

SEARCHING FOR GREY LITERATURE FOR RAPID COMPILATION OF MALAYSIA'S HEALTH SYSTEMS RESPONSE DURING THE COVID-19 PANDEMIC: CHALLENGES AND LESSONS LEARNT

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Abstract

Grey literature is a valuable source of information for evidence synthesis in public health, particularly when swift action is needed to address issues. In 2020, the COVID-19 pandemic was an example where rapid knowledge sharing was quintessential as the world grappled with the management of a novel coronavirus that was spreading at an alarming rate. To document and contextualise the health systems strategies used to address the COVID-19 pandemic in Malaysia from January 2020 to April 2020, we conducted a rapid review of publicly available documents from WHO Global Research on Coronavirus Disease (COVID-19) (WHO database), official government websites and local newspapers. This paper aims to describe the methods and discuss the lessons learnt from the review. In the early stage of the pandemic, published articles in the WHO database focused on clinical knowledge, hence we relied on grey literature as a primary source of information, mainly official government websites, which provided real-time information relevant to our study. Grey literature can be a good source of information for a rapid review of nascent and urgent topics particularly in the area of public health, however, a trade-off between comprehensiveness and efficiency has to be considered.

Keywords: Rapid Review, Grey Literature, COVID-19, Health Systems, Strategies

Introduction

Grey literature carries various definitions (1). The most widely used definition is “document types produced on all levels of government, academics, business and industry in print and electronic formats that are protected by intellectual property rights, of sufficient quality to be collected and preserved by library holdings or institutional repositories, but not controlled by commercial publishers i.e., where publishing is not the primary activity of the producing body” (2). The diverse and evolving types of documents that fall under non-peer reviewed literature led to the term “grey resources” as technology advancement gives rise to new types of information (1).

The extensive usage of the world wide web in this era enables easy access to a wealth of information, serving as a valuable and convenient source of information, especially when the usual method of searching through

academic journal databases is not suitable for finding relevant documents that meet the eligibility criteria of a study. As some information is less likely to appear in peer-reviewed publications, it has been acknowledged that applied public health review questions more often than not require information that appears in grey literature (3). In systematic reviews, grey literature is included to supplement database searches to reduce publication bias and to ensure comprehensiveness (4, 5). Inversely, to ensure timeliness, rapid reviews of information from journal databases often exclude grey literature (6).

The COVID-19 pandemic that emerged in 2020 was a perfect example where quick information sharing was crucial. Without any known cure and proven treatment in early 2020, public health strategies were implemented based on lessons from previous influenza pandemics (7), while researchers and scientists worked on uncovering

new discoveries about the virus. In such situations, rapid review, an abbreviated form of systematic review, is a useful tool to provide timely evidence synthesis for policymakers. Responding to the need for swift reviews, Cochrane released a two-page summary guide for conducting rapid reviews in March 2020 with a subsequent publication of an interim guidance (8). At the time of writing, the Cochrane COVID Review Bank lists 11 Cochrane rapid reviews (9) while a general PubMed search for rapid reviews on COVID-19 in 2020 yielded 106 hits.

In early 2020, the challenge in compiling information related to COVID-19 was the nascent and continuously evolving nature of information. Peer-reviewed articles take a long time to publish (10) and are less favourable when quick information is needed. COVID-19 became the trending publication in journals, with preprints made accessible to address this limitation. Naturally in the early stages of the pandemic, published information centred around clinical and epidemiological knowledge of the virus, and less so on the public health strategies employed by countries to prevent transmission. At country-level, information was being shared in various ways. At the very least, most countries had daily Ministry of Health (MOH) press releases detailing pandemic situation updates and government responses to the pandemic (11-13).

Some organisations, such as WHO Europe and Oxford University made information on country-level public health strategies publicly accessible in early 2020 (14, 15). Similarly, we compiled Malaysia's health systems responses in addressing COVID-19 from January 2020 to April 2020 by utilising rapid review methodology, incorporating grey literature as a source due to limited journal publication on the topic and the use of official websites as the main form of communication. This documentation is important for creating awareness among the public of the initiatives taken to address the pandemic and as lessons for future pandemic management. When mapped against the pandemic situation in the country, effectiveness was demonstrated by case reduction. It provides an easy reference for other countries seeking measures to adopt or adapt in their local context.

In this paper, we describe the method employed to review Malaysia's health systems responses to COVID-19, through grey literature and the challenges and lessons learnt from this. To the best of the authors' knowledge, there aren't any published guidelines for reviewing grey literature as a primary source of information for health systems topics. Results from a subsequent modified and extended review are discussed elsewhere (16).

Materials and Methods

The protocol for this study was registered in Open Science Framework (17), adapting a document review approach proposed by Bowen (18). We searched for information from three resources, namely the WHO Global Research on Coronavirus Disease (COVID-19) (WHO database), official government websites and local newspapers. Research team

members consisted of eight reviewers and two supervisors; where two reviewers (KYL and NBZA) worked on the WHO database, four (AZY, SMS, ASJ, NMS) on official government websites and two (JT, CKY) on local newspapers. Documents describing health systems strategies (hereafter referred to as 'strategies') to address the COVID-19 pandemic in Malaysia were reviewed.

Search strategy

Keyword searches were not done for the official government websites and the WHO database. The website "From the Desk of the Director-General of Health Malaysia" (kpkesehatan.com) (11) had COVID-related press releases on its landing page, while the WHO database stored the list of global articles on COVID-19 in a downloadable Comma-separated Values (CSV) file. The website kpkesehatan.com has a search feature, however it was not utilised in this review.

All the press releases in kpkesehatan.com from 1 January 2020-17 April 2020 were screened for eligibility. MOH Malaysia website was hand searched between 27 March-1 April 2020 for COVID-19 related documents. The CSV file of global articles on COVID-19 was downloaded on 23 March 2020, deduplicated and screened for eligibility.

The newspaper search was done in ProQuest using the keywords below on 26 March 2020:

coronavirus OR COVID-19 OR "COVID 19" OR "Wuhan virus" OR "Wuhan pneumonia" OR "Wuhan pneumoniae"

The search was limited to newspapers and news in the English language, published in local Malaysian newspapers including The Star, Malay Mail, New Straits Times and Malay Mail Online between 1 January-25 March 2020.

An updated search was done in the selected websites and databases to include documents up to 17 April 2020.

Data management

Articles from the WHO database and newspapers from ProQuest were imported into Google Sheets, while links to documents from government websites were manually transferred into Google Sheets by one reviewer. Each type of document (journal article, information from government websites) was organised into separate Google Sheets as the descriptive information for each type differed. Screening and data extraction were done using Google Sheets. All research team members had access to the Google Drive folder containing all Google Sheets used for the review. Specific to newspaper articles, types were categorised into news reports, opinion pieces or advisories.

Screening for eligibility

A standardised screening form was piloted among all eight reviewers until a consensus was reached. As the search included diverse document types, improvements were made to ensure that the form could be used for documents from all three information sources. For all

sources, documents in English or Bahasa Melayu that contained health systems strategies to address the COVID-19 pandemic between 1 January 2020 – 17 April 2020 were included. We excluded documents describing proposed strategies that have not been implemented and opinion pieces in newspaper articles. Using Google Sheets, two-level screening was done for documents from WHO database while full-text screening was conducted for documents from government websites and ProQuest as they lacked abstracts. Each reviewer had a unique list of documents to screen independently. Uncertainties were discussed with other reviewers and disagreements were resolved by discussion with the research team. To ensure accuracy, SMS verified the screening that was done by each reviewer by random sampling of 10% of excluded documents.

Data extraction

The data extraction form was piloted among all eight reviewers until a consensus was reached. Each reviewer was assigned the same list of documents that they have screened independently. The information extracted from included documents were document date, author, type, title, URL and strategies to address COVID-19. Uncertainties were discussed with the research team. Verification was done by SMS on all documents.

Data analysis

The extracted information was mapped against the WHO COVID-19 Strategic Preparedness and Response Plan (WHO SPRP) (19), plotted against a timeline of pandemic progression in Malaysia.

Deviation from protocol

The systematic newspaper review was dropped in May 2020. The decision to discontinue the newspaper review was done due to minimal yield of useful information, which will be detailed in the discussion section.

Instead, relevant content from news and official social media accounts of government organisations (such as the MOH Malaysia Facebook account as well as Director-General of Health’s Facebook and Twitter account) were used to supplement the context of extracted information from the targeted website search. The information was used to publish a compilation of health systems responses in Malaysia (20) and to produce an interactive dashboard (21).

The search was modified to include other sources and inclusion criteria were revised to include documents published from 31 December 2019 to 30 June 2020. Methods and results from this modified and extended search are presented elsewhere (16).

Results

A total of 9,892 documents were retrieved from the search through three information sources. Figure 1 presents the

flow chart of the database and document review. In the first quarter of 2020, there were no journal articles in the WHO database describing health systems strategies in Malaysia. Most of the documents that contained health systems strategies were retrieved from government websites. The most efficient search was from government websites where 80% of hits were included.

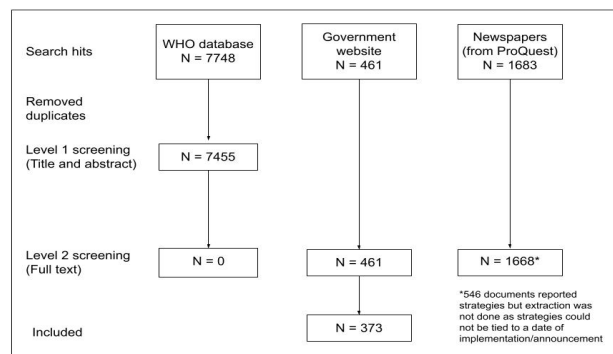


Figure 1: Flow of document review

The majority (60%) of documents from government websites were announcements and advisories related to COVID-19 (Figure 2). Twenty-four percent reported on the implementation of strategies, while the remainders were guidelines and forms related to COVID-19 management.

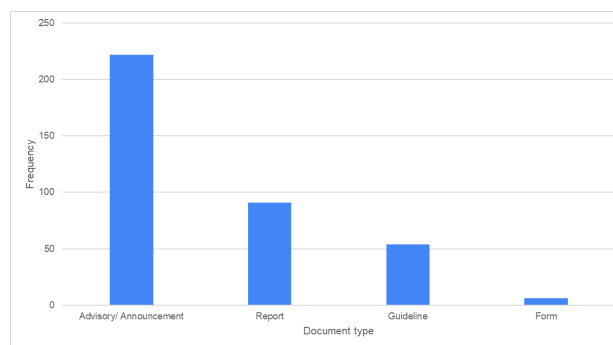


Figure 2: Type of documents from government websites

Out of the 546 newspaper articles that had health systems strategies, 527 were reports, 17 were opinion pieces and two were advisories on measures to reduce COVID-19 transmission risk. Information from newspaper articles was not extracted as most of the newspaper reports did not contain date of implementation or announcement of strategies.

Discussion

Source of information

As COVID-19 was a rapidly emerging topic and comprehensive details on strategies to address the

pandemic were rarely reported in academic journals in early 2020, we systematically searched a database and selected grey literature. We reviewed strategies employed by Malaysia to address the pandemic by searching information from the WHO database and official government websites, supplemented by local news and official MOH social media accounts.

Publication does not occur instantly, and despite the thirst of showcasing knowledge related to COVID-19 in early 2020, most publications focused on clinical and epidemiological discoveries on the virus while countries strive to address the infection that was spreading at an alarming rate. The update frequency of academic databases may differ (22); therefore, it may not be suitable for quick searches for rapidly evolving topics. Our search in the WHO database did not return any results. Moreover, public health strategies to address COVID-19 were mainly recorded in grey documents, which may or may not be publicly available. Grey literature is often accessible earlier compared to journal articles (23); hence, it was our main resource for information.

Recurrent argument in disregarding grey literature as a credible source is the lack of peer-review. However, information needs in the area of public health are beyond those available in published articles, hence, grey literature is highly valued as an information source (24, 25). Despite not being peer-reviewed, documents such as organisation and government reports come from reputable sources and are often used in public policy review, therefore the value of grey literature should not be undermined (26). Nevertheless, the selection of a particular information source should be justified.

Throughout the course of the pandemic, many channels were used to communicate strategies implemented by Malaysia, however, as the Director-General of Health was the principal designated spokesperson for the health sector, his website was selected as the primary source of information on the latest developments. To avoid duplication of information, we did not search through other ministries' websites. In the early stages of the review, we planned to include local news related to the implementation of COVID-19 health systems strategies. While newspapers in Malaysia covered a range of different languages, we narrowed down to English newspapers to make the review manageable.

Search plan

There is no one-size-fits-all approach to reviewing grey literature, owing to the various types of sources and documents that fall under the category of grey literature. Balancing efficiency and effectiveness of the search strategy is challenging yet extremely important, especially if the review has a timed duration and in situations requiring rapid responses from policymakers. Locating resources and deciding where to search also requires careful consideration. To date, there is no gold standard

in grey literature review as the method poses challenges particularly in reproducibility.

At the conceptualisation stage of the study, we planned a rapid review of available documents that met eligibility. Balancing between comprehensiveness and timeliness, we selected the WHO database as it was updated daily on weekdays and it attempts to converge available COVID-19 related articles in a database. We did not search available Malaysian health research repositories as the short timeline for the review called for the quickest and most efficient retrieval method, given the timeline and resource allocation towards documents from grey literature. Additionally, we explored grey literature that made more real-time information accessible such as MOH-related official websites, in view of daily updates on COVID-19. Many other studies have employed similar methodology of searching through relevant organisation and government websites (27-31).

Newspapers were initially included as a resource as it was one of the main-stream means of conveying information to the public. During an early-stage pilot of newspaper search, we attempted to systematically search local online mainstream news portals for relevant documents. This proved challenging and labour-intensive as search engines of these portals did not allow users to filter search using combinations of keywords, therefore we resorted to a search in ProQuest for articles in Malaysian newspapers instead. Searching for 'unarchived' information is time-consuming (3), implicating timelines in rapid reviews. Each news portal had a different layout and stored their news differently, and hence would have variable search strategies which would compromise a systematic search. Moreover, search hits in ProQuest could easily be exported into Microsoft Excel. The evolution of the final information included in the results was due to a change in policymakers' needs as the pandemic advanced. To provide context to the strategies, supplemental searches in the local news and official social media accounts were carried out.

Data management

Improvement in curation of grey literature has been raised particularly following better access to resources with the digital revolution involving the internet. Grey literature, unlike peer-reviewed articles, does not have bibliographic information and hence is not easy to organise (32). Some organisations and libraries in developed countries invest in development of grey literature databases to improve access to documents. Indexing of grey literature would also help improve data management (33). In 2012, the WHO proposed for action on improving access to grey literature by establishing repositories as grey literature is valuable for health policy and systems research (34, 35).

For the website search, we manually imported the information into an excel sheet. This allowed a window for mistakes if the reviewer was not careful and vigilant while carrying out the task. Similarly, managing references was

a challenge raised by Mahood et al. (32) as Google search engine results cannot be readily imported into a reference manager software. Data management for record keeping was also a challenge raised by Adams et al. (3), particularly with their use of social media to approach appropriate key informants. Various formats of grey literature pose a challenge in standardising data management.

Eligibility screening

The variable format of grey literature makes it difficult to conform to traditional systematic review approaches (36). Instead of a two-level screening, we read the full text of all grey documents found as the titles did not depict the content of the document. Deduplicating grey documents is labour-intensive as search hits are not stored in a standard way, hence manual deduplication had to be employed. In their grey literature review, Mahood et al. (32) described screening of results was troublesome as the title and abstract provided may not have enough information, thus relied on subjective judgement of reviewers. Specific to newspaper articles, type of news could not be filtered through ProQuest, compromising specificity of search strategy. This resulted in a large number of documents to screen for eligibility. We excluded opinion pieces as they may include suggestions and not implemented strategies.

Quality appraisal

Quality of information can be an issue in grey literature review. As grey literature lacks peer-review, quality assessment is an important step. Often, researchers make the judgement on quality of the information, including rigour and relevance (3). Grey literature can be laid into a spectrum with distinct tiers in assigning quality and credibility (36). To date, there is no standard way to assess grey literature quality, due to the variable types and formats. Tyndall (37) proposed the AACODS checklist for quality assessment of grey literature in 2010, however use of the checklist can be hampered by the limited information available from grey literature. Alternatively, Lewin et al. developed the WEIRD tool for assessment of non-scientific evidence (38). In our study, quality appraisal of grey literature was not done as we assumed that data from the authorities was deemed reliable.

Data extraction

We attempted to extract data with the WHO SPRP as a guide, however, we found that description of a strategy may straddle across several pillars in the document and hence we had to make a decision whether to have the same information in two pillars or to make subjective judgement on the dominant pillar for the strategy. Extracting the date of implementation of a strategy proved difficult as sometimes the same information was repeated multiple times in different documents with different dates. This is particularly a challenge for extraction of strategies from newspaper articles where authors may have written in retrospect. Typical data extraction templates require information that may not be readily available for grey

literature, therefore as per traditional systematic review recommendation, authors should be contacted to minimise missing information (3). However, this step is not feasible for rapid reviews as timeliness has to be factored in. In our study, information from different resources proved difficult to fit into a standardised data extraction template.

In our targeted website review, although the format of information presented differed from period to period, some information was commonly repeated, such as infection prevention and control advice. This raised the question of whether repetitive information should be extracted or should only new strategies be extracted. The research team members did acknowledge that although the gist of the content was similar, they may be targeted at different groups, depending on the local context in terms of pandemic progression at the particular time. If data trawling could be automated, sub-analysis of these repetitive information could possibly be done to compare differences in context. Some important strategies such as the evolution of risk communication cannot be gleaned from documents, but are observed from changes in the content and the way information was presented.

The transient nature of online documents was a challenge that we faced for the targeted website search. In the MOH Malaysia website, the older versions of COVID-19 clinical guidelines were not available online once an updated version has been uploaded. Similarly, Godin et al. (39) and Adams et al. (3) highlighted the temporary nature of information displayed online, which may affect reproducibility of searches. The unavailability of older versions of documents complicates analysis of COVID-19 strategy evolution if the documents found earlier were not downloaded and saved by the review team.

Recommendations

New approaches for screening and data extraction by automating the process could significantly reduce the time and increase efficiency of a review. Web scraping tools in grey literature review is a promising approach for researchers to explore (22). Calibrating the tools for automation, however, will likely be a lengthy process to ensure scientific rigour. La et al. (40) developed a web crawler engine to search and store information related to COVID-19 in online news portals. Although this requires capacity of programming language to execute, it would be useful for reviews that require timely results. Bohr J (41) used topic modelling in overcoming the problem of newspaper articles that mentioned keywords in passing from the newspaper database search to screen for relevance.

A change in the approach for storage of electronic resources to mimic that of articles in journal databases will also be helpful in increasing efficiency as well as reducing errors in data management. Grey literature has evolved with more reliance on electronic resources; thus, it is important to concentrate effort on curating, storing and ensuring accessibility of documents (42). Several reference

managers such as Mendeley and Zotero allows storing and saving of online resources through point-and-click, however, due to the variable nature of grey literature, standardised information such as that of a journal article may not be available. The main source of information in our study was official government websites. In reviewing country level approaches for public health measures, government websites would be a principal resource, hence, it is important to standardise archiving of official documents across countries.

For comprehensiveness of information, this review could be supplemented with an expert panel discussion on the health systems strategies employed by Malaysia to address the COVID-19 pandemic. By doing so, information not retrievable from documents alone could be included.

Limitations

Our primary source in the search was the official resources from the MOH, particularly press statements of the Director-General of Health, as websites of other ministries and organisations often contained repeated information. As such, the information gathered would be skewed towards information that the MOH shared with the public. There were other strategies that were carried out to manage the pandemic that remained out of the public eye, and some of these were communicated to the public at a later date, though details of date of implementation may not always be disclosed.

To ensure speed, a large team was mobilised to participate in the review. Although effort was put in to ensure standardisation of review execution, we could not completely avoid and prevent some degree of variation in how the tasks were carried out. To overcome this, verification of all the included documents was done by one reviewer. Although this task was labour-intensive, it was essential to ensure that the review was done systematically as intended.

For strategies that had no clear date of implementation, the date it was informed to the public was used instead. We did not make any attempt to clarify information with the responsible divisions in the MOH, in line with rapid review methods proposed (43).

Conclusion

Although reviewing grey literature can be challenging, it can be a potential source of information for a rapid review in quickly evolving situations, as demonstrated by our study compiling the health systems response to COVID-19 using official government websites as the primary source. With a variety of information sources to select from, strategies should be in place to ensure efficient but comprehensive search with practical data management, eligibility screening and data extraction. As more and more reviews incorporate grey literature, guidelines should be made available as a gold standard for a systematic grey literature review on topics with little information in published articles.

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Competing Interests

The authors declare they have no competing interest.

Ethical Clearance

The study was registered in the National Medical Research Register of Malaysia (Research ID 54409; NMRR ID: NMRR-20-603-54409) and approved by the Medical Research and Ethics Committee, Ministry of Health Malaysia. No consent to participate was needed as no human subjects were recruited.

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