REVIEW ARTICLE

Effects of local faith-actor engagement in the uptake and coverage of immunization in low- and middle-income countries: A literature review

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Abstract

Introduction: Religious leaders are universally recognized as having an influence on immunization uptake and coverage in low- and middle-income countries (LMICs). Despite this, there is limited understanding of three questions: 1) how do religious leaders impact the uptake and coverage of immunization in LMICs? 2) what successful strategies exist for working with local faith actors to improve immunization acceptance? and 3) what evidence gaps exist in relation to faith engagement and immunization?

Methods: In January 2021, we searched PubMed and Google Scholar databases covering the period from January 1, 2011 to January 15, 2021 with key search terms related to faith engagement and immunization in peer-reviewed literature and conducted a gray literature review to answer these three questions. We excluded articles covering faith engagement and immunization in high-income countries, news articles, online blogs, social media postings, and articles in languages outside of English. Data were coded to guide thematic analysis.

Results: We found extensive evidence supporting the value of religious engagement for immunization promotion and acceptance in LMICs across faiths. However, there was limited rigorous evidence and examples of specific approaches for engaging local faith actors to strengthen immunization uptake in LMICs. As a result, there is a lack of widely shared knowledge of what works (or doesn't) and successful models for engaging local faith actors. Additional current evidence gaps include: few rigorous study designs; a lack of vaccine hesitancy studies outside of Nigeria and Pakistan; and limited exploration of faith engagement and immunization in religions other than Islam and Christianity.

Conclusions: Our review findings reinforce the powerful role local faith actors play in diverse communities within LMICs in both promoting and inhibiting immunization uptake. The literature review comes at a critical time, given the urgent need to expand access to COVID-19 vaccination in LMICs. Findings from this review will advance understanding on how to more effectively engage local faith actors in promoting immunization campaigns and addressing vaccine hesitancy, which is more complex than expected. Further study is needed to understand how to most effectively counter vaccine hesitancy in different geographic, linguistic, and socio-cultural context.

Key Words: vaccine hesitancy, systematic review, immunization, low- and middle-income countries, faith-based organizations, religious leaders, local faith actors

Introduction

Religious leaders and local faith actors are universally recognized as having an influence on immunization uptake and coverage in low- and middle-income countries (LMICs).[1,2] This association between religion and vaccination dates back to as early as 1,000 AD, when a Buddhist nun was described as grinding scabs from a smallpox-infected person into a powder, blowing it into a non-immune person's nostrils to induce immunity.[3-5]

Today, many major religions commonly believe that vaccination—the act of administering a substance that stimulates the body's immune response against diseases—supports their shared objectives of preserving and protecting life, health, well-being, equity, and prevention of suffering, especially among children and other innocents.[5] Some religions even call for vaccination as a moral imperative to preserve the lives of children or within a community.[3,6]

Yet, despite the powerful positive potential to reduce and eliminate diseases such as smallpox and polio, religious factors remain the third most frequently cited reason for vaccine hesitancy in global surveys.[7-13] Vaccine hesitancy in this case is defined as delay in acceptance or refusal of vaccines despite the availability of vaccination services. Religiously-linked, vaccine hesitancy concerns are especially pronounced and rising in LMICs, though often these concerns are inter-mixed with others related to political, economic, or social issues.[13-15] Prominent media coverage and academic study of widespread polio vaccine hesitancy among Muslim communities in Northern Nigeria and Pakistan in the 2000s and 2010s has further heightened awareness and interest in vaccine hesitancy and faith communities.

Specific aims of the literature review

There is still limited information on and understanding of how faith actors impact the uptake and coverage of immunizations in LMICs, as well as what interventions work to counter vaccine hesitancy among local faith actors. To date, the bulk of research on vaccine hesitancy and faith communities has been conducted in high-income countries. We are unaware of efforts to validate vaccine hesitancy measurement tools in sub-Saharan Africa.[16]

This is a critical evidence gap, as vaccine hesitancy among faith communities has been demonstrated to negatively impact immunization coverage in certain LMICs.[17] The rollout of COVID-19 vaccinations in LMICs also represents an acute challenge and opportunity to engage faith leaders in what will be the largest public health vaccination campaign in the past 100 years.

The Faith Engagement Team of the US Agency for International Development's (USAID's) MOMENTUM Country and Global Leadership program undertook a study of the role of faith communities in vaccine hesitancy. In January 2021,

we conducted a literature review to answer three key questions: 1) How do religious leaders and faith-based organizations impact the uptake and coverage of immunization in LMICs? 2) What successful strategies exist for working with local faith actors and communities to improve immunization acceptance and reduce vaccine hesitancy? and 3) What evidence gaps exist in relation to faith engagement and immunization? Findings will advance understanding on how to more effectively engage local faith actors in promoting routine and supplementary immunization campaigns and reducing vaccine hesitancy.

Methods

Search strategy

The research team searched PubMed and Google Scholar databases for peer-reviewed literature for the period from January 1, 2011 to January 15, 2021 with key search terms related to faith engagement and immunization (Figure 1).

Figure 1. Literature review search terms

We combined the following terms: vaccin*, immuniz*, immunis*, vaccine hesitancy AND faith, faith-based, faith actors, relig*, church, mosque, temple, Christian, Muslim, Islam, Hindu, Buddhis* AND Low- and Middle-Income Countries, LMICs, Africa, Asia, Latin America.

Note. The asterisk* indicates a wildcard symbol enabling a broader search by finding words that start with the same letters/word stems.

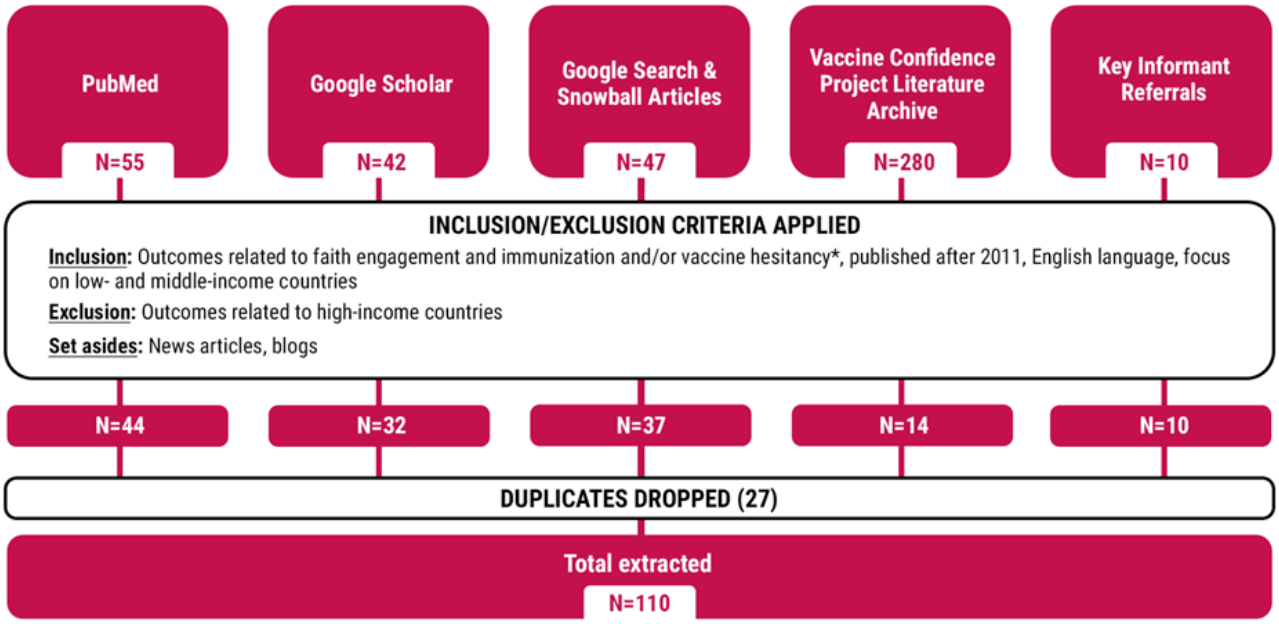
We supplemented the peer-reviewed database searches with a gray literature search, recognizing that many interventions related to religious leaders are not published in peer-reviewed journals. The review included a keyword search across several online databases and organizational websites for the same period: Google, the Vaccine Confidence Project Literature Archive, and USAID's Maternal and Child Survival Program website. References in papers meeting inclusion criteria were searched for further relevant studies for potential review. The authors also solicited submissions from a cohort of key informants who included experts from the USAID MOMENTUM Country and Global Leadership program and from a cohort of 18 global faith engagement and immunization experts drawn from Christian Connections for International Health's (CCIH) networks.

Inclusion/exclusion criteria

We included peer-reviewed studies and gray resources meeting the following criteria: 1) the study context was an LMIC; 2) it included any of the search keywords in the title or abstract; 3) the main focus of the study or resource was related to faith-actor engagement and immunization and/or vaccine hesitancy; 4) it was published between January 1, 2011 and January 15, 2021; and 5) it was published in English. Resources were excluded if they were about faith engagement and immunization in high-income countries, news articles, online blogs, or references to social media postings.

As depicted in Figure 2, the literature review found an initial 434 articles through initial search terms and an assessment of relevance using the pre-identified inclusion criteria. All articles that met the inclusion criteria (137) were included for quality assessment and data extraction. Of these, 27 duplicate references were manually removed, leaving 110 resources. These are presented in Appendix 1.

Figure 2. Literature Review Search Strategy



Note. *Using literature review search terms in Figure 1

Data extraction and analysis

We reviewed the 110 relevant papers and entered qualitative and quantitative descriptive information into an Excel data extraction matrix template that included the following categories: author, year, publication; country(ies), and/or region covered; type of study/article/resource; focal religion(s); and topical area of focus (including vaccine hesitancy, specific types of vaccine). The matrix also captured key observations and findings, vaccine hesitancy findings, evidence-based interventions related to engaging local faith actors and immunization, promising practices for faith engagement and immunization, and reported evidence gaps. Data were coded using a predefined set of themes and sub-themes from the matrix categories to answer the three literature review questions.

Results

Description of the resources reviewed

Despite results, there is still scant published evidence of the role of religion and local faith actors on immunization.[1] Most studies treat religion as a confounding variable without a detailed examination of the nuanced impact or inter-related factors (social/political/economic) that impact immunization uptake.[1,2] The review did find a number of key thematic foci, as depicted in Table 1.

Table 1. Key Themes Found in Literature Review (see Appendix 1 for full listing of resources)

Theme	Relevant Materials
Main Topical Focus of Article	
Religion/local faith actors and immunization	Akseer, N (2018); Alemu M (2016); Ames H (2017); Asress A and Bezabih L (2018); Bangura JB (2020); Berkley Center (2020); Berkley Center (2012); Boulton ML and Wagner AL (2021); Catholic Relief Services (2019); Christian Connections for International Health (2017); Costa JC (2020); Gavi (2015); Glatman-Freedman A and Nichols K (2012); Grabenstein JD (2013); International Interfaith Peace Corps (2016); Jalloh MF (2020); Makoka M (2020); Malande OO (2019); Marshall K (2013); Morry C (2019); Mukungwa T (2015); Mupere E (2020); Nnadi C (2017); Olivier, J (2016); Oyo-Ita A (2020); Soura A (2013); UNICEF (2012); UNICEF (2015); Vatican Commission for COVID-19 (2021); Vermandere H (2016); Wesevich A (2016); Wilkinson O and Marshall K (2021); Wonodi CB (2012); Woo, YL (2012); World Council of Churches and World Jewish Congress (2020); World Faiths Development Dialogue (2012); World Health Organization (WHO) (2017); (WHO) (2018); WHO/Sage Working Group on Vaccine Hesitancy, systematic review (2014); World Vision, barrier analysis (2021)
Religion/local faith actors and vaccine hesitancy	Abakar MF (2018); Abubakar A (2019); Agrawal A (2020); Ahmed A (2018); Ahmed S (2014); Ansari, MT (2020); Anyene, B (2014); Balbir Singh HK (2019); Barmania S and Reiss MJ (2020); Berkley Center (2021); Cobos Muñoz D (2015); Cooper S (2018); de Figueiredo A (2020); Dubé E (2014); Ebrahim, AF (2013); Evans D (2019); Falade BA (2014); Gallup and Wellcome Global Monitor (2018); Gerede R (2017); Ghinai I (2013); Grandahl M (2018); Greenberger C (2017); Guzman-Holst A (2020); Ha W (2014); Habib MA, community engagement (2017); Habib MA, knowledge and perceptions (2017); Hamdi S. (2018); Harapan H (2021); Hussain SF (2016); International Vaccine Access Center (2020); Jalloh MF (2019); Jamal D (2020); Jarrett C (2015); Kalok A (2020); Khan MU, Muslim scholars' knowledge (2017); Khan MU, knowledge, attitudes (2017); Khowaja AR (2012); Kriss JL (2016); Kucheba F (2021); Lane S (2018); Larson, HJ (2016); Machekanyanga Z (2017); Marti M (2017); McArthur-Lloyd A (2016); Muslim religious scholars (2014)l Nasir JA (2017); Nasir SG (2014); Ndiaye K (2013); Njeru I (2016); Olivier J. (2014); Olorunsaiye CZ (2017); Olufowote JO (2016); Owoaje E (2020); Padela AI (2014); Padmawati RS (2019); Peckham R (2018); Pelčić G (2016); Pugliese-Garcia M (2018); Remes P (2012); Renne E (2010); Sabahelzain MM (2019); Syiroj ATR (2019); Taylor S (2017); Tefera YA (2018); Turiho AK (2017); Wagner AL (2019); Wong LP and Wong PF (2020); Wong LP (2020); WHO/Sage Working Group on Vaccine Hesitancy, systematic review (2014); WHO/Sage Working Group on Vaccine Hesitancy, report (2014)
New vaccine acceptance	Padmawati RS (2019); Wonodi CB (2012)
Faith-Based Concerns or Interest with Specific Vaccines	
Polio	Agrawal A (2020); Ahmed S (2014); Falade BA (2014); Ghinai I (2013); Habib MA, community engagement (2017); Habib MA, knowledge and perceptions (2017); Hussain SF (2016); Khan MU, Muslim scholars' knowledge (2017); Khan MU, knowledge, attitudes (2017); Khowaja AR (2012); McArthur-Lloyd A (2016); Nasir JA (2017); Nasir SG (2014); Ndiaye K (2013); Njeru I (2016); Olufowote JO (2016); Owoaje E (2020); Peckham R (2018); Renne E (2010); Taylor S (2017)
COVID-19	Barmania S and Reiss MJ (2020); Berkley Center (2021); Berkley Center (2020); Vatican Commission (2021); Wilkinson O and Marshall K (2021); World Council of Churches and World Jewish Congress (2020); World Vision, PowerPoint (2021); World Vision, website (2021)
Rotavirus	Padmawati RS (2019); Wesevich A (2016)

Table 1. Key Themes Found in Literature Review [continued]

Religion of Focus in Relation to Immunization Exploration	
Multiple religions or no specific religion	Akseer, N (2018); Bangura JB (2020); Barmania S and Reiss MJ (2020); Berkley Center (2021); Berkley Center (2020); Berkley Center (2012); Boulton ML and Wagner AL (2021); Catholic Relief Services (2019); Christian Connections for International Health (2017); Cobos Muñoz D (2015); Cooper S (2018); Costa JC (2020); Dubé E (2014); Gavi (2015); Glatman-Freedman A and Nichols K (2012); Grabenstein JD (2013); Guzman-Holst A (2020); International Interfaith Peace Corps (2016); Jalloh MF (2020); Jarrett C (2015); Lane S (2018); Larson, HJ (2016); Marshall K (2013); Marti M (2017); Morry C (2019); Mupere E (2020); Nnadi C (2017); Olivier J (2014); Olivier J (2016); Olorunsaiye CZ (2017); Remes P (2012); Soura A (2013); Tefera YA (2018); Turiho AK (2017); UNICEF (2012); UNICEF (2015); Wagner AL (2019); Wilkinson O and Marshall K (2021); Wonodi CB (2012); Wong LP (2020); World Council of Churches and World Jewish Congress (2020); World Faiths Development Dialogue (2012); WHO (2018); WHO (2017); WHO/Sage Working Group on Vaccine Hesitancy, systematic review (2014); World Vision, barrier analysis (2021)
Muslim	Abakar MF (2018); Abubakar A (2019); Agrawal A (2020); Ahmed A (2018); Ahmed S (2014); Ansari, MT (2020); Anyene, B (2014); Balbir Singh HK (2019); de Figueiredo A (2020); Ebrahim AF (2013); Falade BA (2014); Ghinai I (2013); Habib MA, community engagement (2017); Habib MA, knowledge and perceptions (2017); Hamdi S (2018); Harapan H (2021); Hussain SF (2016); Jalloh MF (2019); Jamal D (2020); Kalok A (2020); Khan MU, Muslim scholars' knowledge (2017); Khan MU, knowledge, attitudes (2017); Khowaja AR (2012); McArthur-Lloyd A (2016); Muslim religious scholars (2014); Nasir JA (2017); Nasir SG (2014); Ndiaye K (2013); Olufowote JO (2016); Owoaje E (2020); Oyo-Ita A (2020); Padela AI (2014); Padmawati RS (2019); Peckham R (2018); Remes P (2012); Renne E (2010); Sabahelzain MM (2019); Syiroj ATR (2019); Taylor S (2017); Vermandere H (2016); Wong LP and Wong PF (2020); Woo, YL (2012)
Christian	Alemu M (2016); Ames H (2017); Asress A and Bezabih L (2018); Evans D (2019); Gerede R (2017); Ha, W (2014); Kriss JL (2016); Kucheba F (2021); Machekanyanga Z (2017); Makoka, M (2020); Malande OO (2019); Mukungwa T (2015); Njeru I (2016); Pugliese-Garcia M (2018); Remes P (2012); Vatican Commission for COVID-19 (2021); Wesevich A (2016)
Non-Muslim or Non-Christian	Grandahl M (2018); Greenberger C (2017); Malande OO (2019)

Study/resource type and quality

The review found a total of 110 relevant articles, 69% of which were peer reviewed, and the other 31% were from gray literature. While the literature review did not explicitly assess and score study quality, the quality of literature reviewed appears mixed based upon the study designs found. Most peer-reviewed literature cited was observational in nature; gray literature or discussion papers represented 44.5% of resources reviewed. The review found only three intervention studies (2.7%) examining approaches for engaging faith leaders. As the dominant resource type, the descriptive literature consisted of cross-sectional studies, qualitative studies, mixed methods, and data analysis. Additionally, there were several commentaries and discussion papers along with both literature and systematic reviews. The gray literature consisted of tools, guidelines, various resources, and reports. There were a variety of additional gray resources found including books, evaluations, poster/oral presentations, and unpublished theses.

Topical focus

The relevant literature was predominantly focused on vaccine hesitancy (60%) among different faith groups, versus a general exploration of religious engagement and vaccines (36%). The remaining 4% of resources focused on new vaccine acceptance among local faith actors and vaccines delivered by local faith actors in humanitarian environments. Of the articles that examined a

specific vaccine type, there was a focus on campaign-based vaccinations and so-called "controversial" vaccines (those causing hesitancy), rather than routine immunizations. The resource breakdown included:

- Polio (20)
- Human papillomavirus (HPV) (9)
- COVID-19 vaccination (8)
- Childhood immunization generally (5)
- Rotavirus (2)

Time period

At least five articles have been published every year since 2012 on the topic of local faith actors and immunization in LMICs. Interest in the topic appear to be rising as 70% of the resources identified were published within the last five years of the review (2016–2020). Last year (2020) was the peak, with 20 articles published.

Religions of focus

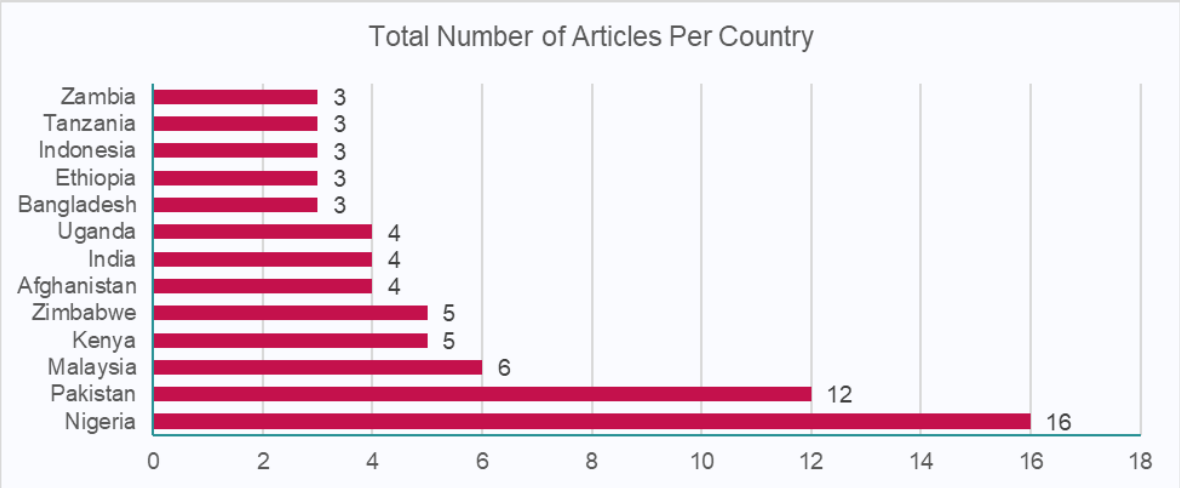
Just under half the resources found (42%) focused on multiple religions or general local faith-actor engagement and immunization rather than specific religions. The majority of studies with an explicit religious focus examined large-scale organized, monotheistic faiths (Islam, Christianity), and mainline religions—those linked to established denominations in the global North. Only eight studies explored immunization and faith engagement in traditional, folk, or growing non-networked religions such as Pentecostal or Charismatic denominations (12.5%), a growing proportion of religions in LMICs. We found few studies exploring immunization in the context of Buddhist or Hindu faiths in Asia.

The literature also reflects a heavy focus on polio vaccine hesitancy among Muslim populations, with 19% of all resources focused on that topic. The hesitancy literature in general focuses primarily on countries with large or predominantly Muslim populations, with the exception of Apostolic Christian denominations within Zimbabwe.

Geographic focus

Nearly half of the studies that met the inclusion criteria (44%) offered a global or multi-country focus in LMICs, rather than zeroing in on a specific geographic area. The other resources were localized to specific regions, predominantly sub-Saharan Africa (34%), followed by Southeast and South Asia (19%). Within sub-Saharan Africa, the majority of resources focused on Nigeria (16 articles), with fewer resources from Ethiopia, Kenya, Uganda, Tanzania, Zambia, and Zimbabwe (Figure 3).

Figure 3. Literature review findings: Top focal countries (as of January 15, 2021)



Within the Southeast and South Asian region, the majority of resources were specific to Pakistan (12 articles), while Afghanistan, Bangladesh, India, Indonesia, and Malaysia had fewer published research resources. The literature review uncovered major research gaps for the Latin American and Caribbean region, and only three resources were found for the Middle East and North Africa. There were no articles published for Eastern Europe nor the Asia Pacific region.

Discussion

Question 1: How do religious leaders and faith-based organizations impact the uptake and coverage of immunization in LMICs?

Measuring the precise impact and causality of local faith actors on immunization rates is challenging. Most studies generally treat religion as a confounding variable without a detailed examination of the nuanced impact or inter-related factors (social/political/economic) that effect immunization uptake.[1,2] This remains an important area for future research and exploration.

The reviewed literature did demonstrate four main mechanisms through which religious leaders and faith actors impact immunization uptake in LMICs: 1) influencing caretaker beliefs and values,[1,2,17,18] 2) impacting access to resources that facilitate immunization uptake,[1] 3) communicating immunization messages and conducting mobilization,[2] and 4) providing routine immunizations in hard-to-reach areas or humanitarian settings. These findings suggest that continued investment in and engagement with faith leaders can be a valuable strategy for immunization programming.[2,19] At the same time, the review did not find detailed explorations and analysis of the dynamics and mechanisms of how faith actors specifically influenced immunization uptake and coverage within local communities. This may warrant additional research in this area to unpack the influence and interplay of local faith actors within communities to better understand these mechanisms and design evidence-based interventions.

Religiously-linked vaccine hesitancy

Vaccine hesitancy is a complex phenomenon. Few religious groups or their sacred texts explicitly reject immunization (Figure 4).[3,5,11,12,20,21]

Figure 4. What major religions say about vaccines

ISLAM	• Theology generally supports immunization [4,5,26,67,82, KII] • Islamic law (hukm), however, prohibits use of haram (forbidden) materials such as porcine-derived products in vaccines/medicines [4,79,82] • Exceptions made for "law of necessity" when no alternatives available
CHRISTIANITY**	• Most denominations have no scriptural or canonical objection to the use of vaccines (*exception: Roman Catholic fetal cell objections*)[34] • Biblical support for immunization include Christian service to humanity (being one's brother's keeper, loving your neighbor as yourself)
HINDUISM	• Hindus advocate non-violence (ahimsa) and respect for life • Despite veneration of cows, no notable contemporary Hindu concerns with trace bovine components of some vaccines[34]
BUDDHISM	• Buddhism prohibits killing of humans and animals[34,82] • Modern Buddhists will generally use vaccines to protect their health[34,82]

Multiple resources reviewed suggested that vaccination hesitancy is often cloaked under the guise of "religion," without a theologically-grounded objection.[3,12] Instead, religious objections to vaccination serve as a cover or proxy for concerns about safety, social norms, socio-cultural issues, political, and economic factors.[2,3,5,26,27]

Common faith-linked vaccine hesitancy views across religions included the belief(s) that:

- Humans should not attempt to override God's will with man-made solutions.[3,4,28]
- God created a perfect world, including a perfect immune system: humanity should not attempt to improve on it.[4]
- The human body is a temple of God—immunizations introduce potentially harmful viruses, bacteria, and/or derivatives of forbidden substances.[4]
- Violations against taking life, including the use of fetal tissue from abortions, which are used in the development of cell lines used to make certain vaccines.[4,21]
- Violation of dietary laws (such as using vaccine development materials with porcine or bovine origins).[3]

The review found additional vaccine hesitancy themes, including: promotion of faith healers and/or the power of prayer over the use of vaccines or medicine,[11,29,30] distrust of Western medicine/fear that vaccines are being tested on their community,[29,30] worry that vaccines will sterilize recipients/impact fertility, and the promotion of traditional remedies rather than biomedical solutions.[8,30,31]

While these vaccine hesitancy themes were explored in numerous resources in the review, we did not find systematic analysis or study of the specific actions that local faith actors took to translate these beliefs into action and influence social norms, outside of specific references to case studies of vaccine hesitancy in certain countries among local faith actors. In these specific country examples, actions taken by local faith actors included sharing anti-vaccine messaging within houses of worship; disseminating anti-vaccination messaging informally within the community outside religious structures; broadcasting anti-vaccine messaging on mass media channels; and establishing formal or informal boycotts and encouraging adherents to avoid immunizing their children.

Heavy emphasis on Islam and vaccine hesitancy

The literature review found extensive documentation and exploration of Islam and vaccine hesitancy in LMICs, amounting to 69% of all studies with a specific single religion focus. This is likely due, in part, to very visible cases of vaccine hesitancy and boycotts in the early 2000s in northern Nigeria, Pakistan, and Afghanistan as well as the finding that Muslim religious leaders are especially influential in impacting vaccine uptake and hesitancy.[32,33]

Several references underscore the principle that Islamic theology generally supports immunization,[14,22,23] and there are predominantly Muslim countries with low rates of reported vaccine hesitancy, including Bangladesh, Malaysia, Niger, and Saudi Arabia. The review did find multiple studies that suggested lower coverage of immunizations among Muslim populations in LMICs (across countries and within countries of heterogenous religions).[1,14-16,34] Major drivers of vaccine hesitancy among Muslim faith communities identified in the studies included concerns that vaccines may contain *haram* materials (those prohibited under Islamic law) ,[14,33,35] fears that immunization would impact the fertility of recipients,[32,36] and beliefs that vaccinations were part of a Western conspiracy to harm their population.[29,30]

Other religions of interest

Christian denominations accounted for 23% of all resources with a single religious focus in the literature review, with a strong focus on Apostolic

denominations in Zimbabwe and Southern Africa. Originating from the Protestant Pentecostal church, Apostolic churches reflect a desire to emulate first-century Christianity in its faith, practices, and government and have historically objected to most medical interventions in lieu of prayer for healing.[9,11] Multiple studies showed lower basic immunization uptake and completion in Zimbabwe among Apostolic communities, with varying attitudes and degrees of refusal toward immunization among sub-sects, indicating a need for further study and interventions to address this growing population in Southern Africa. [8,9,11,20,37]

Despite much coverage in news media and popular culture focused on the use of cells from aborted fetuses to develop vaccines, the review only found two resources meeting inclusion criteria focused on vaccine hesitancy among Catholic populations where Catholic bishops in Kenya led a call for the boycott of the maternal tetanus toxoid (fertility concerns) and childhood polio vaccines (safety concerns).[29,38]

Vaccines of concern to faith actors

Religiously-linked polio vaccine hesitancy featured most prominently within the literature (representing 20 articles/41.7% of all articles with a specific vaccine focus), with examples from Pakistan,[32,35,39,40] Nigeria,[41–43] and Kenya.[38] This hesitancy contributed to increased reported caretaker vaccine refusal in Kenya due to safety concerns.[38] Polio vaccine rejection by religious and community leaders was linked with overall reduced polio vaccine coverage in Nigeria.[41,43] In Pakistan, multiple barriers were found, including concerns that vaccines include non-*halal* ingredients[35] and fears of a Western plot to sterilize Muslims or reduce the Muslim population.[32,39]

HPV immunization was found to be the second most frequently cited vaccine with religious objections. The HPV vaccine creates faith-linked challenges in both higher- and lower-income countries due to its perceived links to sexual activity. The review found broader religious objections to HPV vaccination among Catholic[7] and Muslim[44] communities globally and specific concerns in Brazil,[8,45] Indonesia,[8,45] Kenya,[46] Malaysia,[47] Tanzania,[8,45] and Zambia.[28] The literature review also found instances of religiously-linked vaccine hesitancy among the following specific immunizations (as opposed to general immunization hesitancy): measles, mumps, and rubella (Indonesia[18,34], Sudan [48]); rotavirus (Indonesia[33], Zambia[49]); cholera (Zambia[30]); and pertussis (Nigeria[14,36]).

Question 2. What successful strategies exist for working with local faith actors and communities to improve immunization acceptance and reduce vaccine hesitancy?

The literature review found limited high-quality evidence and examples of specific approaches for engaging local faith actors to strengthen routine immunization and campaign-based immunization uptake. Most interventions involved engaging religious leaders and the local community in dialogue-based interventions[50] and engaging religious leaders and church structures in social mobilization and advocacy.[1,2,44,49,51–53]

Improving immunization uptake and coverage

One study found that working with religious leaders on a multi-pronged immunization promotion and delivery strategy, including targeting priority populations and increasing service delivery availability, was more effective for increasing vaccine uptake than messaging with religious leaders alone.[50] Using church infrastructure, faith-based health facilities, and religious rituals as vaccination messaging or delivery points, including in humanitarian settings, was also found to be effective for increasing vaccine coverage.[19,28,54]

Reducing religiously-linked vaccine hesitancy

The review found limited examples of evidence-based approaches for tackling faith-linked

vaccine hesitancy. Engaging faith-based organizations and faith leaders in the rollout of new vaccines was found in multiple studies to be important for increasing community acceptability and uptake and preventing potential vaccine hesitancy.[55–57] Several studies found that religious concerns focused on the bioethics of vaccine production may be effectively addressed through theological analyses of sacred text and dialogue with faith leaders, including understanding the alternatives among available vaccines.[25,55,58] In Muslim countries, where there is concern that vaccines were manufactured with *haram* (forbidden) materials, acknowledging these concerns and communicating effectively about them with Muslim faith leaders and structures is critical.[14,59]

Question 3. What evidence gaps exist in relation to faith engagement and immunization?

The literature review found promising evidence of the value of religious engagement for immunization promotion and acceptance in LMICs across faiths. In particular, we found multiple articles demonstrating the value of religious engagement for immunization promotion and acceptance,[2,16,60] studies of vaccine hesitancy among Muslim leaders,[32,33,35,36,40,41] comparisons of immunization among different faiths within the same countries,[14,15,34] and reviews and discussion papers on the correlation between faith engagement and vaccine acceptance.[1,2,17,18]

Despite these findings, this literature review found significant evidence gaps—described below—that limit the generalizability of some findings, such as:

- A dearth of peer-reviewed research and gray literature on the influence of local faith actors on vaccine hesitancy in LMICs as compared to high-income countries.[16]
- Low-quality evidence of impact of religious leaders' engagement on uptake of vaccines and the relative contribution of faith actors in vaccine uptake.[2,16,60] The review found few rigorous study designs. Most literature found was observational in nature and gray literature or discussion papers represented 44.5% of resources reviewed; the review found only three intervention studies (2.7%) examining approaches for engaging faith leaders.
- Nearly 25% of all 110 reviewed resources focused on Nigeria (16 total resources) and Pakistan (12 total resources%), raising questions if such findings are applicable to other countries or regions.
- Similarly, the majority of studies with an explicit religious focus examined large-scale organized, monotheistic faiths (Islam, Christianity), limiting their potential applicability to differently organized religions.
- Few studies or resources examined or evaluated the effectiveness of specific interventions with local faith actors and immunization and/or vaccine hesitancy. As a result, there is a lack of widely shared knowledge of what works (or doesn't) and successful models for engaging local faith actors. We found few published articles or gray literature that included the voices of local faith actors as primary authors or significant contributors discussing their role within immunization programs, indicating a need for further dialogue and research in this area.

Limitations

It is well-known that many local faith-based organizations and actors maintain practice-based knowledge and are less likely to publish their findings in journals. This literature review and its conclusions may therefore be subject to publication bias, in that unsuccessful interventions may be less likely to be documented in either the peer-reviewed or gray literature. In addition, the review excluded non-English language resources, potentially missing observations and promising practices.

Several other factors also warrant caution on extrapolating findings more broadly. While the literature did not explicitly assess and score study

quality, the quality of literature remains mixed, based upon review of study/resource type, limiting generalizability and rigor of conclusions. As noted above, the review found evidence gaps among certain geographies, religion types, and different vaccines.

Finally, this literature was conducted amid the early launch and rollout of COVID-19 vaccination (January 2021). As such, the review found very limited and explicit gray or peer-reviewed literature on the topic of faith engagement and COVID-19 immunization. While many of the findings and interventions may be applicable and effective if applied to COVID-19 immunizations, further study and investigation is warranted for this urgent public health crisis.

Conclusions

Our literature review findings suggest that continued investment in and engagement with local faith actors can be a valuable strategy for immunization programming in LMICs. The review found that engaged religious leaders have long contributed to achieving full immunization coverage within their communities and today offer the potential to help counter growing vaccine hesitancy in some LMICs. At the same time, the review found numerous troubling examples of religiously-linked vaccine hesitancy, some well-known, such as Indonesia, Nigeria, and Pakistan, and some lesser-known examples in Burkina Faso, Chad, and Sudan.

More investigations and evidence are needed regarding what interventions that involve local faith actors are most effective, and in which contexts, in promoting vaccine uptake. Vaccine hesitancy is a highly complex phenomenon. The current peer-reviewed and gray literature does not provide an adaptable, concise roadmap for tackling these issues in different geographic, cultural, linguistic, and other contexts. In particular, further study is needed on the role of faith leaders in the promotion of *routine immunization* (rather than campaign-based immunization), the impact of local faith actors on vaccine uptake among growing Pentecostal, Charismatic, and so-called "un-networked" faiths, and vaccine hesitancy among Buddhist and Hindu faiths in Asia.

Multiple studies and resources within the review did identify the importance of listening, understanding, and diagnosing some of the complex and inter-related socio-cultural factors that contribute to religiously-linked vaccine hesitancy. These review findings should reinforce an important caution for public health planners, policymakers, and implementers to avoid the temptation to oversimplify or blame faith actors for vaccine hesitancy. Evidence repeatedly demonstrates that apparent faith-based objections are sometimes a convenient proxy for more complex, inter-related socio-cultural, and political issues related to immunization. In cases where vaccine hesitancy is identified among local faith actors, the review suggests that listening and dialoguing with faith leaders is critical to finding theologically-acceptable solutions to vaccine hesitancy.

In addition, this review suggests that more work is needed to foster global and national-level discussions to engage faith leaders in vaccine hesitancy reduction efforts. Country-level strategies to stimulate research and dialogue with religious structures, interfaith networks, and theological institutions may help identify some of these underlying socio-cultural and political issues. To increase understanding and scale-up of successful strategies, we also encourage local faith actors and implementers to more widely share their experiences engaging religious leaders in immunization programs, which are largely absent from peer-reviewed and gray literature.

This review comes at a critical time, given the rollout of COVID-19 vaccination in LMICs. At the time of the literature review, most COVID-19 vaccine hesitancy research in LMICs was just getting underway. However, emerging research in six countries shows that endorsement of the COVID-19 vaccine by faith leaders will be critical to vaccine acceptance.[61,62] On a positive note, many religious

leaders and groups have taken a lead role on calls for vaccine equity in LMICs and are leading the charge to promote COVID-19 immunization in their countries. It will be critical to adapt and scale successful strategies from previous immunization efforts with faith leaders to successfully respond to this urgent public health crisis.

References

1. Costa JC, Weber AM, Darmstadt GL, Abdalla S, Victora CG. Religious affiliation and immunization coverage in 15 countries in Sub-Saharan Africa. Vaccine. 2020;38(5):1160-9. https://doi.org/10.1016/j.vaccine.2019.11.024
2. Olivier J. Local faith communities and immunization for community and health systems strengthening. Scoping review report. Joint Learning Initiative on Faith and Local Communities; 2014. Available from: https://jliflc.com/wp-content/uploads/2014/09/LOCAL-FAITH-COMMUNITIES-AND-IMMUNIZATION-FOR-COMMUNITY-AND-HEALTH-SYSTEMS.pdf
3. Grabenstein JD. What the world's religions teach, applied to vaccines and immune globulins. Vaccine. 2013;31(16):2011-23. https://doi.org/10.1016/j.vaccine.2013.02.026
4. Greenberger C. Religion, Judaism, and the challenge of maintaining an adequately immunized population. Nurs Ethics. 2017;24(6):653-62. https://doi.org/10.1177/0969733015623096
5. Marshall K. Engaging faith communities on immunization: what's next? The Berkley Center for Religion, Peace, and World Affairs; 2013. Available from: https://berkleycenter.georgetown.edu/publications/engaging-faith-communities-on-immunization-what-next
6. World Council of Churches/World Jewish Congress. Invitation to reflection and engagement on ethical issues related to COVID-19 vaccine distribution; 2020. Available from: https://www.oikoumene.org/sites/default/files/2020-12/20_12%20COVID-19%20vaccination%20rollout%20ethical%20issues_WCC%20and%20WJC%20%20joint%20statement_FINAL.pdf.
7. Dubé E, Gagnon D, Nickels E, Jeram S, Schuster M. Mapping vaccine hesitancy–country-specific characteristics of a global phenomenon. Vaccine. 2014;32(49):6649-54. https://doi.org/10.1016/j.vaccine.2014.09.039
8. Guzman-Holst A, DeAntonio R, Prado-Cohrs D, Juliao P. Barriers to vaccination in Latin America: a systematic literature review. Vaccine. 2020;38(3):470-81. https://doi.org/10.1016/j.vaccine.2019.10.088
9. Kriss JL, Goodson J, Machekanyanga Z, Shibeshi ME, Daniel F, Masresha B, Kaiser R. Vaccine receipt and vaccine card availability among children of the apostolic faith: analysis from the 2010-2011 Zimbabwe demographic and health survey. Pan Afr Med J. 2016;24:47. https://doi.org/10.11604/pamj.2016.24.47.8663
10. Lane S, MacDonald NE, Marti M, Dumolard L. Vaccine hesitancy around the globe: analysis of three years of WHO/UNICEF Joint Reporting Form data-2015-2017. Vaccine. 2018;36(26):3861-7. https://doi.org/10.1016/j.vaccine.2018.03.063
11. Machekanyanga Z, Ndiaye S, Gerede R, Chindedza K, Chigodo C, Shibeshi ME, et al. Qualitative assessment of vaccination hesitancy among members of the Apostolic Church of Zimbabwe: a case study. J Relig Health. 2017;56(5):1683-91. https://doi.org/10.1007/s10943-017-0428-7
12. Marti M, de Cola M, MacDonald NE, Dumolard L, Duclos P. Assessments of global drivers of vaccine hesitancy in 2014–Looking beyond safety concerns. PLoS One. 2017;12(3):e0172310. https://doi.org/10.1371/journal.pone.0172310
13. World Health Organization. Global vaccine action plan monitoring, evaluation and accountability: Secretariat Annual Report 2017; 2017. Available from: https://www.who.int/immunization/global_vaccine_action_plan/web_gvap_secretariat_report_2017.pdf?ua=1
14. Ahmed A, Lee KS, Bukhsh A, Al-Worafi YM, Sarker MMR, Ming LC, et al. Outbreak of vaccine-preventable diseases in Muslim majority countries. J Infect Public Heal. 2018;11(2):153-5. https://doi.org/10.1016/j.jiph.2017.09.007
15. Ansari MT, Jamaluddin NN, Ramlan TA, Zamri N, Majeed S, Badgujar, et al. Knowledge, attitude, perception of Muslim parents towards vaccination in Malaysia. Hum Vacc Immunother. 2020 1–6.

Advance online publication. https://doi.org/10.1080/21645515.2020.1800325
16. Cooper S, Betsch C, Sambala E, Mchiza N, Wiysonge C. Vaccine hesitancy—a potential threat to the achievements of vaccination programmes in Africa. Hum Vacc Immunother. 2018;14(10):2355-7. https://doi.org/10.1080/21645515.2018.1460987
17. Bangura JB, Xiao S, Qiu D, Ouyang F, Chen L. Barriers to childhood immunization in sub-saharan Africa: a systematic review. BMC Public Health. 2020;20:1108. https://doi.org/10.1186/s12889-020-09169-4
18. de Figueiredo A, Simas C, Karafillakis E, Paterson P, Larson HJ. Mapping global trends in vaccine confidence and investigating barriers to vaccine uptake: a large-scale retrospective temporal modelling study. Lancet. 2020;396:898–908. https://doi.org/10.1016
19. Nnadi C, Etsano A, Uba B, Ohuabunwo C, Melton M, wa Nganda G, et al. Approaches to vaccination among populations in areas of conflict. J Infect Dis. 2017;216(suppl_1):S368-S372. https://doi.org/10.1093/infdis/jix175
20. Gerede R, Machekanyanga Z, Ndiaye S, Chindedza K, Chigodo C, Messeret S, et al. How to increase vaccination acceptance among Apostolic communities: quantitative results from an assessment in three provinces in Zimbabwe. J Relig Health. 2017;56(5):1692-1700. https://doi.org/10.1007/s10943-017-0435-8
21. Pelčić G, Karačić S, Mikirtichan GL, Kubar O, Leavitt F, Cheng-tek T, et al. Religious exception for vaccination or religious excuses for avoiding vaccination. Croat Med J. 2016;57(5):516-21. https://doi.org/10.3325/cmj.2016.57.516
22. Ahmed S, Othman N, Sulaiman SA, Us M, Simbak N, Baig A. Resistance to polio vaccination in some Muslim communities and the actual Islamic perspectives—a critical Review. J Pharm Tech [official publication of the Association of Pharmacy Technicians]. 2014;7(4):494-5. https://doi.org/10.5958/0974-360X
23. Ebrahim AF. Islam and vaccination [Internet]. Islamic Medical Association of South Africa. 2013. Available from: (PDF) Islam and Vaccination (researchgate.net)
24. Muslim religious scholars. Dakar declaration on vaccination [Internet]. International Conference on Vaccination and Religion. Dakar, Senegal; 2014. Available from: https://www.afro.who.int/sites/default/files/2017-09/Religious%20Leaders%20Declaration.pdf
25. Padela AI, Furber SW, Kholwadia MA, Moosa E. Dire necessity and transformation: entry-points for modern science in Islamic bioethical assessment of porcine products in vaccines. Bioethics. 2014;28(2):59-66. https://doi.org/10.1111/bioe.12016
26. Larson HJ, de Figueiredo A, Xiahong Z, Schulz WS, Verger P, Johnston IG, et al. The state of vaccine confidence 2016: Global insights through a 67-country survey. EBioMedicine. 2016;12,295–301. https://doi.org/10.1016/j.ebiom.2016.08.042
27. Ndiaye K. The influence of religious and traditional rulers in polio vaccination efforts in Northern Nigeria [unpublished research paper] [Internet]. 2013. Available from: https://ssrn.com/abstract=2250207
28. Kucheba F, Mweemba O, Matenga T, Zulu JM. Acceptability of the human papillomavirus vaccine in schools in Lusaka in Zambia: role of community and formal health system factors. Global public health. 2021;16(3):378–89. https://doi.org/10.1080/17441692.2020.1810734
29. Cobos Muñoz D, Monzón Llamas L, Bosch-Capblanch X. Exposing concerns about vaccination in low- and middle-income countries: a systematic review. Int J Public Health. 2015;60:767-80. https://doi.org/10.1007/s00038-015-0715-6
30. Pugliese-Garcia M, Heyerdahl LW, Mwamba C, Nkwemu S, Chilengi R, Demolis R, et al. Factors influencing vaccine acceptance and hesitancy in three informal settlements in Lusaka, Zambia. Vaccine. 2018;36(37):5617-24. https://doi.org/10.1016/j.vaccine.2018.07.042
31. Syiroj ATR, Pardosi JF, Heywood AE. Exploring parents' reasons for incomplete childhood immunisation in Indonesia. Vaccine. 2019;37(43):6486-93. https://doi.org/10.1016/j.vaccine.2019.08.081
32. Nasir JA, Imran M, Zaidi SAA, Rehman NU. Knowledge and perception about polio vaccination approval among religious leaders. J Postgrad Med Inst. 2017;31(1):61-6. Available from: https://jpmi.org.pk/index.php/jpmi/article/view/1798

33. Padmawati RS, Heywood A, Sitaresmi MN, Atthobari J, MacIntyre CR, Soenarto Y, et al. Religious and community leaders' acceptance of rotavirus vaccine introduction in Yogyakarta, Indonesia: a qualitative study. BMC Public Health. 2019;19(1):368. https://doi.org/10.1186/s12889-019-6706-4
34. Harapan H, Shields N, Kachoria AG, Shotwell A, Wagner AL. Religion and measles vaccination in Indonesia, 1991-2017. Am J Prev Med. 2021;60(1S1):S44-S52. https://doi.org/10.1016/j.amepre.2020.07.029
35. Khowaja AR, Khan SA, Nizam N, Omer SB, Zaidi A. Parental perceptions surrounding polio and self-reported non-participation in polio supplementary immunization activities in Karachi, Pakistan: a mixed methods study. Bull World Health Organ. 2012;90(11):822-30. https://doi.org/10.2471/BLT.12.106260
36. Abubakar A, Dalhat M, Mohammed A, Ilesanmi SO, Anebonam U, Barau N, et al. Outbreak of suspected pertussis in Kaltungo, Gombe State, Northern Nigeria, 2015: the role of sub-optimum routine immunization coverage. Pan Afr Med J. 2019; 32(Suppl 1):9. https://doi.org/10.11604/pamj.supp.2019.32.1.13352
37. Ha W, Salama P, Gwavuya S, Kanjala C. Is religion the forgotten variable in maternal and child health? Evidence from Zimbabwe. Soc Sci Med (1982). 2014;118,80-8. https://doi.org/10.1016/j.socscimed.2014.07.066
38. Njeru I, Ajack Y, Muitherero C, Onyango D, Musyoka J, Onuekusi I, et al. Did the call for boycott by the Catholic bishops affect the polio vaccination coverage in Kenya in 2015? A cross-sectional study. Pan Afr Med J. 2016;24:120. https://doi.org/10.11604/pamj.2016.24.120.8986
39. Hussain SF, Boyle P, Patel P, Sullivan R. Eradicating polio in Pakistan: an analysis of the challenges and solutions to this security and health issue. Global Health. 2016;12(1):63. https://doi.org/10.1186/s12992-016-0195-3
40. Khan MU, Ahmad A, Salman S, Ayub M, Aqeel T, Haq NU, et al. Muslim scholars' knowledge, attitudes and perceived barriers towards polio immunization in Pakistan. J Relig Health. 2017;56(2):635-48. https://doi.org/10.1007/s10943-016-0308-6
41. Falade BA. Vaccination resistance, religion, and attitudes to science in Nigeria [Unpublished doctoral dissertation thesis]. LSEPS, 2014. Available from: http://etheses.lse.ac.uk/911/1/Falade_Vaccination-resistance-religion-and-attitudes-to-science-in-Nigeria.pdf
42. Ghinai I, Willott C, Dadari I, Larson HJ. Listening to the rumours: what the northern Nigeria polio vaccine boycott can tell us ten years on. Glob Public Health. 2013;8(10):1138-50. https://doi.org/10.1080/17441692.2013.859720
43. Owoaje E, Rahimi AO, Kalbarczyk A, Akinyemi O, Peters MA, Alonge OO. Conflict, community, and collaboration: shared implementation barriers and strategies in two polio endemic countries. BMC Public Health. 2020;20(Suppl 4):1178. https://doi.org/10.1186/s12889-020-09235-x
44. Hamdi S. The impact of teachings on sexuality in Islam on HPV vaccine acceptability in the Middle East and North Africa region. J Epidemiol Glob Health. 2018;7(Suppl 1):S17-S22. https://doi.org/10.1016/j.jegh.2018.02.003
45. Grandahl M, Paek SC, Grisurapong S, Sherer P, Tydén T, Lundberg P. Correction: parents' knowledge, beliefs, and acceptance of the HPV vaccination in relation to their socio-demographics and religious beliefs: a cross-sectional study in Thailand. PloS One. 2018;13(4):e0196437. https://doi.org/10.1371/journal.pone.0196437
46. Vermandere H, van Stam MA, Naanyu V, Michielsen K, Degomme O, Oort F. Uptake of the human papillomavirus vaccine in Kenya: testing the health belief model through pathway modeling on cohort data. Global Health. 2016;12:72. https://doi.org/10.1186/s12992-016-0211-7
47. Woo YL, Razali SM, Chong KR, Omar SZ. Does the success of a school-based HPV vaccine programme depend on teachers' knowledge and religion?—a survey in a multicultural society. Asian Pac J Cancer P. 2012;13(9):4651-4. https://doi.org/10.7314/apjcp.2012.13.9.4651
48. Sabahelzain MM, Moukhyer M, Dubé E, Hardan A, van den Borne B, Bosma H. Towards a further understanding of measles vaccine hesitancy in Khartoum state, Sudan: a qualitative study. PLoS One. 2019;14(6):e0213882. https://doi.org/10.1371/journal.pone.0213882

49. Wesevich A, Chipungu J, Mwale M, Bosomprah S, Chilengi R. Health promotion through existing community structures: a case of churches' roles in promoting rotavirus vaccination in rural Zambia. J Prim Care Community Health. 2016;7(2):81-7. https://doi.org/10.1177/2150131915622379
50. Jarrett C, Wilson R, O'Leary M, Eckersberger E, Larson H. Strategies for addressing vaccine hesitancy—a systematic review. Vaccine. 2015;33(34):4180-90. https://doi.org/10.1016/j.vaccine.2015.04.040
51. Asress A, Bezabih L. Assess role of religious leaders and caretakers' knowledge to child immunization [Conference presentation abstract]. Annual meeting and expo of the American Public Health Association, 2018 Nov 10-14; San Diego, CA, United States. Available from: https://apha.confex.com/apha/2018/meetingapp.cgi/Paper/412223
52. Catholic Relief Services. Civil society organization platforms contribute to national immunization programs. Promising practices 2012-2018 [Internet]; 2019. Available from: https://www.crs.org/sites/default/files/tools-research/promising_practices_a4_final_rev071119_online.pdf
53. Oyo-Ita A, Bosch-Capblanch X, Ross R, Hanlon P, Oku A, Esu E, et al. Impacts of engaging communities through traditional and religious leaders on vaccination coverage in Cross River State, Nigeria. 3ie Grantee Final Report. New Delhi: International Initiative for Impact Evaluation (3ie); 2020.
54. Morry C. Reflections on polio lessons from conflicted affected environments [Internet]. USAID/MCSP project; 2019. Available from: https://www.mcsprogram.org/resource/reflections-on-polio-lessons-from-conflict-affected-environments/
55. Berkeley Center for Religion, Peace and World Affairs/Joint Learning Initiative on Faith and Local Communities/World Faiths Development Dialogue. Religious responses and engagement on COVID-19 vaccines; 2020. Available from: https://berkleycenter.georgetown.edu/events/end-of-year-consultation-religious-responses-and-engagement-on-covid-19-vaccines
56. Gavi. Approach to engagement with the faith-based community; 2015. Available from: https://jliflc.com/wp-content/uploads/2015/06/Gavi_Faith-Based-Engagement-28-01-15-short.docx
57. World Faiths Development Dialogue. Faith and immunization: Past, present, and potential roles of faith-inspired organizations; 2012. Available from: https://berkleycenter.georgetown.edu/publications/faith-immunization-past-present-and-potential-roles-of-faith-inspired-organizations
58. Barmania S, Reiss MJ. Health promotion perspectives on the COVID-19 pandemic: the importance of religion. Global health promotion, 1757975920972992. Advance online publication. 2020. https://doi.org/10.1177/1757975920972992
59. Khan MU, Ahmad A, Aqeel T, Salman S, Ibrahim Q, Idrees J, et al. Knowledge, attitudes and perceptions towards polio immunization among residents of two highly affected regions of Pakistan. BMC Public Health. 2015;15:1100. https://doi.org/10.1186/s12889-015-2471-1
60. World Health Organization/Sage Working Group on Vaccine Hesitancy. Strategies for addressing vaccine hesitancy—systematic review [Internet]. 2014. Available from: https://www.who.int/immunization/sage/meetings/2014/october/3_SAGE_WG_Strategies_addressing_vaccine_hesitancy_2014.pdf
61. World Vision. Barrier analysis studies on Covid-19 vaccines. PowerPoint presentation. 2021.
62. World Vision. Faith leaders must play key role in COVID-19 vaccine roll-out [Internet]. 2021. Available from: https://www.worldvision.org/about-us/media-center/faith-leaders-must-play-key-role-in-covid-19-vaccine-roll-out

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Appendix 1. Articles Reviewed

Reference and year	Country(s) and/ or Region	Religions	Resource Type/ Study Type	Areas of Focus/ Key Themes	Link to reference
			2010		
Renne, E. Islam and immunization in Northern Nigeria.	Nigeria	Islam	Draft book chapter	Vaccine Hesitancy; Polio	https://www.ascleiden.nl/Pdf/paperrenne.pdf
			2012		
Berkeley Center for Religion, Peace & World Affairs/World Faiths Development Dialogue. Faith and immunizations meeting report.	Global	Multiple	Meeting report	Religion & immunization	https://berkleycenter.georgetown.edu/news/new-meeting-report-faith-and-immunizations.
Glatman-Freedman A, Nichols K. The effect of social determinants on immunization programs.	Global - Low income countries	Multiple	Review	Religion & immunization	Hum Vaccin Immunother. 8;3:293-301. https://doi.org/10.4161/hv.19003
Khowaja AR, Khan SA, Nizam N, Omer SB, Zaidi A. Parental perceptions surrounding polio and self-reported non-participation in polio supplementary immunization activities in Karachi, Pakistan: a mixed methods study.	Pakistan	Islam	Mixed methods study	Vaccine Hesitancy; Polio	Bull World Health Organ. 90(11):822-30. https://doi.org/10.2471/BLT.12.106260
Remes P, et al. A qualitative study of HPV vaccine acceptability among health workers, teachers, parents, female pupils, and religious leaders in northwest Tanzania.	Tanzania	Christian; Islam	Qualitative semi-structured interviews	Vaccine Hesitancy; HPV	Vaccine. 30(36):5363-7. https://doi.org/10.1016/j.vaccine.2012.06.025
UNICEF. Partnering with religious communities for children.	Global	Multiple	Report	Religion & immunization	https://sites.unicef.org/about/partnerships/files/Partnering_with_Religious_Communities_for_Children_(UNICEF).pdf
Wonodi CB, et al. Using social network analysis to examine the decision-making process on new vaccine introduction in Nigeria.	Nigeria	None	Mixed methods study using qualitative [key informant interviews (KIIs)] and quantitative (survey) data collection methods	Religion & immunization	Health Policy Plan. 27(suppl 2): ii27–ii38. https://doi.org/10.1093/heapol/czs037

Woo YL, Razali SM, Chong KR, Omar SZ. Does the success of a school-based HPV vaccine programme depend on teachers' knowledge and religion?–a survey in a multicultural society.	Malaysia	Islam; multiple faiths	Survey	Multi-cultural society; HPV	Asian Pac J Cancer Preve. 13(9): 4651-4. https://doi.org/10.7314/apjcp.2012.13.9.4651
World Faiths Development Dialogue. Faith & immunization: past, present, and potential roles of faith-inspired organizations.	Global	Multiple religions	White paper	Religion & immunization; New Immunizations	https://berkleycenter.georgetown.edu/publications/faith-immunization-past-present-and-potential-roles-of-faith-inspired-organizations
2013					
Ebrahim AF. Islam & vaccination.	Global	Islam	Book	Vaccine hesitancy	Islamic Medical Association of South Africa.
Ghinai I, Willott C, Dadari I, Larson HJ. Listening to the rumours: what the northern Nigeria polio vaccine boycott can tell us ten years on.	Nigeria	Islam	Mixed methods data analysis and qualitative analysis	Vaccine Hesitancy; Polio	Glob Public Health. 8(10):1138-50. https://doi.org/10.1080/17441692.2013.859720
Grabenstein JD. What the world's religions teach, applied to vaccines and immune globulins.	Global	Hindu, Buddhism, Judaism, Jainism, Christian, Islam	Review	Immunization and faith	Vaccine. 31(16):2011-23. https://doi.org/10.1016/j.vaccine.2013.02.026
Ndiaye K. The Influence of religious and traditional rulers in polio vaccination efforts in Northern Nigeria.	Nigeria	Islam	Discussion paper [Unpublished research paper]	Vaccine Hesitancy; Polio	https://ssrn.com/abstract=2250207
Marshall K. Engaging faith communities on immunization: what's next?	Global	Multiple faiths	Technical Brief	Vaccine Hesitancy; Religion & immunization	The Berkley Center for Religion, Peace & World Affairs. https://berkleycenter.georgetown.edu/publications/engaging-faith-communities-on-immunization-what-next
Soura A, Pison G, Senderowicz L, Rossier C. Religious differences in child vaccination rates in urban Africa:	Burkina Faso	Islam, Catholic	Statistical analysis	Religion & immunization; Routine Immunization	Etude Popul Afr. 27(2):174-187. https://aps.journals.ac.za/pub/article/vie

Comparison of population surveillance data from Ouagadougou, Burkina Faso					w/439/393
2014					
Ahmed S, et al. Resistance to polio vaccination in some Muslim communities and the actual Islamic perspectives—a critical Review.	Pakistan; Nigeria; Afghanistan; India	Islam	Review article	Vaccine Hesitancy; Polio	J Pharm Technol. 7(4):494-5. https://doi.org/10.52711/0974-360X.2022.00001
Anyene B. Routine immunization in Nigeria: the role of politics, religion and cultural practices	Nigeria	Islam; Christian	Discussion paper	Vaccine Hesitancy	Afr J Health Econ. 3. https://www.ajhe.org.in/uploads/55/3075_pdf.pdf
Dubé E, Gagnon D, Nickels E, Jeram S, Schuster M. Mapping vaccine hesitancy—country-specific characteristics of a global phenomenon.	Global	None	Mixed methods study	Vaccine Hesitancy	Vaccine. 32(49):6649-54. https://doi.org/10.1016/j.vaccine.2014.09.039
Falade BA. Vaccination resistance, religion, and attitudes to science in Nigeria.	Nigeria	Islam	PhD thesis [Unpublished doctoral dissertation thesis].	Vaccine Hesitancy; Religion & immunization; Polio	http://etheses.lse.ac.uk/911/1/Falade_Vaccination-resistance-religion-and-attitudes-to-science-in-Nigeria.pdf
Ha W, Salama P, Gwavuya S, Kanjala C. Is religion the forgotten variable in maternal and child health? Evidence from Zimbabwe.	Zimbabwe	Apostolic	Statistics review	Vaccine Hesitancy; BCG Vaccine	Soc Sci Med. 1982;118:80–8. https://doi.org/10.1016/j.socscimed.2014.07.066
Muslim religious scholars. Dakar declaration on vaccination.	Africa	Islam	Declaration	Vaccine Hesitancy	International Conference on Vaccination and Religion. Dakar, Senegal. https://www.afro.who.int/sites/default/files/2017-09/Religious%20Leaders%20Declaration.pdf
Nasir SG, et al. From intense rejection to advocacy: how Muslim clerics were engaged in a polio eradication initiative in Northern Nigeria.	Nigeria	Islam	Analysis	Vaccine Hesitancy; Polio	PLoS Med. 11(8):e1001687. https://doi.org/10.1371/journal.pmed.1001687

Olivier J. Local faith communities and immunization for community and health systems strengthening.	Global	Multiple	Literature review	Vaccine Hesitancy; Religion & immunization	Joint Learning Initiative on Faith and Local Communities. https://jliflc.com/wp-content/uploads/2014/09/LOCAL-FAITH-COMMUNITIES-AND-IMMUNIZATION-FOR-COMMUNITY-AND-HEALTH-SYSTEMS.pdf
Padela AI, Furber SW, Kholwadia MA, & Moosa E. Dire necessity and transformation: entry-points for modern science in Islamic bioethical assessment of porcine products in vaccines.	Global	Islam	Bioethical commentary	Vaccine Hesitancy	Bioethics. 28(2):59-66. https://doi.org/10.1111/bioe.12016
World Health Organization/Sage Working Group on Vaccine Hesitancy. Strategies for addressing vaccine hesitancy— systematic review.	Global	None	Review article	Vaccine Hesitancy; Religion & immunization	https://www.who.int/immunization/sage/meetings/2014/october/3_SAGE_WG_Strategies_addressing_vaccine_hesitancy_2014.pdf
World Health Organization/Sage Working Group on Vaccine Hesitancy. Report of the Sage Working Group on vaccine hesitancy	Global	None	Report	Vaccine Hesitancy	https://www.who.int/immunization/sage/meetings/2014/october/SAGE_working_group_revised_report_vaccine_hesitancy.pdf?ua=1%20
			2015		
Cobos Muñoz D, Monzón Llamas L, Bosch-Capblanch X. Exposing concerns about vaccination in low- and middle-income countries: a systematic review.	Global - LMICs		Review	Vaccine Hesitancy	Int J Public Health. 60:767–80. https://doi.org/10.1007/s00038-015-0715-6
Gavi. Approach to engagement with the faith-based community.	Global	Multiple religions	White paper	Religion & immunization	
Jarrett C, Wilson R, O'Leary M, Eckersberge E, Larson H. Strategies for addressing vaccine hesitancy—a systematic review.	Global	None	Review	Vaccine Hesitancy	Vaccine. 33(34):4180-90. https://doi.org/10.1016/j.vaccine.2015.04.040
Khan MU, et al. Knowledge, attitudes and perceptions towards polio immunization among residents of two highly affected regions of Pakistan.	Pakistan	Islam	Descriptive cross-sectional study	Vaccine Hesitancy; Polio	BMC Public Health. 15:1100. https://doi.org/10.1186/s12889-015-

					2471-1.
Mukungwa T. Factors associated with full immunization coverage amongst children aged 12–23 months in Zimbabwe.	Zimbabwe	Apostolic	Data analysis	Religion & immunization	Afr Popul Stud. 29(2): 1761–74. https://doi.org/10.11564/29-2-745.
UNICEF. A global mapping: UNICEF engagement with religious communities.	Global	Multiple	Report	Religion & immunization	http://www.arcworld.org/downloads/UNICEF_engagement.pdf.
2016					
Alemu M. Religious leaders' knowledge on immunization communication and social mobilization, semi pastoralist, Ethiopia: Qualitative Study. Oct. 29-Nov. 2.	Ethiopia	Ethiopian Evangelical Mekane Yesus Church/Lutheran	Oral conference presentation [Conference presentation abstract].	Religion & immunization; Routine Immunization	Annual meeting and expo of the American Public Health Association, Denver, CO, United States. https://apha.confex.com/apha/144am/meetingapp.cgi/Paper/348510
Hussain SF, Boyle P, Patel P, Sullivan R. Eradicating polio in Pakistan: an analysis of the challenges and solutions to this security and health issue.	Pakistan	Islam	Analysis/Commentary	Vaccine Hesitancy; Polio	Global Health. 12(1):63. https://doi.org/10.1186/s12992-016-0195-3.
International Interfaith Peace Corps. Religious Leaders Declaration: reaffirming their commitment to the Dakar Declaration on the issue of vaccination.	Global	Multiple religions	Declaration; Gray	Religion & immunization	https://www.afro.who.int/sites/default/files/2017-09/Religious%20Leaders%20Declaration.pdf
Kriss JL, et al., (2016). Vaccine receipt and vaccine card availability among children of the apostolic faith: analysis from the 2010-2011 Zimbabwe demographic and health survey.	Zimbabwe	Apostolic (Zimbabwe)	Descriptive analysis	Vaccine Hesitancy	Pan Afr Med J. 24:47. https://doi.org/10.11604/pamj.2016.24.47.8663.
Larson HJ, et al. The state of vaccine confidence 2016: global insights through a 67-country survey.		Multiple faiths	Survey	Vaccine Hesitancy	EBioMedicine. 12:295–301. https://doi.org/10.1016/j.ebiom.2016.08.042
McArthur-Lloyd A, McKenzie A, Findley S, Green C, Adamu F. Community engagement, routine immunization, and the	Nigeria	Islam	Literature review	Vaccine Hesitancy; Polio	Global Health Commun. 2;1:1-10, https://doi.org/10.1080/23762004.2016.

polio legacy in Northern Nigeria.					1205887.
Njeru I, et al. Did the call for boycott by the Catholic bishops affect the polio vaccination coverage in Kenya in 2015?	Kenya	Catholic	Cross-sectional survey	Vaccine Hesitancy; Polio	Pan Afr Med J. 24:120. https://doi.org/10.11604/pamj.2016.24.120.8986.
Olivier J. Interventions with local faith communities on immunization in development contexts.	Global		Discussion paper		Rev Faith Int Aff. 14;3:36-50. https://doi.org/10.1080/15570274.2016.1215843.
Olufowote JO. Identity constructions and inter-organizational collaboration: Islamic faith-based organizations and the polio vaccination stoppage in Northern Nigeria.	Nigeria	Islam	Media analysis	Vaccine Hesitancy; Polio	Communn Q. 64;5:518-35, https://doi.org/10.1080/01463373.2015.1129354.
Pelčić G, Karačić S, et al. Religious exception for vaccination or religious excuses for avoiding vaccination.	Global		Essay	Vaccine Hesitancy	Croat Med J. **57**(5): 516-21. https://doi.org/10.3325/cmj.2016.57.516
Vermandere H, et al. Uptake of the human papillomavirus vaccine in Kenya: testing the health belief model through pathway modeling on cohort data.	Kenya	Islam	Longitudinal data analysis	Religion & immunization; HPV	Global Health. 12:72. https://doi.org/10.1186/s12992-016-0211-7.
Wesevich A, Chipungu J, Mwale M, Bosomprah S, Chilengi R. Health promotion through existing community structures: a case of churches' roles in promoting rotavirus vaccination in rural Zambia.	Zambia	Christian	Non Controlled cross-sectional study	Rotavirus vaccine	J Prim Care Community Health. 7(2):81-7. https://doi.org/10.1177/2150131915622379.
2017					
Ames H, et al. Stakeholder perceptions of communication about vaccination in two regions of Cameroon: a qualitative case study.	Cameroon	Christian	Mixed methods case study	Religion & immunization; Polio	PLoS ONE. 12(8):e0183721. https://doi.org/10.1371/journal.pone.0183721.
Christian Connections for International Health. Vaccines save lives: how faith groups can help.	Global	Multiple	Brief	Religion & immunization	https://www.ccih.org/wp-content/uploads/2017/09/Faith-Groups-

					and-Immunization-1.pdf.
Gerede R, et al. How to increase vaccination acceptance among Apostolic communities: quantitative results from an assessment in three provinces in Zimbabwe.	Zimbabwe	Apostolic		Vaccine hesitancy	J Relig Health. 56(5):1692-1700. https://doi.org/10.1007/s10943-017-0435-8
Greenberger C. Religion, Judaism, and the challenge of maintaining an adequately immunized population.	Global	Judaism; other faiths		Vaccine Hesitancy	Nurs Ethics. Sep;24(6):653-62. https://doi.org/10.1177/0969733015623096
Habib MA, Soofi SB, Ali N, et al. Knowledge and perceptions of polio and polio immunization in polio high-risk areas of Pakistan.	Pakistan	Islam	Mixed methods	Vaccine Hesitancy; Polio	J Public Health Pol. 2017. 38:16–36. https://doi.org/10.1057/s41271-016-0056-6
Habib MA, Soofi S, Cousens S, Anwar S, Haque NU, Ahmed I, et al. Community engagement and integrated health and polio immunisation campaigns in conflict-affected areas of Pakistan: a cluster randomised controlled trial.	Pakistan	Islam	Cluster randomized trial	Vaccine Hesitancy; Polio	Lancet Glob Health. 5(6):e593–e603. https://doi.org/10.1016/S2214-109X(17)30184-5
Khan MU, et al. Muslim scholars' knowledge, attitudes and perceived barriers towards polio immunization in Pakistan.	Pakistan	Islam	Observational - Descriptive cross-sectional study	Vaccine hesitancy; Polio	J Relig Health. 56(2):635-48. https://doi.org/10.1007/s10943-016-0308-6
Machekanyanga Z, et al. Qualitative assessment of vaccination hesitancy among members of the Apostolic Church of Zimbabwe: a case study.	Zimbabwe	Apostolic (Zimbabwe)	Case Study	Vaccine hesitancy	J Relig Health. 56(5):1683-91. https://doi.org/10.1007/s10943-017-0428-7
Marti M, de Cola M, MacDonald NE, Dumolard L, Duclos P. Assessments of global drivers of vaccine hesitancy in 2014-Looking beyond safety concerns.	Global	Multiple religions	Survey analysis/data review	Vaccine Hesitancy	PLoS One. 12(3):e0172310. https://doi.org/10.1371/journal.pone.0172310
Nasir JA, Imran M, Zaidi SAA, Rehman NU. Knowledge and perception about polio vaccination approval among religious leaders.	Pakistan	Islam	Cross-sectional study	Vaccine Hesitancy; Polio	J Postgrad Med Inst. 31(1): 61-6. https://jpmi.org.pk/index.php/jpmi/article/view/1798/1786
Nnadi C, et al. Approaches to vaccination among populations in areas of conflict.	Nigeria, Pakistan,	None	Discussion paper	Religion & immunization; Humanitarian Settings	J Infect Dis. 216(suppl_1):S368-72. https://doi.org/10.1093/infdis/jix175

	Somalia				
Olorunsaiye CZ, Langhamer MS, Wallace AS, Watkins ML. Missed opportunities and barriers for vaccination: a descriptive analysis of private and public health facilities in four African countries.	Kenya; Tanzania; Senegal; Malawi		Survey and data analysis	Vaccine Hesitancy; Religion & immunization	Pan Afr Med J. 27(3):6 https://doi.org/10.11604/pamj.supp.2017.27.3.12083
Taylor S, et al. Understanding vaccine hesitancy in polio eradication in northern Nigeria.	Nigeria	Islam	Purposive sampling survey	Vaccine Hesitancy; Polio	Vaccine. 35(47):6438-43. https://doi.org/10.1016/j.vaccine.2017.09.075
Turiho AK, et al. Perceptions of human papillomavirus vaccination of adolescent schoolgirls in Western Uganda and their implications for acceptability of HPV vaccination: a qualitative study.	Uganda		Qualitative study - FGDs	Vaccine Hesitancy; HPV	BMC Res Notes. 10:431. https://doi.org/10.1186/s13104-017-2749-8
World Health Organization. Global vaccine action plan monitoring, evaluation and accountability: Secretariat Annual Report.	Global	None	Report	Religion & immunization	https://www.who.int/immunization/global_vaccine_action_plan/web_gvap_secretariat_report_2017.pdf?ua=1
			2018		
Abakar MF, et al. Vaccine hesitancy among mobile pastoralists in Chad: a qualitative study	Chad	Islam	Qualitative study		Int J Equity Health. 17(1):167. https://doi.org/10.1186/s12939-018-0873-2
Ahmed A, et al. Outbreak of vaccine-preventable diseases in Muslim majority countries.	Pakistan, Malaysia, Nigeria, Afghanistan, Egypt	Islam	Review	Vaccine Hesitancy	J Infect Public Health. 11(2):153-5. https://doi.org/10.1016/j.jiph.2017.09.007
Akseer N, et al. Status and drivers of maternal, newborn, child and adolescent health in the Islamic world: a comparative analysis. '	Global	Islam	Country-level ecological study	Religion & immunization	The Lancet. 391(10129): 1493-512. https://doi.org/10.1016/S0140-6736(18)30183-1
Asress A, Bezabih L. Assess role of religious leaders and caretakers' knowledge to child immunization.	Ethiopia	Ethiopian Evangelical Mekane	Poster presentation [Conference presentation	Religion & immunization; Routine Immunization	Annual meeting and expo of the American Public Health Association, San Diego, CA, United States.

		Yesus Church/Lutheran	abstract]		https://apha.confex.com/apha/2018/meetingapp.cgi/Paper/412223
Cooper S, Betsch C, Sambala E, Mchiza N, Wiysonge C. (2018). Vaccine hesitancy—a potential threat to the achievements of vaccination programmes in Africa.	Sub-Saharan Africa	None		Vaccine hesitancy	Hum Vaccin Immunother. 14;10:2355-7. https://doi.org/10.1080/21645515.2018.1460987
Gallup/Wellcome Global Monitor. How does the world feel about science and health?	Global	None	Report		https://static1.squarespace.com/static/5d4d746d648a4e0001186e38/t/5da9a9ee57ce312451325890/1571400178293/wellcome-global-monitor-2018.pdf
Grandahl M, et al. Correction: parents' knowledge, beliefs, and acceptance of the HPV vaccination in relation to their socio-demographics and religious beliefs: a cross-sectional study in Thailand.	Thailand	Buddhism	Cross-sectional study	Vaccine hesitancy; HPV	PloS One. 13(4):e0196437. https://doi.org/10.1371/journal.pone.0196437
Hamdi S. The impact of teachings on sexuality in Islam on HPV vaccine acceptability in the Middle East and North Africa region.	Middle East and North Africa	Islam	Review	Vaccine hesitancy; HPV	J Epidemiol Glob Health. 7{1}:S17-22, https://doi.org/10.1016/j.jegh.2018.02.003
Lane S, MacDonald NE, Marti M, Dumolard L. Vaccine hesitancy around the globe: analysis of three years of WHO/UNICEF Joint Reporting Form data—2015-2017.	Global	None	Data analysis	Vaccine hesitancy	Vaccine. 36(26):3861-7. https://doi.org/10.1016/j.vaccine.2018.03.063
Peckham R. Polio, terror and the immunological worldview.	Afghanistan; Pakistan	Islam	Discussion paper	Vaccine Hesitancy; Polio	Global Public Health. 13;2:189-210. https://doi.org/10.1080/17441692.2016.1211164
Pugliese-Garcia M, et al. Factors influencing vaccine acceptance and hesitancy in three informal settlements in Lusaka, Zambia.	Zambia	Christian		Vaccine Hesitancy; Cholera	Vaccine. 36(37):5617-24. https://doi.org/10.1016/j.vaccine.2018.07.042
Tefera YA, Wagner AL, Mekonen EB, Carlson BF, Boulton ML. Predictors and barriers to full vaccination among children in Ethiopia.	Ethiopia	Islam; Protestant	Cross-sectional survey	Vaccine Hesitancy	Vaccines (Basel). 6(2):22. https://doi.org/10.3390/vaccines6020022

World Health Organization. Global vaccine action plan monitoring, evaluation and accountability: Secretariat Annual Report 2018.	Global	None	Report	Religion & immunization	https://www.who.int/immunization/global_vaccine_action_plan/web_gvap_secretariat_report_2018.pdf
			2019		
Abubakar A, Dalhat M, Mohammed A, et al. Outbreak of suspected pertussis in Kaltungo, Gombe State, Northern Nigeria, 2015: the role of sub-optimum routine immunization coverage.	Nigeria	Islam	Matched case control	Vaccine Hesitancy; Pertussis/ routine immunization	Pan Afr Med J. 32(1):9. https://doi.org/10.11604/pamj.supp.2019.32.1.13352
Balbir Singh HK, et al. Assessment of knowledge and attitude among postnatal mothers towards childhood vaccination in Malaysia.	Malaysia	Islam	Cross-sectional survey	Vaccine Hesitancy; Childhood Vaccination	Hum Vaccin Immunother. 15(11):2544-51. https://doi.org/10.1080/21645515.2019.1612666
Catholic Relief Services. Civil society organization platforms contribute to national immunization programs. Promising practices 2012-2018.	Global	Multiple faiths	Report	Vaccine Hesitancy; Religion & immunization	https://www.crs.org/sites/default/files/tools-research/promising_practices_a4_final_rev071119_online.pdf
Evans D, et al. Trust in vaccines and medicines in Uganda.	Uganda	Protestant; Catholic	Cross-sectional survey	Vaccine Hesitancy	Vaccine. 37(40): 6008-15. https://doi.org/10.1016/j.vaccine.2019.07.022
Jalloh MF, et al. Rapid behavioral assessment of barriers and opportunities to improve vaccination coverage among displaced Rohingyas in Bangladesh, January 2018.	Bangladesh	Islam	Qualitative assessment	Vaccine hesitancy	Vaccine. 37(6):833-38. https://doi.org/10.1016/j.vaccine.2018.12.042
Malande OO, et al. Barriers to effective uptake and provision of immunization in a rural district in Uganda.	Uganda	Traditional religions	Cross-sectional mixed methods	Religion & immunization	PLoS ONE. 14(2): e0212270. https://doi.org/10.1371/journal.pone.0212270
Morry C. Reflections on polio lessons from conflicted affected environments.	Global - LMICs	None	Report	Humanitarian environments; Religion and Immunization	USAID/MCSP project. https://www.mcsprogram.org/resource/reflections-on-polio-lessons-from-conflict-affected-environments/
Padmawati RS, et al. Religious and community leaders' acceptance of rotavirus vaccine introduction in	Indonesia	Islam	Qualitative - semi-structured in-depth interview	Vaccine hesitancy; Rotavirus; New Vaccine	BMC Public Health. 19(1):368. https://doi.org/10.1186/s12889-019-

Yogyakarta, Indonesia: a qualitative study.				acceptance	6706-4
Sabahelzain MM, et al. Towards a further understanding of measles vaccine hesitancy in Khartoum state, Sudan: a qualitative study.	Sudan	Islam	Qualitative semi-structured interviews	Vaccine Hesitancy; Measles	PLoS One. 14(6):e0213882. https://doi.org/10.1371/journal.pone.0213882
Syiroj ATR, Pardosi JF, Heywood AE. Exploring parents' reasons for incomplete childhood immunisation in Indonesia.	Indonesia	Islam	Qualitative semi-structured interviews	Vaccine hesitancy	Vaccine. 37(43):6486-93. https://doi.org/10.1016/j.vaccine.2019.08.081
			2020		
Agrawal A, Kolhapure S, Di Pasquale A, Rai J, Mathur A. Vaccine hesitancy as a challenge or vaccine confidence as an opportunity for childhood immunisation in India.	India	Islam	Literature review	Vaccine Hesitancy; Polio	Infect Dis Ther. 9(3):421-32. https://doi.org/10.1007/s40121-020-00302-9
Ansari MT, et al. Knowledge, attitude, perception of Muslim parents towards vaccination in Malaysia.	Malaysia	Islam	Observational	Vaccine Hesitancy	Hum Vaccin Immunothers. 1–6. Advance online publication. https://doi.org/10.1080/21645515.2020.1800325.
Barmania S, Reiss MJ. Health promotion perspectives on the COVID-19 pandemic: The importance of religion.	Global	Multiple	Analysis/commentary	Vaccine Hesitancy; COVID19	Global Health Promot. 1757975920972992. Advance online publication. https://doi.org/10.1177/1757975920972992
Bangura JB, et al. Barriers to childhood immunization in sub-saharan Africa: a systematic review.	Sub-Saharan Africa	None	Review	Religion & immunization	BMC Public Health. 20:1108. https://doi.org/10.1186/s12889-020-09169-4
Berkeley Center for Religion, Peace & World Affairs/Joint Learning Initiative on Faith & Local Communities/World Faiths Development Dialogue. Religious responses and engagement on COVID-19 vaccines.	Global	Multiple	Brief/event report	Religion & immunization; COVID-19	https://berkleycenter.georgetown.edu/events/end-of-year-consultation-religious-responses-and-engagement-on-covid-19-vaccines
Costa JC, Weber AM, Darmstadt GL, Abdalla S, Victora CG. Religious affiliation and immunization coverage in 15	Sub-Saharan Africa	Christian, Islam	Systematic multi-country survey analysis	Religion & Immunization; Folk	Vaccine. 38(5):1160-9. https://doi.org/10.1016/j.vaccine.2019.1

countries in Sub-Saharan Africa.					1.024
de Figueiredo A, Simas C, Karafillakis E, Paterson P, Larson HJ. Mapping global trends in vaccine confidence and investigating barriers to vaccine uptake: a large-scale retrospective temporal modelling study.	Global	Multiple (mainly Islam)			Lancet. 396:898–908. https://doi.org/10.1016/S0140-6736(20)31558-0
Guzman-Holst A, DeAntonio R, Prado-Cohrs D, Juliao P. Barriers to vaccination in Latin America: a systematic literature review.	Latin America, Caribbean		Literature Review	Vaccine Hesitancy; Religions and Vaccines	Vaccine. 38(3):470-81. https://doi.org/10.1016/j.vaccine.2019.10.088
International Vaccine Access Center. Vaccine hesitancy in South Asia.	South Asia	None	Brief	Vaccine hesitancy	https://www.jhsph.edu/ivac/wp-content/uploads/2020/12/SAVI-Vaccine-Hesitancy-in-South-Asia-White-Paper.pdf.
Jamal D, Zaidi S, Husain S, Orr DW, Riaz A, Farrukhi AA, Najmi R. Low vaccination in rural Sindh, Pakistan: a case of refusal, ignorance or access?	Pakistan	Islam		Vaccine hesitancy	Vaccine. 38(30):4747-54. https://doi.org/10.1016/j.vaccine.2020.05.018.
Jalloh MF, Wilhelm E, Abad N, Prybylski D. Mobilize to vaccinate: lessons learned from social mobilization for immunization in low and middle-income countries.	Global LMICs	None	Commentary	Religion and immunization	Hum Vaccin Immunother. 16(5):1208-14. https://doi.org/10.1080/21645515.2019.1661206.
Kalok A, et al. Vaccine hesitancy towards childhood immunisation amongst urban pregnant mothers in Malaysia.	Malaysia	Islam	Cross-sectional survey	Vaccine hesitancy	Vaccine. 38(9):2183-9. https://doi.org/10.1016/j.vaccine.2020.01.043
Makoka M. Health promoting churches: reflections on health and healing for churches on commemorative World Health Days.	Global	Christian	White paper/guidebook; Gray	Religion and health/immunization	World Council of Churches. https://www.oikoumene.org/sites/default/files/2020-10/English-Health-PromotingChurches.pdf.
Mupere E, et al. Family Health Days program contributions in vaccination of unreached and under-immunized children during routine vaccinations in Uganda.	Uganda	Christian, Islam	Cross-sectional descriptive analysis	Religion and Immunization	PLoS ONE. 15(1):e0218239. https://doi.org/10.1371/journal.pone.0218239
Owoaje E, et al. Conflict, community, and collaboration: shared implementation barriers and strategies in two polio	Afghanistan; Nigeria	Islam	Gray literature review + online survey	Vaccine Hesitancy; Polio	BMC Public Health. 20(4):1178. https://doi.org/10.1186/s12889-020-

endemic countries.					09235-x
Oyo-Ita, et al. Impacts of engaging communities through traditional and religious leaders on vaccination coverage in Cross River State, Nigeria.	Nigeria	Islam; Christian	Program evaluation [3ie Grantee Final Report]	Religion & Immunization; Routine Immunization	New Delhi: International Initiative for Impact Evaluation (3ie). https://www.3ieimpact.org/sites/default/files/2020-07/TW10.1073-Nigeria-TRL.pdf
Wong LP, Wong PF, AbuBakar S. Vaccine hesitancy and the resurgence of vaccine preventable diseases: the way forward for Malaysia, a Southeast Asian country.	Malaysia	Islam	Qualitative semi-structured interviews	Vaccine Hesitancy	Hum Vaccin Immunother. 16(7):1511-20. https://doi.org/10.1080/21645515.2019.1706935.
Wong LP, et al. Multidimensional social and cultural norms influencing HPV vaccine hesitancy in Asia.	Asia	Multiple religions	Review	HPV	Hum Vaccin Immunother. 16(7):1611-22. https://doi.org/10.1080/21645515.2020.1756670.
World Council of Churches/World Jewish Congress. Invitation to reflection and engagement on ethical issues related to COVID-19 vaccine distribution.	Global	Multiple	White paper; Gray	Religion and COVID-19 Immunization	https://www.oikoumene.org/sites/default/files/2020-12/20_12%20COVID-19%20vaccination%20rollout%20ethical%20issues_WCC%20and%20WJC%20%20joint%20statement_FINAL.pdf.
			2021		
Berkley Center for Religion, Peace & World Affairs, Joint Learning Initiative on Faith and Local Communities, World Faiths Development Dialogue. Faith and COVID-19: Resource repository.	Global	Multiple	Collection of links/Resource document	Vaccine Hesitancy; COVID-19	https://docs.google.com/document/d/1FLxwvN6ICTxWWYOwRiv9sBLgf7v0vstsSzV7_o_1-B8/edit.
Boulton ML, Wagner AL. Advancing global vaccination equity.	Global	None	Editorial	Religion and Immunization; Vaccine Hesitancy	Am J Prev Med. 60(1S1):S1-S3. https://doi.org/10.1016/j.amepre.2020.10.004.
Harapan H, Shields N, Kachoria AG, Shotwell A, Wagner AL. religion and measles vaccination in Indonesia, 1991-2017.	Indonesia	Islam		Vaccine Hesitancy; Measles	Am J Prev Med. 60(1S1):S44-52. https://doi.org/10.1016/j.amepre.2020.07.029.
Kucheba F, Mweemba O, Matenga T, Zulu J M. (2021). Acceptability of the human papillomavirus vaccine in schools in Lusaka in Zambia: role of community and formal health system factors.	Zambia	Christian	Qualitative case study	Vaccine Hesitancy; HPV	Glob Public Health. 16(3): 378–89. https://doi.org/10.1080/17441692.2020.1810734

Vatican Commission for COVID-19. (2021). COVID-19 vaccines: resources for church leaders.	Global	Catholic	Guidance/tool	COVID-19	https://www.humandevelopment.va/content/dam/sviluppoumano/vatican-covid19-response/reports/Resource%20Kit%20-%20March%202.pdf.
Wilkinson O, Marshall K. A quick analysis guide, Part I: for health and development actors: engaging faith actors in COVID-19 vaccine rollout.	Multiple countries	Multiple	Guide/tool	COVID-19	World Faiths Development Dialogue and the Berkley Center for Religion, Peace and World Affairs. Georgetown University. https://jliflc.com/wp-content/uploads/2021/02/Final_Faith-and-COVID-Vaccines-analysis-matrix-1.pdf.
World Vision. Barrier analysis studies on Covid-19 vaccines.	Bangladesh, Mynamar, India, Tanzania, Kenya	Multiple	Barrier analysis/formative research/survey	COVID-19	PowerPoint presentation.
World Vision. Faith leaders must play key role in COVID-19 vaccine roll-out.	Bangladesh, Mynamar, India, Kenya, Tanzania	Islam, Christian	web article	Religion and Immunization; COVID-19	https://www.worldvision.org/about-us/media-center/faith-leaders-must-play-key-role-in-covid-19-vaccine-roll-out.