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Are Indigenous research principles incorporated into maternal health research? A scoping review of the global literature

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ABSTRACT

Background: Indigenous women world-wide are diverse and heterogenous, yet many have similar experiences of colonization, land dispossession, and discrimination. These experiences along with inequitable access to, and quality of, maternal healthcare increase adverse maternal health outcomes. To improve health outcomes for Indigenous women, studies must be conducted with Indigenous involvement and reflect Indigenous research principles.

Objectives/Aim: The aim of this review was to explore the range, extent, and nature of Indigenous maternal health research and to assess the reporting of Indigenous research principles in the global Indigenous maternal health literature.

Methods: Following a systematic scoping review protocol, four scholarly electronic databases were searched. Articles were included if they reported empirical research published between 2000 and 2019 and had a focus on Indigenous maternal health. Descriptive data were extracted from relevant articles and descriptive analysis was conducted. Included articles were also assessed for reporting of Indigenous research principles, including Indigenous involvement, context of colonization, Indigenous conceptualizations of health, community benefits, knowledge dissemination to participants or communities, and policy or intervention recommendations.

Results: Four-hundred and forty-one articles met the inclusion criteria. While studies were conducted in all continents except Antarctica, less than 3% of articles described research in low-income countries. The most researched topics were access to and quality of maternity care (25%), pregnancy outcome and/or complications (18%), and smoking, alcohol and/or drug use during pregnancy (14%). The most common study design was cross-sectional (49%), and the majority of articles used quantitative methods only (68%). Less than 2% of articles described or reported all Indigenous research principles, and 71% of articles did not report on Indigenous People's involvement.

Conclusions: By summarizing the trends in published literature on Indigenous maternal health, we highlight the need for increased geographic representation of Indigenous women, expansion of research to include important but under-researched topics, and meaningful involvement of Indigenous Peoples.

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1. Introduction

Indigenous women are heterogenous, yet many have similar experiences of colonization, land dispossession, and discrimination, that increase adverse maternal health outcomes (Anderson et al., 2016; Gracey and King, 2009; Hill et al., 2007; King et al., 2009; Ohenjo et al., 2006). Indeed, Indigenous women have among the highest rates of maternal mortality and morbidity in the world (Gracey and King, 2009; Lennox and Stephens, 2013). Evidence from studies in high, middle and a few low-income countries suggests that Indigenous women typically receive less antenatal care and have lower rates of skilled birth attendance (Akter et al., 2019). Additionally, Indigenous women often have higher fertility rates and adverse perinatal, neonatal and infant outcomes than non-Indigenous women (Akter et al., 2019; Anderson et al., 2016; Mohindra, 2017; UNFPA, UNICEF, UN Women, 2018).

High quality data are critical to both monitoring health outcomes and developing policy and health service responses for Indigenous Peoples (Anderson et al., 2016; UN, 2019); however, disaggregated data on Indigenous women are missing, particularly in middle- and low-income regions (Anderson et al., 2016; Shah et al., 2011; Smylie and Firestone, 2015; Smylie and Phillips-Beck, 2019; UN, 2019). This lack of disaggregated data is, in part, due to Indigenous identity not being recognized or acknowledged by many governments (Crivelli et al., 2013; Ohenjo et al., 2006; UN, 2019); where Indigenous Peoples are distinctly recognized, data are rarely routinely collected (Freemantle et al., 2015). When Indigenous Peoples are included in research, particularly in large surveys or census data, they are often under-represented and/or categorized as a homogenous group (Kukutai and Taylor, 2016; UN, 2019).

Many Indigenous Peoples are wary of participating in research, which is rooted in a long history of unethical research and ongoing legacies of colonization (Huria et al., 2019; Smith, 2012), which can lead to further gaps in Indigenous maternal health data and research. Indeed, Indigenous health research "has largely been void of culturally relevant, meaningful, engaging, contextual, or decolonizing knowledge" (Ninomiya and Pollock, 2017, p. 2) and that "research conducted 'on' Indigenous Peoples has not improved Indigenous health outcomes but perpetuated systemic health inequities and geopolitical dominance by non-Indigenous institutions" (Huria et al., 2019, p. 1). Further, some Indigenous Peoples have been "over-researched", while others have been ignored, neglected, and/or excluded (Eades et al., 2010). In response, many Indigenous Peoples have advocated for more targeted research that is conducted in collaboration with or led by Indigenous Peoples to address critical health gaps and community priorities (Eades et al., 2010; Hyett et al., 2018) and to support research that leads to action (Hyett et al., 2018; Prussing, 2018). To achieve this, maternal health research needs to engage directly with Indigenous women and Indigenous organizations, acknowledge the context of and influence of colonialism, and seek to value and incorporate Indigenous conceptualizations of health and Indigenous knowledge. These actions, if executed effectively, result in more relevant, collaborative and valuable research, and in improvements to maternal health outcomes (Chomat et al., 2018; Drawson et al., 2017; National Collaborating Centre for Aboriginal Health, 2010; Rumbold et al., 2011; Smylie and Phillips-Beck, 2019; Wilson, 2008).

Acknowledging the harmful history of research and recognizing that much research continues to perpetuate colonialism is critical to designing and conducting meaningful Indigenous maternal health research (Anderson et al., 2016; Hyett et al., 2018, 2019; Ninomiya and Pollock, 2017). Summarizing the Indigenous maternal health published literature could highlight where research reporting can be strengthened, create accountability in research, and improve maternal health outcomes for Indigenous women. Therefore, this review explored the range, extent, and nature of Indigenous maternal health research and assessed the range and extent of reporting of Indigenous health research principles in the global Indigenous maternal health published literature.

2. Methods

This review was guided by a scoping review framework (Arksey and O'Malley, 2005) and is reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Scoping Review (PRISMA ScR) reporting guidelines (Tricco et al., 2018). Specifically, this involved: consulting and collaborating with Indigenous experts and Indigenous research and community partners; identifying the research question and purpose; identifying relevant studies; selecting studies for inclusion; extracting data from included studies; and summarizing, analyzing and reporting results (Arksey and O'Malley, 2005).

2.1. Indigenous collaboration and consultation

Long-term relationships and collaborations with Indigenous research and community partners informed the development of the protocol and this scoping review. A larger project on maternal health, developed in partnership with Indigenous Batwa women and their communities, inspired this review. The protocol for this review was developed in collaboration with an Indigenous women's health scholar (author TMA) and presented to Batwa community partners (Kanungu District, Uganda, in person June 2016) and two academic conferences to solicit feedback. Ongoing communications and meetings with Indigenous Batwa partners informed the analysis and interpretation (Kanungu District, Uganda, in person July 2017, and via WhatsApp© and FaceTime® August 2018 and April 2020). Final results sharing with Indigenous partners has occurred via online communications, and additional in-person results dissemination is planned for Summer 2022.

2.2. Information sources and search

The search strategy for this review was created by a team consisting of Indigenous research partner communities (author BC), an Indigenous health scholar (author TMA), non-Indigenous scholars (authors KP, JS, SY, LBF, SL, and SLH), a public health practitioner (author VS), and a university librarian, and refined through feedback from academic conferences and knowledge sharing sessions. A search string was developed (Table 1) and used to search the following four electronic databases: MEDLINE/PubMed®, Scopus®, Web of Knowledge™, and JSTORE®. The initial search was conducted on March 28, 2017, and results in all databases were restricted by publishing date (2000–2016) with no restrictions on language or publication type. The search was updated on March 20, 2018, September 14, 2019, and January 1, 2020, to capture articles published in 2017, 2018, and 2019, respectively. Additionally, a hand search of the journals *Maternal and Child Health*; *Obstetrics & Gynecology*; and *International Journal of Indigenous Health* was conducted in August 2020 to verify the comprehensiveness of our search strategy.

2.3. Eligibility criteria and relevance screening

Citations were managed through Mendeley©, a desktop reference management software manager. Duplicates were removed using the Mendeley© duplicate removal tool. Citations were then imported into DistillerSR© (DistillerSR, 2021) to facilitate screening. The de-duplication tool in DistillerSR© was utilized to identify any remaining duplicates. Multiple articles from the same study were eligible for inclusion if they presented new information and/or used different methods.

Two levels of relevance screening were conducted using the inclusion criteria (Table 2). In the first level of screening, the title and abstract were screened for relevance (Appendix 2). Articles proceeded to the second stage of screening (i.e. full text screening) if they reported empirical research, were published online between 2000 and 2019, and specifically addressed maternal health and/or well-being (Table 2). Maternal health and wellbeing were defined as research related to pregnancy, occurring during pregnancy or taking place within 42 days

Table 1
Example search string used in Scopus® to identify published articles on Indigenous maternal health research published from 2000 to 2019 (see appendix 1 for search strings used in MEDLINE/PubMed®, Web of Knowledge™, and JSTORE®).

Maternal health terms	TITLE-ABS-KEY (abortion OR "abruptio placentae" OR antenatal OR ante-natal OR "antepartum bleeding" OR birth OR "breech presentation" OR caesarean OR "cephalopelvic disproportion" OR childbirth OR "chorea gravidarum" OR chorioamnionitis OR dystocia OR eclampsia OR "gestational diabetes" OR "gestational hypertension" OR hellp OR "hyperemesis gravidarum" OR maternal OR maternity OR miscarriage OR "morning sickness" OR mother OR natal OR obstetric OR obstructed labor OR "obstructed labour" OR oligohydramnios OR parturition OR "pemohigoid gestationis" OR perinatal OR peri-natal OR peripartum OR "placenta accrete" OR "placenta previa" OR polydramnios OR postabortion OR postnatal OR "post-natal" OR postpartum OR "postpartum depression" OR "postpartum hemorrhage" OR "postpartum hemorrhage" OR "postpartum thyroiditis" OR "pre-eclampsia" OR pregnant OR pregnancy OR prenatal OR "prolonged labour" OR "prolonged labor" OR puerperal OR puerperium OR "retained placenta" OR stillbirth OR "uterine inertia" OR "uterine inversion" OR "uterine rupture" OR "vaginal fistula" OR "vasa previa" OR "vesicovaginal fistula")
AND	
Indigenous Peoples terms	ALL (Aborigin* OR Indigenous OR First Nations OR Maori OR Batwa OR […][a])

[a] Terms used to identify Indigenous Peoples were based on a series of umbrella terms for Indigenous Peoples as well as individual group names derived from two sources; The International Work Group for Indigenous Affairs (IWGIA, www.iwgia.org) and the United Nations Refugee Agency database of Minority and Indigenous Peoples (www.refworld.org). See Appendix 1 for the full explanation and list of Indigenous Peoples search terms and example search strategy.

Table 2
Inclusion and exclusion criteria used to select published articles on Indigenous maternal health.

Inclusion Criteria	Exclusion
Data collected and article published between 2000 and 2019 (inclusive)	Data collected or article published before 2000 or after 2019
Empirical research article	Case studies (e.g. patient descriptions), protocols, frameworks, comments, editorials, abstracts, calls for research, letters, conference proceedings, book reviews, textbooks, replies from authors, erratum, opinions, theses, grey literature.
Focus on Indigenous maternal health and/or well-being	Less than 8 sentences referring to Indigenous maternal health in the results and/or discussion. (Full list of maternal health terms and Indigenous populations available in appendix 1).

of delivery and/or termination of pregnancy (Say et al., 2014). Due to the establishment of the Millennium Development Goals in 2000, with specific goals to target maternal and child health, significant progress on reducing negative maternal health outcomes has been made (Lozano et al., 2018). Substantial investment into maternal health and research has occurred since then, and the landscape of maternal health and basic access to care has changed (Chersich et al., 2016). Therefore, only papers published in 2000 or after were eligible for inclusion in the study. Potentially relevant articles entered the second level of screening for full text review (Appendix 2). Indigenous Peoples comprise heterogeneous populations; as such, in this review we recognize Indigenous Peoples as those who self-identify as Indigenous, and acknowledge their extensive experiences of colonialism, land dispossession, discrimination, inequity, and, importantly, resilience. During full-text screening, the population of study had to be Indigenous pregnant (or previously pregnant) women to be included in the review (see Appendix 1 for full list of Indigenous terms). Data and results for Indigenous women had to be presented in a minimum of 8 sentences in the results and/or discussion sections of the article. Indigenous data presented in tables or figures counted as 1 sentence. Two independent reviewers participated in all screening stages. Regular meetings were held to review screening decisions and disagreements. At least one proficient person in the language of publication reviewed every document. A second reviewer could confirm exclusion using Google Translate©. To assess interrater reliability, a Cohen's Kappa (κ) statistic was calculated for full-text level of screening (McHugh, 2012).

2.4. Data characterization and analysis

Using a pre-tested data extraction form in DistillerSR©, descriptive data on articles (e.g. online publication year, journal name) and study characteristics (study design; study objectives; methods used (quantitative, qualitative, or mixed); types of data used (e.g. clinical records, surveys, interviews, photovoice); population of study; country of data collection; and maternal health focus) were extracted by KP (proficient in English and French). For articles in other languages, proficient individuals in that language extracted the data. An additional reviewer conducted quality control of a random selection of 20% of articles (including non-English and French articles), and any disagreements were resolved through a third reviewer and regular group meetings. To examine geographic representation of Indigenous Peoples we categorized the country of residence for the study population into high, upper-middle, low-middle, and low-income regions according to the World Bank classifications (World Bank, 2019).

In 2019, Huria et al. (2019) published the Consolidated criteria for strengthening reporting of health research involving Indigenous peoples: the CONSIDER statement, providing a checklist for health research reporting to both strengthen research and improve Indigenous health. This CONSIDER checklist underscores the importance of standards of reporting for Indigenous health research. To examine whether articles followed Indigenous research principles, we extracted whether the articles explicitly reported, and quotes to illustrate how they reported on the following (Table 3): Indigenous involvement; context of colonization; Indigenous conceptualizations of health; community benefits; knowledge dissemination to participants or communities; and policy, intervention, or research recommendations. These principles were selected based on works by Chambers et al. (2018), Huria et al. (2019), Ninomiya and Pollock (2017) and Smith (2012), and in consultation with Indigenous community partners and Indigenous scholars. Extracted data were exported into Microsoft® Excel (2018) and STATA 14 (StataCorp, 2015) to calculate descriptive statistics and data summaries, and to visualize results. Critical appraisal of individual sources of evidence (quality of study), summary measures, and risk of bias across studies were not extracted from relevant articles, as they are not applicable for scoping reviews (Tricco et al., 2018).

3. Results

3.1. Selection of sources of evidence

A total of 23,186 articles were retrieved from the database searches. Articles were written in a number of different languages, including Arabic, Chinese, Croatian, Czech, English, Finnish, French, German, Hungarian, Iranian, Italian, Japanese, Norwegian, Polish, Portuguese, Turkish, Spanish, Swedish, and Swiss (Fig. 1). Four-thousand seven-hundred and fifty-three full text articles were reviewed, with 4317 excluded as they had insufficient focus on pregnant or previously pregnant Indigenous women. Four hundred and forty-one articles (in Chinese, English, French, Portuguese, and Spanish), including five articles identified through hand-searching of journals, met the inclusion criteria for data extraction, analysis, and visualization (see Appendix 4

Table 3
Indigenous research principles for Indigenous maternal health research. Information extracted from each article included: whether or not the principle was reported in the article (i.e. yes/no), and details on what was reported as it related to each principle.

Priority	Explanation	Reporting criteria
Indigenous involvement	A lack of involvement of Indigenous Peoples in research can lead to minimal improvement of health outcomes and often reinforce non-Indigenous priorities; however, when Indigenous rightsholders are involved, the data are higher quality, the research better meets the needs and priorities of communities, and research leads to more effective interventions and policy action (Harding et al., 2012; Huria et al., 2019; Smith, 2012; Solomon and Randall, 2014).	Specify whether there was involvement of Indigenous rightsholders in the research study beyond being research participants. Report if Indigenous Peoples were involved in the conceptualization, study design, data collection, data analysis, writing or dissemination.
Context of colonialization	Colonialism has been recognized as a critical determinant of health for Indigenous Peoples (Andersen, 2016; Bourassa et al., 2004). For maternal health specifically, Indigenous practices and knowledge have been erased, demonized, and outlawed in many countries, leaving women with western biomedical care as their only option for maternal healthcare (Castro et al., 2015; Mannava et al., 2015; Ngomane and Mulaudzi, 2012). Further, this does not apply only to Indigenous Peoples who experience(d) European colonization. Within Africa and Asia, many Indigenous Peoples experience marginalization or discrimination, largely because they have a distinct and different cultural tradition and history compared to other groups within a state (Ohenjo et al., 2006; Thummapol et al., 2018). Contextualizing results and health outcomes within colonial relationships in reporting shifts the risk factors for negative outcomes from inherently 'being Indigenous' to experiencing effects of colonialism and/or marginalization (Czyzewski, 2011; Kim, 2019).	Specify how colonialism impacts the results and context within which maternal health is realised for Indigenous Peoples.
Indigenous conceptualizations of health	Indigenous Peoples' concepts of health and pregnancy differ from western biomedical models, rarely focusing on individual health outcomes, rather often viewing health as intimately linked to that of the wider community and the environment in which they live (Crivelli et al., 2013; Naidu and Nqila, 2013; Sokoloski, 1995; Withers et al., 2018). Understanding and having the ability to embed Indigenous conceptualizations of health into research practice are vital for researching, measuring, and improving Indigenous maternal health (Crivelli et al., 2013).	Describe Indigenous conceptualizations of health.
Community benefits	Research has a long history of doing harm and returning few benefits to Indigenous Peoples (Ninomiya and Pollock, 2017; Smith, 2012). Participating in research demands considerable resources and time from participants. However, targeted research led by or conducted in collaboration with Indigenous Peoples to address critical health gaps and community priorities can be beneficial (Eades et al., 2010; Hyett et al., 2018).	Explain how the research project and/or process benefits the Indigenous Peoples.
Knowledge dissemination to participants or communities	The results and findings of Indigenous health research must be shared with participants. Further, the findings should be developed into relevant messaging for Indigenous Peoples and organizations, policy makers, healthcare providers, and other researchers (Browne et al., 2016; Smylie et al., 2016). Dissemination and knowledge sharing with communities can enable Indigenous rightsholders to hold researchers accountable for the research and methods (Bull et al., 2019; Chambers et al., 2018). Communities can use research results to monitor community health and advocate for change and action (Chambers et al., 2018).	Describe how findings were shared with Indigenous rightsholders and other relevant stakeholders.
Policy, intervention, or research recommendations	The findings and results of Indigenous maternal health research should be translated to actionable steps for policymakers, health services, and other researchers (Huria et al., 2019; Ninomiya et al., 2017; Ninomiya and Pollock, 2017).	Outline the specific recommendations for policy and programming resulting from the study, and/or explicitly outline the next steps in research.

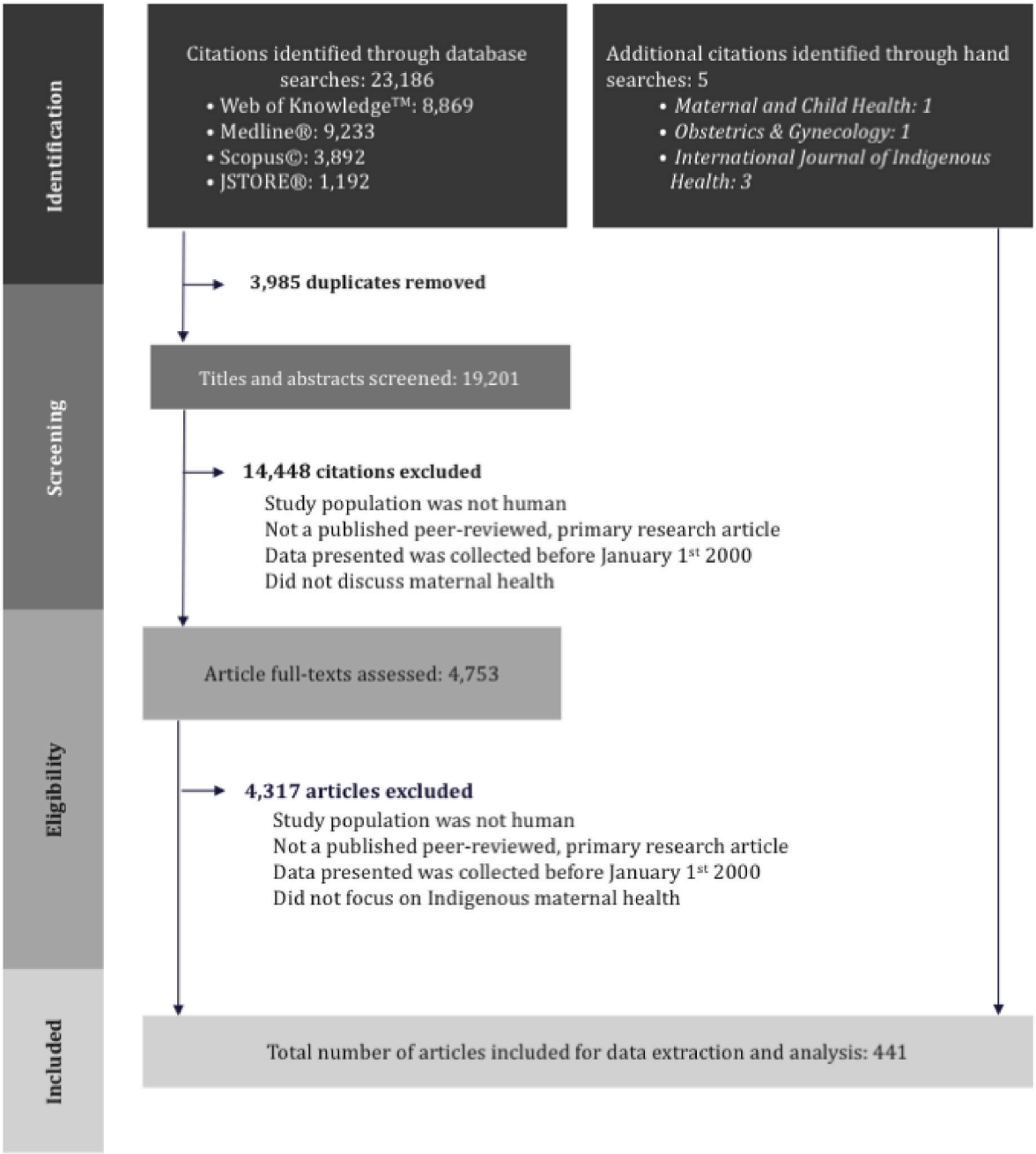

Fig. 1. Scoping review flowchart illustrating process of article inclusion: search results, two stages of screening, and final articles included for data extraction and analysis.

for descriptive table of all included studies, and Appendix 5 for full reference list). There was a very high level of agreement between reviewers with a Cohen's Kappa (κ) statistic of 0.93 in the full-text level of screening (McHugh, 2012).

Articles described maternal health research for Indigenous women residing in all continents (except Antarctica): Oceania (36%; n = 169), North America (31%; n = 146), Asia (11%; n = 54), South America (10%; = 47), Africa (8%; n = 37), and Europe (3%; n = 16) (Fig. 2). Distribution of the research across countries by World Bank (2019) income classifications was 66% (n = 312) in high, 19% (n = 92) in upper-middle, 12% (57) in lower-middle and 3% (n = 14) in low-income countries; 145 countries were not represented in the global Indigenous maternal health literature. Aboriginal and Torres Strait Islander (29%; n = 127), Indigenous Peoples in the US (11%; n = 57), Pacific Islander (9%; n = 40), and First Nations (6%; n = 28) were the most presented Indigenous Peoples. Among articles that reported study population demographics (96%; n = 425), there were 2,228,696 Indigenous women (pregnant or previously pregnant) and 86,300,000 other participants.

The most frequently studied maternal health topics were maternity care and use (24%; n = 105), pregnancy outcome and/or complications (18%; n = 82), and substance use/abuse (14%; n = 59) (Fig. 3). Over time, Indigenous maternal health research topics have diversified.

Of the 441 articles, two articles met all Indigenous research principles for maternal health research: Vallianatos et al. (2006) and Kotz et al. (2016). Seventy-one percent of articles (n = 312) did not report any Indigenous involvement in the research process (conceptualization, study design, data collection, data analysis, writing or dissemination). While this does not indicate that collaboration or involvement did not occur, it does highlight that this is not being explicitly reported in the literature. Among the articles that specified Indigenous involvement,

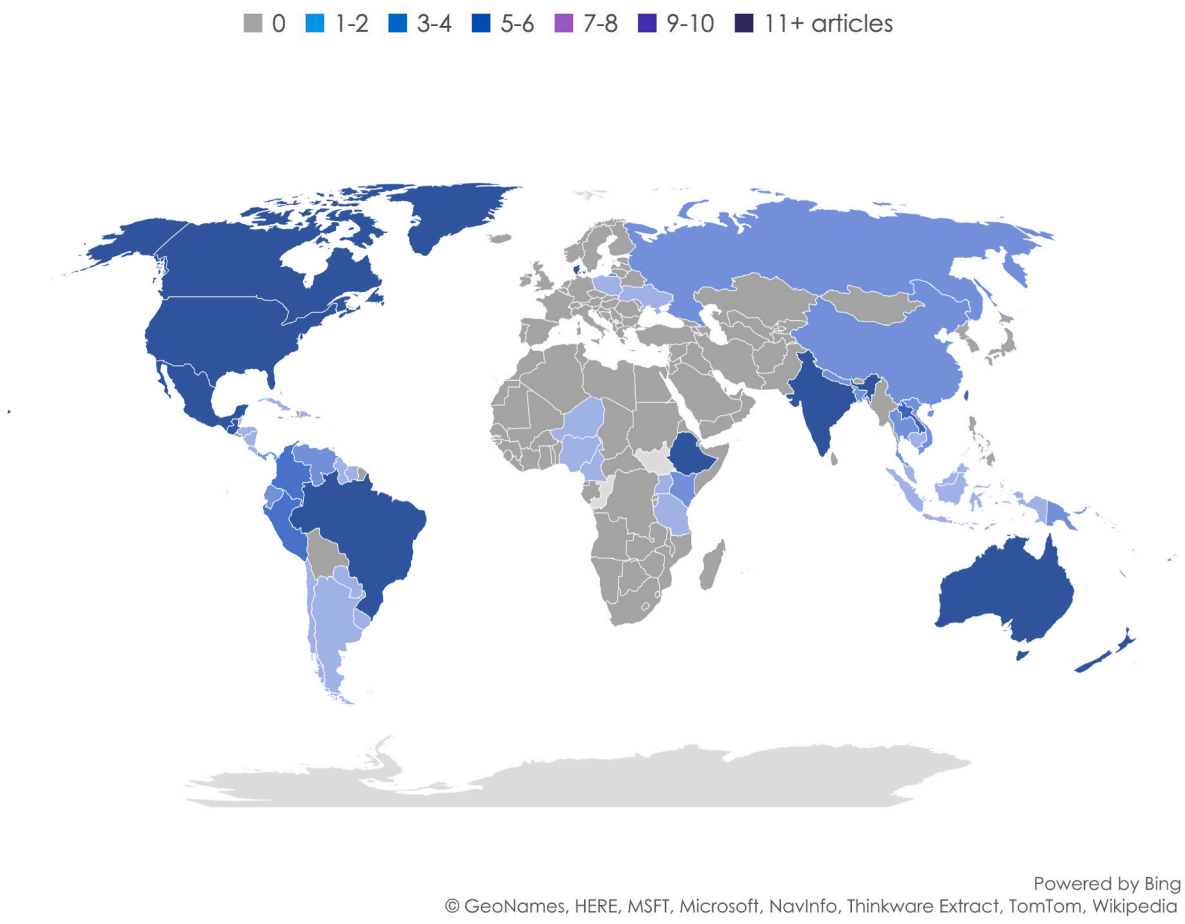

Fig. 2. Number of Indigenous maternal health articles by research location (2000–2019).

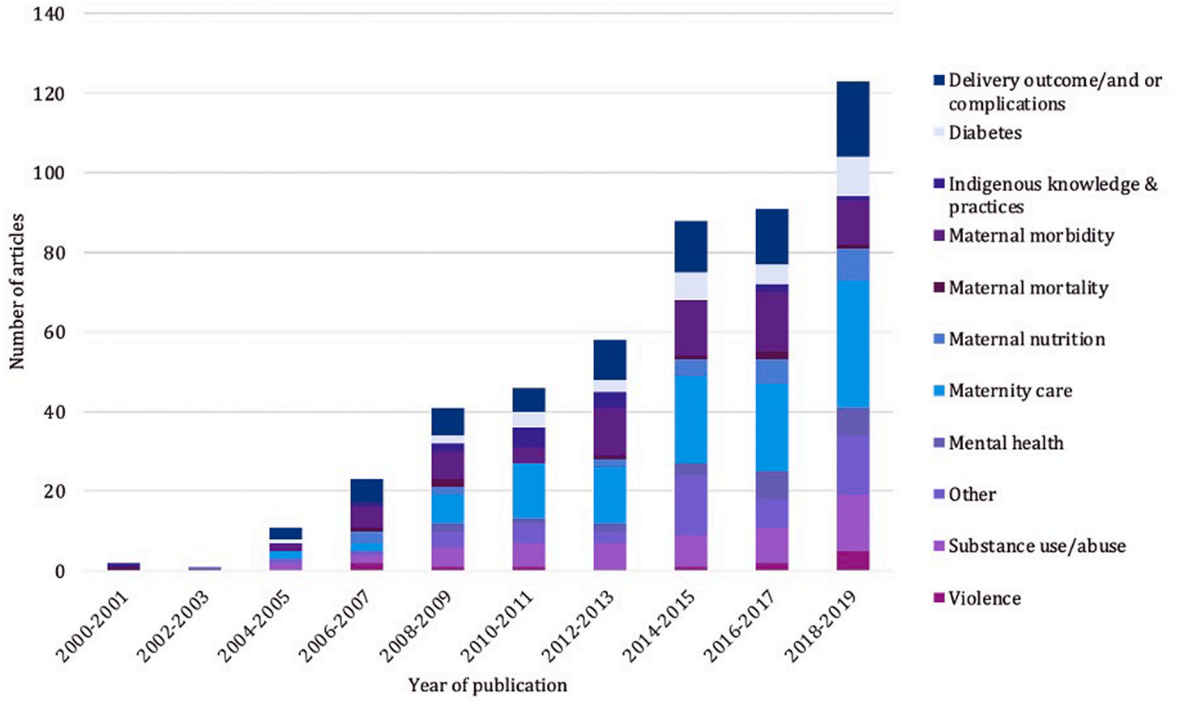

Fig. 3. Primary research focus of Indigenous maternal health published literature between 2000 and 2019. Categories were not mutually exclusive.

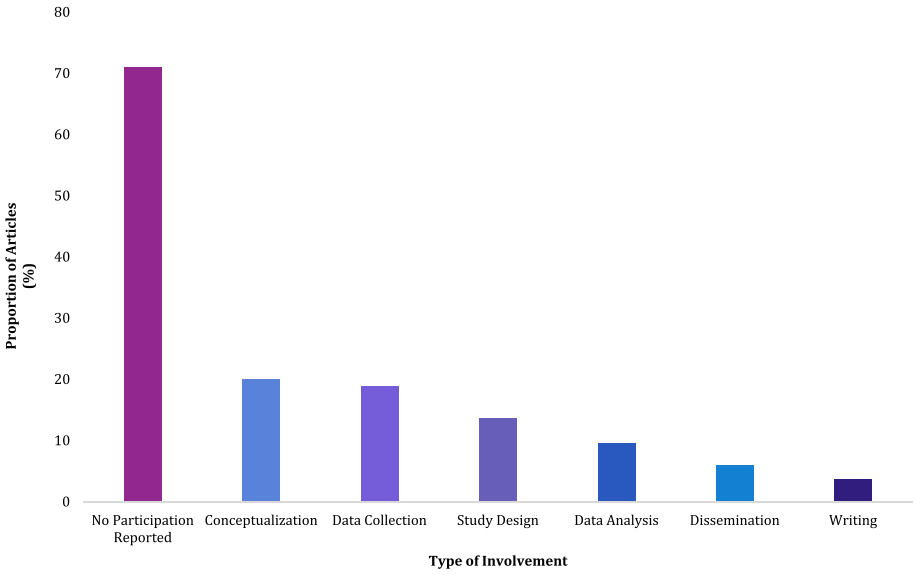

Fig. 4. Reported Indigenous involvement in published Indigenous maternal health articles (2000–2019). Categories of Indigenous participation in the research process are not mutually exclusive (e.g. an article could describe Indigenous involvement in more than one research phase).

Indigenous Peoples were most commonly involved in conceptualization (21%; n = 90) and data collection (19%; n = 83) (Fig. 4). No articles reported that they were entirely Indigenous led.

Colonialism was not mentioned in 82% (n = 360) of articles. In some articles, colonialism was used to contextualize maternal health behaviours and outcomes. For example, Gamlin and Hawkes (2015) examine the role of colonialism in maternal health through the lens of structural violence. They demonstrate the role of colonialism in the maternal health seeking behaviour of Huichol women: "*The doctor-patient relationships is characteristic of this, where linguistic, racial, and economic inequities are embodied by the patient and expressed as feelings of shame, humiliation and inferiority. Seeking ante-natal care with a mara'akame as opposed to a doctor avoids confrontations with these forms of violence and in particular the racist undertones of medical doctors and health care providers* (2015, p. 86)." Colonialism was also presented more broadly as reality faced and experienced by Indigenous Peoples, but did not elaborate on how it impacted maternal health specifically. Acknowledgement of Indigenous conceptualizations of health was not reported in 87% (n = 379) of articles. Articles describing Indigenous conceptualizations of health ranged from a short acknowledgement (e.g. "*Health is considered in a holistic way*" (Ormaeche et al., 2012, p. e725)), to in-depth explanations (e.g. "*Te Whare Tapa Wha is an ecological metaphor recognizing the interdependent nature of tinana (the physical realm), hinengaro (the emotional and mental aspects), whānau (family and social environments), and wairua (the spiritual realm)*" (Glover et al., 2016)).

Ninety-five percent (n = 417) of articles did not report disseminating findings to communities, and 87% (n = 386) did not report benefits for the Indigenous Peoples participating in the research. Examples of benefits to communities reported in articles included:

1. Assisted women with navigating the health system, and helped women to understand RHD [Rheumatoid heart disease] and its impact on fertility management and pregnancy (Belton et al., 2018).
2. Supported the development of maternity homes and programming in the area (Eckermann and Deodato, 2008).
3. Developed a new culturally appropriate way to detect perinatal depression in Kimberly communities (Kotz et al., 2016).
4. Created a record of plant knowledge held by Indigenous Nahua women for conception, pregnancy, birth, contraception, postpartum, and general reproductive health (Smith-Oka, 2008).
5. Demonstrated the importance families as part of the improvement of maternal and child health outcomes which led to an extension of *Apunipima*'s home visiting approach and provision of consistent care for women, babies, partners and the wider family from pregnancy through to birth and up to 1000 days (McCalman et al., 2015).
6. Designed care specifically for Indigenous women. The authors decided to forego a trial so women could benefit immediately from this care (Kildea et al., 2019).

Over time, the number of articles on Indigenous maternal health and/or well-being has increased, from a low in 2001 (n = 1) to a high in 2018 (n = 64), but the proportion of articles that included Indigenous research principles has not substantially increased over time (Fig. 5).

A range of study designs were utilized, including cross sectional (49%; n = 214), qualitative (22%; n = 94), cohort (21%; n = 91), randomized control trial (2%; n = 8), case-control trial (2%; n = 7), pilot/feasibility study (2%; n = 7), systematic review (2%; n = 7), and other study designs (2%; n = 8). Most articles used quantitative methods only (68%; n = 296). Articles used a range of tools and data sources, the most frequent being questionnaires (44%; n = 191), hospital, clinic, or health centre data (31%; n = 137), and qualitative interviews (26%; n = 115). A higher proportion of articles that used mixed (qualitative and quantitative) methods reported Indigenous involvement and benefits for participants than articles that used only qualitative or quantitative methods (Fig. 6). Almost half of the articles compared Indigenous and non-Indigenous participants (46%; n = 203). Further, among articles that did compare Indigenous peoples to other populations, less than 12% (n = 24) reported Indigenous participation.

Overall, we found that the proportion of articles that acknowledged colonialism was higher in articles that reported Indigenous involvement (37%; n = 48) compared to those that did not (11%; n = 33). We observed a similar pattern for Indigenous conceptualizations of health (28% vs. 7%), benefits for communities (32% vs. 4%), and results dissemination (11% vs. 2%).

4. Discussion

Published research on Indigenous maternal health has increased over the past 20 years, responding to calls to increase collection and analyses of Indigenous maternal health data (Anderson et al., 2016; Chomat et al., 2018; Crivelli et al., 2013; Smylie and Firestone, 2015; Smylie and

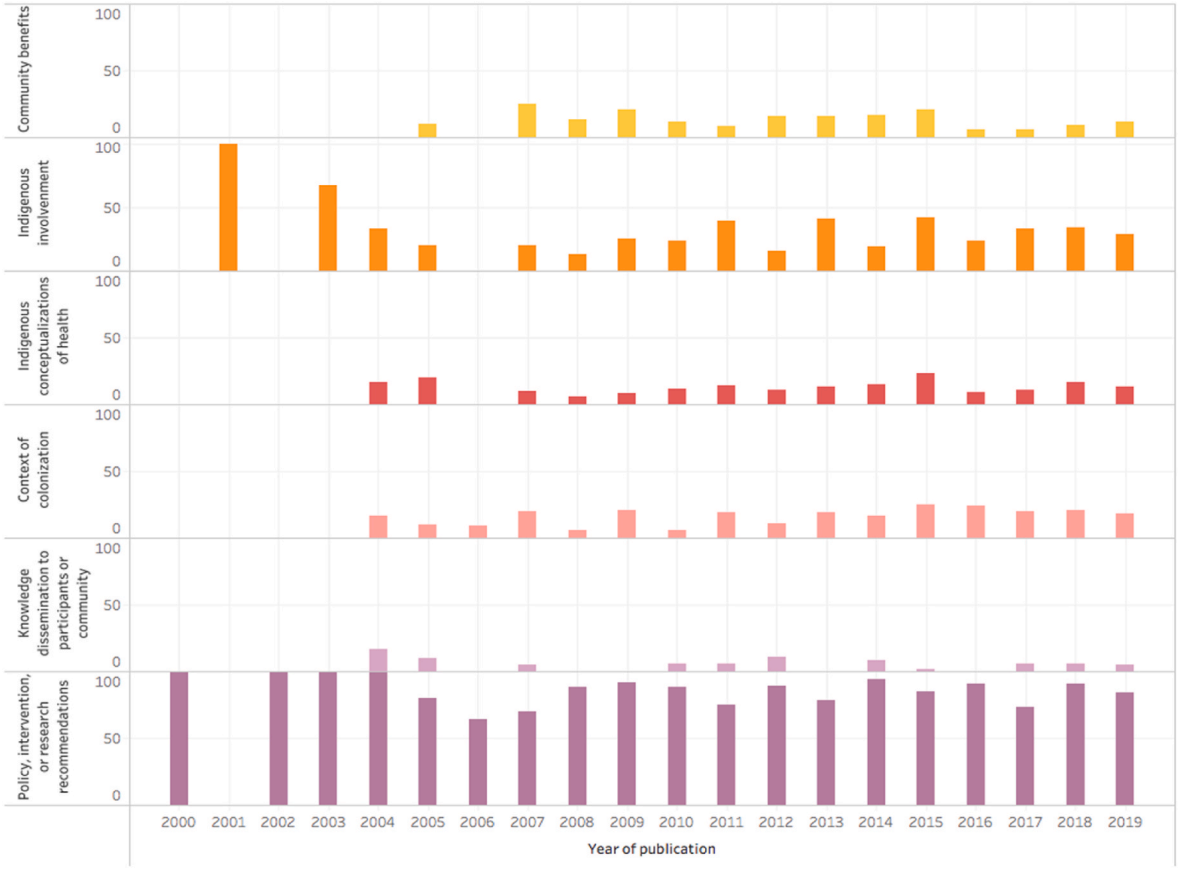

Fig. 5. Proportion of Indigenous maternal health articles reporting Indigenous research principles overtime (2000–2019).

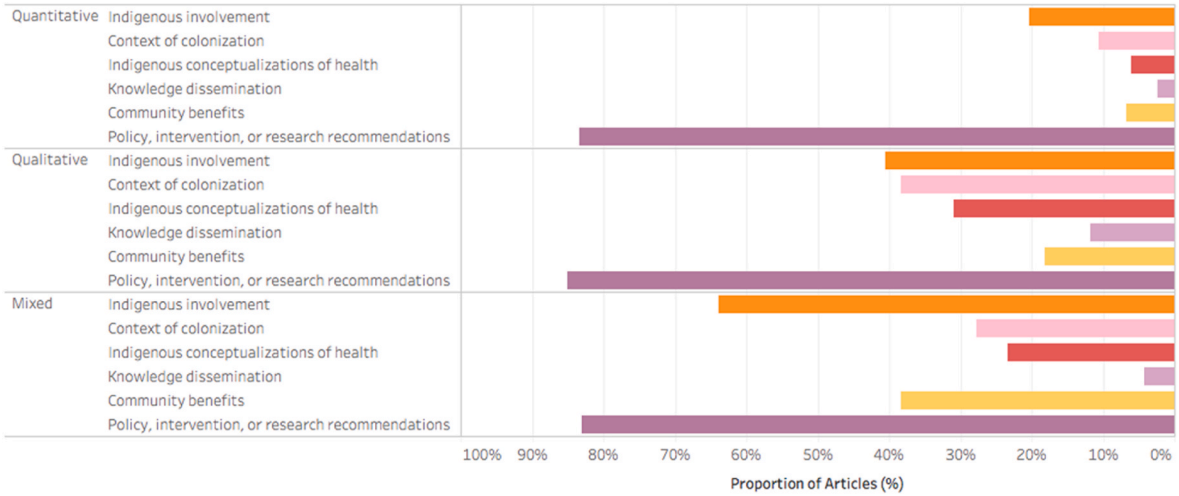

Fig. 6. Indigenous research principles for maternal health research summarized by methods used in Indigenous maternal health articles (2000–2019). The Indigenous research principles are not mutually exclusive (e.g. an article could include more than one principle).

Phillips-Beck, 2019). However, important gaps in the Indigenous maternal health literature remain. In light of the results of this scoping review, three findings merit further elaboration. First, Indigenous women from middle- and low-income countries were under-represented in the literature. Second, colonialism was rarely examined contextually in articles or as a factor in Indigenous maternal health outcomes. Finally, Indigenous research principles were infrequently reported in articles, suggesting that the researchers (and/or reviewers and journal editors) did not prioritize reporting these principles in their articles, and/or that these research principles were not embedded in the research process.

Indigenous women are not a homogenous group. Indeed, direct and systematic discrimination grounded in a wide range of intersecting social, economic, political, cultural, and geographical factors affect the experiences of individual women (UNFPA, UNICEF, UN Women, 2018). These intersecting factors result in different risk factors for maternal health and routes to address for Indigenous women; as such, understanding this intersectionality and recognizing the heterogeneity of Indigenous women within, between, and among countries is critical and

should be reflected in the literature. When examining research coverage among countries, we identified a substantial gap in geographical research coverage, with very few articles describing maternal health research in low-income countries (similar to other areas of Indigenous health research (see Anderson et al., 2016)), where ninety-nine percent of maternal mortality occurs (Kassebaum et al., 2016). While globally Indigenous women may share relative experiences of exclusion and poverty (Anderson et al., 2016; Crivelli et al., 2013), the lack of research on Indigenous maternal health in low income countries renders their burdens of illness (e.g. malaria) and experiences invisible (Bergström, 2016).

Colonialism has and continues to perpetuate health inequities for Indigenous Peoples and has been associated with malnutrition, poverty, infectious and chronic disease, as well as addiction and mental health (Czyzewski, 2011; de Leeuw et al., 2010; Greenwood and De Leeuw, 2012; Kim, 2019; Rice et al., 2016). However, despite considerable emphasis on examining inequities in maternal health outcomes, the published literature is not interrogating colonialism as a determinant or acknowledging how colonialism contextualizes and often underpins Indigenous maternal health. Indeed, we found fewer than twenty percent of articles mentioned colonialism. Acknowledging both the experiences of oppression by traditional colonial powers and other local dominant groups is critical to addressing maternal health inequities and injustices experienced by Indigenous Peoples (King et al., 2009; Mohindra, 2017; Ohenjo et al., 2006).

Indigenous engagement and leadership is critical to positive and productive maternal health research with benefits for Indigenous Peoples (Cochran et al., 2008; Minkler, 2005; Wallerstein and Duran, 2006). When Indigenous Peoples set the research agenda and identify needs and priorities, the research processes and outputs will reflect the community's values and needs (Dadich et al., 2019; Drawson et al., 2017). We found, however, very few articles reported on all Indigenous research principles (<2%), and reporting Indigenous involvement (including consultation or permission) was uncommon. As such, more meaningful inclusion of Indigenous voices and perspectives in Indigenous maternal health research is needed; Indigenous Peoples need to be central to the processes of research conceptualization, design, implementation, analysis, and interpretation (Cochran et al., 2008; Dadich et al., 2019; Prout, 2012). This is particularly important for quantitative maternal health research, as we found that articles describing quantitative research methods reported fewer Indigenous research principles than qualitative or mixed (qualitative and quantitative) methods studies. The development of quantitative data sets needs to be done in close collaboration with Indigenous Peoples so as to ensure that Indigenous values, health, and priorities are reflected in them (Prout, 2012). Applying Indigenous research principles, incorporating Indigenous knowledges, and integrating community perspectives via approaches such as community-based participatory research has the potential to facilitate sustainable solutions, decrease maternal health disparities, and instigate long-term social change (Wallerstein and Duran, 2006).

Nonetheless, our findings herein may under-represent the actual extent of Indigenous engagement and leadership in research processes; indeed, Indigenous engagement or leadership might have been embedded in the research but not explicitly reported in the article. Improved and standardized reporting guidelines in the health literature have been linked to both improved quality of health research and improved health outcomes (Moher et al., 2010; Plint et al., 2006). The recent development of the consolidated criteria for strengthening the reporting of health research involving Indigenous Peoples (CONSIDER) (Huria et al., 2019), reflects the need for accountability and visibility of Indigenous principles of research in publications.

4.1. Strengths & limitations

This scoping review has some notable strengths and limitations. We were able to engage with Batwa women and their communities from conceptualization to interpretation, and, additionally, co-develop a dissemination strategy post-COVID-19 restrictions. Through this partnership we were better able to understand and identify gaps in Indigenous maternal health research, and whether research was meeting the needs of Indigenous Peoples. However, analysis could only be conducted upon the content reported in article. As such, research may have had Indigenous involvement (e.g. Indigenous authorship), may have yielded benefits for communities, and may have had disseminated findings to participants and communities, but did not report this information in the article. Details of Indigenous involvement, benefits to communities and dissemination processes may have been present in other documents such as linked data notes, appendices, ethics applications, and or grant applications. However, most of these documents are not published or are not available to the public. Further, it is important that these principles are presented and are prominent in research presentation to ensure accountability of researchers to Indigenous communities (Huria et al., 2019). Another strength is the sensitive strategy and inclusion of non-English language publications. However, while there were no language restrictions in the search strategy, the search string was developed and executed in English, potentially missing articles indexed in other languages. Finally, and importantly, our search strategy may not have been sufficiently comprehensive to capture all published articles on Indigenous maternal health. There are between 4000–5000 unique Indigenous People(s) recognized globally (UN, 2019); logistically it was not possible to populate a list of all the Indigenous Peoples or search them with the current database search restrictions.

5. Conclusion

The findings of this scoping review underscore the importance of calls for increasing Indigenous-led maternal health research. Indigenous Peoples should lead and/or be meaningfully engaged on the best ways to collect, analyze, and report maternal health data to ensure the research meets the health priorities of their communities. By summarizing the published literature on Indigenous maternal health, we highlight the need for increased geographic representation of Indigenous women, as well as the need to recognize and redress the role that colonialism plays in maternal health. Finally, Indigenous maternal health research needs to respond to calls to meaningfully engage Indigenous Peoples throughout the research process and explicitly report these methods in the literature. Improving and standardizing Indigenous health reporting guidelines may be a key tool to mandate that Indigenous research principles are followed, create accountability for researchers, and improve the overall quality of Indigenous maternal health research (Huria et al., 2019).

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Declaration of competing interest

None.

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References

Akter, S., Davies, K., Rich, J.L., Inder, K.J., 2019. Indigenous women's access to maternal healthcare services in lower- and middle-income countries: a systematic integrative review. Int. J. Publ. Health 64, 343–353. https://doi.org/10.1007/s00038-018-1177-4.

Andersen, C., 2016. The colonialism of Canada's Métis health population dynamics: caught between bad data and no data at all. J. Popul. Res. 33, 67–82. https://doi.org/10.1007/s12546-016-9161-4.

Anderson, I., Robson, B., Connolly, M., Al-Yaman, F., Bjertness, E., King, A., Tynan, M., Madden, R., Bang, A., Coimbra, C.E.A., Pesantes, M.A., Amigo, H., Andronov, S., Armien, B., Obando, D.A., Axelsson, P., Bhatti, Z.S., Bhutta, Z.A., Bjerregaard, P., Bjertness, M.B., Briceno-Leon, R., Broderstad, A.R., Bustos, P., Chongsuvivatwong, V., Chu, J Deji, Gouda, J., Harikumar, R., Htay, T.T., Htet, A.S., Izugbara, C., Kamaka, M., King, M., Kodavanti, M.R., Lara, M., Laxmaiah, A., Lema, C., Taborda, A.M.L., Liabsuetrakul, T., Lobanov, A., Melhus, M., Meshram, I., Miranda, J.J., Mu, T.T., Nagalla, B., Nimmathota, A., Popov, A.I., Poveda, A.M.P., Ram, F., Reich, H., Santos, R.V., Sein, A.A., Shekhar, C., Sherpa, L.Y., Skold, P., Tano, S., Tanywe, A., Ugwu, C., Ugwu, F., Vapattanawong, P., Wan, X., Welch, J.R., Yang, G., Yang, Z., Yap, L., 2016. Indigenous and tribal peoples' health (the lancet–lowitja institute global collaboration): a population study. Lancet 388, 131–157. https://doi.org/10.1016/S0140-6736(16)00345-7.

Arksey, H., O'Malley, L., 2005. Scoping studies: towards a methodological framework. Int. J. Soc. Res. Methodol. Theory Pract. 8, 19–32. https://doi.org/10.1080/1364557032000119616.

Belton, S., Kruske, S., Jackson Pulver, L., Sherwood, J., Tune, K., Carapetis, J., Vaughan, G., Peek, M., McLintock, C., Sullivan, E., 2018. Rheumatic heart disease in pregnancy: how can health services adapt to the needs of Indigenous women? A qualitative study. Aust. New Zeal. J. Obstet. Gynaecol. 58, 425–431. https://doi.org/10.1111/ajo.12744.

Bergström, S., 2016. Global maternal health and newborn health: looking backwards to learn from history. Best Pract. Res. Clin. Obstet. Gynaecol. 36, 3–13. https://doi.org/10.1016/j.bpobgyn.2016.05.010.

Bourassa, C., McKay-McNabb, K., Hampton, M., 2004. Racism, sexism, and colonialism the impact on the health aboriginal women in Canada. Can. Woman Stud. 24, 23–29.

Browne, A.J., Varcoe, C., Lavoie, J., Smye, V., Wong, S.T., Krause, M., Tu, D., Godwin, O., Khan, K., Fridkin, A., 2016. Enhancing health care equity with Indigenous populations: evidence-based strategies from an ethnographic study. BMC Health Serv. Res. 16, 1–17. https://doi.org/10.1186/s12913-016-1707-9.

Bull, J., Beazley, K., Shea, J., MacQuarrie, C., Hudson, A., Shaw, K., Brunger, F., Kavanagh, C., Gagne, B., 2019. Shifting practise: recognizing Indigenous rights holders in research ethics review. Qual. Res. Org. Manag. Int. J. 15, 21–35. https://doi.org/10.1108/QROM-04-2019-1748.

Castro, A., Savage, V., Kaufman, H., 2015. Assessing equitable care for Indigenous and Afrodescendant women in Latin America. Rev. Panam. Salud Públic 38, 96–109.

Chambers, L.A., Jackson, R., Worthington, C., Wilson, C.L., Tharao, W., Greenspan, N.R., Masching, R., Pierre-Pierre, V., Mbulaheni, T., Amirault, M., Brownlee, P., 2018. Decolonizing scoping review methodologies for literature with, for, and by indigenous peoples and the african diaspora: dialoguing with the tensions. Qual. Health Res. 28, 175–188. https://doi.org/10.1177/1049732317743237.

Chersich, M., Blaauw, D., Dumbaugh, M., Penn-Kekana, L., Thwala, S., Bijlmakers, L., Vargas, E., Kern, E., Kavanagh, J., Dhana, A., Becerra-Posada, F., Mlotshwa, L., Becerril-Montekio, V., Mannava, P., Luchters, S., Pham, M.D., Portela, A.G., Rees, H., 2016. Mapping of research on maternal health interventions in low- and middle-income countries: a review of 2292 publications between 2000 and 2012. Glob. Health 12, 52. https://doi.org/10.1186/s12992-016-0189-1.

Chomat, A.M., Kring, B., Bekker, L.P., 2018. Approaching maternal health from a decolonized, systemic, and culturally safe approach: case study of the mayan-indigenous populations of Guatemala. In: Maternal Death and Pregnancy-Related Morbidity Among Indigenous Women of Mexico and Central America. Springer, Cham, pp. 483–511. https://doi.org/10.1007/978-3-319-71538-4_25.

Cochran, P.A.L.L., Marshall, C.A., Garcia-Downing, C., Kendall, E., Cook, D., McCubbin, L., Gover, R.M.S., 2008. Indigenous ways of knowing: implications for participatory research and community. Heal. Policy Ethics 98, 22–27. https://doi.org/10.2105/AJPH.2006.093641.

Crivelli, V., Hautecouer, J., Llamas, A., Stephens, C., Hutchison, C., Llamas, A., Stephens, C., 2013. Improving indigenous maternal and child health. In: State of the World's Minorities and Indigenous Peoples 2013. Minority Rights Group International, London, pp. 26–36.

Czyzewski, K., 2011. Colonialism as a broader social determinant of health. Int. Indig. Policy J. 2 https://doi.org/10.18584/iipj.2011.2.1.5.

Dadich, A., Moore, L., Eapen, V., 2019. What does it mean to conduct participatory research with Indigenous peoples? A lexical review. BMC Publ. Health 19, 1388. https://doi.org/10.1186/s12889-019-7494-6.

de Leeuw, S., Greenwood, M., Cameron, E., 2010. Deviant constructions: how governments preserve colonial narratives of addictions and poor mental health to intervene into the lives of indigenous children and families in Canada. Int. J. Ment. Health Addiction 8, 282–295. https://doi.org/10.1007/s11469-009-9225-1.

DistillerSR, 2021. Version 2.35. Evidence Partners. Accessed September 2016-December 2021. https://www.evidencepartners.com.

Drawson, A.S., Toombs, E., Mushquash, C.J., 2017. Indigenous research methods: a systematic review. Int. Indig. Policy J. 8 https://doi.org/10.18584/iipj.2017.8.2.5.

Eades, S.J., Taylor, B., Bailey, S., Williamson, A.B., Craig, J.C., Redman, S., 2010. The health of urban Aboriginal people: insufficient data to close the gap. Med. J. Aust. 193, 521–524. https://doi.org/10.5694/j.1326-5377.2010.tb04036.x.

Eckermann, E., Deodato, G., 2008. Maternity waiting homes in Southern Lao PDR: the unique "silk home". J. Obstet. Gynaecol. Res. 34, 767–775. https://doi.org/10.1111/j.1447-0756.2008.00924.x.

Freemantle, J., Ring, I., Arambula Solomon, T.G., Gachupin, F.C., Smylie, J., Cutler, T.L., Waldon, J.A., 2015. Indigenous mortality (revealed): the invisible illuminated. Am. J. Publ. Health. https://doi.org/10.2105/AJPH.2014.301994.

Gamlin, J., Hawkes, S., 2015. Pregnancy and birth in an indigenous Huichol community: from structural violence to structural policy responses. Cult. Health Sex. 17, 78–91. https://doi.org/10.1080/13691058.2014.950334.

Glover, M., Kira, A., Smith, C., 2016. Enlisting "aunties" to support indigenous pregnant women to stop smoking: feasibility study results. Nicotine Tob. Res. 18, 1110–1115. https://doi.org/10.1093/ntr/ntv146.

Gracey, M., King, M., 2009. Indigenous health part 1: determinants and disease patterns. Lancet 374, 65–75. https://doi.org/10.1016/S0140-6736(09)60914-4.

Greenwood, M.L., De Leeuw, S.N., 2012. Social determinants of health and the future well-being of Aboriginal children in Canada. Paediatr. Child Health 17, 381–384. https://doi.org/10.1093/pch/17.7.381.

Harding, A., Harper, B., Stone, D., O'Neill, C., Berger, P., Harris, S., Donatuto, J., 2012. Conducting research with tribal communities: sovereignty, ethics, and data-sharing issues. Environ. Health Perspect. 120, 6–10. https://doi.org/10.1289/ehp.1103904.

Hill, K., Barker, B., Vos, T., 2007. Excess Indigenous mortality: are Indigenous Australians more severely disadvantaged than other Indigenous populations? Int. J. Epidemiol. 36, 580–589. https://doi.org/10.1093/ije/dym011.

Huria, T., Palmer, S.C., Pitama, S., Beckert, L., Lacey, C., Ewen, S., Smith, L.T., 2019. Consolidated criteria for strengthening reporting of health research involving indigenous peoples: the CONSIDER statement. BMC Med. Res. Methodol. 19 https://doi.org/10.1186/s12874-019-0815-8.

Hyett, S., Marjerrison, S., Gabel, C., 2018. Improving health research among Indigenous Peoples in Canada. CMAJ (Can. Med. Assoc. J.) 190, E616–E621. https://doi.org/10.1503/cmaj.171538.

Hyett, S.L., Gabel, C., Marjerrison, S., Schwartz, L., 2019. Deficit-based indigenous health research and the stereotyping of indigenous peoples. Can. J. Bioethics/Revue Can. bioéthique 2, 102–109. https://doi.org/10.7202/1065690ar.

Kassebaum, N.J., Barber, R.M., Bhutta, Z.A., Dandona, L., Gething, P.W., Hay, S.I., Kinfu, Y., Larson, H.J., Liang, X., Lim, S.S., Lopez, A.D., Lozano, R., Mensah, G.A., Mokdad, A.H., Naghavi, M., Pinho, C., Salomon, J.A., Steiner, C., Vos, T., Wang, H., Abajobir, A.A., Abate, K.H., Abbas, K.M., Abd-Allah, F., Abdallat, M.A., Abdulle, A. M., Abera, S.F., Aboyans, V., Abubakar, I., Abu-Rmeileh, N.M.E., Achoki, T., Adebiyi, A.O., Adedeji, I.A., Adelekan, A.L., Adou, A.K., Afanvi, K.A., Agarwal, A., Kiadaliri, A.A., Ajala, O.N., Akinyemiju, T.F., Akseer, N., Al-Aly, Z., Alam, K., Alam, N.K.M., Alasfoor, D., Aldhahri, S.F., Aldridge, R.W., Alhabib, S., Ali, R., Alkerwi, A., Alla, F., Al-Raddadi, R., Alsharif, U., Martin, E.A., Alvis-Guzman, N., Amare, A.T., Amberbir, A., Amegah, A.K., Ammar, W., Amrock, S.M., Andersen, H. H., Anderson, G.M., Antoine, R.M., Antonio, C.A.T., Aregay, A.F., Ärnlöv, J., Arora, M., Arsenijevic, V.S.A., Artaman, A., Asayesh, H., Atique, S., Avokpaho, E.F.G. A., Awasthi, A., Quintanilla, B.P.A., Azzopardi, P., Bacha, U., Badawi, A., Bahit, M. C., Balakrishnan, K., Banerjee, A., Barac, A., Barker-Collo, S.L., Bärnighausen, T., Basu, S., Bayou, T.A., Bayou, Y.T., Bazargan-Hejazi, S., Beardsley, J., Wang, N.H. Bedi, Bekele, T., Bell, M.L., Bennett, D.A., Bensenor, I.M., Berhane, A., Bernabé, E., Betsu, B.D., Beyene, A.S., Biadgilign, S., Bikbov, B., Abdulhak, A.A. Bin, Biroscak, B. J., Biryukov, S., Bisanzio, D., Bjertness, E., Blore, J.D., Brainin, M., Brazinova, A., Breitborde, N.J.K., Brugha, T.S., Butt, Z.A., Campos-Nonato, I.R., Campuzano, J.C., Cárdenas, R., Carrero, J.J., Carter, A., Casey, D.C., Castañeda-Orjuela, C.A., Castro, R.E., Catalá-López, F., Cavalleri, F., Chang, H.-Y., Chang, J.-C., Chavan, L., Chibueze, C.E., Chisumpa, V.H., Choi, J.-Y.J., Chowdhury, R., Christopher, D.J., Ciobanu, L.G., Cirillo, M., Coates, M.M., Coggeshall, M., Colistro, V., Colquhoun, S. M., Cooper, C., Cooper, L.T., Cortinovis, M., Dahiru, T., Damasceno, A., Danawi, H., Dandona, R., das Neves, J., Leo, D. De, Dellavalle, R.P., Deribe, K., Deribew, A., Des Jarlais, D.C., Dharmaratne, S.D., Dicker, D.J., Ding, E.L., Dossou, E., Dubey, M., Ebel, B.E., Ellingsen, C.L., Elyazar, I., Endries, A.Y., Ermakov, S.P., Eshrati, B., Esteghamati, A., Faraon, E.J.A., Farid, T.A., Farinha, C.S. e S., Faro, A., Farvid, M.S., Farzadfar, F., Fereshtehnejad, S.-M., Fernandes, J.C., Fischer, F., Fitchett, J.R.A., Fleming, T., Foigt, N., Franca, E.B., Franklin, R.C., Fraser, M.S., Friedman, J., Fullman, N., Fürst, T., Futran, N.D., Gambashidze, K., Gamkrelidze, A., Gebre, T., Gebrehiwot, T.T., Gebremedhin, A.T., Gebremedhin, M., Gebru, A.A., Geleijnse, J. M., Gibney, K.B., Giref, A.Z., Giroud, M., Gishu, M.D., Glaser, E., Goenka, S., Gomez-Dantes, H., Gona, P., Goodridge, A., Gopalani, S.V., Goto, A., Graetz, N., Gugnani, H. C., Guo, Y., Gupta, Rahul, Gupta, Rajeev, Gupta, V., Hafezi-Nejad, N., Hailu, A.D., Hailu, G.B., Hamadeh, R.R., Hamidi, S., Hancock, J., Handal, A.J., Hankey, G.J., Harb, H.L., Harikrishnan, S., Harun, K.M., Havmoeller, R., Hoek, H.W., Horino, M., Horita, N., Hosgood, H.D., Hoy, D.G., Htet, A.S., Hu, G., Huang, H., Huang, J.J., Huybrechts, I., Huynh, C., Iannarone, M., Iburg, K.M., Idrisov, B.T., Iyer, V.J., Jacobsen, K.H., Jahanmehr, N., Jakovljevic, M.B., Javanbakht, M., Jayatilleke, A.U., Jee, S.H., Jeemon, P., Jha, V., Jiang, G., Jiang, Y., Jibat, T., Jonas, J.B., Kabir, Z., Kamal, R., Kan, H., Karch, A., Karletsos, D., Kasaeian, A., Kaul, A., Kawakami, N.,

Kayibanda, J.F., Kazanjan, K., Kazi, D.S., Keiyoro, P.N., Kemmer, L., Kemp, A.H., Kengne, A.P., Keren, A., Kereselidze, M., Kesavachandran, C.N., Khader, Y.S., Khan, A.R., Khan, E.A., Khang, Y.-H., Khonelidze, I., Khosravi, A., Khubchandani, J., Kim, Y.J., Kivipelto, M., Knibbs, L.D., Kokubo, Y., Kosen, S., Koul, P.A., Koyanagi, A., Krishnaswami, S., Defo, B.K., Bicer, B.K., Kudom, A.A., Kulikoff, X.R., Kulkarni, C., Kumar, G.A., Kutz, M.J., Lal, D.K., Lalloo, R., Lam, H., Lamadrid-Figueroa, H., Lan, Q., Larsson, A., Laryea, D.O., Leigh, J., Leung, R., Li, Yichong, Li, Yongmei, Lipshultz, S.E., Liu, P.Y., Liu, S., Liu, Y., Lloyd, B.K., Lotufo, P.A., Lunevicius, R., Ma, S., Razek, H.M.A. El, Razek, M.M.A. El, Majdan, M., Majeed, A., Malekzadeh, R., Mapoma, C.C., Marcenes, W., Margolis, D.J., Marquez, N., Masiye, F., Marzan, M.B., Mason-Jones, A.J., Mazorodze, T.T., Meaney, P.A., Mehari, A., Mehndiratta, M.M., Mejia-Rodriguez, F., Mekonnen, A.B., Melaku, Y.A., Memish, Z.A., Mendoza, W., Meretoja, A., Meretoja, T.J., Mhimbira, F.A., Miller, T.R., Mills, E.J., Mirarefin, M., Misganaw, A., Ibrahim, N.M., Mohammad, K.A., Mohammadi, A., Mohammed, S., Mola, G.L.D., Monasta, L., de la Cruz Monis, J., Hernandez, J.C.M., Montero, P., Montico, M., Mooney, M.D., Moore, A.R., Moradi-Lakeh, M., Morawska, L., Mori, R., Mueller, U.O., Murthy, G.V.S., Murthy, S., Nachega, J.B., Naheed, A., Naldi, L., Nand, D., Nangia, V., Nash, D., Neupane, S., Newton, J.N., Ng, M., Ngalesoni, F.N., Nguhiu, P., Nguyen, G., Nguyen, Q. Le, Nisar, M.I., Nomura, M., Norheim, O.F., Norman, R.E., Nyakarahuka, L., Obermeyer, C.M., Ogbo, F.A., Oh, I.-H., Ojelabi, F. A., Olivares, P.R., Olusanya, B.O., Olusanya, J.O., Opio, J.N., Oren, E., Ota, E., Oyekale, A.S., Pa, M., Pain, A., Papantoniou, N., Park, E.-K., Park, H.-Y., Caicedo, A. J.P., Patten, S.B., Paul, V.K., Pereira, D.M., Perico, N., Pesudovs, K., Petzold, M., Phillips, M.R., Pillay, J.D., Pishgar, F., Polinder, S., Pope, D., Pourmalek, F., Qorbani, M., Rafay, A., Rahimi, K., Rahimi-Movaghar, V., Rahman, M., Rahman, M. H.U., Rahman, S.U., Rai, R.K., Ram, U., Ranabhat, C.L., Rangaswamy, T., Rao, P.V., Refaat, A.H., Remuzzi, G., Resnikoff, S., Rojas-Rueda, D., Ronfani, L., Roshandel, G., Roy, A., Ruhago, G.M., Sagar, R., Saleh, M.M., Sanabria, J.R., Sanchez-Niño, M.D., Santos, I.S., Santos, J.V., Sarmiento-Suarez, R., Sartorius, B., Satpathy, M., Savic, M., Sawhney, M., Saylan, M.I., Schneider, I.J.C., Schwebel, D.C., Seedat, S., Sepanlou, S. G., Servan-Mori, E.E., Setegn, T., Shackelford, K.A., Shaikh, M.A., Shakh-Nazarova, M., Sharma, R., She, J., Sheikhbahaei, S., Shen, J., Shibuya, K., Shin, M.-J., Shiri, R., Shishani, K., Shiue, I., Sigfusdottir, I.D., Silpakit, N., Silva, D.A.S., Silveira, D.G.A., Silverberg, J.I., Simard, E.P., Sindi, S., Singh, A., Singh, J.A., Singh, O.P., Singh, P.K., Singh, V., Skirbekk, V., Sligar, A., Sliwa, K., Smith, J.M., Soneji, S., Sorensen, R.J.D., Soriano, J.B., Soshnikov, S., Sposato, L.A., Sreeramareddy, C.T., Stathopoulou, V., Stroumpoulis, K., Sturua, L., Sunguya, B.F., Swaminathan, S., Sykes, B.L., Szoeke, C.E.I., Tabarés-Seisdedos, R., Tabb, K.M., Talongwa, R.T., Tavakkoli, M., Taye, B., Tedla, B.A., Tefera, W.M., Tekle, T., Shifa, G.T., Terkawi, A.S., Tesfay, F.H., Tessema, G.A., Thomson, A.J., Thorne-Lyman, A.L., Tobe-Gai, R., Topor-Madry, R., Towbin, J.A., Tran, B.X., Dimbuene, Z. T., Tura, A.K., Tyrovolas, S., Ukwaja, K.N., Uthman, O.A., Vasankari, T., Venketasubramanian, N., Violante, F.S., Vladimirov, S.K., Vlassov, V.V., Vollset, S.E., Wagner, J.A., Wang, L., Weichenthal, S., Weiderpass, E., Weintraub, R.G., Werdecker, A., Westerman, R., Wijeratne, T., Wilkinson, J.D., Wiysonge, C.S., Woldeyohannes, S.M., Wolfe, C.D.A., Wolock, T., Won, S., Wubshet, M., Xiao, Q., Xu, G., Yadav, A.K., Yakob, B., Yalew, A.Z., Yano, Y., Yebyo, H.G., Yip, P., Yonemoto, N., Yoon, S.-J., Younis, M.Z., Yu, C., Yu, S., Zaidi, Z., Zaki, M.E.S., Zeeb, H., Zhao, Yi, Zhao, Yong, Zhou, M., Zodpey, S., Zuhlke, L.J., Murray, C.J.L., 2016. Global, regional, and national levels of maternal mortality, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet 388, 1775–1812. https://doi.org/10.1016/S0140-6736(16)31470-2.

Kildea, S., Gao, Y., Hickey, S., Kruske, S., Nelson, C., Blackman, R., Tracy, S., Hurst, C., Williamson, D., Roe, Y., 2019. Reducing preterm birth amongst Aboriginal and Torres Strait Islander babies: a prospective cohort study, Brisbane, Australia. EClinicalMedicine 12, 43–51. https://doi.org/10.1016/j.eclinm.2019.06.001.

Kim, P.J., 2019. Social determinants of health inequities in indigenous Canadians through a life course approach to colonialism and the residential school system. Heal. Equity 3, 378–381. https://doi.org/10.1089/heq.2019.0041.

King, M., Smith, A., Gracey, M., 2009. Indigenous health part 2: the underlying causes of the health gap. Lancet 374, 76–85. https://doi.org/10.1016/S0140-6736(09)60827-8.

Kotz, J., Munns, A., Marriott, R., Marley, J.V., 2016. Perinatal depression and screening among Aboriginal Australians in the Kimberley. Contemp. Nurse 52, 42–58. https://doi.org/10.1080/10376178.2016.1198710.

Kukutai, T., Taylor, J., 2016. Indigenous Data Sovereignty: toward an Agenda. ANU Press.

Lennox, C, Stephens, C (Eds.), 2013. Realizing the right to health for minorities and indigenous peoples. Minority Rights Group International. https://minorityrights.org/wp-content/uploads/old-site-downloads/download-1293-State-of-the-Worlds-Minorities-and-Indigenous-Peoples-2013.pdf.

Lozano, R., Fullman, N., Abate, D., Abay, S.M., Abbafati, C., Abbasi, N., Abbastabar, H., Abd-Allah, F., Abdela, J., Abdelalim, A., Abdel-Rahman, O., Abdi, A., Abdollahpour, I., Abdulkader, R.S., Abebe, N.D., Abebe, Z., Abejie, A.N., Abera, S.F., Abil, O.Z., Aboyans, V., Abraha, H.N., Abrham, A.R., Abu-Raddad, L.J., Abu-Rmeileh, N.M., Abyu, G.Y., Accrombessi, M.M.K., Acharya, D., Acharya, P., Adamu, A.A., Adebayo, O.M., Adedeji, I.A., Adedoyin, R.A., Adekanmbi, V., Adetokunboh, O.O., Adhena, B.M., Adhikari, T.B., Adib, M.G., Adou, A.K., Adsuar, J. C., Afarideh, M., Afshari, M., Afshin, A., Agarwal, G., Aghayan, S.A., Agius, D., Agrawal, A., Agrawal, S., Ahmadi, A., Ahmadi, M., Ahmadieh, H., Ahmed, M.B., Ahmed, S., Akalu, T.Y., Akanda, A.S., Akbari, M.E., Akibu, M., Akinyemi, R.O., Akinyemiju, T., Akseer, N., Alahdab, F., Al-Aly, Z., Alam, K., Alam, T., Albujeer, A., Alebel, A., Alene, K.A., Al-Eyadhy, A., Alhabib, S., Ali, R., Alijanzadeh, M., Alizadeh-Navaei, R., Aljunid, S.M., Alkerwi, A., Alla, F., Allebeck, P., Allen, C.A., Almasi, A., Al-Maskari, F., Al-Mekhlafi, H.M., Alonso, J., Al-Raddadi, R.M., Alsharif, U., Altirkawi, K., Alvis-Guzman, N., Amare, A.T., Amenu, K., Amini, E., Ammar, W., Anber, N.H., Anderson, J.A., Andrei, C.L., Androudi, S., Animut, M.D., Anjomshoa, M., Ansari, H., Ansariadi, A., Ansha, M.G., Antonio, C.A.T., Anwari, P., Appiah, L.T., Aremu, O., Areri, H.A., Ärnlöv, J., Arora, M., Aryal, K.K., Asayesh, H., Asfaw, E.T., Asgedom, S.W., Asghar, R.J., Assadi, R., Ataro, Z., Atique, S., Atre, S.R., Atteraya, M.S., Ausloos, M., Avila-Burgos, L., Avokpaho, E.F.G.A., Awasthi, A., Ayala Quintanilla, B.P., Ayele, H.T., Ayele, Y., Ayer, R., Azarpazhooh, M.R., Azzopardi, P. S., Azzopardi-Muscat, N., Babalola, T.K., Babazadeh, A., Badali, H., Badawi, A., Balakrishnan, K., Bali, A.G., Banach, M., Banerjee, A., Banoub, J.A.M., Banstola, A., Barac, A., Barboza, M.A., Barker-Collo, S.L., Bärnighausen, T.W., Barrero, L.H., Barthelemy, C.M., Bassat, Q., Basu, A., Basu, S., Battista, R.J., Baune, B.T., Baynes, H. W., Bazargan-Hejazi, S., Bedi, N., Beghi, E., Behzadifar, Masoud, Behzadifar, Meysam, Béjot, Y., Bekele, B.B., Belachew, A.B., Belay, A.G., Belay, S.A., Belay, Y.A., Bell, M.L., Bello, A.K., Bennett, D.A., Bensenor, I.M., Benzian, H., Berhane, A., Berhe, A.K., Berman, A.E., Bernabe, E., Bernstein, R.S., Bertolacci, G.J., Beuran, M., Beyranvand, T., Bhala, N., Bhalla, A., Bhansali, A., Bhattarai, S., Bhaumik, S., Bhutta, Z.A., Biadgo, B., Biehl, M.H., Bijani, A., Bikbov, B., Bililign, N., Bin Sayeed, M.S., Birlik, S.M., Birungi, C., Bisanzio, D., Biswas, T., Bitew, H., Bizuneh, H., Bjertness, E., Bobasa, E.M., Boufous, S., Bourne, R., Bozorgmehr, K., Bragazzi, N.L., Brainin, M., Brant, L.C., Brauer, M., Brazinova, A., Breitborde, N.J.K., Briant, P.S., Britton, G., Brugha, T., Bukhman, G., Busse, R., Butt, Z.A., Cahuana-Hurtado, L., Callender, C.S., Campos-Nonato, I.R., Campuzano Rincon, J.C., Cano, J., Car, J., Car, M., Cárdenas, R., Carrero, J.J., Carter, A., Carvalho, F., Castañeda-Orjuela, C.A., Castillo Rivas, J., Castro, F., Causey, K., Çavlin, A., Cercy, K.M., Cerin, E., Chaiah, Y., Chalek, J., Chang, H.-Y., Chang, J.-C., Chattopadhyay, A., Chattu, V.K., Chaturvedi, P., Chiang, P.P.-C., Chin, K.L., Chisumpa, V.H., Chitheer, A., Choi, J.-Y.J., Chowdhury, R., Christensen, H., Christopher, D.J., Chung, S.-C., Cicuttini, F.M., Ciobanu, L.G., Cirillo, M., Claro, R.M., Claßen, T.K.D., Cohen, A.J., Collado-Mateo, D., Cooper, C., Cooper, L.T., Cornaby, L., Cortinovis, M., Costa, M., Cousin, E., Cromwell, E.A., Crowe, C.S., Cunningham, M., Daba, A.K., Dadi, A.F., Dandona, L., Dandona, R., Dang, A.K., Dargan, P.I., Daryani, A., Das, S.K., Das Gupta, Rajat, das Neves, J., Dasa, T.T., Dash, A.P., Davis, A.C., Davitoiu, D.V., Davletov, K., Dayama, A., de Courten, B., De Leo, D., De Neve, J.-W., De Steur, H., Degefa, M.G., Degenhardt, L., Degfie, T.T., Deiparine, S., Dellavalle, R.P., Demoz, G. T., Demtsu, B., Denova-Gutiérrez, E., Deribe, K., Dervenis, N., Dessie, G.A., Dey, S., Dharmaratne, S.D., Dhimal, M., Dicker, D., Dinberu, M.T., Ding, E.L., Djalalinia, S., Do, H.P., Dokova, K., Doku, D.T., Douwes-Schultz, D., Driscoll, T.R., Duan, L., Dubey, M., Dubljanin, E., Duken, E.E., Duncan, B.B., Duraes, A.R., Ebrahimpour, S., Edvardsson, D., El Bcheraoui, C., Eldrenkamp, E., El-Khatib, Z., Elyazar, I.R., Enayati, A., Endries, A.Y., Eshrati, B., Eskandarieh, S., Esteghamati, A., Esteghamati, S., Estep, K., Fakhar, M., Fakhim, H., Fanzo, J., Faramarzi, M., Fareed, M., Farhadi, F., Farid, T.A., Farinha, C.S. e S., Farioli, A., Faro, A., Farvid, M. S., Farzadfar, F., Farzaei, M.H., Farzam, H., Fazaeli, A.A., Fazeli, M.S., Feigin, V.L., Feigl, A.B., Fekadu, W., Feldman, R., Fentahun, N., Fereshtehnejad, S.-M., Fernandes, E., Fernandes, J.C., Feyissa, G.T., Fijabi, D.O., Filip, I., Finegold, S., Finger, J.D., Fischer, F., Fitzmaurice, C., Flor, L.S., Foigt, N.A., Foreman, K.J., Frank, T.D., Franklin, R.C., Fukumoto, T., Fukutaki, K., Fuller, J.E., Fürst, T., Furtado, J.M., Gakidou, E., Gallus, S., Gankpe, F.G., Gansevoort, R.T., Garcia, A.C., Garcia-Basteiro, A.L., Garcia-Gordillo, M.A., Gardner, W.M., Gebre, A.K., Gebre, T., Gebregergs, G.B., Gebrehiwot, T.T., Gebremedhin, A.T., Gebremichael, B., Gebremichael, T.G., Gelano, T.F., Geleijnse, J.M., Geramo, Y.C.D., Getachew, S., Gething, P.W., Gezae, K.E., Ghadami, M.R., Ghadimi, R., Ghadiri, K., Ghasemi-Kasman, M., Ghiasvand, H., Ghimire, M., Ghoshal, A.G., Giampaoli, S., Gill, P.S., Gill, T.K., Giussani, G., Gnedovskaya, E.V., Goldberg, E.M., Goli, S., Gona, P.N., Goodridge, A., Gopalani, S.V., Gorman, T.M., Goto, A., Goulart, A.C., Goulart, B.N. G., Grada, A., Griswold, M.G., Grosso, G., Gugnani, H.C.C., Guillemin, F., Guimaraes, A.L.S., Guo, Y., Gupta, P.C., Gupta, Rahul, Gupta, Rajeev, Gupta, T., Ha, G.H., Haagsma, J.A., Hachinski, V., Hafezi-Nejad, N., Haghparast Bidgoli, H., Hagos, T.B., Haile, M.T., Hailegiyorgis, T.T., Hailu, G.B., Haj-Mirzaian, Arvin, Haj-Mirzaian, Arya, Hamadeh, R.R., Hamidi, S., Hankey, G.J., Harb, H.L., Harikrishnan, S., Haririan, H., Haro, J.M., Hasan, M., Hassankhani, H., Hassen, H.Y., Havmoeller, R., Hawley, C.N., Hay, S.I., He, Y., Hedayatizadeh-Omran, A., Hegazy, M.I., Heibati, B., Heidari, B., Heidari, M., Hendrie, D., Henok, A., Heredia-Pi, I., Herteliu, C., Heydarpour, B., Heydarpour, F., Heydarpour, S., Hibstu, D.T., Híjar, M., Hoek, H.W., Hoffman, D.J., Hole, M.K., Homaie Rad, E., Hoogar, P., Horita, N., Hosgood, H.D., Hosseini, S.M., Hosseinzadeh, M., Hostiuc, M., Hostiuc, S., Hotez, P.J., Hoy, D.G., Hsairi, M., Hsiao, T., Hu, G., Huang, J.J., Hughes, C., Huynh, C.K., Igumbor, E.U., Ikeda, C.T., Ilesanmi, O.S., Iqbal, U., Irvani, S.S.N., Irvine, C.M.S., Islam, S.M.S., Islami, F., Ivers, R.Q., Izadi, N., Jacobsen, K.H., Jahangiry, L., Jahanmehr, N., Jain, S.K., Jakovljevic, M., Jalu, M.T., Jamal, A.A., James, S.L., Jassal, S.K., Javanbakht, M., Jayatilleke, A.U., Jeemon, P., Jha, R.P., Jha, V., Ji, J.S., Johnson, C.O., Johnson, S.C., Jonas, J.B., Jonnagaddala, J., Jorjoran Shushtari, Z., Joshi, A., Jozwiak, J.J., Jungari, S.B., Jürisson, M.K.M., Kabir, Z., Kadel, R., Kahsay, A., Kahssay, M., Kalani, R., Kapil, U., Karami, M., Karami Matin, B., Karanikolos, M., Karimi, N., Karimi, S.M., Karimi-Sari, H., Kasaeian, A., Kassa, D.H., Kassa, G.M., Kassa, T.D., Kassa, Z.Y., Kassebaum, N.J., Katikireddi, S.V., Kaul, A., Kawakami, N., Kazemi, Z., Karyani, A. K., Kazi, D.S., Kc, P., Kebede, S., Keiyoro, P.N., Kemmer, L., Kemp, G.R., Kengne, A. P., Keren, A., Kesavachandran, C.N., Khader, Y.S., Khafaei, B., Khafaie, M.A., Khajavi, A., Khalid, N., Khalil, I.A., Khan, E.A., Khan, M.S., Khan, M.A., Khang, Y.-H., Khanna, T., Khater, M.M., Khatony, A., Khazaeipour, Z., Khazaie, H., Khoja, A.T., Khosravi, A., Khosravi, M.H., Khubchandani, J., Kiadaliri, A.A., Kiarie, H.W., Kibret, G.D., Kiirithio, D.N., Kim, D., Kim, J.Y., Kim, Y.-E., Kim, Y.J., Kimokoti, R.W., Kinfu, Y., Kinra, S., Kisa, A., Kissimova-Skarbek, K., Kissoon, N., Kivimäki, M., Kocarnik, J.M., Kochhar, S., Kokubo, Y., Kolola, T., Kopec, J.A., Kosek, M.N., Kosen, S., Koul, P.A., Koyanagi, A., Kravchenko, M.A., Krishan, K., Krohn, K.J., Kuate Defo, B., Kucuk Bicer, B., Kudom, A.A., Kulikoff, X.R., Kumar, G.A., Kumar, M.,

Kumar, P., Kutz, M.J., Kyu, H.H., Lachat, C., Lad, D.P., Lad, S.D., Lafranconi, A., Lagat, A.K., Lal, D.K., Lalloo, R., Lam, H., Lami, F.H., Lamichhane, P., Lan, Q., Lang, J.J., Lansingh, V.C., Lansky, S., Larson, H.J., Larsson, A.O., Laryea, D.O., Lassi, Z.S., Latifi, A., Lau, K.M.-M., Laxmaiah, A., Lazarus, J.V., Leasher, J.L., Lebedev, G., Ledesma, J.R., Lee, J.B., Lee, P.H., Leever, A.T., Leigh, J., Leinsalu, M., Leshargie, C.T., Leung, J., Lewycka, S., Li, S., Li, X., Li, Y., Liang, J., Liang, X., Liben, M.L., Lim, L.-L., Limenih, M.A., Linn, S., Liu, S., Liu, Y., Lodha, R., Logroscino, G., Lopez, A.D., Lorkowski, S., Lotufo, P.A., Lucchesi, L.R., Lyons, R.A., Macarayan, E.R.K., Mackay, M.T., Maddison, E.R., Madotto, F., Maghavani, D.P., Magis-Rodriguez, C., Mahotra, N.B., Majdan, M., Majdzadeh, R., Majeed, A., Malekzadeh, R., Malta, D.C., Mamun, A.A., Manda, A.-L., Mandarano-Filho, L.G., Mangalam, S., Manguerra, H., Mansournia, M.A., Mapoma, C.C., Maravilla, J.C., Marcenes, W., Marks, A., Martin, R.V., Martins, S.C.O., Martins-Melo, F.R., Martopullo, I., Mashamba-Thompson, T.P., Massenburg, B.B., Mathur, M.R., Maulik, P.K., Mazidi, M., McAlinden, C., McGrath, J.J., McKee, M., McMahon, B.J., Mehata, S., Mehndiratta, M.M., Mehrotra, R., Mehta, K.M., Mehta, V., Mejia-Rodriguez, F., Mekonen, T., Mekonnen, T.C.C., Meles, H.G., Melese, A., Melku, M., Memiah, P.T.N., Memish, Z.A., Mendoza, W., Mengistu, D.T., Mengistu, G., Mensah, G.A., Mensink, G.B.M., Mereta, S.T., Meretoja, A., Meretoja, T.J., Mestrovic, T., Mezgebe, H.B., Miazgowski, B., Miazgowski, T., Millear, A.I., Miller, T. R., Miller-Petrie, M.K., Milne, G.J., Mini, G.K., Minnig, S.P., Mirabi, P., Mirarefin, M., Mirrakhimov, E.M., Misganaw, A.T., Mitchell, P.B., Moazen, B., Moghadamnia, A.A., Mohajer, B., Mohammad, K.A., Mohammadi, M., Mohammadifard, N., Mohammadnia-Afrouzi, M., Mohammed, M.A., Mohammed, S., Mohan, M.B.V., Mohan, V., Mohebi, F., Moitra, M., Mokdad, A.H., Molokhia, M., Monasta, L., Montañez, J.C., Moosazadeh, M., Moradi, G., Moradi, M., Moradi-Lakeh, M., Moradinazar, M., Moraga, P., Morawska, L., Morgado-da-Costa, J., Morisaki, N., Morrison, S.D., Mosapour, A., Moschos, M.M., Mountjoy-Venning, W.C., Mouodi, S., Mousavi, S.M., Muche, A.A., Muchie, K.F., Mueller, U.O., Muhammed, O.S.S., Mukhopadhyay, S., Mullany, E.C., Muller, K., Mumford, J.E., Murhekar, M., Murthy, G.V.S., Murthy, S., Musa, J., Musa, K.I., Mustafa, G., Muthupandian, S., Nabhan, A.F., Nachega, J.B., Nagarajan, A.J., Nagel, G., Naghavi, M., Naheed, A., Nahvijou, A., Naidoo, K., Naik, G., Naik, N., Najafi, F., Naldi, L., Nam, H.S., Nangia, V., Nansseu, J.R., Nascimento, B.R., Nawaz, H., Neamati, N., Negoi, I., Negoi, R.I., Neupane, S., Newton, C.R.J., Ngalesoni, F.N., Ngunjiri, J.W., Nguyen, A., Nguyen, G., Nguyen, H., Nguyen, H.L.T., Nguyen, H.T., Nguyen, M., Nichols, E., Nigatu, S.G., Ningrum, D.N.A., Nirayo, Y.L., Nisar, M.I., Nixon, M.R., Nolutshungu, N., Nomura, M., Norheim, O.F., Noroozi, M., Norrving, B., Noubiap, J. J., Nouri, H.R., Nourollahpour Shiadeh, M., Nowroozi, M.R., Nyasulu, P.S., Obermeyer, C.M., Ofori-Asenso, R., Ogah, O.S., Ogbo, F.A., Oh, I.-H., Okoro, A., Oladimeji, K.E., Oladimeji, O., Olagunju, A.T., Olagunju, T.O., Olivares, P.R., Olsen, H.E., Olusanya, B.O., Olusanya, J.O., Ong, K.L., Ong, S.K., Oommen, A.M., Opio, J.N., Oren, E., Oros, A., Ortega-Altamirano, D.D.V., Ortiz, A., Ortiz, J.R., Ortiz-Panozo, E., Ota, E., Otstavnov, S.S., Owolabi, M.O.P.A.M., Pakhale, S., Pakhare, A.P., Pan, W.-H., Pana, A., Panda, B.K., Panda-Jonas, S., Pandian, J.D., Papantoniou, N., Park, E.-K., Parry, C.D.H., Parsian, H., Patel, S., Pati, S., Patle, A., Patton, G.C., Paturi, V.R., Paudel, D., Paulson, K.R., Pearce, N., Peprah, E.K., Pereira, D.M., Perico, N., Pervaiz, A., Pesudovs, K., Petri, W.A., Petzold, M., Phillips, M.R., Pigott, D.M., Pillay, J.D., Pirsaheb, M., Pletcher, M., Pond, C.D., Postma, M.J., Pourshams, A., Poustchi, H., Prabhakaran, D., Prakash, S., Prasad, N., Purcell, C.A., Pyakurel, M., Qorbani, M., Quansah, R., Radfar, A., Rafay, A., Rafiei, A., Rahim, F., Rahimi, K., Rahimi-Movaghar, A., Rahimi-Movaghar, V., Rahman, M., Rahman, M. S., Rahman, M.H.U., Rahman, M.A., Rahman, S. ur, Rai, R.K., Rajati, F., Rajsic, S., Ram, U., Rana, S.M., Ranabhat, C.L., Ranjan, P., Rasella, D., Rawaf, D.L., Rawaf, S., Razo-García, C., Reddy, K.S., Reiner, R.C., Reis, C., Reitsma, M.B., Remuzzi, G., Renzaho, A.M.N., Resnikoff, S., Reynales-Shigematsu, L.M., Rezaei, S., Rezaeian, S., Rezai, M.S., Riahi, S.M., Ribeiro, A.L.P., Rios-Blancas, M.J., Roba, K.T., Roberts, N.L. S., Roever, L., Ronfani, L., Roshandel, G., Rostami, A., Roth, G.A., Roy, A., Rubagotti, E., Ruhago, G.M., Sabde, Y.D., Sachdev, P.S., Saddik, B., Sadeghi, E., Safari, H., Safari, Y., Safari-Faramani, R., Safdarian, M., Safi, S., Safiri, S., Sagar, R., Sahebkar, A., Sahraian, M.A., Sajadi, H.S., Salam, N., Salama, J.S., Salamati, P., Saldanha, R. de F., Saleem, Z., Salimi, Y., Salimzadeh, H., Salomon, J.A., Salvi, S.S., Salz, I., Sambala, E.Z., Samy, A.M., Sanabria, J., Sanchez-Niño, M.D., Santos, I.S., Santric Milicevic, M.M., Sao Jose, B.P., Sardana, M., Sarker, A.R., Sarrafzadegan, N., Sartorius, B., Sarvi, S., Sathian, B., Satpathy, M., Savic, M., Sawant, A.R., Sawhney, M., Saxena, S., Saylan, M., Sayyah, M., Schaeffner, E., Schmidt, M.I., Schneider, I.J.C., Schöttker, B., Schutte, A.E., Schwebel, D.C., Schwendicke, F., Seedat, S., Sekerija, M., Sepanlou, S.G., Serván-Mori, E., Seyedmousavi, S., Shabaninejad, H., Shackelford, K.A., Shafieesabet, A., Shaheen, A.A., Shaikh, M.A., Shams-Beyranvand, M., Shamsi, M.B., Shamsizadeh, M., Sharafi, H., Sharafi, K., Sharif, M., Sharif-Alhoseini, M., Sharma, J., Sharma, R., Sharma, S.K., She, J., Sheikh, A., Shey, M.S., Shi, P., Shibuya, K., Shields, C., Shifa, G.T., Shiferaw, M.S., Shigematsu, M., Shiri, R., Shirkoohi, R., Shirude, S., Shishani, K., Shiue, I., Shokraneh, F., Shoman, H., Shrime, M.G., Shukla, S.R., Si, S., Siabani, S., Sibai, A.M., Siddiqi, T.J., Sigfusdottir, I.D., Silpakit, N., Silva, D.A.S., Silva, J.P., Silva, N.T. da, Silveira, D.G.A., Singh, J.A., Singh, N.P., Singh, O.P., Singh, P.K., Singh, V., Sinha, D. N., Skiadaresi, E., Sliwa, K., Smith, A.E., Smith, M., Soares Filho, A.M., Sobaih, B.H., Sobhani, S., Soljak, M., Soofi, M., Soosaraei, M., Sorensen, R.J.D., Soriano, J.B., Soshnikov, S., Soyiri, I.N., Spinelli, A., Sposato, L.A., Sreeramareddy, C.T., Srinivasan, R.G., Srinivasan, V., Stanaway, J.D., Starodubov, V.I., Stathopoulou, V., Steckling, N., Stein, D.J., Stewart, L.G., Stockfelt, L., Stokes, M.A., Straif, K., Sudaryanto, A., Sufiyan, M.B., Sunguya, B.F., Sur, P.J., Sutradhar, I., Sykes, B.L., Sylaja, P.N., Sylte, D.O., Szoeke, C.E.I., Tabarés-Seisdedos, R., Tabuchi, T., Tadakamadla, S.K., Tamirat, K.S., Tandon, N., Tanser, F.C., Tassew, A.A., Tassew, S. G., Tavakkoli, M., Taveira, N., Tawye, N.Y., Tehrani-Banihashemi, A., Tekalign, T.G., Tekle, M.G., Temesgen, H., Temsah, M.-H., Temsah, O., Terkawi, A.S., Teshale, M.Y., Teshome, D.F., Tessema, B., Teweldemedhin, M., Thakur, J.S., Thankappan, K.R., Theis, A., Thirunavukkarasu, S., Thomas, L.A., Thomas, N., Thomson, A.J., Thrift, A. G., Tilahun, B., To, Q.G., Tobe-Gai, R., Tonelli, M., Topor-Madry, R., Torre, A.E., Tortajada-Girbés, M., Tovani-Palone, M.R., Towbin, J.A., Tran, B.X., Tran, K.B., Tran, T.T., Tripathy, S.P., Troeger, C.E., Truelsen, T.C., Tsadik, A.G., Tudor Car, L., Tuzcu, E.M., Tymeson, H.D., Ukwaja, K.N., Ullah, I., Updike, R.L., Usman, M.S., Uthman, O.A., Vaduganathan, M., Vaezi, A., Vaidya, G., Valdez, P.R., van Donkelaar, A., Varavikova, E., Vasankari, T.J., Venketasubramanian, N., Vidavalur, R., Villafaina, S., Violante, F.S., Vladimirov, S.K., Vlassov, V., Vollmer, S., Vollset, S.E., Vos, T., Vosoughi, K., Vujcic, I.S., Wagner, G.R., Wagnew, F.S., Waheed, Y., Walson, J.L., Wang, Y., Wang, Y.-P., Wassie, M.M., Weiderpass, E., Weintraub, R.G., Weiss, J., Weldegebreal, F., Weldegwergs, K.G., Werdecker, A., Werkneh, A.A., West, T.E., Westerman, R., Whisnant, J.L., Whiteford, H.A., Widecka, J., Widecka, K., Wijeratne, T., Wilner, L.B., Winkler, A.S., Wiyeh, A.B., Wiysonge, C.S., Wolde, H.F., Wolfe, C.D.A., Wu, S., Xavier, D., Xu, G., Xu, R., Yadollahpour, A., Yahyazadeh Jabbari, S.H., Yakob, B., Yamada, T., Yan, L.L., Yano, Y., Yaseri, M., Yasin, Y.J., Ye, P., Yearwood, J.A., Yeshaneh, A., Yimer, E.M., Yip, P., Yirsaw, B.D., Yisma, E., Yonemoto, N., Yonga, G., Yoon, S.-J., Yotebieng, M., Younis, M.Z., Yousefifard, M., Yu, C., Zaman, S. Bin, Zamani, M., Zare, Z., Zavala-Arciniega, L., Zegeye, D.T., Zegeye, E.A., Zeleke, A.J., Zendehdel, K., Zerfu, T.A., Zhang, A.L., Zhang, X., Zhou, M., Zhu, J., Zimsen, S.R.M., Zodpey, S., Zoeckler, L., Zucker, I., Zuhlke, L.J.J., Lim, S.S., Murray, C.J.L., 2018. Measuring progress from 1990 to 2017 and projecting attainment to 2030 of the health-related Sustainable Development Goals for 195 countries and territories: a systematic analysis for the Global Burden of Disease Study 2017. Lancet 392, 2091–2138. https://doi.org/10.1016/S0140-6736(18)32281-5.

Mannava, P., Durrant, K., Fisher, J., Chersich, M., Luchters, S., 2015. Attitudes and behaviours of maternal health care providers in interactions with clients: a systematic review. Glob. Health 11, 36. https://doi.org/10.1186/s12992-015-0117-9.

McCalman, J., Searles, A., Bainbridge, R., Ham, R., Mein, J., Neville, J., Campbell, S., Tsey, K., 2015. Empowering families by engaging and relating Murri way: a grounded theory study of the implementation of the Cape York Baby Basket program. BMC Pregnancy Childbirth 15, 119. https://doi.org/10.1186/s12884-015-0543-y.

McHugh, M.L., 2012. Interrater reliability: the kappa statistic. Biochem. Med. 22, 276–282. https://doi.org/10.11613/bm.2012.031.

2018 Microsoft Corporation, 2018. Microsoft Excel. Redmond, WA, USA. Retrieved from. https://office.microsoft.com/excel.

Minkler, M., 2005. Community-based research partnerships: challenges and opportunities. J. Urban Health 82. https://doi.org/10.1093/JURBAN/JTI034 ii3.

Moher, D., Schulz, K.F., Simera, I., Altman, D.G., 2010. Guidance for developers of health research reporting guidelines. PLoS Med. 7, e1000217 https://doi.org/10.1371/journal.pmed.1000217.

Mohindra, K.S., 2017. Research and the health of indigenous populations in low- and middle-income countries. Health Promot. Int. 32, 581–586. https://doi.org/10.1093/heapro/dav106.

Naidu, M., Nqila, K., 2013. Indigenous mothers: an ethnographic study of using the environment during pregnancy. Stud. Ethno-Med. 7, 127–135. https://doi.org/10.1080/09735070.2013.11886453.

National Collaborating Centre for Aboriginal Health, 2010. STRONG WOMEN, STRONG NATIONS : Aboriginal Maternal Health in British Columbia. Prince George.

Ngomane, S., Mulaudzi, F.M., 2012. Indigenous beliefs and practices that influence the delayed attendance of antenatal clinics by women in the Bohlabelo district in Limpopo, South Africa. Midwifery 28, 30–38. https://doi.org/10.1016/j.midw.2010.11.002.

Ninomiya, M.E., Atkinson, D., Brascoupé, S., Firestone, M., Robinson, N., Reading, J., Ziegler, C.P., Maddox, R., Smylie, J.K., 2017. Effective knowledge translation approaches and practices in Indigenous health research: a systematic review protocol. Syst. Rev. 6, 34. https://doi.org/10.1186/s13643-017-0430-x.

Ninomiya, M.E., Pollock, N.J., 2017. Reconciling community-based Indigenous research and academic practices: knowing principles is not always enough. Soc. Sci. Med. 172, 28–36. https://doi.org/10.1016/J.SOCSCIMED.2016.11.007.

Ohenjo, N., Willis, R., Jackson, D., Nettleton, C., Good, K., Mugarura, B., 2006. Indigenous health 3: health of indigenous people in Africa. Lancet 367, 1937–1946. https://doi.org/10.1016/S0140-6736(06)68849-1.

Ormaeche, M., Whittembury, A., Pun, M., Suárez-Ognio, L., 2012. Hepatitis B virus, syphilis, and HIV seroprevalence in pregnant women and their male partners from six indigenous populations of the Peruvian Amazon Basin, 2007-2008. Int. J. Infect. Dis. 16 https://doi.org/10.1016/j.ijid.2012.05.1032.

Plint, A.C., Moher, D., Morrison, A., Schulz, K., Altman, D.G., Hill, C., Gaboury, I., 2006. Does the CONSORT checklist improve the quality of reports of randomised controlled trials? A systematic review. Med. J. Aust. 185, 263–267. https://doi.org/10.5694/j.1326-5377.2006.tb00557.x.

Prout, S., 2012. Indigenous wellbeing frameworks in Australia and the quest for quantification. Soc. Indicat. Res. 109, 317–336. https://doi.org/10.1007/s11205-011-9905-7.

Prussing, E., 2018. Critical epidemiology in action: research for and by indigenous peoples. SSM - Popul. Heal. 6, 98–106. https://doi.org/10.1016/j.ssmph.2018.09.003.

Rice, K., Te Hiwi, B., Zwarenstein, M., Lavallee, B., Barre, D.E., Harris, S.B., 2016. Best practices for the prevention and management of diabetes and obesity-related chronic disease among indigenous peoples in Canada: a review. Can. J. Diabetes 40, 216–225. https://doi.org/10.1016/J.JCJD.2015.10.007.

Rumbold, A.R., Bailie, R.S., Si, D., Dowden, M.C., Kennedy, C.M., Cox, R.J., O'Donoghue, L., Liddle, H.E., Kwedza, R.K., Thompson, S.C., Burke, H.P., Brown, A.

D.D.H., Weeramanthri, T., Connors, C.M., 2011. Delivery of maternal health care in Indigenous primary care services: baseline data for an ongoing quality improvement initiative. BMC Pregnancy Childbirth 11, 16. https://doi.org/10.1186/1471-2393-11-16.

Say, L., Chou, D., Gemmill, A., Tunçalp, Ö., Moller, A.-B., Daniels, J., Gülmezoglu, A.M., Temmerman, M., Alkema, L., 2014. Global causes of maternal death: a WHO systematic analysis. Lancet Glob. Heal. 2, e323–e333. https://doi.org/10.1016/S2214-109X(14)70227-X.

Shah, P.S., Zao, J., Al-Wassia, H., Shah, V., Knowledge Synthesis Group on Determinants of Preterm/LBW Births, 2011. Pregnancy and neonatal outcomes of aboriginal women: a systematic review and meta-analysis. Wom. Health Issues 21, 28–39. https://doi.org/10.1016/j.whi.2010.08.005.

Smith-Oka, V., 2008. Plants used for reproductive health by Nahua women in northern Veracruz, Mexico. Econ. Bot 62, 604–614. https://doi.org/10.1007/s12231-008-9026-7.

Smith, L.T., 2012. Decolonizing Methodologies: Research and Indigenous Peoples, second ed. Zed Books Ltd.

Smylie, J., Firestone, M., 2015. Back to the basics: identifying and addressing underlying challenges in achieving high quality and relevant health statistics for indigenous populations in Canada. Stat. J. IAOS 31, 67–87. https://doi.org/10.3233/SJI-150864.

Smylie, J., Kirst, M., McShane, K., Firestone, M., Wolfe, S., O'Campo, P., 2016. Understanding the role of Indigenous community participation in Indigenous prenatal and infant-toddler health promotion programs in Canada: a realist review. Soc. Sci. Med. 150, 128–143. https://doi.org/10.1016/j.socscimed.2015.12.019.

Smylie, J., Phillips-Beck, W., 2019. Truth, respect and recognition: addressing barriers to Indigenous maternity care. Can. Med. Assoc. J. 191, E207–E208. https://doi.org/10.1503/cmaj.190183.

Sokoloski, E.H., 1995. Canadian first Nations women's beliefs about pregnancy and prenatal care. Can. J. Nurs. Res. Arch. 27, 89–100.

Solomon, T.G., Randall, L., 2014. Conducting Health Research with Native American Communities, Conducting Health Research with Native American Communities. American Public Health Association. https://doi.org/10.2105/9780875532028.

StataCorp, 2015. Stata Statistical Software: Release 14. LP. StataCorp, College Station, TX.

Thummapol, O., Park, T., Barton, S., 2018. Exploring health services accessibility by indigenous women in Asia and identifying actions to improve it: a scoping review. Ethn. Health 25 (7), 1–20. https://doi.org/10.1080/13557858.2018.1470607.

Tricco, A.C., Lillie, E., Zarin, W., O'Brien, K.K., Colquhoun, H., Levac, D., Moher, D., Peters, M.D.J., Horsley, T., Weeks, L., Hempel, S., Akl, E.A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M.G., Garritty, C., Lewin, S., Godfrey, C.M., Macdonald, M.T., Langlois, E.V., Soares-Weiser, K., Moriarty, J., Clifford, T., Tunçalp, Ö., Straus, S.E., 2018. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. Ann. Intern. Med. 169, 467. https://doi.org/10.7326/M18-0850.

UN, 2019. State of the World's Indigenous Peoples: Implementing the United Nations Declaration on the Rights of Indigenous Peoples. New York.

UNFPA, UNICEF, UN Women, 2018. Fact Sheet - Indigenous Women's Maternal Health and Mortality.

Vallianatos, H., Brennand, E.A., Raine, K., Stephen, Q., Petawabano, B., Dannenbaum, D., Willows, N.D., 2006. Beliefs and practices of First Nation women about weight gain during pregnancy and lactation: implications for women's health. Can. J. Nurs. Res. 38, 102–119.

Wallerstein, N.B., Duran, B., 2006. Using community-based participatory research to address health disparities. Health Promot. Pract. 7, 312–323. https://doi.org/10.1177/1524839906289376.

Wilson, S., 2008. Research Is Ceremony : Indigenous Research Methods. Fernwood Publishing, Black Point.

Withers, M., Kharazmi, N., Lim, E., 2018. Traditional beliefs and practices in pregnancy, childbirth and postpartum: a review of the evidence from Asian countries. Midwifery 56, 158–170. https://doi.org/10.1016/j.midw.2017.10.019.

World Bank, 2019. World Bank Country and Lending Groups [WWW Document]. World Bank Gr. URL (accessed 9.24.20). https://datahelpdesk.worldbank.org/knowledgebase/articles/906519.