Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Reasons for COVID-19 vaccine hesitancy in ethnic minority groups: A systematic review and thematic synthesis of initial attitudes in qualitative research

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ABSTRACT

Despite being disproportionately affected by the COVID-19 pandemic, ethnic and racial minority groups show widespread vaccine hesitancy. Adherence to ongoing booster vaccine campaigns is required to contain future spread of the virus and protect health systems. This review aims to appraise and synthesise qualitative studies published from December 2021 to February 2022 addressing the issue for an in-depth exploration of initial COVID-19 vaccine hesitancy in minorities, including refugee, asylum seeker and migrant populations. A systematic literature search of five databases identified 15 eligible studies. Thematic synthesis identified three main themes of "institutional mistrust", "lack of confidence in vaccine and vaccine development process", and "lack of reliable information or messengers". Two minor themes included "complacency/perceived lack of need" and "structural barriers to vaccine access". "Institutional mistrust" permeated several other themes, demonstrating the need for culturally sensitive approaches. Applying our findings to the World Health Organisation's Three C Model of vaccine hesitancy, the "confidence" dimension appears to represent a disproportionately large barrier to vaccine uptake in ethnic minority groups. Indeed, nuanced adaptations of the model may be necessary to explain vaccine hesitancy in those groups. Further research is required to explore factors facilitating vaccine uptake to monitor changes in hesitancy over time.

1. Introduction

The COVID-19 pandemic has had a wide-scale impact across the global population, causing an unprecedented strain on healthcare services (World Health Organisation, 2020). Since the Pfizer-BioNTech vaccine became the first COVID-19 vaccination to be authorised for use in the UK in December 2020, several further vaccines have been developed and rolled out to the public worldwide (Ritchie et al., 2020).

COVID-19 vaccinations have been central in the fight against the pandemic by drastically reducing serious illness and deaths caused by COVID-19 infection, as well as reducing infection rates (Rossman et al., 2021). It has been estimated that vaccination is required for around three quarters of the population to stop the pandemic; therefore vaccine acceptance across all parts of society is considered vital to support these efforts (Bartsch et al., 2020; Iboi et al., 2020). In addition, current research suggests that uptake of initial COVID-19 vaccinations may not be enough to curb the effects of the pandemic in the long-run, with studies showing immunity to COVID-19 reducing over time (Falsey et al., 2021) and existing vaccinations having potential limitations in their effectiveness against variants of the disease (Lopez Bernal et al., 2021). Therefore, adherence to ongoing booster vaccine campaigns is required in order to contain future spread of the virus and to protect the health system from being overwhelmed. Consequently, vaccine hesitancy, defined as 'a delay in acceptance or refusal of vaccination when vaccination services are available' (MacDonald, 2015), poses a significant challenge, particularly as past examples of vaccine hesitancy have already proven to negatively influence the curtailment of pandemics such as Middle East Respiratory Syndrome, Severe Acute Respiratory Syndrome and Ebola Virus Disease (Majid & Ahmad, 2020).

International systematic reviews have found that intent to receive a COVID-19 vaccination is particularly low in minority ethnic groups (Robinson et al., 2021). This is of particular concern as ethnic minorities have been disproportionally affected by the pandemic, with greater numbers of COVID-19 infections, hospitalisations and deaths (SAGE Ethnicity Sub-group, 2020; Gross et al., 2020; Mackey et al., 2021; Karaca-Mandic et al., 2021). Migrants, asylum seekers and refugees are also

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described as an ethnic or national minority group who have been associated with low intent and uptake of the COVID-19 vaccination (World Health Organisation, 2022) and face additional challenges relating to accessing healthcare, such as concerns about entitlement, costs, immigration checks and language barriers (Gardner, 2021). These existing inequities and past experiences are likely to affect vaccine perceptions, for example by undermining trust in healthcare systems and public health communication. Despite this, their views on and experiences of vaccination programmes have rarely been sought (Deal et al., 2021). Understanding the reasons underlying COVID-19 vaccine hesitancy in these racial and ethnic minority groups is essential to develop targeted strategies to increase vaccination acceptance and thereby improve COVID-related health prognoses for these groups. The World Health Organisation has proposed a 'Three C model' (World Health Organisation, 2014) identifying areas influencing vaccine hesitancy in the general population. These include 'convenience', describing vaccination accessibility, 'confidence', describing general trust in vaccinations, and 'complacency', describing perceived risk of the disease. However, it has been suggested that this framework may overlook or minimise nuanced factors related to hesitancy in racial and ethnic minority groups, such as the impact of systemic racism on equitable access to healthcare (Okoro et al., 2021). This highlights the importance of research with ethnic minorities to build on existing models and better understand the specific influencers in these particularly hesitant groups.

Previous literature reviews have highlighted potential reasons for COVID-19 vaccine hesitancy, focusing on specific racial and ethnic minority groups. Restrepo and Krouse (2021) conducted a systematic review focusing on disparities and COVID-19 vaccine hesitancy specifically in Black Americans on an individual level, finding factors most commonly associated with hesitancy were safety and side effect misconceptions, concerns about the vaccine development process and mistrust of government agencies. The review by Khubchandani and Macias (2021) had an increased population focus, including also Hispanic studies, citing this as one of the largest ethnic minority groups in the United States. Here, similarly, concerns about vaccine safety and medical mistrust were found to influence COVID-19 vaccine hesitancy, as well as low past compliance with vaccinations and increased exposure to misinformation. The review also highlights several associated sociodemographic factors across studies, such as being female, younger in age, living in a larger household and having a lower level of education or income. A rapid systematic review of factors influencing COVID-19 vaccination uptake was conducted for solely UK-based studies of ethnic minorities, with barriers from the aforementioned US reviews being echoed, alongside practical issues such as transportation to vaccination sites (Kamal et al., 2021).

Whilst these existing reviews begin to shed light on correlates of COVID-19 vaccine hesitancy in racial and ethnic minorities, they share a number of important limitations. The vast majority of data included in existing reviews was extrapolated from quantitative cohort and cross-sectional studies. These quantitative reviews neglected findings from emerging qualitative research that provides more detailed insights into participants' vaccination attitudes. So far, only one scoping review of qualitative research on minorities' vaccine hesitancy has been conducted (Ochieng et al., 2021), which reported broadly similar main themes to the aforementioned quantitative reviews, namely 'mistrust', 'safety and efficacy of vaccines' and 'socioeconomic characteristics'. However, the review failed to include descriptions of study characteristics, quality appraisal and key quotations from participants forming the findings. A more comprehensive review is required to establish key details and rigour of qualitative studies conducted at initial vaccine roll-out and consider overlooked minority groups of refugees, asylum seekers and migrants.

The present review aims to address this research need by systematically appraising published qualitative and mixed-methods studies at initial stages of the vaccine roll-out (2021 to early 2022) exploring hesitancy and barriers to COVID-19 vaccine uptake in racial and ethnic minorities, including immigrant and refugee populations. The aim is to synthesise key research themes and derive evidence-based recommendations for the design of targeted behaviour change interventions.

2. Methods

2.1. Search strategy

A systematic literature search was performed covering five electronic databases (Medline, CINAHL, APA PsycINFO, Scopus, and Web of Science) to identify relevant literature from medicine, allied health professionals, psychology, and related fields. Searches were limited to papers published from December 2019, when the first known case of COVID-19 was identified (Cheng et al., 2020), to present date at the point of search (February 2022). Search terms were used to search titles and abstracts (see Table 1) complemented by key medical subject headings ('MeSH') where available. Filters were applied for qualitative studies (http://guides.lib.uw.edu/hsl/qualres/pubmed; http://libguides.sph.uth.tmc.edu/search_filters/ovid_medline_filters) as well as limiters applied to reduce records to journal articles published in the English language. Reference lists of existing reviews in the field were also manually searched, however no additional relevant records were identified for study selection.

2.2. Study selection

2.2.1. Eligibility criteria

The following selection criteria were used to determine eligible papers for study inclusion:

Table 1
Database search strategy.

Concept	Search Terms
COVID-19	**COVID-19** OR "SARS-Cov-2" OR coronavirus OR "corona virus" OR covid OR covid19 OR covid2019 OR "novel coronavirus" OR ncov OR 2019-ncov OR "novel betacov" OR "novel betacoronavirus" OR "covid 19″ OR "sars cov 2″ OR "sars coronavirus 2″ OR "severe acute respiratory syndrome coronavirus 2″ OR "novel corona virus" OR severe-acute-respiratory-syndrome-coronavirus-2 OR "sars coronavirus 2" OR "ncov19" OR "cov-19" OR "n-cov" OR 2019ncov OR 19ncov OR "sarscov-2"
Vaccination	**Vaccination** OR vaccin* OR immuni*ation OR in*oculat* OR immuni* OR inject* OR shot*
Hesitancy	**Patient acceptance of healthcare** OR **treatment refusal** OR accept* OR willing* OR hesita* OR refus* OR barrier* OR reluctan* OR attitude* OR confiden* OR adher* OR uptak* OR uptak* OR intent* OR decision* OR decide OR undecided OR indecis*
Racial and Ethnic Minority Groups	**Ethnic groups** OR **minority groups** OR **cultural diversity** OR **race factors** OR **minority health** OR **emigrants and immigrants** OR **continental population groups** OR **african americans** OR **asian americans** OR **hispanic americans** OR **mexican americans** OR **indigenous peoples** OR **roma** OR **amish** OR **arabs** OR **refugees** OR ethnic* OR minorit* OR racial* OR race* OR BME OR BAME OR divers* OR foreign* OR immigra* OR refuge* OR asylum* OR non-white* OR non-Caucasian* OR black* OR asian* OR african* OR indian* OR chinese OR japanese OR korean* OR arab* OR hispanic* OR filipin* OR latin* OR aborigin* OR indigenous OR inuit OR "people of colo*r" OR "person* of colo*r" OR POC OR "mixed race" OR "mixed racial" OR bangladeshi* OR bengali* OR pakistani* OR gyps* OR "irish traveller*" OR "afro caribbean*" OR "african caribbean*" OR afrocaribbean* OR "afro-caribbean*"

Note. * = truncation/letter substitution; "" = search phrase.
Boolean 'AND' function was used to combine concept search terms.
Terms in **bold** indicate key MeSH terms.

- Reports primary research using human population of any age group eligible for COVID-19 vaccination
- Includes sample from racial or ethnic minority populations (relative to country of study) as focus of study, including refugees, asylum seekers or migrants
- Aims to explore individual/community attitudes/hesitancy towards vaccinating themselves against COVID-19
- Uses qualitative or mixed-methods methodology and/or analysis
- Published in an English-language, peer-reviewed academic journal article

Papers were excluded from the study if they met one or more of following criteria:

- Published in non-English language
- Paper non-peer reviewed
- Review paper
- Only reports quantitative methodology/analysis
- Exploring reasons for COVID-19 vaccine hesitancy or attitudes towards COVID-19 vaccination are not the main aim of the study

2.2.2. Selection summary

A total of 1146 articles were identified through initial database searches. Duplicates were removed and the remaining titles and abstracts ($n = 953$) were screened for eligibility, with 921 failing to meet the inclusion criteria. Full texts were retrieved and assessed for the remaining 32 papers, excluding a further 17 and leaving 15 studies eligible for inclusion in the review. Fig. 1 summarises this process in a PRISMA flowchart (Moher et al., 2009). Screening of titles and abstracts and assessing of remaining full-text articles for eligibility was completed by one researcher (C.S.).

2.3. Data extraction and quality appraisal

Relevant data were extracted from all included studies in line with the aims of the review and standard data extraction forms for qualitative studies (Booth et al., 2016), including location and publication date of studies, sample characteristics, qualitative data collection and analysis methodologies, and results related to vaccine hesitancy. Full manuscripts were uploaded to NVivo 12 (QSR International Pty Ltd., 2020) data analysis software to aid data extraction and synthesis.

The Critical Appraisal Skills Programme (CASP, 2018) checklist for qualitative studies was used to assess quality of included studies, comprising of ten questions to appraise validity of findings, presentation of results and value of the research locally. This tool is endorsed by Cochrane for synthesis of qualitative research (Noyes et al., 2018). Due to the subjectivity of the process, the quality appraisal checklist was not used to exclude or weight studies, rather to offer an overview of strengths and limitations to aid the review of current literature.

2.4. Qualitative synthesis

Qualitative data were selected for synthesis from 'results' and 'discussion' sections of papers, including direct quotations from participants regarding barriers to COVID-19 vaccination or vaccine hesitancy, as well as authors' descriptions or interpretations of the findings. A thematic synthesis method was employed, used in previous reviews to examine people's perspectives, attitudes or experiences (Harden et al., 2004). This method was selected because it enabled a rigorous examination of common elements across multiple studies. Synthesis included line-by-line coding, organising free codes into related areas ('descriptive themes') and, finally, developing 'analytical' themes in line with the review question. The lead researcher (C.S.) coded all data from included

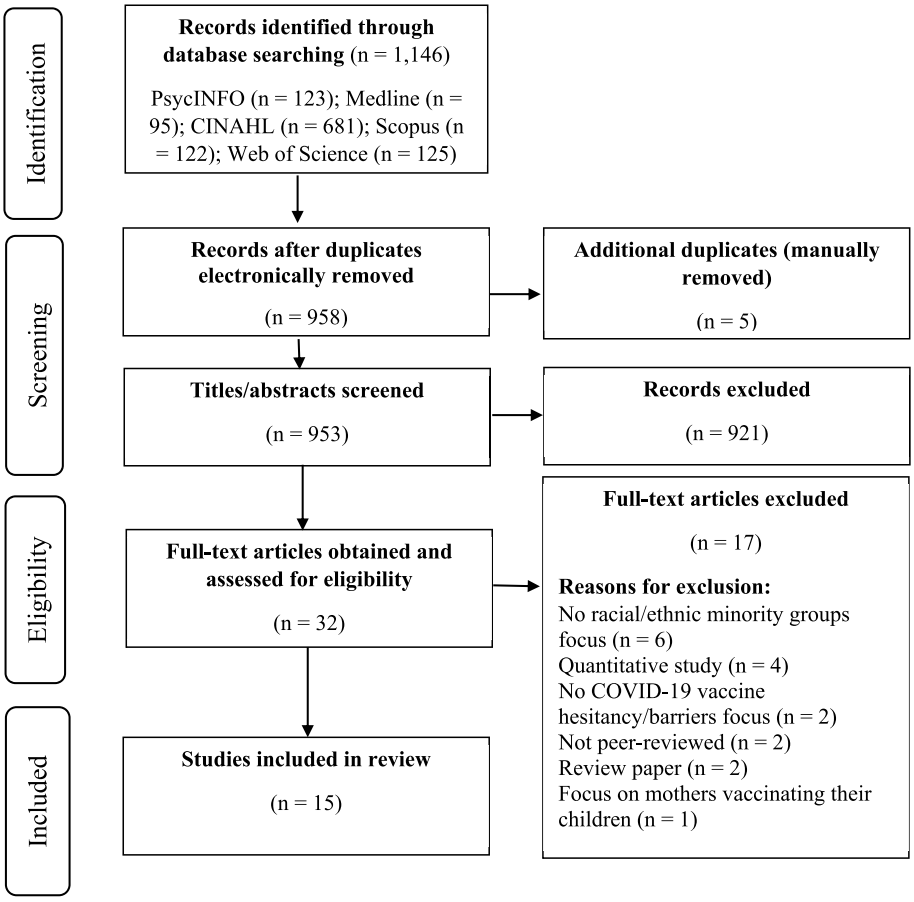

Fig. 1. *The PRISMA Flow Diagram of Study Selection.*

papers and established initial themes. To minimise bias, C.S. held meetings with E.K. to discuss and refine initial themes. An iterative process was adopted to reach consensus for final themes and subthemes.

3. Results

3.1. Study characteristics

Fifteen papers, published between 2020 and 2022, were selected for inclusion in the present review. Eleven were conducted across various states and districts of the USA, with the remaining four studies taking place in the UK. The total number of participants across studies was 791, ranging from study totals of 13 (Shaw et al., 2022) to 111 (Jimenez et al., 2021). These high participants numbers are explained by several studies conducting group interviews and some analysing qualitative responses from a large pool of survey data. Female participants made up 71% of eleven included studies, with information regarding gender unreported or unclear for qualitative analysis in the remaining four studies (Cook et al., 2022; Kerrigan et al., 2022; Momplaisir et al., 2021; Shaw et al., 2022). Most studies sampled from an adult population, while three studies included children and adolescents from age 13 (Budhwani et al., 2021; Garcia et al., 2021; Okoro et al., 2021). Regarding race and ethnicity of participants, the majority of studies included African American and Latinx samples. Two focused solely on African American populations (Budhwani et al., 2021; Okoro et al., 2021), two on Latinx populations (Cáceres et al., 2022; Garcia et al., 2021) and five on both of these groups (Balasuriya et al., 2021; Jimenez et al., 2021; Momplaisir et al., 2021; Kerrigan et al., 2022; Osakwe et al., 2022). Four papers included broader multi-ethnic groups (Carson et al., 2021; Cook et al., 2022; Woodhead et al., 2021, pp. 1–20; Woolf et al., 2021) while two papers sampled migrant or refugee populations (Deal et al., 2021; Shaw et al., 2022).

Four studies used a mixed-methods design (Cook et al., 2022; Okoro et al., 2021; Shaw et al., 2022; Woolf et al., 2021), while the eleven remaining studies used purely a qualitative design. Qualitative data collection and analysis methods varied across papers. Six studies conducted semi-structured interviews with individuals (Budhwani et al., 2021; Deal et al., 2021; Garcia et al., 2021; Osakwe et al., 2022; Shaw et al., 2022; Woodhead et al., 2021, pp. 1–20), while four studies conducted focus groups (Balasuriya et al., 2021; Cáceres et al., 2022; Carson et al., 2021; Momplaisir et al., 2021) and one collected open-text responses from a community open survey (Cook et al., 2022). The remaining four studies used multiple data collection methods, with Okoro et al. (2021), Jimenez et al. (2021) and Kerrigan et al. (2022) conducting both individual interviews and focus groups, and Woolf et al. (2021) additionally collecting free-text data from their cohort study. Most frequently employed analysis methods were thematic analysis (Cáceres et al., 2022; Carson et al., 2021; Kerrigan et al., 2022; Okoro et al., 2021; Shaw et al., 2022; Woodhead et al., 2021, pp. 1–20), including thematic framework analysis (Deal et al., 2021; Woolf et al., 2021), and content analysis (Balasuriya et al., 2021; Cook et al., 2022; Osakwe et al., 2022). Other studies described using modified grounded theory (Momplaisir et al., 2021), immersion-crystallisation (Garcia et al., 2021), rapid qualitative analysis (Budhwani et al., 2021) and an 'editing' approach (Jimenez et al., 2021).

Details of included study characteristics are illustrated in Table A of the supplementary materials.

3.2. Quality appraisal

The methodological quality of the fifteen included studies according to criteria on the CASP Qualitative Studies checklist (2018), which can be found in Table B of the supplementary materials. Overall, the studies were found to be of reasonable to good quality with 50%–100% of the checklist items being present in the studies, though it should be noted that these figures are only intended as an illustration of comparative quality of papers, acknowledging items are not necessarily of equal weighting and prone to subjectivity. Main strengths across papers included clear aims and rationale for research appropriate for qualitative design, rigorous data analysis, often conducted with multiple analysts, and discussion of recommendations based on findings. The main weakness across studies was not adequately considering the relationship between participants and researchers. Despite several studies commenting on collaborations with advisory boards and community groups, and some acknowledging own ethnicities within their research teams, most papers did not explicitly address their own role and potential bias or influence across stages of the research.

3.3. Thematic synthesis

Three main themes were identified as factors driving COVID-19 vaccination hesitancy: (1) Institutional mistrust (including 'legacy of historical mistreatment in context of current inequities', 'negative experiences of healthcare and fear of differential treatment', and 'beliefs about financial motivations), (2) lack of confidence in vaccine and development process (including 'concerns over safety and side effects', 'scepticism about efficacy/effectiveness', and 'speed of vaccine development and underrepresentation in trials'), and (3) lack of reliable information or messengers (including 'difficulty accessing and identifying trustworthy information', 'misinformation, conspiracy theories and negative messages', and 'issues around culturally accessible information'). Two other themes were also identified, although these were mentioned less frequently and emerged from fewer studies: (4) Complacency/perceived lack of need (including 'low risk perception', 'preference for alternative means of protection', and 'perception that vaccination risks outweigh benefits') and (5) structural barriers to vaccine (including 'difficulties arranging vaccination appointments' and 'difficulties attending vaccination appointments'). Below follows a review of all themes and subthemes. See supplementary materials Table C for a comprehensive overview of example quotes.

3.3.1. Institutional mistrust

3.3.1.1. Legacy of historical mistreatment in context of current inequities. Across statements of multiple participants and studies frequent references were made to previous traumas and mistreatment of racial minorities by the government and medical researchers, such as the unethical research conducted by the US Public Health Services Syphilis Study at Tuskegee. Participants feared a reoccurrence of such experimentation, with increased scepticism around the prioritisation of minority groups, as illustrated by this African American participant:

> "I don't want to call it a 'dog whistle,' but just to hear that somehow what's being discussed as, you know, the priorities of the African American communities as if the African American communities aren't aware of the past experiments, whether it's social science, medical that we have been a part of unknowing what the truth was behind it and the long-lasting effects that it's had on our families, our men, women and children … We don't want to be another Tuskegee Experiment or something else. We love that you're thinking about us, but you know" – African American participant (Carson et al., 2021)

Scepticism around racially or ethnically targeted campaigns and vaccination efforts was perpetuated by participants' experiences of ongoing systemic racism, concern about anti-immigrant sentiments and suspected population control. Fears often related to vaccines as means of sterilisation or eradication (Cáceres et al., 2022; Garcia et al., 2021; Okoro et al., 2021). Undocumented migrant participants reported additional fears that attending vaccination appointments would involve data being shared with immigration enforcement, as this asylum seeker described:

> "They don't need to put the word documents [in Covid vaccine adverts] because.. what if I don't have it, I'm undocumented. And you said okay come on have your vaccine, we're not going to check you.. I won't go because I don't know to what extent is true. It might be a ploy to get people to come" – Asylum seeker participant (Deal et al., 2021).

3.3.1.2. Negative experiences of healthcare and fear of differential treatment. Poor treatment in healthcare was reported by participants, including experiences of racism, hostility and medical errors. Some participants described feeling unheard, ignored or excluded from the healthcare system:

> "I had to fight my way to get certain things done for my health.…They don't take you seriously sometimes … that kind of contributes to the fear of wanting to get vaccines, wanting to do new medical things because it's like you've been put in so many different ways before in the past that you really just don't trust it" – Individual of ethnic minority group (Balasuriya et al., 2021)

Participants highlighted the disparity in death rates of racial and ethnic minorities in the healthcare system, contributing to fear of engaging with the medical system for vaccination. Participants described being made to feel 'othered' and were concerned they would receive poorer treatment and a lower quality vaccination:

> "We as Latinos will not receive the same quality of a vaccine …" - Latina participant (Osakwe et al., 2022)

3.3.1.3. Beliefs about financial motivations. Engagement with vaccination programmes was also influenced by mistrust of pharmaceutical companies and medical systems, with some participants questioning their motives. Some assumed the vaccination roll-out was financially driven, particularly participants living in the United States, with healthcare often associated with immediate costs:

> "There is a huge mistrust of the medical community and I can understand why. The U.S. medical system is very different from what's practiced at home. The idea of insurance, deductibles, premiums – those things all seems like a money-making scheme to people. Similarly, with the COVID vaccine, I am hearing hesitations like 'what if this is something the doctors are doing as another way to make money?" – Ethiopian participant (Kerrigan et al., 2022)

3.3.2. Lack of confidence in vaccine and development process

3.3.2.1. Concerns over safety and side effects. Several participants across studies voiced concerns relating to safety of the COVID-19 vaccinations, particularly uncertainty about potential side effects. Individuals described hearing about side effects from news media sources and friends, with concerns being regularly discussed in communities. Whilst most participants spoke of a general sense of uncertainty, some reported specific concerns about long-term risk of infertility through vaccination, as described by this Public Health Registrar:

> "I am quite worried and mainly about the impact on fertility, you know, and even though studies say there's no link, there's no plausible biological mechanism, we haven't had that long term research really to say it's definitely 100% safe." – Participant ethnic group not stated (Woolf et al., 2021)

Both long- and short-term side effects were considered by many, who felt that more time was needed following initial roll-out to monitor the full effects of the COVID-19 vaccine and determine its safety. Others reflected on previous experiences of illness following receipt of other vaccinations and described beliefs that the vaccine itself may transmit COVID-19:

> "Honestly, I don't think a lot of people if there was a vaccine, would just be willing to go in and get a vaccine, especially if it's (like) the flu vaccine. Because a lot people go in and get the flu shot, and then guess what, a lot of people get the flu after they get the shot. Nobody's gonna wanna go in and get a COVID shot 'cause they gonna think they're gonna get COVID. You know what I mean?" – Black/African American participant (Okoro et al., 2021)

3.3.2.2. Scepticism about effectiveness. Uncertainty about effectiveness contributed to lack of confidence in the COVID-19 vaccination. Some authors described participants' views on vaccines in general as 'ineffective'. Some participants voiced concerns around limitations of the vaccine, such as not being fully protected from transmission of the virus, and wondered whether the vaccine was effective against different variants. Fundamentally, most participants cited general uncertainty about what protection to expect from the vaccination, especially given the lack of longitudinal-data on outcomes. This Hispanic participant described her confusion:

> "Are they already like, protected? for how long? A month … Six months? One year? I don't know … Nobody knows." – Hispanic participant (Osakwe et al., 2022)

3.3.2.3. Speed of vaccine development and underrepresentation in trials. Participants frequently cited discomfort with the expedited development of the COVID-19 vaccines as driving their lack of confidence and related hesitancy. Several participants compared the development timeline with those of vaccines they perceived to be 'successful', and concluded that the COVID-19 vaccine development was rushed under pressure and required more robust research to establish safety and efficacy. An example statement was provided by this Black Caribbean individual:

> "A vaccination that should have taken 10–20 years to develop and test properly has been produced in a matter of months. And, um … so it hasn't been -it hasn't been tested and it hasn't been scrutinised the way it should have been." – Black Caribbean participant (Woodhead et al., 2021, pp. 1–20)

Several participants also expressed a lack of confidence in the vaccination due to vaccine trials not including sufficient numbers of individuals from racial or ethnic minority groups. This fuelled concerns about vaccination affecting these individuals differently and potential health implications:

> "The other concern is the long-term effects and not sampling enough Pacific Islanders, women, people of color, those with health disparities." — Pacific Islander participant (Carson et al., 2021)

Many participants described a 'wait and see' attitude, wishing to observe the effects of vaccination on others before being willing to vaccinate themselves:

> "Back to the point of the testing feeling like it's being rushed, I feel like right now whoever tries it is literally going to be the test group … like the same thing with Apple launches. I never want to get the first phone. I want to get the one that after all the bugs get worked out. I'll go get that one." — Filipino/a participant (Carson et al., 2021)

3.3.3. Lack of reliable information or messengers

3.3.3.1. Difficulty accessing and identifying reliable information. Several participants expressed that a lack of trustworthy information deterred them from taking up a COVID-19 vaccination. This reportedly left them

with many unanswered questions about the vaccination process, such as location of vaccination sites, potential cost or health insurance requirements, and vaccine brands administered. A number of participants cited a lack of clear information on the benefits of vaccination (Cáceres et al., 2022; Kerrigan et al., 2022).

A lack of consistency in guidance and accessed information was of concern for several participants, with the breadth and variability of information causing confusion and leading to doubt about which sources were trustworthy:

> "For me, I would like to take the vaccine if that will make everything better. But the fake news is scaring me, so I don't know. That is a problem. I don't know if it's real, I don't know if it's fake." - Asylum seeker participant (Deal et al., 2021)

3.3.3.2. Misinformation, conspiracy theories and negative messages. In the absence of trustworthy information, room was left for media speculation, misinformation and conspiracy theories. Many participants described being exposed to large amounts of misinformation about the COVID-19 vaccine across multiple platforms, including social media, television and radio. Conspiracy theories relating to radiation from 5G networks and 'tracking devices' or 'microchips' being implanted, were frequently cited, as exemplified by this 15-year old from a Latinx family:

> "I have had a conversation with my parents: so, it's kind of a weird situation she started talking about the bad part of Facebook and the microchips they put inside of you with the vaccine." – Latinx participant (Garcia et al., 2021)

Participants explained that negative messages and rumours about vaccination were perpetuated and spreading quickly amongst their communities through word of mouth:

> "The bad news goes very fast that the vaccine will cause death or the vaccine will cause this symptom, the vaccine will make you sick, the vaccine will not cure the virus. So those kinds of things I often hear all the time in the community. So, it is challenging for us." – Refugee participant (Shaw et al., 2022)

3.3.3.3. Issues around culturally accessible information. Language barriers were discussed in studies both based in the USA and the UK, as described by this nurse specialist:

> "Around the community … a multinational community … some of them can't speak [English] … the information which is available in the English, they are not getting access for that. I came across a few patients like that because they don't have any knowledge about how the vaccination's working … what is going on about vaccination" – Participant ethnic group not stated (Woolf et al., 2021)

Some Latinx participants explained that available information was not translated into Spanish, making it inaccessible for many in the community. Participants also perceived popular Spanish media outlets in the community as less robust and not impressing the prevalence and severity of COVID-19 compared to English-language media:

> "I believe for Latinos there's not a lot of information … we don't have the right resources ….in Spanish news you don't get the same amount of COVID information like you see in English …" – Hispanic participant (Osakwe et al., 2022)

Some participants expressed the view that community engagement efforts had been insufficient which meant that many lacked opportunities to clarify information, discuss their concerns regarding the vaccine, and receive community specific information (Carson et al., 2021; Jimenez et al., 2021).

3.3.4. Complacency/perceived lack of need

3.3.4.1. Low risk perception. Several participants described a lack of motivation to receive a vaccination, believing COVID-19 not to pose a significant risk to them. Having previously been infected with COVID-19, observing low infection numbers locally, not belonging to high risk population groups and assuming a less severe impact of infection due to being in good health, were amongst reasons given for this belief:

> "As far as impact on a personal level, I don't think that the majority of people here in –, outside of the elderly population and the population who are most at risk to die from a disease, I don't think that the majority of people in – and other places like this would be likely to take a vaccine" - Black/African American participant (Okoro et al., 2021)

Some cited that general vaccine hesitancy or rejection was not uncommon, with others, including themselves, regularly declining the flu vaccination with no perceived negative outcomes (Woodhead et al., 2021, pp. 1–20).

3.3.4.2. Preference for alternative means of protection. Participants shared beliefs that the need for vaccination was negated by other methods which had so far proven to be effective in protecting against the virus. These included practising safety measures like mask-wearing and social distancing and building a healthy immune system. Natural remedies were described as being preferred to manufactured vaccines:

> "You have alkaline foods that you can put in your body that fight off the virus, you have immune support vitamins out here that can fight off virus and that's what I'd be with, without a vaccine, so … I don't know why they keep trying and push their vaccine, because people didn't even want to take the flu shot" – Black participant (Momplaisir et al., 2021)

3.3.4.3. Perception that vaccination risks outweigh benefits. In many cases, the potential for negative outcomes of receiving a COVID-19 vaccination were deemed more important than potential benefits and therefore not worth the risk. Some feared that experiencing side effects could impact them financially due to being unable to work (Carson et al., 2021). Others, who considered themselves medically vulnerable, were concerned that the vaccine would exacerbate underlying difficulties or even lead to death. A Filipino participant described concerns of this nature, explaining certain pre-existing health conditions as particularly prominent in racial or ethnic minority groups:

> "There has been a lot of concerns in my family on how the vaccine works for people with heart disease, which really affects also a lot of the Filipino community, and also those with respiratory diseases." – Filipino participant (Carson et al., 2021)

3.3.5. Structural barriers to vaccine access

3.3.5.1. Difficulties arranging vaccination appointments. A variety of practical issues with arranging and attending vaccination appointments were cited by participants, preventing them and others in their community from taking the vaccine. Difficulties with telephone and online vaccine registration were described as confusing long-winded processes, particularly for the elderly, alongside a lack of availability of convenient appointments. Others explained about community members with limited or no access to electronic devices required for registration:

> "You have families who have no electronic devices … putting this [vaccine registration] now on them with the overhead of 'COVID is going to come get you if you don't do this,' it's going to be quite

traumatic for a lot of our communities" —American Indian participant (Carson et al., 2021)

Particular concerns were raised about undocumented or precarious migrants being excluded from vaccination programmes due to being unregistered with a General Practitioner (GP). Migrant and asylum seeker participants reported the resulting difficulties attending to their healthcare needs and having to rely on alternative methods, such as walk-in centres or charities:

"The people that are not legal in the UK, they found that really hard to access any medical unless they registered in a homeless centre. And then they get the medical that they need through a homeless service unit" - Undocumented migrant participant (Deal et al., 2021).

3.3.5.2. Difficulties attending vaccination appointments. Some participants raised concerns about language barriers and lack of resources to accommodate for older, vulnerable and disabled people at vaccination sites (Carson et al., 2021). Additionally, they discussed financial implications of attending vaccination appointments, such as cost of transportation to vaccination sites and having to take time off work, as described by this Latino participant:

"If they do qualify for the vaccine they'd have to take a day off of work to go. And not everybody has the privilege of sick hours or anything like that. So, they would sacrifice a day's wage to go get the vaccine." – Latino participant (Carson et al., 2021)

4. Discussion

The aim of the present review was to explore reasons for vaccine hesitancy and barriers to COVID-19 vaccination in racial and ethnic minority groups, including refugees, asylum seekers and migrants at initial stages of the vaccine roll-out. Three main themes (institutional mistrust, lack of confidence in vaccine and development process and lack of reliable information or messengers) and two less prevalent themes (complacency/perceived lack of need and structural barriers to vaccine access) emerged from fifteen included studies. Themes and relationships between themes are shown in the left panel of Fig. 2.

Mistrust of government and the healthcare system was a particularly prevalent driving factor for COVID-19 vaccine hesitancy in racial and ethnic minority communities, running through several other identified themes. This was perpetuated by the legacy of historical mistreatment by these institutions, negative experiences of healthcare and scepticism about potential financial motivations. Our review supports findings that mistrust and experiences of discrimination exist across multiple contexts and populations (Sripad et al., 2017) and results of previous reviews suggesting that this mistrust influences vaccine hesitancy in ethnic minority groups (Restrepo & Krouse, 2021; Khubchandani & Macias, 2021; Ochieng et al., 2021; Kamal et al., 2021). The present review also highlights the influence of mistrust on vaccine hesitancy in migrant populations, with further specific concerns including beliefs that vaccination appointments would be used as a means of checking immigration status and sharing data with immigration enforcement.

Lack of trust in institutions also fed into the theme of a lack of confidence in the COVID-19 vaccine and development process. This included increased concerns about the safety and side effects of the vaccine, scepticism about its effectiveness and speed of the vaccine development process. This echoes findings of existing literature reviews (Restrepo & Krouse, 2021; Khubchandani & Macias, 2021; Ochieng et al., 2021; Kamal et al., 2021) as well as previous research on other vaccination programmes, for example the Human Papillomavirus (HPV) vaccine, where a lack of trust in these vaccinations is not uncommon in racial and ethnic minority groups (Kolar et al., 2015). While the process and speed of the COVID-19 vaccine development process have been identified as a barrier to uptake intention in the general population (AlShurman et al., 2021), the current review highlights additional concerns by ethnic minority groups regarding underrepresentation in vaccine trials.

Another main theme relating to COVID-19 vaccine hesitancy amongst ethnic minority groups was a lack of reliable information or messengers, with studies reporting difficulties accessing and identifying reliable and culturally accessible information, and instead being exposed to negative messaging and conspiracy theories regarding the vaccine. This is in line with previous reviews, which highlighted the importance of

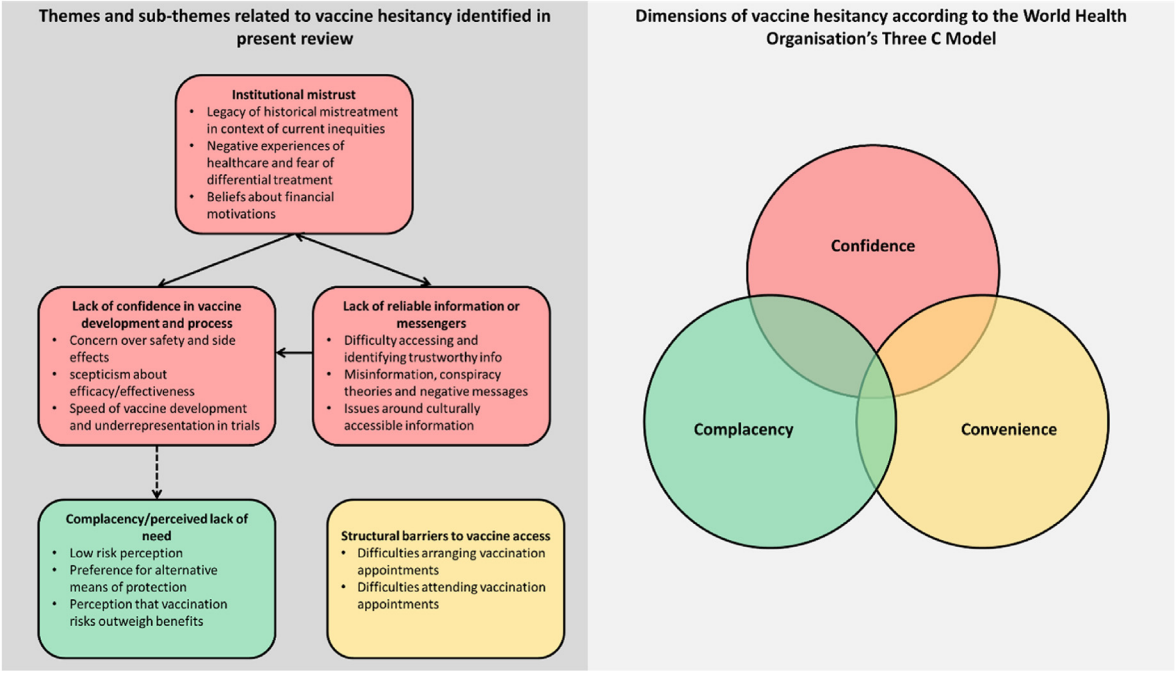

Fig. 2. Diagram of interrelated themes and sub-themes identified in this review, mapped against the dimensions of the 'Three C Model' of vaccine hesitancy (World Health Organisation, 2014).

misinformation (Restrepo & Krouse, 2021; Khubchandani & Macias, 2021; Ochieng et al., 2021; Kamal et al., 2021). Frequently cited conspiracy theories regarding experimentation, sterilisation and eradication of minority groups also appeared closely linked with the theme of institutional mistrust, perpetuated by fear of repeated historical unethical and exploitative practice and increasing scepticism about racially and ethnically targeted messaging and prioritisation. Lack of vaccine knowledge is a frequently suggested reason for vaccine hesitancy in general (Hammour et al., 2022), and this was supported by the current review, which found participants expressed confusion due to the breadth and variability of information from different media sources. Notably, information was sought to make informed decisions, but reliable culturally accessible information was reportedly difficult to obtain, leaving room for mistrust and safety concerns to fester.

While the present review confirms findings of previous literature reviews exploring COVID-19 vaccine hesitancy in ethnic minority groups, the qualitative methodology and inclusion of migrant, asylum seeker and refugee populations has highlighted more nuanced factors relating to hesitancy in these groups. For example, while several participants across ethnic minority groups stated mistrust of institutions, migrant populations reported particular concerns around anti-immigration sentiments, with scepticism around papers not being required for vaccination and fear of deportation fuelling hesitancy. Issues of accessibility were also particularly prevalent across migrant, asylum seeker and refugee populations. Undocumented migrants reported additional confusion about eligibility for and concerns about exclusion from vaccination programmes due to being unregistered to a GP and relying on healthcare through charities and walk-in centres.

Finally, our results may be used to inform adaptations of existing models pertaining to vaccine hesitancy, most notably the 'Three C Model' of vaccine hesitancy (World Health Organisation, 2014). While all of the present review's themes mapped onto the model's dimensions of 'confidence', 'complacency' and 'convenience' (see Fig. 2), our findings suggest that the 'confidence' dimension may represent a disproportionately large barrier to vaccine uptake in ethnic minority groups. Three of the five themes of the present review, 'institutional mistrust', 'lack of confidence in vaccine and development process' and 'lack of reliable information or messenger', fall within this facet of the model. This highlights both the relative significance of the 'confidence' dimension, and the need for a more nuanced consideration of different aspects that shape the dimension.

4.1. Limitations

It should be noted that there are several limitations to the present review. Whilst the review seeks to present initial qualitative research, the timeline of results across the course of the pandemic shows considerable variability, with participants' perceptions presented over differing stages of vaccine approval and rollout. As an example, a selection of participants made direct reference to mistrust of the Trump administration influencing their decision making, though the political leadership in the United States has since changed.

Vaccine hesitancy is recognised as a dynamic concept, influenced greatly by context and time (MacDonald, 2015) therefore variables such as vaccination procedures and legislation, number and brand of available vaccines and number of locally identified cases may lead to difficulties generalising the findings of this review to present day attitudes and behaviours. Future longitudinal studies exploring changes in vaccine hesitancy in racial and ethnic minority groups over time and associated reasons would further add to our understanding of this active concept and assess whether intention translates into behaviour. Generalisability is further impacted by the Western-centric papers included in this review, which were overwhelmingly published in the USA, with a small selection of UK studies, and predominantly focused on African American and Latinx populations. The research context, for example specific healthcare systems, and different minority populations are likely to shape local regional vaccination attitudes. Refugees, asylum seekers and migrants also appear to be underrepresented in current research on COVID-19 vaccine hesitancy, suggesting a crucial gap to be addressed in future research.

4.2. Conclusion and implications for practice

We conducted the first systematic review and synthesis of qualitative reason on COVID-19 vaccine hesitancy in racial and ethnic minorities including migrant populations. Our findings highlight the need to consider attitudes and behavioural intentions in light of the historical mistreatment of these groups with its enduring legacy through social unrest and structural racism (Abbasi, 2020). Awareness of and compassion regarding these driving factors is essential in sensitively addressing issues of hesitancy, with literature highlighting the risk of further stigmatisation through singling out minority groups as 'vaccine hesitant' in the media and vaccination campaigns (Woolf et al., 2021). Instead, the review highlights the importance of tackling minority groups' disproportionate lack of confidence, for example by working with trusted messengers to deliver information about vaccination to communities, which may be achieved through forming partnerships with community leaders and institutions. Such partnerships have proved highly effective in the rollout of other vaccinations, such as for Human Papillomavirus in the United States (Lahijani et al., 2021). In addition, issues of accessibility, particularly in migrant populations, call for the establishment of facilities for in-person registration and vaccination sites in under-resourced neighbourhoods as important steps towards combating vaccine hesitancy. Further research is needed from the Global South to shed light on specific geographical challenges.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmqr.2022.100210.

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