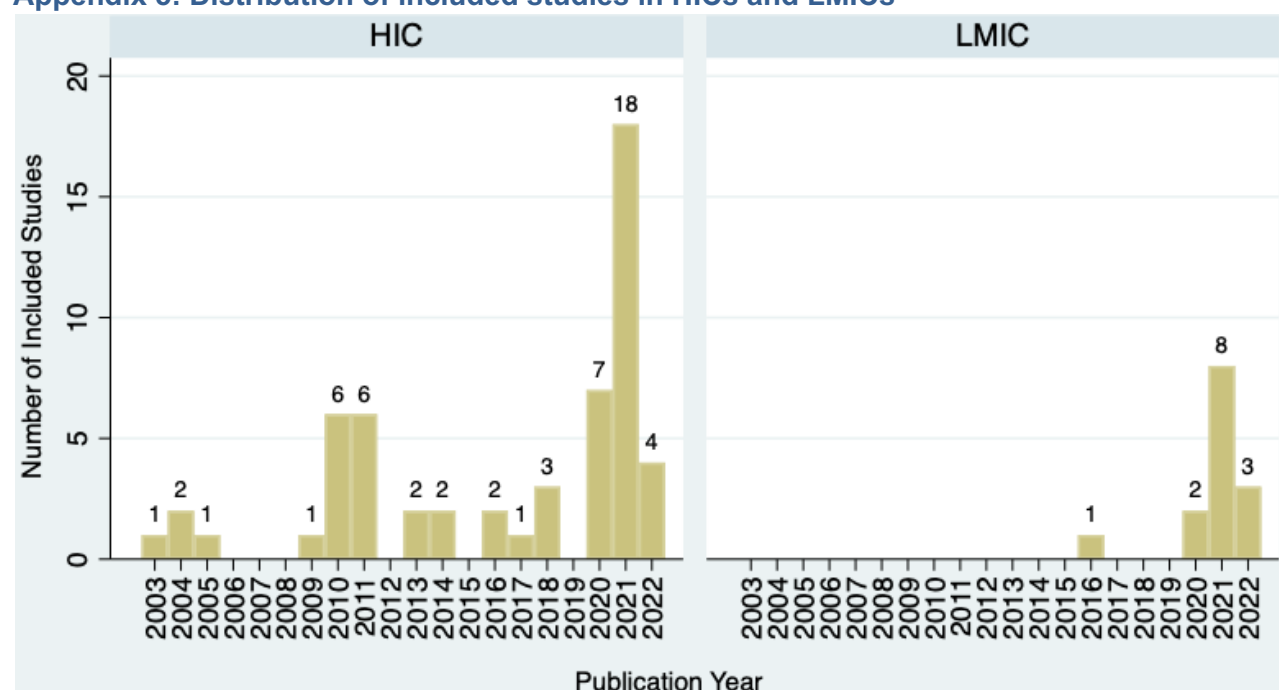
*LMICs: low- and lower-middle- income countries; HICs: upper-middle- and high-income countries

Appendix 6: Individual sources of evidence

Study ID	Authors	Year	Journal	Origin	Sample Size	Study Design	Scale	Target Population	Infectious Disease	Duration	Phone Type	Sampling Method	Language	Length	Interviewer	Incentive
#1	Abba et al.[87]	2021	Afrika Focus	Nigeria	11	Qualitative	Local	HCPs	COVID-19	NS	Mobile	Purposive	NS	NS	2	No
#2	Abdelmagid et al.[88]	2021	BMC Public Health	Sudan	89	Qualitative	Regional	Other: Adult individuals, patients	COVID-19	83	NS	Purposive, snowball	1	40-70	NS	No
#3	Akhtar et al.[89]	2021	Antibiotics	Bangladesh	1845	Quantitative descriptive	National	Adult individuals	COVID-19	60	Mobile	Simple random*	NS	3-16 (8 av.)	2	No
#4	Assefa et al.[90]	2021	American Society of Tropical Medicine and Hygiene	Burkina Faso, Ethiopia, Nigeria	10797	Quantitative descriptive	International	Other: Adult individuals, HCPs	COVID-19	124	NS	Stratified*	NS	NS	NS	No
#5	Boehm et al.[91]	2020	European Urology	Germany	399	Quantitative randomized controlled trials	Local	Patients	COVID-19	7	NS	Clustered	NS	NS	1	No
#6	Bonet-Esteve et al.[92]	2021	BMC Family Practice	Spain	434	Quantitative non-randomized	Regional	Patients	COVID-19	15	NS	Clustered	NS	NS	4	No
#7	Bennett et al.[93]	2021	Transplant Infectious Disease	Italy	144	Quantitative non-randomized	Local	Patients	COVID-19	1	NS	Clustered	1	NS	1	No
#8	Boscolo-Rizzo et al.[94]	2021	International Forum of Allergy & Rhinology	Italy	304	Quantitative descriptive	Regional	Patients	COVID-19	387	NS	Clustered	NS	NS	NS	No
#9	Chan et al.[95]	2021	PLOS Neglected Tropical Diseases	China	590	Quantitative descriptive	Local	Adult individuals	Dengue	10	Landline	Simple random	1	NS	NS	No
#10	Checcucci et al.[96]	2021	World Journal of Urology	Italy	607	Quantitative descriptive	Local	Patients	COVID-19	71	NS	Clustered	NS	NS	NS	No
#11	Chen et al.[97]	2021	Journal of Clinical Nursing	China	15	Qualitative	Local	HCPs	COVID-19	32	NS	Purposive	1	15-45	1	No
#12	Chen et al.[98]	2021	International Journal of Environmental Research and Public Health	China	1075	Quantitative descriptive	Local	Adult individuals	COVID-19	14	NS	Simple random*	NS	NS	1	No
#13	Cowling at al.[99]	2010	Journal of Infectious Diseases	China	12965	Quantitative descriptive	Local	Adult individuals	H1N1	53	Landline	Simple random*	1	15 max.	NS	No
#14	Earle-Richardson et al.[100]	2018	Emerging Infectious Diseases	United States	950	Quantitative non-randomized	Regional	Other: Women	Zika	270	NS	Simple random	NS	NS	NS	No
#15	Ferrarotti et al.[101]	2021	Respiratory Medicine	Italy	209	Quantitative descriptive	National	Patients	COVID-19	31	NS	Clustered	NS	NS	NS	No
#16	Fritzell et al.[102]	2018	PLOS Neglected Tropical Diseases	France	1129	Quantitative non-randomized	Regional	Adult individuals	Zika	16	50-50	Simple random*	NS	NS	NS	No

#17	Gao et al.[103]	2021	BMJ Open	China	31332	Quantitative non-randomized	Local	Adult individuals	COVID-19	139	NS	Simple random*	2	NS	NS	No
#18	Goodwin et al.[104]	2014	BMC Infectious Diseases	China	1011	Quantitative descriptive	Local	Adult individuals	H7N9	9	Landline	Simple random*	NS	NS	NS	No
#19	Harling et al.[105]	2021	JMIR Public Health and Surveillance	South Africa	5120	Quantitative non-randomized	Regional	Households	COVID-19	245	Mobile	Simple random	NS	NS	NS	Shopping voucher (3 USD)
#20	Heo et al.[106]	2013	PLOS One	South Korea	1650	Quantitative non-randomized	National	Adult individuals	H1N!	11	NS	Quota	NS	NS	NS	No
#21	Jayakody et al.[107]	2021	Public Health	Sri Lanka	139	Qualitative	Regional	Patients	COVID-19	93	NS	Purposive	NS	20-30	1	No
#22	Jones et al.[108]	2004	Clinical Infectious Diseases	United States	4028	Quantitative non-randomized	Local	Adult individuals	Seasonal Flu	122	Landline	Simple random*	1	NS	NS	No
#23	Kirkegaard et al.[109]	2021	Scandinavian Journal of Public Health	Denmark	33	Qualitative	Regional	Other: Women	COVID-19	10	NS	Clustered	NS	18 av.	1	No
#24	Kiviniemi et al.[110]	2011	BMC Public Health	United States	807	Quantitative descriptive	Local	Adult individuals	H1N1	42	NS	Simple random*	1	NS	1	No
#25	Kuehne et al.[111]	2016	PLOS Neglected Tropical Diseases	Liberia	905	Quantitative descriptive	Regional	Households	Ebola	91	Mobile	Simple random	NS	NS	15	Airtime (1 USD)
#26	Lau et al.[112]	2009	BMJ	China	301	Quantitative descriptive	Local	Adult individuals	H1N1	10	Landline	Simple random	NS	20	NS	No
#27	Lau et al.[113]	2010	BMC Infectious Diseases	China	999	Quantitative descriptive	Local	Adult individuals	H1N1	10	Landline	Simple random	NS	15 max.	NS	No
#28	Lau et al.[114]	2010	American Journal of Infection Control	China	999	Quantitative descriptive	Local	Adult individuals	H1N1	25	Landline	Simple random	1	NS	NS	No
#29	Lau et al.[115]	2003	Journal of Epidemiology and Community Health	China	1379	Quantitative descriptive	Local	Adult individuals	SARDS	7	Landline	Simple random	NS	20	NS	No
#30	Lau et al.[116]	2005	Emerging Infectious Diseases	China	1681	Quantitative descriptive	Local	Adult individuals	SARDS	10	Landline	Simple random	NS	NS	NS	No
#31	Lee et al.[117]	2020	International Journal of Environmental Research and Public Health	South Korea	18	Qualitative	Local	HCPs	COVID-19	110	Mobile	Snowball	NS	60 Additional: 10-20	NS	No
#32	Leigh et al.[118]	2021	BMC Health Services Research	Canada	15	Qualitative	Regional	HCPs	COVID-19	93	NS	Purposive	1	21 md.	2	No
#33	Liao et al.[119]	2010	PLOS One	China	1001	Quantitative non-randomized	Local	Adult individuals	H1N1	3	Landline	Simple random*	1	NS	NS	No

#34	Liao et al.[120]	2011	International Journal of Behavioral Medicine	China	2776	Quantitative non-randomized	Local	Households	H1N1, H5N1	94	Landline	Simple random	NS	NS	NS	No
#35	Liao et al.[121]	2014	BMC Infectious Diseases	China	10345	Quantitative non-randomized	Local	Households	H1N1	43	Landline	Simple random*	NS	15 av.	NS	No
#36	Liao et al.[122]	2021	Scientific Reports	China	30827	Quantitative non-randomized	Local	Adult individuals	COVID-19	336	50-50	Simple random*	1	15 max.	NS	No
#37	Lin et al.[123]	2011	BMC Infectious Diseases	China	10669	Quantitative descriptive	Regional	Adult individuals	H1N1	76	Landline	Proportional	NS	NS	NS	No
#38	Liu et al.[124]	2020	Lancet Global Health	China	13	Qualitative	Local	HCPs	COVID-19	6	NS	Purposive, snowball	1	20-60 (38.62 av.)	2	No
#39	Lupton et al.[125]	2021	BMC Public Health	Australia	40	Qualitative	National	Adult individuals	COVID-19	62	NS	Convenience	NS	NS	1	Gift card (NS)
#40	Markkanen et al.[126]	2021	BMC Health Services Research	United States	37	Qualitative	Local	Other: Elderly, home care workers	COVID-19	215	NS	Purposive	1	60 max.	1	Check (40 USD)
#41	Mayeur et al.[127]	2020	European Journal of Obstetrics Gynecology and Reproductive Biology	France	104	Quantitative descriptive	Local	Other: Women	COVID-19	92	NS	Clustered	NS	NS	12	No
#42	Meng et al.[128]	2016	BMC Infectious Diseases	China	516	Quantitative non-randomized	Local	Households	Seasonal Flu	26	Landline	Simple random*	1	5-10	NS	No
#43	Mora et al.[129]	2022	Journal of Agromedicine	United States	1115	Quantitative descriptive	Local	Other: Farm workers	COVID-19	138	NS	Convenience	2	45	NS	Debit card (50 USD)
#44	Mwamba et al.[130]	2020	Public Health Action	Zambia	17	Qualitative	Local	Patients	COVID-19	31	Mobile	Purposive	3	45-60	NS	No
#45	Qian et al.[131]	2020	BMJ Open	China	1011	Quantitative non-randomized	Regional	Adult individuals	COVID-19	10	Mobile	Quota*	NS	NS	NS	No
#46	Quah et al.[132]	2004	Emerging Infectious Diseases	Singapore	1202	Quantitative descriptive	National	Adult individuals	SARDS	6	Landline	Stratified*	3	NS	NS	No
#47	Raude et al.[133]	2018	Medical Decision Making	France	3721	Quantitative descriptive	Regional	Adult individuals	Chikungunya, Dengue, Zika	120	NS	Simple random, quota*	2	NS	NS	No
#48	Reed et al.[134]	2011	Clinical Infectious Diseases	United States	1790	Quantitative descriptive	Regional	Households	H1N1	19	NS	Stratified	NS	NS	NS	No
#49	Rubin et al.[135]	2016	European Journal of Psycho-traumatology	United Kingdom	51	Qualitative	Regional	Other: Public health professionals, NGO, university researcher	Ebola	63	NS	Simple random, convenience	NS	35-123 (70 md.) Follow up: 5-13 (9 md.)	7	No
#50	Sell et al.[136]	2020	Public Health Reports	United States	28	Qualitative	Regional	Other: Public health professionals	Zika	93	NS	Purposive	NS	45	NS	No

#	Author	Year	Journal	Country	N	Study type	Geo	Population	Disease			Sampling				Incentive
#51	Shah et al.[137]	2021	JMIR Cardio	Canada	29	Qualitative	Local	Other: HCPs, patients	COVID-19	46	NS	Purposive	NS	30	2	no
#52	Shati et al.[138]	2020	Medical Journal of The Islamic Republic of Iran	Iran	558	Quantitative descriptive	National	Other: Elderly	COVID-19	NS	NS	Quota	NS	NS	NS	No
#53	Smaghi et al.[139]	2021	International Journal of Infectious Diseases	Papua New Guinea	426	Mixed methods	National	HCPs	COVID-19	19	NS	Purposive, snowball	1	NS	8	No
#54	SteelFisher et al.[140]	2021	Health Security	United States	1986	Quantitative non-randomized	National	Adult individuals	COVID-19	15	Mobile	Simple random*	2	NS	NS	No
#55	Stoop et al.[141]	2021	World Development	Democratic Republic of Congo	1000	Quantitative non-randomized	Regional	Other: Households, small businesses	COVID-19, Ebola	62	NS	Stratified	NS	NS	NS	No
#56	Taglioni et al.[142]	2013	BMC Infectious Diseases	France	725	Quantitative descriptive	Regional	Households	H1N1	155	NS	Clustered	NS	NS	NS	No
#57	Tan et al.[143]	2020	Annals of Trans-plantation	Singapore	71	Quantitative descriptive	Local	Patients	COVID-19	29	NS	Purposive	3	NS	3	No
#58	Topcu et al.[144]	2022	Educational Gerontology	Turkey	134	Quantitative descriptive	Regional	Patients	COVID-19	76	NS	Snowball	1	30	4	No
#59	Wong et al.[145]	2010	Journal of Community Health	Malaysia	1050	Quantitative descriptive	Regional	Adult individuals	H1N1	64	Landline	Simple random*	3	NS	NS	No
#60	Wong et al.[146]	2010	Preventive Medicine	Malaysia	1050	Quantitative descriptive	Local	Adult individuals	H1N1	65	Landline	Simple random*	NS	NS	NS	No
#61	Wong et al.[147]	2011	Journal of Behavioral Medicine	Malaysia	1050	Quantitative descriptive	Local	Adult individuals	H1N!	64	Landline	Simple random*	3	15 av.	NS	No
#62	Wong et al.[148]	2011	International Journal of Behavioral Medicine	Malaysia	1050	Quantitative descriptive	Regional	Adult individuals	H1N1	64	Landline	Simple random*	3	15	NS	No
#63	Xiao et al.[149]	2022	Lancet Regional Health Western Pacific	China	7411	Quantitative descriptive	Local	Adult individuals	COVID-19	39	50-50	Simple random	1	10 max.	NS	No
#64	Xin et al.[150]	2022	Social Science & Medicine	China	443	Quantitative descriptive	Local	Adult individuals	COVID-19	15	Landline	Simple random	1	15	NS	No
#65	Yeung et al.[151]	2017	Emerging Infectious Diseases	China	503	Quantitative descriptive	Local	Adult individuals	H1N1	89	Landline	Unclear	NS	NS	NS	Super-market voucher (6.5 USD)
#66	Yin et al.[152]	2021	BMC Family Practice	China	12	Qualitative	Regional	HCPs	COVID-19	32	NS	Convenience	1	20-53	3	no
#67	Ba et al.[153]	2022	Human Vaccines &	Senegal	637	Mixed methods	National	Adult individuals	COVID-19	64	Mobile	Simple random, quota	6	30 av.	5	No

			Immuno-therapeutics												
#68	Diallo et al.[154]	2022	Revue d'Épi-démiologie et de Santé Publique	Senegal	813	Quantitative descriptive	National	Adult individuals	COVID-19	31	NS	Quota*	Multiple	NS	5	No
#69	Ridde et al.[155]	2021	Human Vaccines & Immuno-therapeutics	Senegal	607	Quantitative descriptive	National	Adult individuals	COVID-19	24	Mobile	Quota*	6	NS	5	No
#70	Ridde et al.[156]	2022	PLOS Global Public Health	Senegal	843	Mixed methods	National	Adult individuals	COVID-19	54	Mobile	Simple random, quota*	6	18-56 (37 av.)	5	No

Appendix 7: Titles and purposes

Study ID	Title	Purpose
#1	Experiences of Healthcare Workers of Hospitalised Individuals with COVID-19 in Kano, Nigeria: A Qualitative Study	to explore the experiences of healthcare workers managing hospitalised patients with covid-19 in a treatment centre in Kano, Nigeria
#2	Acceptability and Feasibility of Strategies to Shield the Vulnerable during the COVID-19 Outbreak: A Qualitative Study in Six Sudanese Communities	to explore the acceptability and feasibility of strategies to shield persons at higher risk of severe COVID-19 outcomes, during the COVID-19 epidemic in six communities in Sudan
#3	Antibiotics Use and its Knowledge in the Community: A Mobile Phone Survey during the COVID-19 Pandemic in Bangladesh	to assess antibiotic use for any reported illnesses in the preceding four weeks and knowledge regarding antibiotics among the general population in Bangladesh
#4	Reported Barriers to Healthcare Access and Service Disruptions Caused by COVID-19 in Burkina Faso, Ethiopia, and Nigeria: A Telephone Survey	to collect data regarding the effects of COVID-19 on the healthcare system from the perspectives of two groups of stakeholders: healthcare providers and community members
#5	Telemedicine Online Visits in Urology During the COVID-19 Pandemic-Potential, Risk Factors, and Patients' Perspective	to evaluate patients' eligibility for telemedicine according to the physician and examined the patients' perspective by evaluating their willingness for telemedicine
#6	Influenza Vaccination during the Coronavirus Pandemic: Intention to Vaccinate among the At-Risk Population in the Central Catalonia Health Region (VAGCOVID)	to determine the at-risk population's intention to vaccinate against seasonal influenza during the 2020-21 flu campaign in the Central Catalonia Health Region, in the midst of the SARS-CoV-2 pandemic
#7	Impact of SARS-CoV-2 Outbreak on Heart and Lung Transplant: A Patient-Perspective Survey	to evaluate the incidence of COVID-19 and the impact of the SARS-CoV-2 outbreak on the personal hygiene and expectations in heart and lung transplant recipients
#8	Sequelae in Adults at 12 Months after Mild-to-Moderate Coronavirus Disease 2019 (COVID-19)	to evaluate the prevalence of COVID-related symptoms 12-months after the onset of mild-to-moderate disease
#9	Sociodemographic Predictors of Knowledge, Mosquito Bite Patterns and Protective Behaviors Concerning Vector Borne Disease: The Case of Dengue Fever in Chinese Subtropical City, Hong Kong	to examine the knowledge of dengue, mosquito bite patterns, protective behavior practices and their associated factors
#10	Implementing Telemedicine for the Management of Benign Urologic Conditions: A Single Centre Experience in Italy	to evaluate the health status of these patients, to identify those who needed an "in-person" ambulatory visit due to the worsening of their condition
#11	Dispatched Nurses' Experience of Wearing Full Gear Personal Protective Equipment to Care for COVID-19 Patients in China—A Descriptive Qualitative Study	to explore dispatched nurses' experiences of wearing full gear personal protective equipment to care for patients with coronavirus disease-2019 (COVID-19) in Wuhan, China
#12	Prevalence and Factors Associated with the Reuse of Mask during the COVID-19 Pandemic: A Nationwide Survey in Taiwan	to understand the factors associated with mask reuse and provide important information for educating individuals regarding appropriate preventive behaviors against the SARS-COV-2 infection
#13	Community Psychological and Behavioral Responses through the First Wave of the 2009 Influenza A(H1N1) Pandemic in Hong Kong	to examine trends in anxiety, risk perception, knowledge on modes of transmission, and preventive behaviors
#14	Influences of Community Interventions on Zika Prevention Behaviors of Pregnant Women, Puerto Rico, July 2016—June 2017	to assess how community education efforts influenced pregnant women's Zika prevention behaviors during the 2016 Centers for Disease Control and Prevention–Puerto Rico Department of Health Zika virus response
#15	COVID-19 Infection in Severe Alpha 1-Antitrypsin Deficiency: Looking for a Rationale	to investigate whether people with severe AAT deficiency (AATD) have an increased risk of (severe) COVID-19 infection
#16	Emerging Trends of Zika Apprehension in an Epidemic Setting	to examine public perceptions associated with this new health threat, with the purpose of informing ongoing intervention practices
#17	Pandemic Fatigue and Attenuated Impact of Avoidance Behaviours against COVID-19 Transmission in Hong Kong by Cross-Sectional Telephone Surveys	to explore the attenuated impact of reported avoidance behaviours adherence on the transmission of COVID-19
#18	Early Responses to H7N9 in Southern Mainland China	to examine risk awareness and media use, beliefs about the emergence of the threat and those most at risk, anxiety about infection and preventive and avoidant behaviours
#19	Protective Behaviors and Secondary Harms Resulting from Nonpharmaceutical Interventions During the COVID-19 Epidemic in South Africa: Multisite, Prospective Longitudinal Study	to observe how households in rural and peri-urban areas responded to, and were affected by, national NPIs enacted to minimize the epidemic spread of Covid-19
#20	Risk Perception, Preventive Behaviors, and Vaccination Coverage in the Korean Population during the 2009–2010 Pandemic Influenza A (H1N1): Comparison between High-Risk Group and Non–High-Risk Group	to estimate the vaccination coverage, public perception, and preventive behaviors against pandemic influenza A (H1N1) and to understand the motivation and barriers to vaccination between high-risk and non–high-risk groups during the outbreak of pandemic influenza A (H1N1)
#21	Why Are You Not Dead Yet?' — Dimensions and the Main Driving Forces of Stigma and Discrimination among COVID-19 Patients in Sri Lanka	to explore the experiences, and main driving forces of stigma and discrimination among COVID-19 patients, following hospital discharge, in Sri Lanka
#22	Determinants of Influenza Vaccination, 2003—2004: Shortages, Fallacies and Disparities	to assess people's knowledge, attitudes, and beliefs about vaccination and to assess how access issues may have impacted other determinants of vaccination rates
#23	Balancing Risks: Qualitative Study of Attitudes, Motivations and Intentions about Attending for Mammography during the COVID-19 Pandemic	to explore the attitudes, motivations and intentions around attending for mammography among women in the Danish population-based breast cancer screening programme who cancelled or postponed mammography during, and due to, the COVID-19 pandemic

#24	Perceptions of and Willingness to Engage in Public Health Precautions to Prevent 2009 H1N1 Influenza Transmission	to examine individuals' interpretation of recommendations, willingness to comply, and factors predicting willingness
#25	Mortality, Morbidity and Health-Seeking Behaviour during the Ebola Epidemic 2014–2015 in Monrovia Results from a Mobile Phone Survey	to quantify mortality and morbidity and describe health-seeking behaviour in Monrovia
#26	Acceptability of A/H1N1 Vaccination during Pandemic Phase of Influenza A/H1N1 in Hong Kong: Population Based Cross Sectional Survey	to investigate the intention of the Hong Kong general population to take up vaccination against influenza A/H1N1
#27	Avoidance Behaviors and Negative Psychological Responses in the General Population in the Initial Stage of the H1N1 Pandemic in Hong Kong	to examine the prevalence of the avoidance behaviors (i.e. avoiding going out, visiting crowded places and visiting hospitals) and negative psychological responses of the general population in Hong Kong at the initial stage of the H1N1 epidemic
#28	Prevalence of Preventive Behaviors and Associated Factors during Early Phase of the H1N1 Influenza Epidemic	to investigate the prevalence of self-reported preventive behaviors in response to the influenza A/H1N1epidemic in Hong Kong, including wearing face masks regularly in public areas, wearing face masks in case of influenza-like illness (ILI) symptoms, and frequent handwashing
#29	Monitoring community responses to the SARS epidemic in Hong Kong: from day 10 to day 62	to report the evolution in perceptions and behaviours of the general public in response to the severe acute respiratory syndrome (SARS) epidemic in Hong Kong
#30	SARS-related Perceptions in Hong Kong	to understand different aspects of community responses related to severe acute respiratory syndrome (SARS)
#31	South Korean Nurses' Experiences with Patient Care at a COVID-19-Designated Hospital: Growth after the Frontline Battle against an Infectious Disease	to explore the lived experiences and essential structure of the experiences of a group of nurses at a COVID-19-designated hospital who were providing patient care
#32	A Qualitative Study of Physician Perceptions and Experiences of Caring for Critically Ill Patients in the Context of Resource Strain during the First Wave of the COVID-19 Pandemic	to investigate physicians' perceptions and experiences of caring for critically ill patients in the context of actual or anticipated resource strain during the COVID-19 pandemic, and to explore implications for the healthcare workforce and the delivery of patient care
#33	Situational Awareness and Health Protective Responses to Pandemic Influenza A (H1N1) in Hong Kong: A Cross-Sectional Study	to test a hypothesized model of associations between trust in (formal/informal) information, situational awareness variables (causal understanding, self-efficacy, susceptibility and worry) and different types of health protective behaviours (hand hygiene and social distancing) for influenza protection
#34	The Influence of Social-Cognitive Factors on Personal Hygiene Practices to Protect Against Influenzas: Using Modelling to Compare Avian A/H5N1 and 2009 Pandemic A/H1N1 Influenzas in Hong Kong	to model associations between trust in information, perceived hygiene effectiveness, knowledge about the causes of influenza, perceived susceptibility and worry, and personal hygiene practices (PHPs) associated with influenza
#35	Anxiety, Worry and Cognitive Risk Estimate in Relation to Protective Behaviors during the 2009 Influenza A/H1N1 Pandemic in Hong Kong: Ten Cross-Sectional Surveys	to compare the strength of associations between different cognitive and affective measures of risk and self-reported protective behaviors
#36	Community Psychological and Behavioural Responses to Coronavirus Disease 2019 over One Year of the Pandemic in 2020 in Hong Kong	to monitor the changes of public stress appraisal including COVID-19 risk perception, personal efficacy and confidence in government's pandemic control, behavioural coping (i.e., precautionary behaviours) and psychological distress over one year of the pandemic in 2020 in Hong Kong
#37	Knowledge, Attitudes and Practices (KAP) Related to the Pandemic (H1N1) 2009 among Chinese General Population: A Telephone Survey	to investigate community responses to A/H1N1 in China; to describe the knowledge, attitudes and practices of A/H1N1 among general population in China and put forward policy recommendations to government in case of future similar conditions
#38	The Experiences of Health-Care Providers during the COVID-19 Crisis in China: A Qualitative Study	to describe the experiences of these health-care providers in the early stages of the outbreak
#39	Learning about COVID-19: A Qualitative Interview Study of Australians' Use of Information Sources	to investigate how Australians learnt about the novel coronavirus and COVID-19 and what sources of information they had found most useful and valuable during the early months of the pandemic
#40	"It Changed Everything": The Safe Home Care Qualitative Study of the COVID-19 Pandemic's Impact on Home Care Aides, Clients, and Managers	to characterize qualitatively the impact of the COVID-19 pandemic on three key HC stakeholders: clients, aides, and agency managers
#41	First Follow-Up of Art Pregnancies in the Context of the COVID-19 Outbreak	to follow up the monitoring, health and anxiety from women who became pregnant after an embryo transfer or a intrauterine insemination during the COVID-19 epidemic in France
#42	Healthcare Seeking Behavior of Patients with Influenza like Illness: Comparison of the Summer and Winter Influenza Epidemics	to compare healthcare seeking behaviors, such as seeking medical consultations in western practitioners or Traditional Chinese Medicine (TCM) and self-medication of ILI patients, between the summer and winter influenza epidemics in Hong Kong
#43	Impact of COVID-19 Pandemic on California Farmworkers' Mental Health and Food Security	to examine the mental health and economic impact of the COVID-19 pandemic on Latino farmworkers in California
#44	Diagnosed with TB in the Era of COVID-19: Patient Perspectives in Zambia	to explore the potential of COVID-19 to further compromise TB care engagement in Zambia
#45	Anxiety Levels, Precautionary Behaviours and Public Perceptions during the Early Phase of the COVID-19 Outbreak in China: A Population-Based Cross-Sectional Survey	to investigate psychological and behavioural responses to COVID-19 among the Chinese general population
#46	Crisis Prevention and Management during SARS Outbreak, Singapore	to examine four areas of public reaction to the SARS outbreak in Singapore: preventive practices, perception of self-health, knowledge of SARS, and appraisal of SARS crisis management
#47	Are Perceived Prevalences of Infection also Biased and How? Lessons from Large Epidemics of Mosquito-Borne Diseases in Tropical Regions	to examine the accuracy of judgments of risk frequencies
#48	Influenza-Like Illness in the Community during the Emergence of 2009 Pandemic Influenza A(H1N1) – Survey of 10 States, April 2009	to better estimate the burden of ILI in the community at the time of the emergence of pH1N1

#49	How to Support Staff Deploying on Overseas Humanitarian Work: A Qualitative Analysis of Responder Views about the 2014/15 West African Ebola Outbreak	to understand what factors were stressful or uplifting
#50	A Public Health Systems View of Risk Communication About Zika	to characterize state and local risk communication efforts launched in response to Zika
#51	The Resilience of Cardiac Care Through Virtualized Services During the COVID-19 Pandemic: Case Study of a Heart Function Clinic	to understand people's experiences with and the barriers and facilitators of the rapid virtualization and expansion of cardiac care resulting from the pandemic
#52	Adherence to Self-Isolation Measures by Older Adults during Coronavirus Disease 2019 (COVID-19) Epidemic: A Phone Survey in Iran	to identify the coverage, efficacy, and integrity of self-isolation and its predictors in the Iranian older adults (≥60 years) from February 19 to 19 March 2020
#53	Barriers and Enablers Experienced by Health Care Workers in Swabbing for COVID-19 in Papua New Guinea: A Multi-Methods Cross-Sectional study	to identify the barriers and enablers that Health Care Workers (HCWs) in Papua New Guinea experienced in swabbing for COVID-19
#54	Experiences and Views of Domestic Summer Travelers During the COVID-19 Pandemic: Findings from a National Survey	to fill gaps in the scientific understanding of domestic travel-related behaviors during the COVID-19 pandemic by using data from a nationally representative survey of adults in the United States who travelled during the summer of 2020
#55	Covid-19 vs. Ebola: Impact on Households and Small Businesses in North Kivu, Democratic Republic of Congo	to compare the socioeconomic impact across two high-profile disease outbreaks that affected North Kivu simultaneously
#56	The Influenza A (H1N1) Pandemic in Reunion Island: Knowledge, Perceived Risk and Precautionary Behaviour	to investigate the perceived severity, vulnerability and precautionary behaviour adopted in response to the influenza A (H1N1) epidemic that broke out in 2009 on Reunion Island (Indian Ocean)
#57	Waitlisted Transplant Candidates' Attitudes and Concerns Toward Transplantation During COVID-19	to determine the opinions and concerns of waitlisted candidates for transplant during the current COVID-19 pandemic
#58	Investigation of Health Care Needs, Behaviors, and Existing Health Conditions of Individuals Aged ≥ 65 during the Pandemic	to determine the investigation of health-care needs, behaviors, and existing health conditions of individuals aged and over the age of 65 during the pandemic
#59	Public Sources of Information and Information Needs for Pandemic Influenza A(H1N1)	to explore sources of influenza A(H1N1)-related information, specific information needs and preferences of the lay public during the peak of the outbreak
#60	Temporal Changes in Psychobehavioral Responses during the 2009 H1N1 Influenza Pandemic	to examine the temporal changes in psychobehavioral responses in relation to reported 2009 H1N1 influenza deaths
#61	Behavioral Responses to the Influenza A(H1N1) Outbreak in Malaysia	to assess: (1) fear of the A(H1N1) pandemic; (2) risk avoidance behavior; (3) health-protective behavior; and (4) psychosocial impact in the ethnically diverse population of Malaysia
#62	Knowledge and Attitudes in Regard to Pandemic Influenza A(H1N1) in a Multiethnic Community of Malaysia	to investigate the level of knowledge and attitudes towards the influenza A(H1N1) outbreak across various ethnic groups and socio-demographic backgrounds in Malaysia
#63	Temporal Changes in Factors Associated with COVID-19 Vaccine Hesitancy and Uptake among Adults in Hong Kong: Serial Cross-Sectional Surveys	to explore the factors associated with vaccine hesitancy and uptake among adults before and after the implementation of the COVID-19 vaccination program in Hong Kong
#64	Multi-Dimensional Factors Related to Participation in a Population-Wide Mass COVID-19 Testing Program among Hong Kong Adults: A Population-Based Randomized Survey	to investigate the multi-dimensional factors associated with participation in a free and voluntary population-wide mass COVID-19 testing program
#65	Population Responses during the Pandemic Phase of the Influenza A(H1N1)pdm09 Epidemic, Hong Kong, China	to explore changes in their behavioral and psychological responses to the influenza A(H1N1)pdm09 virus epidemic
#66	General Practitioner Trainees' Career Perspectives after COVID-19: A Qualitative Study in China	to explore the Chinese GP trainees' career perspectives after COVID-19 utilizing a qualitative methodology
#67	Factors Associated with COVID-19 Vaccine Hesitancy in Senegal: A Mixed Study	to assess and identify factors associated with hesitancy toward the COVID-19 vaccine in Senegal
#68	Factors Associated with the Acceptability of Government Measures to Address COVID-19 in Senegal	to study the acceptability of government measures in Senegal concerning curfews, the prohibition of travel between regions, and the closure of markets and places of worship
#69	Participating in a Vaccine Trial for COVID-19 in Senegal: Trust and Information	to understand the level and determinants of people's willingness to participate in a vaccine trial for COVID-19 in Senegal
#70	Acceptability of Government Measures against COVID-19 Pandemic in Senegal: A Mixed Methods Study	to measure and understand the acceptability of these four governmental measures (the closure of places of worship, a curfew, a ban on movement between regions, and the closure of markets) as well as the level of public trust in the state to fight the pandemic

Appendix 8: WHO regional distribution (n = 70)

WHO Region Origin	Disease Type	Disease Total	Country Total	Region Total
WPRO				33
People's Republic of China	COVID-19	9	23	
	H1N1	8		
	SARS	2		
	Dengue	1		
	H1N1, H5N1	1		
	H7N9	1		
	Seasonal Flu	1		
Malaysia	H1N1	4	4	
Singapore	COVID-19	1	2	
	SARS	1		
South Korea	COVID-19	1	2	
	H1N1	1		
Australia	COVID-19	1	1	
Papua New Guinea*	COVID-19	1	1	
EURO				13
France	COVID-19	1	4	
	H1N1	1		
	Zika	1		
	Chikungunya, Dengue, Zika	1		
Italy	COVID-19	4	4	
Denmark	COVID-19	1	1	
Germany	COVID-19	1	1	
Spain	COVID-19	1	1	
Turkey	COVID-19	1	1	
United Kingdom	Ebola	1	1	
AMRO				10
United States	COVID-19	3	8	
	H1N1	2		
	Zika	2		
	Seasonal Flu	1		
Canada	COVID-19	2	2	
AFRO				10
Senegal*	COVID-19	4	4	
Burkina Faso, Ethiopia, Nigeria*	COVID-19	1	1	
Democratic Republic of Congo*	COVID-19, Ebola	1	1	
Liberia*	Ebola	1	1	
Nigeria*	COVID-19	1	1	
South Africa	COVID-19	1	1	
Zambia*	COVID-19	1	1	
EMRO				2
Iran*	COVID-19	1	1	
Sudan*	COVID-19	1	1	
SEARO				2
Bangladesh*	COVID-19	1	1	
Sri Lanka*	COVID-19	1	1	

*LMICs based on the World Bank's classification by income (n = 14)

Appendix 9: Infectious diseases, target population and phone type in LMICs (n = 14)

	Infectious Disease	Target Population	Phone Type	Total
AFRO				9
Burkina Faso, Ethiopia, Nigeria	COVID-19	Other	Not Specified	
Democratic Republic of Congo	COVID-19, Ebola	Other	Not Specified	
Liberia	Ebola	Households	Mobile	
Nigeria	COVID-19	HC Professionals	Mobile	
Senegal (n = 4)	COVID-19	Adult Individuals	Mobile (n =3) Not specified (n =1)	
Zambia	COVID-19	Patients	Mobile	
EMRO				2
Iran	COVID-19	Other	Not Specified	
Sudan	COVID-19	Other	Not Specified	
SEARO				2
Bangladesh	COVID-19	Adult Individuals	Mobile	
Sri Lanka	COVID-19	Patients	Not Specified	
WPRO				1
Papua New Guinea	COVID-19	HC Professionals	Not Specified	

Appendix 10: Challenges and strengths highlighted in studies in LMICs by study design

	Quanlitative	Quantitative Descriptive	Mixed Methods
Challenges	- Absence of non-verbal communication - Long interview session - Generalizability	- Recall bias - Under/Over representation of certain groups - Low response rate	- Under/Over representation of certain groups - Non-response bias - Exclusion of people without telephone
Strengths	- Consideration for fatigue of participants	- Use of local languages - Several interviewers - Techniques (CATI, RAD, RDD, SMS)	- Use of local languages - Several interviewers - Techniques (CATI, RAD, RDD, SMS)

Abstract in French

Titre : Utilisation de Sondages Téléphoniques Administrés par un Intervieweur pendant les Épidémies et les Pandémies de Maladies Infectieuses : Une Revue de la Portée

Introduction : L'émergence de la technologie moderne et de la numérisation a influencé la recherche en santé publique, notamment les méthodes de collecte de données. La littérature existante décrit le téléphone comme un outil utile permettant de recueillir des données qualitatives et quantitatives à distance, en particulier lors d'épidémies et de pandémies de maladies infectieuses, lorsque les méthodes traditionnelles en face à face sont inappropriées ou irréalisables. L'objectif de cette revue de la portée est de comprendre les enquêtes téléphoniques administrées par un intervieweur et menés pendant les épidémies et les pandémies de maladies infectieuses.

Méthodes : Des recherches dans les bases de données ont permis d'identifier des études utilisant une seule méthode de collecte de données, celle des enquêtes téléphoniques administrées par un enquêteur, ciblant les personnes âgées d'au moins 18 ans et menées pendant des épidémies de maladies infectieuses. Des documents supplémentaires examinés lors de l'élaboration du protocole ont été ajoutés. Aucune limite n'a été fixée quant à l'année de publication. Deux examinateurs indépendants ont sélectionné les études pertinentes. L'extraction des données a été effectuée par un examinateur et vérifiée par les autres examinateurs. Pour présenter les résultats, des analyses descriptives et de contenu ont été effectuées.

Résultats : Cette revue a identifié 70 études publiées entre 2003 et 2022, dont 57,1% ont été réalisées dans le temps de COVID-19. Les enquêtes téléphoniques administrées par un enquêteur sont le plus souvent réalisées en Chine (32,9 %) et aux États-Unis (11,4 %). Indépendamment de la maladie infectieuse, les adultes (48,6 %) constituent la population la plus fréquemment ciblée, et le modèle d'étude le plus courant est le modèle descriptif quantitatif (50,0 %). Les études publiées entre 2003 et 2010 n'utilisaient que des téléphones fixes. La première étude qui s'est entièrement appuyée sur les téléphones portables a été publiée en 2016. L'utilisation des téléphones portables est en augmentation, notamment dans les PRFM. Les sujets les plus récurrents dans toutes les études incluses étaient liés aux vaccins, à la santé mentale et aux comportements. Certains défis communs et persistants, s'agissant notamment de l'exclusion des personnes n'ayant pas accès au téléphone et de l'absence de communication non verbale, ont été constatés. Des détails méthodologiques manquaient dans de nombreuses études.

Conclusion : Cette modalité semble particulièrement adaptée aux études locales ciblant des groupes spécifiques avec la disponibilité de données démographiques et socio-économiques de

référence qui permettent de bien estimer le degré de représentativité et de précision des résultats. Afin de faire un meilleur usage des enquêtes téléphoniques administrées par un enquêteur, les chercheurs sont encouragés à détailler leurs méthodes et techniques conçues pour relever leurs défis.

Mots-clés : Épidémies et Pandémies de Maladie Infectieuse ; Enquêtes ; Crise de Santé Publique ; Collecte de Données à Distance ; Téléphoniques