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Recognising the heterogeneity of Indigenous Peoples during the COVID-19 pandemic: a scoping review across Canada, Australia, New Zealand and the USA

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ABSTRACT

Objectives The COVID-19 pandemic has had a disproportionate impact on the health of Indigenous Peoples in Canada, Australia, New Zealand and the USA, as reflected in the growing literature. However, Indigenous Peoples are often homogenised, with key differences often overlooked, failing to capture the complexity of issues and may lead to suboptimal public health policy-making. The objective of this review was to assess the extent to which the heterogeneity of the Indigenous Peoples in Canada, Australia, New Zealand and the USA has been reflected in COVID-19 research.

Design This study took the form of a scoping review.

Data sources Medline, Embase, CINAHL and Web of Science were searched for studies investigating COVID-19 pandemic outcomes among Indigenous Peoples in Canada, Australia, New Zealand and the USA. The search dates included January 2019 to January 2024.

Eligibility criteria All citations yielded by this search were subjected to title and abstract screening, full-text review and data extraction. We included original, peer-reviewed research investigating COVID-19-related outcomes among Indigenous Peoples in Canada, Australia, New Zealand or the USA.

Data extraction and synthesis Data extraction was conducted as an iterative process, reaching consensus between two of the study authors. All included studies were analysed through a combination of quantitative descriptive summary and qualitative thematic analysis.

Results Of the 9795 citations found by the initial search, 428 citations were deemed eligible for inclusion. Of these citations: 72.9% compared Indigenous participants to non-Indigenous participants; 10.0% aggregated Indigenous and non-white participants; and 17.1% provided findings for Indigenous participants exclusively.

Conclusions By overlooking the heterogeneity that exists among Indigenous Peoples in Canada, Australia, New Zealand and the USA, researchers and policy-makers run the risk of masking inequities and the unique needs of groups of Indigenous Peoples. This may lead to inefficient policy recommendations and unintentionally perpetuate health disparities during public health crises.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Health disparities between the general population and Indigenous Peoples in different regions across the globe are well documented.

WHAT THIS STUDY ADDS

⇒ Highlights the lack of attention paid towards the heterogeneity of Indigenous Peoples, with varying strengths and needs during a public health crisis.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Enhancing research and policy that assesses and takes into account the heterogeneity of Indigenous Peoples within countries, which is tailored to the needs of Indigenous Peoples to improve health and well-being outcomes.

INTRODUCTION

Indigenous Peoples comprise a diverse mosaic of communities globally. These communities vary widely in their cultures, traditions, languages, histories and identities.[1] Despite this rich diversity, Indigenous communities around the world share an experience of colonisation and marginalisation. As discussed by Béteille,[2] the designation of a population as 'Indigenous' implies a history of displacement and usurpation by an invading or colonising power. The United Nations Working Group on Indigenous Populations describes Indigenous Peoples as those 'having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories' and who 'consider themselves distinct from other sectors of the societies now prevailing in those territories'.[3 4]

This recurrent history has had a devastating impact on Indigenous communities through intentional targeted campaigns, which used disease, violence, exploitation and cultural assimilation to disempower and eradicate Indigenous populations.[5] While many Indigenous communities exist today, their identities and ways of life have been inextricably altered under the societal structures and paradigms imposed onto them through settler colonialism. In the face of systematic marginalisation, Indigenous Peoples demonstrated incredible strength, resilience and, in many instances, they have had to advocate and fight to preserve their autonomy, reclaim their identities and empower their communities in the face of abject oppression.[6] The sociodemographic profile of Indigenous populations varies considerably across regions. There are an estimated 476 million Indigenous Peoples around the world today—accounting for 6% of the global population.[7]

The Indigenous population of Canada consists of an estimated 1.8 million persons, comprising about 5% of the population.[8] The Indigenous population in Canada consists of First Nations, Inuit and Métis, with each group having a unique history, identity and relationship with the federal government. First Nations have traditionally inhabited the lands south of the Arctic Circle, with 831 720 of the 1 127 010 First Nations identifying with one of the 634 tribal bands recognised by the federal government.[9] As per the Indian Act, passed in 1876, the Canadian government draws a distinction between First Nations who are 'Status Indians' and those who are 'Non-Status Indians', with the former being entitled to certain legal rights and protections, such as the use of tracts of land 'owned' by the Government of Canada that are known as reserves. The term 'Inuit' refers to a group of culturally related Indigenous communities inhabiting the Canadian Arctic.[10] There are an estimated 65 000 Inuit residing in Canada who are concentrated in their homeland of Inuit Nunangat. Finally, originally derived from the union of Indigenous and European ancestry, the Métis have created unique communities over time with their own distinctive culture, language, traditions and nationhood.[9 11 12] There are an estimated 624 000 Métis, the majority of which reside in historical homelands in the Prairie Provinces.[8 12]

Meanwhile, the Indigenous population of Australia is estimated at 984 000 persons, or 3.8% of the country's population.[13] This population is often subdivided into Aboriginal (ie, traditional inhabitants of the Australian mainland and Tasmania) and Torres Strait Islander (ie, traditional inhabitants of the eponymous archipelago north of Queensland) Peoples. Aboriginal Peoples of Australia comprise more than 400 distinct peoples, distinguished by their culture, language, dialect, geography and tribal affiliation.[14] Their distribution varies considerably across the country, comprising less than 1% of the state of Victoria but more than 30% of the Northern Territory.[15] Estimated at more than 33 000, Torres Strait Islander Peoples are a culturally distinct group, which has traditionally resided in 18 communities in the Torres Strait Islands; however, presently, the majority of Torres Strait Islander Peoples reside in the Australian mainland where they continue to maintain a distinct identity rooted in their culture and way of life.[15]

In Aotearoa New Zealand, the Indigenous population comprises 875 300, representing 17.1% of the population.[16] This population predominantly consists of the Māori—a Polynesian group who are recognised as the first inhabitants of the New Zealand mainland.[17] Māori society is connected through networks of kinship organised into tribal (iwi) and subtribal (hapū) affiliations, with each hapū being made up of extended family units (whānau).[17] Iwi and hapū are considered to be the basic political units of Māori society, serving as the nuclei for social, cultural and economic organisation. In addition to the Māori, other Indigenous Peoples reside outside of the New Zealand mainland. For instance, there is a small Moriori community, numbering around 1000, from the Chatham Islands.[18] Closely related to the Māori of mainland New Zealand are the Cook Islands Māori, a Polynesian group native to the area—a constituency of the Realm of New Zealand.[19] There are approximately 80 000 Cook Islands Māori, more than 50 000 of which reside in the New Zealand mainland.[19]

The Indigenous population of the USA is approximately 10 million, or 2.9% of the national population[20]; it is subdivided along geographical delineations: American Indians (inhabiting the mainland composed of the lower 48 states), Alaska Native Peoples and Native Hawaiians. There are more than 500 federally recognised American Indian groups and more than 200 Alaska Native tribal entities, both being recognised as having inherent sovereignty with self-determination.[21] The demographics of Native Hawaiians are often considered separately from American Indians and Alaska Native Peoples, with the latter two often aggregated in statistical sampling.[22] Native Hawaiians are a Polynesian group whose ancestry can be traced to the first inhabitants of the Hawaiian Islands. Other Polynesians native to the American Pacific territories, such as the Samoans and Chamorro, are sometimes considered to make up the Indigenous population of the USA. The American government recognises more than 600 legally distinct areas inhabited by American Indians and Alaska Native Peoples, including tribal reservations, off-reservation tribal trust lands and tribal statistical areas.[23] An estimated 22% of American Indians and Alaska Native Peoples reside in these areas, with the remaining 78% living in non-tribal urban, suburban and rural areas.[24] Similarly, while Native Hawaiians share an important spiritual and cultural connection to their homelands in Hawaii, an estimated 40% of Native Hawaiians reside in the continental USA.[25] This has significant implications for health policy and service delivery as the majority of federal tribal healthcare benefits are only offered on reservations. As a result, Indigenous Peoples living outside of tribal areas tend to face additional hurdles to accessing healthcare.[26]

It is important to note that colonial legal and policy frameworks have imposed classifications on, and membership definitions for, Indigenous Peoples in Canada, Australia, New Zealand and the USA. For example, historically in Canada, Registered First Nations women lost their status and benefits if they married non-status men.[27] While the 'marrying out rule' in the Indian Act was removed in 1985, the legacy of this policy has had long-standing consequences. Meanwhile, in the USA, American Indians and Alaska Native Peoples living on tribal reservations tend to be significantly undercounted in census assessments, limiting federal funding and political representation for these communities.[22 28] These arbitrary definitions by colonial institutions on what constitutes 'Indigenous Peoples' have large-scale impacts on access and delivery of services aimed at health and well-being.

Indigenous Peoples in these four countries have had a shared history of supplantation and displacement under systems of settler colonialism.[29] All four of these countries were former British colonies, and their societies have predominantly been defined by the legal, political and social structures of the British Isles.[30] It is the imposition of these legal, political and social structures by settler colonialism that have profoundly shaped the experiences of Indigenous Peoples. These social institutions have legitimised the assimilationist and paternalistic policies, which culminated in the intentional erosion of Indigenous cultures, economies, social identities, population structures, epistemologies and ontologies.[29] This process of systemic marginalisation continues to this day. Specifically, in the context of public health, the longstanding disenfranchisement and marginalisation of Indigenous Peoples, resulting from policy and legislative decisions, is reflected in a wide range of social processes affecting health and well-being, ranging from social determinants of health to health-seeking behaviour to access to health services. Indeed, while all four of these countries often rank high in various indexes of economic prosperity and human development, their respective Indigenous populations face stark disparities in important social-related and health-related outcomes when compared with their non-Indigenous counterparts.[29]

The structural disadvantage of Indigenous Peoples has become especially prominent in the context of the COVID-19 pandemic.[31 32] While the social, health and economic impacts of the COVID-19 pandemic on Indigenous Peoples has been well documented using an equity lens, the extent to which studies have reported on the heterogeneity of Indigenous Peoples has been poor.[32] Indeed, a longstanding issue is the homogenisation of Indigenous Peoples in research studies.[32] For example, in Canada, it has been recognised that intragroup differences within the Indigenous population are often overlooked, which can lead to the homogenisation of data and associated indicators of health and well-being; indeed, Indigenous Peoples have disparate geographic, cultural and socioeconomic backgrounds.[33–36] These intra-Indigenous differences can be greater than the differences between Indigenous and non-Indigenous populations. For instance, one study set in Canada found that despite the often cited issue of high youth suicide among Indigenous Peoples, some First Nations communities observed youth suicide rates 800 times greater than the national average, whereas many others were below the national average and did not experience a single youth suicide in 15 years over the study period.[37] Similar concerns have been raised in the American context. In a paper by Serchen *et al*,[38] it was noted that the homogenisation of health data for the Indigenous population can erase the challenges faced by disparate populations. For instance, tobacco consumption rates are known to vary by tribe and region (eg, Redwood *et al*[39] noted that Alaska Native Peoples had a 24% greater prevalence of cigarette consumption than American Indians residing in the Southwest USA). In Australia, the homogenisation of the historical trauma faced by Aboriginal and Torres Strait Islander Peoples neglects the diversity through which Indigenous communities understand their relationship with the Australian government.[40] For example, Aboriginal Peoples residing in the arid regions of northern Australia—deemed 'unattractive' to colonial investors—were often able to negotiate a more autonomous relationship with the Australian government than those residing on lands more 'favorable' to capitalist ventures in the south.[40] In New Zealand, Māori are all too often treated as a homogenous group in health policy and planning.[41] For instance, mana whenua—Māori whose tribes retain traditional authority of their homelands—have been reported to have higher rates of social capital than those who are not mana whenua, with this relationship holding true even outside of Māori homelands.

In the context of the COVID-19 pandemic, data on Indigenous Peoples that fails to capture the diversity of this population may have several consequences, including a misrepresentation of scientific understanding of the pandemic on this diverse group as well as suboptimal health policy, programming and healthcare service delivery. This scoping review was conducted to understand how studies on COVID-19-related outcomes have captured the heterogeneity of Indigenous Peoples in Canada, Australia, New Zealand and the USA. Despite key historical differences between these countries, they are western countries that were colonised by strong British and European influence as reflected in political and social institutions, which makes for an interesting international comparison study.

METHODS

This scoping review employed the methodological framework proposed by Arksey & O'Malley.[42] In accordance with this methodological framework, our scoping review process consisted of the following stages: (1) identifying the research question; (2) identifying studies suitable for answering the research question; (3) screening studies for relevance; (4) charting the data by key issues and themes; and (5) collating the results of the scoping

review. It was decided to employ a scoping review, rather than a systematic review, as our goal was not to synthesise data, but identify recurring patterns in the broader literature. In line with the standard expectations surrounding scoping reviews,[43] and consistent with the practices on scoping reviews by organisations such as Cochrane,[44] this review aims to provide an overview of the relevant literature regardless of its methodological quality or risk of bias. As such, this review did not include a critical appraisal component.

This scoping review was guided by the following question: to what extent has the heterogeneity of Indigenous Peoples in Canada, Australia, New Zealand, and the USA been taken into consideration in COVID-19 research?

Search strategy

A comprehensive and systematic search strategy was developed in consultation with the search filters developed by a team of researchers from the University of Alberta's John W. Scott Health Sciences Library.[45–48] The four filters consulted had been specifically designed to retrieve articles on the Indigenous Peoples in Canada,[45] Australia,[46] New Zealand[47] and the USA.[48] These filters were originally designed for exclusive use in Ovid Medline and were curated to only use keywords that were, at the time of writing, known to exist in the database. As such, the search terms listed in these filters were adapted for use in other databases as needed. In addition to the terms relating to Indigenous communities, this search strategy incorporated keywords relating to the COVID-19 pandemic. A summary of the key concepts, synonyms and syntax used for all search queries can be found in online supplemental tables 1–4. In addition to these keywords, limits were applied to restrict the search results to studies involving human participants and studies published from 2019 onward. The protocol for this scoping review has been registered on Open Science Framework (https://doi.org/10.17605/OSF.IO/N4VX2).

The initial search was conducted on 29 November 2022, and updated on 22 January 2024. The following electronic databases, each covering a wide range of topics and disciplines, were referenced for this systematic search: Ovid Medline, Ovid Embase, CINAHL and Web of Science. All searches were limited to articles that had been published in English and between 2019 and 2024. The key concepts were also applied to Google Scholar. To supplement these electronic databases, articles and their reference lists were manually searched for additional articles which may have been relevant for inclusion in this scoping review.

Study selection

All 9795 citations yielded by this search were imported into Covidence, a systematic review management software. A total of 4176 citations were removed due to duplication. The remaining 5619 citations were reviewed through two stages of screening: (1) title and abstract screening; and (2) full-text screening.

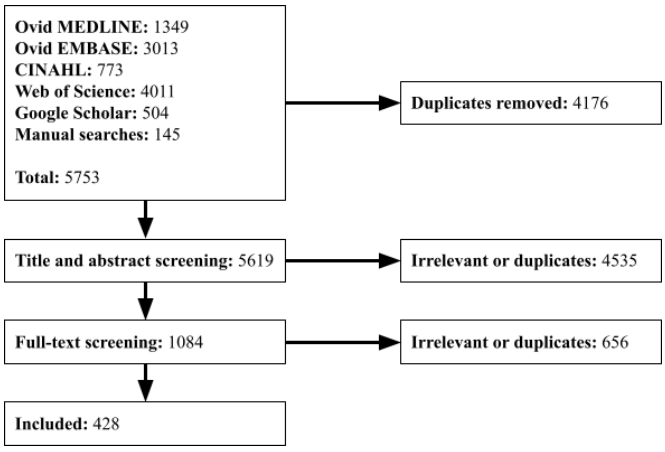

Figure 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses[49] flow chart of study selection process.

During title and abstract screening, 4535 citations were excluded, while 656 citations were removed during full-text screening. In both stages, citations were considered to meet the inclusion criteria if they constituted original, peer-reviewed research investigating COVID-19-related outcomes among Indigenous Peoples in Canada, Australia, New Zealand or the USA. Studies were also included if they discussed downstream consequences of COVID-19, such as socioeconomic outcomes of the COVID-19 pandemic. Conversely, studies were excluded if: (1) they did not comprise original research; (2) they were not published in English; and (3) they did not explicitly investigate COVID-19-related outcomes among Indigenous participants in some capacity. This screening process has been depicted in figure 1 as a Preferred Reporting Items for Systematic Reviews and Meta-Analyses[49] diagram. The initial screening process was conducted by two reviewers, with the results being deliberated on by all study authors. Any disagreements in the screening process were resolved through consensus and discussion by the two reviewers.

Data charting

An extraction table was jointly developed by two of the study authors. This extraction table was developed to ensure that each of the following variables was extracted from the included articles: (1) title; (2) author(s); (3) year of publication; (4) methodology; (5) geographic location; (6) total number of participants; (7) number of Indigenous participants; (8) presentation of data from Indigenous participants; (9) disaggregation by demographic variables; and (10) COVID-19 outcome(s) (online supplemental table 5). All disagreements in the data extraction process were resolved through consensus by deliberation with the entire study team.

All data extracted in this manner, and the findings of the included studies themselves, were used to inform a thematic analysis of the literature. In this thematic analysis, recurring patterns in the presentation of the heterogeneity of Indigenous Peoples' data were summarised using the method described by Maguire

and Delahunt.[50] This method delineated a process which began with the identification of recurring codes, the aggregation of codes into overarching themes, and the definition and subsequent analyses of these constructed themes.

RESULTS

Descriptive analysis

In total, the scoping review identified 428[51–478] publications investigating COVID-19-related outcomes among Indigenous Peoples in Australia, Canada, New Zealand or the USA (online supplemental table 5). Most of the studies identified in this scoping review were conducted in the USA (74.8%, n=320), with the remaining studies in Canada (11.0%, n=47), New Zealand (6.3%, n=27) and Australia (7.9%, n=34). A small number of studies (n=3) were conducted in multiple countries: one study comprised participants from Australia and New Zealand; and two studies comprised participants from Canada and the USA.

Among the studies included in this scoping review: 32 (7.5%) were published in 2020; 108 (25.2%) were published in 2021; 158 (36.9%) were published in 2022; 121 (28.3%) were published in 2023; and 9 (2.1%) were published in 2024. Most studies were quantitative (88.6%, n=379), using cross-sectional (43.7%, n=187) and longitudinal (23.8%, n=102) designs at the individual level of analysis, or cross-sectional designs at an ecological level (21.0%, n=90). The remaining studies were qualitative (10.0%, n=43) or mixed methods (quantitative and qualitative) (1.4%, n=6). In these publications, the number of Indigenous participants ranged from as low as 2—as seen in the smaller, qualitative studies—to as high as the total Indigenous population of a given country—as seen in the larger, nationwide ecological studies.

Presentation of study findings

We found that the studies generally presented findings on COVID-19-related outcomes in three categories: (1) Indigenous participants in relation to non-Indigenous participants (72.9%, n=312); (2) by aggregating Indigenous and non-white participants (10.0%, n=43); (3) Indigenous participants exclusively (17.1%, n=73) (online supplemental table 6).

Furthermore, 123 (28.7%) studies disaggregated their reporting of COVID-19-related outcomes among Indigenous participants into subgroups delineated by sociodemographic factors such as: age (n=77); sex (n=41); income or financial status (n=35); gender (n=32); education (n=27); geography (n=21); urbanicity (n=15); insurance coverage (n=12); marital status (n=12); specific Indigenous ethnicity (n=9); household crowdedness (n=9); and language (n=5). When cross-referenced in relation to the categories, disaggregation occurred in 64 (20.5%) of category 1 studies; 8 (18.6%) of category 2 studies; and 47 (64.4%) of category 3 studies.

DISCUSSION

Category 1: studies presenting COVID-19-related outcomes among Indigenous participants in relation to non-Indigenous participants

Almost all studies in this category aggregated data from multiple, distinct Indigenous Peoples. In studies set in the USA, participants were often broadly classified into groupings, such as 'Native American'[57] or 'American Indian or Alaska Native'.[73] A minority of these studies did recognise a distinction between 'American Indian and Alaska Native' and 'Native Hawaiian' participants[159 176]; however, these studies also tended to treat the individuals within these groups as homogenous. For American Indian participants, this led to the homogenisation of a diverse population spanning nearly 600 distinct tribes. Furthermore, many studies aggregated the data on Native Hawaiian participants with that of 'Other Pacific Islanders'.[176 247 324] This lack of nuance failed to account for the unique disadvantages faced by Native Hawaiians—as an Indigenous group whose traditions, institutions and knowledge systems have been systematically disenfranchised under American colonialism—relative to other Pacific Islander populations. The historic and ongoing experience of Native Hawaiians with colonialism contrasts with that of many other Pacific Islanders, particularly those whose traditional lands lie outside of the USA, who may not consider their homelands to be occupied by the government under which they currently reside.

Similarly, only a minority of studies recognised the heterogeneity within Canada's Indigenous population by providing separate analyses of First Nation, Inuit and Métis participants.[86 317] Instead, most studies aggregated them into broad categories. This even occurred in studies where separate data on First Nation, Inuit and Métis participants were already available; one study by Wu *et al*[232] aggregated the data of First Nations, Inuit and Métis participants into a broader 'Indigenous' category. However, there were no disclaimers on the potential implications of homogenising these populations in the Limitations section of the study; for instance, there was no acknowledgement of the wildly differing relations that these groups have with the Crown, a variable which would likely translate into differing levels of access to resources and political capital in public health planning. The lack of any such acknowledgement may reflect the routine homogenisation of data on Indigenous Peoples in statistical analyses and the disproportionate attention paid to Indigenous/non-Indigenous differences over intra-Indigenous differences. A similar phenomenon was observed in Australia, in which the two groups comprising the nation's Indigenous population, Aboriginal and Torres Strait Islander Peoples, were often aggregated under broader categorisations such as 'Indigenous Australian'. For instance, in a study by Wang *et al*[135] on COVID-19 vaccine hesitancy, participants were categorised as 'Aboriginal' regardless of whether they identified as Aboriginal or Torres Strait Islander Peoples. Once again, this study did not offer any disclaimer of

the limitations (methodological, programming, health policy, etc) associated with homogenising these two populations, such as ignoring that they reside in wildly different geographical contexts, possess different cultural norms and maintain different relations with the Australian government, which may influence vaccine access and hesitancy.

Health policy recommendations put forward by studies in this category were tailored to the needs of Indigenous Peoples as a whole, with little to no consideration of the variation within this population. In a study on well-being during the COVID-19 lockdown, Beaglehole *et al*[312] found that Māori participants were more likely to report 'excellent' well-being relative to participants of European ancestry. They suggested that this inequality may have been a result of the importance of familial connections in Māori culture, in which whānau are regarded as the basic building blocks for Māori society.[312] This assertion did not consider whether Māori participants were residing in their *rohe*—their traditional homelands—or whether they were living in proximity to other members of their *iwi*, their tribe. This highlights the limitations of homogenising data in this manner, and how exclusively reporting on population averages may mask important underlying intragroup differences, which can lead to less effective and equitable policies and interventions. Other studies, particularly those which disaggregated the responses of Indigenous Peoples by sociodemographic characteristics, were able to provide more tailored health policy recommendations. For instance, Wong *et al*[309] noted specific strengths and weaknesses in the USA's pandemic response, highlighting the differential impacts to American Indians living either on and off reservations. While some tribal nations had the autonomy to enact their own reservation-specific pandemic control measures, it was acknowledged that many urban American Indians were reliant on the decisions made by their municipal, county or state governments. This highlighted a disparity in which some Indigenous groups were privy to culturally centred pandemic responses, rooted in traditional healing, while others were not.

Category 2: studies aggregating COVID-19-related outcomes among Indigenous participants and other non-white participants

Although many studies in this category attempted to provide separate results for Indigenous Peoples, they often lacked sufficient data to analyse them as a distinct population. Instead, these studies pooled the data on Indigenous Peoples with that of other racial minority groups. Many studies created a category for 'Other Races' or 'Grouped Races' to aggregate the data from any racial minority populations which lacked an adequate number of participants to be analysed independently. In addition to Indigenous Peoples, it was common for this designation to comprise Asian participants (n=14); participants identifying with two or more races (n=7); and participants who could not be organised into other racial categories due to missing or ambiguous data (n=9). The recurring tendency to aggregate data from Indigenous Peoples with that of other racial minorities may reflect a need to oversample Indigenous Peoples to attain a sample size large enough for meaningful statistical analysis. The heterogeneity among Indigenous Peoples, which is already masked by the aggregation of all Indigenous Peoples into a single category, has the potential to be erased altogether when studies combine the data from disparate populations. The tendency for Indigenous and Asian populations to be aggregated is noteworthy, given the disproportionately higher incidences of COVID-19 infection and severity among the former relative to the latter.[93 99]

This has also been observed in studies that had been identified in the screening process, but were excluded from the scoping review itself. Despite aiming to evaluate the influence of race and ethnicity on various COVID-19-related outcomes, these studies were excluded from the scoping review as they did not include any Indigenous participants. These studies would commonly opt to disaggregate COVID-19-related outcomes between white, black, Hispanic, and—more rarely—Asian participants, but would make no provisions for the analysis of Indigenous Peoples. This may suggest that in addition to a recurring neglect of intra-Indigenous heterogeneity, many studies failed to include Indigenous Peoples entirely. Furthermore, there were studies that did recruit a small number of Indigenous Peoples, but rather than pooling their results with those of other under-represented racialised groups, opted to drop them from the final analytic sample altogether. In many instances, this was done without any explanation. In the few instances where an explanation was provided, the decision was often attributed to an inability to recruit enough Indigenous participants to yield any sort of meaningful analyses. This once again points to a tendency for studies to undersample Indigenous Peoples, which may reflect a wide range of issues (eg, cost, non-response, refusing to participate, convenience, atheoretical approach to data collection, historical legacy of mistreatment of Indigenous Peoples by Western institutions including researchers). Unfortunately, these well-intentioned studies have the potential to inform health policy by identifying existing gaps and issues; for example, in the USA, American Indians and Alaska Native Peoples living on tribal reservations are frequently undercounted in census surveys, which results in reduced services impacting health and well-being,[22 28] including pandemic responses, which could be brought to the forefront if Indigenous Peoples were sufficiently captured in these samples. Additionally, in countries such as the USA, where the majority of federal tribal healthcare benefits are only offered on reservations, studies could capture the experiences of Indigenous Peoples living outside of tribal areas, who tend to face additional hurdles to accessing healthcare,[26] given appropriate samples.

The health policy recommendations put forward by studies in this category tended to be broad in scope with limited relevance to Indigenous Peoples. For instance, in a study by Patel *et al*[242] investigating racial and

ethnic disparities in cancer care during the COVID-19 pandemic, implicit bias and systemic racism were described as important barriers to the receipt of care but were only discussed in the context of black and Latinx communities. This is despite how many of the concerns raised—such as historic distrust in the federal government—are also relevant to the delivery of care to Indigenous communities. Similarly, a study by Cowgill *et al*[66] sought to develop a COVID-19 seroprevalence estimate of King County, Washington, USA that could be disaggregated along the lines of age, race and income. However, because this study was unable to recruit enough American Indian, Alaska Native Peoples, or Native Hawaiian participants, these groups were excluded from the final estimates. Such exclusions can obfuscate the impact of the COVID-19 pandemic on Indigenous Peoples, masking the disproportionate impact they may experience due to higher rates of comorbidities, distrust in federal health messaging and barriers to accessing traditional healing.

Category 3: studies presenting COVID-19-related outcomes only among Indigenous participants

Many studies in this category tended to aggregate the data from disparate groups of Indigenous Peoples. That said, there were a minority of studies that restricted their scope to specific groups of Indigenous Peoples. For instance, studies set in New Zealand tended to specifically present COVID-19-related outcomes among Māori participants—although not always considering the heterogeneity within the Māori population or the small Moriori population. Of the studies in Canada, six presented COVID-19-related outcomes for specific Indigenous Peoples, including: Namgis First Nation (n=1); Inuit Nunavummiut (n=1); the Métis Nation of Ontario (n=2); and two unnamed First Nation communities in Alberta (n=2). Of the studies in the USA, there were 14 studies which focused on specific Indigenous Peoples, namely: Apache (n=5), Assiniboine or Sioux (n=1), Blackfeet (n=3), Navajo (n=2), Maya (n=1), Klamath (n=1) and Zuni (n=1). Of the studies set in Australia, only one focused on a specific group of Indigenous Peoples: the Gunaikurnai community of Lakes Entrance.

It should also be acknowledged that, as discussed prior, the majority (64.4%) of studies in this category disaggregated their reporting of COVID-19-related outcomes across sociodemographic subgroups, including age, gender and income. This was especially true for studies investigating COVID-19-related outcomes within a specific Indigenous community. These studies tended to provide the most detailed analyses of intra-Indigenous identity and were most amenable to addressing intersectionality. Intersectionality refers to the analytical framework wherein an individual's identity is recognised to be situated along multiple axes of oppression.[479] For instance, in a study by Soprovich *et al*[68] investigating COVID-19 guidelines in a specific Alberta First Nations community, women were found to be 14.8% more likely than men to find it difficult to keep 2 m from others. Given this finding, it can be understood that strategies which may benefit the community as a whole may not benefit all members of the community equally. In another study by John-Henderson *et al*[110] investigating changes in sleep outcomes during the COVID-19 pandemic in the Blackfeet Community, women were found to report worse sleep health than men. These key disparities would have likely been masked if the data were aggregated and presented in a homogenised manner. In the absence of these disaggregated findings, any strategies developed from these data may be susceptible to ignoring or even exacerbating the disparities between Indigenous men and women in these communities. As such, to account for the heterogeneity that exists among Indigenous Peoples, future studies should opt to consider the multiple, intersecting forms of inequity and disaggregate outcomes to allow for nuance.

The health policy recommendations put forward by studies in this category were typically more specific and tailored to the needs of particular Indigenous communities. For instance, in a study on vaccine-seeking behaviours among Aboriginal Peoples in Western Sydney, recommendations were tailored to incorporate the specific history and cultural attributes of the specific Aboriginal tribe in question.[61] Further, this study highlighted how longstanding feelings of distrust between the community and the healthcare system were alleviated through the greater visibility of Aboriginal Peoples in health clinics—especially when they occupied more senior roles as healthcare providers.[61] This approach was recommended as part of an important step towards decolonisation and greater accessibility of mainstream healthcare services, especially as it pertained to bolstering the perceived cultural safety of vaccines. In another study by Davies *et al*,[54] specific recommendations were put forward to support Māori health providers in combating the COVID-19 pandemic. For example, they[54] noted the importance of ensuring that Māori cultural values, such as kaitiakitanga (protecting) and manaakitanga (kindness), were at the heart of this process so as to ensure its perceived cultural safety. They also noted the importance of including the voices of traditional healers as part of wider trust-building efforts.

Limitations

As this scoping review focused on original peer-reviewed studies, some relevant articles may have been missed. The lack of a comprehensive grey literature search may have resulted in the omission of relevant documents, including theses, dissertations, government reports and working papers. Similarly, no preprint repositories were explicitly included in the systematic search of the literature; however, some of the databases searched yielded preprints among their results. Furthermore, this scoping review only included studies that had been published in English, reflecting the body of literature from the predominantly English-speaking settler colonial societies of Australia, Canada, New Zealand and the USA. To this end, it should be acknowledged that this review does not reflect the research conducted on Indigenous Peoples

from other settler colonial societies in Central America, South America and elsewhere in the world.

CONCLUSION

This scoping review sought to identify how Indigenous Peoples have been represented in research on COVID-19-related outcomes. From the identified studies set in Australia, Canada, New Zealand and the USA, we identified patterns in the aggregation and disaggregation of data. There may be instances that aggregation may be useful, such as policy documents drawing much-needed public attention to address the common historical experience of settler colonialism and resulting disadvantage of Indigenous Peoples relative to general populations across health and well-being, both within nations and globally; however, intra-Indigenous differences are severely under-represented in the literature, leading to the homogenisation of data from disparate communities of people. Recognising this heterogeneity is a necessary first step in the development of research, health policies and interventions that can optimally meet the specific needs of Indigenous communities during the COVID-19 pandemic, as well as future public emergencies.

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