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How to Increase Vaccination Acceptance Among Apostolic Communities: Quantitative Results from an Assessment in Three Provinces in Zimbabwe

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Abstract

A worldwide increasing trend toward vaccine hesitancy has been reported. Measles outbreaks in southern Africa in 2009–2010 were linked to objections originating from Apostolic gatherings. Founded in Zimbabwe in the 1950s, the Apostolic church has built up a large number of followers with an estimated 3.5 million in Zimbabwe in 2014. To inform planning of interventions for the 2015 measles–rubella vaccination campaign, we assessed vaccination status and knowledge, attitudes and practices among purposive samples of Apostolic caregivers in three districts each in Harare City, Manicaland and Matabeleland South in Zimbabwe. We conducted structured interviews among 97 care-givers of children aged 9–59 months and collected vaccination status for 126 children. Main Apostolic affiliations were Johanne Marange (53%), Madida (13%) and Gospel of God (11%) with considerable variation across assessment areas. The assessment also showed considerable variation among Apostolic communities in children ever vaccinated (14–100%) and retention of immunization cards (0–83%) of ever vaccinated. Overall retention of immunization cards (12%) and documented vaccination status by card (fully vaccinated = 6%) were low compared to previously reported measures in the general population. Mothers living in monogamous relationships reported over 90% of all DTP-HepB-Hib-3, measles and up to date

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Compliance with Ethical Standards

Conflict of interest The authors have no conflicts to disclose related to this work.

immunizations during the first life year documented by immunization card. Results revealed opportunities to educate about immunization during utilization of health services other than vaccinations, desire to receive information about vaccinations from health personnel, and willingness to accept vaccinations when offered outside of regular services. Based on the results of the assessment, specific targeted interventions were implemented during the vaccination campaign, including an increased number of advocacy activities by district authorities. Also, health workers offered ways and timing to vaccinate children that catered to the specific situation of Apostolic care-givers, including flexible service provision after hours and outside of health facilities, meeting locations chosen by caregivers, using mobile phones to set up meeting locations, and documentation of vaccination in health facilities if home-based records posed a risk for caregivers. Coverage survey results indicate that considerable progress has been made since 2010 to increase vaccination acceptability among Apostolic communities in Zimbabwe. Further efforts will be needed to vaccinate all Apostolic children during routine and campaign activities in the country, and the results from our assessment can contribute toward this goal.

Keywords

Vaccination hesitancy; Vaccination confidence; Vaccination acceptance; Apostolic community

Introduction

Experts worldwide have identified vaccine hesitancy as a significant barrier to vaccination, and lack of confidence in vaccines is considered a threat to the success of vaccination programs (Dubé et al. 2013). Vaccine hesitancy refers to delay in acceptance or refusal of vaccines despite availability of vaccination services. Vaccine hesitancy is complex, context-specific and varies across time, place and vaccines (WHO 2014).

Recent systematic reviews on vaccine hesitancy were completed from the global perspective (Dubé et al. 2013; Larson et al. 2014) and focused on low- and middle-income countries (Rainey et al. 2011). The reviews provided models of determinants of vaccine hesitancy (Dubé et al. 2013; Larson et al. 2014) that were organized around contextual influences, individual and group influences, and vaccine and vaccination-specific issues (Larson et al. 2014), and historic, political and sociocultural context, public health and vaccine policies, health professional's recommendations, and communication and media (Dubé et al. 2013). Attitudes toward vaccination should be seen as cross-sectional in time, on a continuum ranging from active demand for vaccines to complete refusal of all vaccines, and changeable over time (Dubé et al. 2013).

The rise and spread of measles outbreaks in southern Africa in 2009–2010 (Shibeshi et al. 2014) were linked to objections to receipt of vaccination originating from Apostolic gatherings (WHO IST 2012; Ha et al. 2014). The Apostolic church is a Pentecostal Christian denomination, which originated in the USA in the early twentieth century (Blumhofer 2002). Founded in Zimbabwe in the 1950s, the Apostolic church has built up a large number of followers with an estimated 3.5 million in Zimbabwe in 2014 (Ha et al. 2014) as well as a presence in Botswana, the Democratic Republic of Congo, South Africa and Zambia (WHO

IST 2012). Apostolic communities in Zimbabwe have been found to be poorer, less educated, more likely to reside in rural areas and having a higher ratio of economically inactive household members (those aged less than 15 years and those above 64 years) to economically active members (those aged 15–64 years) than other Christian groups (Ha et al. 2014). An affiliation with the Apostolic faith was found to be an independent risk factor in reducing the utilization of both maternal and child health services, as a consequence of health beliefs and lack of resources (Ha et al. 2014). A national vaccination coverage survey conducted in Zimbabwe in 2010 found an estimated 58% coverage with all childhood vaccinations among children aged 12–23 months of Apostolic church members compared to 70% in children of Catholics, 70% in children of Pentecostals and 67% in children of Protestants (MHCC and WHO 2010).

Apostolic communities are comprised of various subgroups with varying degrees of health service utilization and immunization coverage rates (Ha et al. 2014). We conducted an assessment of vaccination status and knowledge, attitudes and practices (KAP) in three areas in Zimbabwe that included quantitative and qualitative components. The objective of the assessment was to (a) inform planning of interventions for a measles–rubella vaccination campaign planned in 2015 and (b) determine differences in coverage and KAP among Apostolic subgroups. We report here results of the quantitative component.

Methods

Quantitative methods consisted of purposive sample of overall 90 structured household interviews. To obtain this sample, we selected three of 11 provinces in Zimbabwe known to have a high proportion of persons of Apostolic faith based on previous reports: Harare City (northeast Zimbabwe), Manicaland (east) and Matabeleland South (southwest). In each of the provinces, immunization program officers ranked districts by the proportion of persons of Apostolic faith, and the three highest ranking districts were selected for the assessment: West-southwest, Southeastern-central and Chitungwiza in Harare; Mutare, Makoni and Buhera in Manicaland; and Gwanda, Insiza and Bulilima in Matabeleland South. In each of the selected districts, health workers identified two health facilities that provided immunization services to Apostolic communities. Villages in the service area of each of the facilities were then ranked by the proportion of persons of Apostolic faith, and the five villages with the highest proportion were selected. In each of the selected villages, one household was selected by spinning a pen in the center of the village, counting all households in the direction the pin pointed to until reaching the limit of the village, and selecting one household at random from the number of households counted. If members of selected households were not of Apostolic faith or no child aged 9–59 months was living in the household, health workers went to the next nearest household until completing the interview. If more than one caregiver with a child aged 9–59 months was living in the household, all were included in the assessment. The choice of questions in the questionnaire was guided by previous experience with resistance to immunization (WHO IST 2012) and discussions with immunization program officers who are working with Apostolic communities. Questions addressed household characteristics, socio-demographic caregiver characteristics, health-related caregiver characteristics (e.g., number of ANC visits), child-related socio-demographic questions (e.g., age, sex, place of delivery) and information about

child-related health (e.g., vaccination status, reasons for vaccination and non-vaccination, location of vaccination and suggested options regarding interventions to increase vaccination acceptability). Vaccination dates were documented from immunization cards if available. In addition to number of antenatal care (ANC) visits, mothers were asked about documentation of those visits.

Data collection was conducted in January 2015 by three Shona-speaking field teams in Harare and Manicaland and three Ndebele-speaking field teams in Matabeleland. Each team consisted of two interviewers (one nurse, one prevention officer) and one supervisor. Interviewers and supervisors were not assigned to districts where they normally work or to their district of origin. Teams were trained for 3.5 days. Because of a considerable variety of dialects, questionnaires were not translated from English into local languages.

SAS version 9.3 (SAS Institute, Cary, NC) was used to analyze quantitative data. This study was reviewed by the CDC Human Subjects Research Office and determined to not involve human subjects research since it was judged to involve routine public health activities for program evaluation. The protocol received ethical approval by the Institutional Ethical Review Committee of the Zimbabwe Medical Research Council.

Results

We interviewed 97 parents and caregivers (79 mothers, four fathers and 14 other care-givers) in 92 households. The majority of interviewed caregivers were married (78%), had at least a primary education (96%), were unemployed (71%) and lived in rural areas (67%). Overall, the main Apostolic communities were Johanne Marange (53%), Madida (13%) and Gospel of God (11%). In Manicaland, the Johanne Marange community was the predominant Apostolic community (87%), in Matabeleland South, the Johanne Marange (39%) and Madida (36%) and in Harare, the Johanne Marange (32%) and Gospel of God (32%) communities.

Table 1 shows considerable variation among Apostolic communities in non-vaccination services used at the nearest health center (8–100%), desire to receive information about vaccines (42–100%), mothers living in polygamous relationships (0–62%), children ever vaccinated (15–100%), immunization card availability (0–83%) and reported potential ways to convince caregivers of unvaccinated children to have their children vaccinated (0–75% said something could be done). Of note, 36 of 87 (41%) respondents used health services other than vaccination; of those, 20 (56%) sought family planning, growth monitoring or malaria prevention. Fifty-one of 90 respondents (57%) would like to receive information about vaccines; of those, 34 (66%) wanted this information from a nurse or health worker.

Among 126 children for whom immunization information was collected, only 15 (12%) had immunization cards. Overall proportion of children ever vaccinated and retention of immunization cards among children ever vaccinated were 30 and 41%, respectively (Table 1). Johanne Marange and Madida community members reported the lowest proportions of children ever vaccinated (14 and 18%, respectively) and vaccination cards available among children ever vaccinated (10 and 0%, respectively). Overall, 73% of caregivers with

unvaccinated children said that they will never accept vaccinations and nothing can be done to convince them otherwise. Some members of Apostolic communities suggested engaging church leaders (6%), using government or law enforcement (6%) and having caregivers available to provide vaccines outside official vaccination sessions ("private visits") to get vaccinations (5%)(Table 1).

Overall vaccination coverage for DTP-HepB-Hib-3,[1] measles and up to date immunization during the first life year[2] by immunization card was 10, 9 and 6%, respectively. Of vaccinations with DTP-HepB-Hib-3, measles and up to date immunization during the first life year documented by immunization card, 91, 92 and 100%, respectively, were reported by mothers living in monogamous relationships. Mothers living in monogamous relationships were also more likely than women living in polygamous relationships to report one or more ANC visits during the last pregnancy (43 vs. 15%).

Discussion

Our assessment showed considerable variation in vaccination acceptance among Apostolic communities in Zimbabwe. Our results also indicated lower use of health services, including immunizations, among women living in polygamous relationships compared to women living in monogamous relationships. Retention of immunization cards and being up to date with vaccinations during the first life year according to immunization cards among children of Apostolic caregivers were considerably lower in our assessment than in the 2010–2011 Demographic and Heath Survey in Zimbabwe, which reported availability of immunization cards in 68% of children and 54% of children aged 12–23 months who received all routine vaccinations documented by immunization card (Zimbabwe DHS 2010–11). In our assessment, most caregivers responded that they never will accept vaccinations and nothing can be done to change their minds, indicating the importance of understanding reasons for hesitancy and refusal and ways to overcome these obstacles through targeted interventions. According to the models of determinants of vaccine hesitancy, religion is a contextual, sociocultural and group influence that results in moral convictions among members (Dubé et al. 2013; Larson et al. 2014). Social and cultural pressure has been reported as a reason for under-vaccination (Rainey et al. 2011), and fear of sanctions was mentioned during the assessment as a reason for refusing vaccinations in Zimbabwe. Engaging the government and church leaders as well as government or law enforcement in social mobilization and communication strategies targeting Apostolic communities were mentioned as possible ways to improve immunization acceptance among Apostolic communities; this would potentially reduce group pressure and risk of sanctions from the community. These results are consistent with experiences from 2009 to 2010 when engaging the Prime Minister's office, Ministry of Health and Child Care, Members of Parliament and chiefs, administrators and traditional leaders at district level helped to control a measles outbreak in Zimbabwe (Shibeshi et al. 2014). Messages should be developed in collaboration with communication experts to be effectively communicated (Dubé et al. 2013) and specifically emphasize

[1]Third vaccine dose against diphtheria, tetanus, pertussis, hepatitis B and haemophilus influenzae type B.
[2]Vaccinated with Bacille Calmette-Guerin (BCG) vaccine, three doses of DTP-HepB-Hib vaccine, four doses of oral polio vaccine and measles vaccine within first year of life.

vaccine safety and its effectiveness. Messages reaching caregivers only through passive interventions (e.g., posters, websites) may not be successful (Jarrett et al. 2015). Given that the majority of respondents wanted information about vaccines and most of those trusted a nurse or health worker as information source rather than a church leader, the assessment showed opportunities for continued health education about the benefits of vaccination. Results from qualitative methods that complimented our assessment (Machekanyanga et al. 2017) specifically emphasized the role of poor knowledge in strengthening confidence in alternative methods to treat diseases such as use of holy water and prayers. Our assessment also showed willingness to accept vaccinations when offered outside of regular services.

Targeted interventions during the 2015 measles–rubella vaccination campaign (September 28 to October 2) included an increased number of advocacy activities by district authorities that specifically aimed at educating Apostolic communities about the benefits of immunization, informing about the vaccination days and mobilizing to bring their children for vaccination. In addition, health workers offered ways and timing to vaccinate children that catered to the specific situation of Apostolic caregivers, including flexible service provision after hours and outside of health facilities, meeting locations chosen by caregivers, using mobile phones to set up meeting locations and documentation of vaccination in health facilities if home-based records posed a risk for caregivers. Vaccination coverage among Apostolic children aged 9 months to 14 years in Harare, Manicaland and Matabeleland South, the provinces of our assessment, were estimated by a coverage survey as 78, 84 and 96%, compared to an overall coverage in the target age group of 87, 91 and 97%, respectively (MHCC 2015a). The same survey estimated that routine vaccination coverage with all vaccines at age 1 year at national level has increased among Apostolic children from 58% in 2010 to 81% in 2015 (MHCC 2015b). These results indicate that considerable progress has been made since 2010 to increase vaccination acceptability among Apostolic communities in Zimbabwe. Further efforts will be needed to vaccinate all Apostolic children during routine and campaign activities in the country, and the results from our assessment can contribute toward this goal.

Our assessment had several limitations. In order to provide recommendations in time for the 2015 measles–rubella vaccination campaign, we used a purposive sample among caregivers of Apostolic faith that did not allow a comparison with non-Apostolic groups. The sample was also of limited size that did not allow for statistical testing of differences between subgroups. The results may not be representative of other Apostolic communities or subgroups, and we do not know the effect of the interventions during the 2015 measles–rubella vaccination campaign on vaccination coverage. Our assessment did not include other reasons for vaccine hesitancy, such as elite status (VCP 2015). As recommended before (Ha et al. 2014), local vaccination coverage surveys should include a variable about membership in Apostolic subgroups to better allow quantifying vaccine hesitancy. Interventions resulting from this assessment should be systematically evaluated in the future. Assessment results were intended to inform interventions for a vaccination campaign; however, use of selected interventions in general routine immunization services should be considered based on evaluation results.

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Table 1

Selected indicators by Apostolic group, vaccination acceptability assessment, Zimbabwe 2015

Apostolic community[a]	**African Apostolic (*N* = 6) *n* (%)**	**Gospel of God (*N* = 10) *n* (%)**	**Johane Masowe (*N* = 7) *n* (%)**	**Johanne Marange (*N* = 48) *n* (%)**	**Madida (*N* = 12) *n* (%)**	**Others (*N* = 8) *n* (%)**	**Total (*N* = 91) *n* (%)**
Use of services in nearest health center other than vaccinations							
No	0	4 (40)	3 (50)	32 (71)	11 (92)	1 (13)	51 (59)
Yes	6 (100)	6 (60)	3 (50)	13 (29)	1 (8)	7 (87)	36 (41)
Type of services used[a]							
Family planning, growth monitoring, malaria prevention	1 (17)	0	1 (33)	12 (92)	1 (100)	5 (71)	20 (56)
General care	2 (33)	2 (33)	2 (67)	1 (8)	0	2 (29)	9 (25)
Accidents, emergencies, church unable to treat	1 (17)	4 (67)	0	0	0	0	5 (14)
Other prevention[b]	2 (33)	0	0	0	0	0	2 (6)
Would you like to receive information about vaccines							
No	0	0	2 (29)	27 (56)	7 (58)	1 (14)	37 (41)
Yes	6 (100)	8 (80)	5 (71)	21 (44)	5 (42)	6 (86)	51 (57)
Do not know/not sure	0	1 (10)	0	0	0	0	1 (1)
No response	0	1 (10)	0	0	0	0	1 (1)
From whom do you want to get the information							
Church leader	1 (17)	2 (25)	1 (20)	2 (10)	0	0	6 (12)
Nurse at health center	3 (50)	4 (50)	3 (60)	3 (14)	0	3 (50)	16 (31)
Community health worker	1 (17)	1 (12)	1 (20)	11 (52)	3 (60)	1 (17)	18 (35)
Other[c]	1 (17)	1 (12)	0	5 (24)	2 (40)	2 (33)	11 (22)
Total numbers of mothers interviewed	**5 (100)**	**7 (100)**	**6 (100)**	**42 (100)**	**9 (100)**	**5 (100)**	**74 (100)**
Mother living in polygamous relationship							
No	4 (100)	5 (71)	5 (83)	15 (38)	9 (100)	5 (100)	43 (61)
Yes	0	2 (29)	1 (17)	25 (62)	0	0	28 (39)
Total number of children for which vaccination information was collected	**6 (100)**	**12 (100)**	**9 (100)**	**72 (100)**	**18 (100)**	**9 (100)**	**126 (100)**
Child ever vaccinated							
No	0	4 (33)	5 (56)	62 (86)	14 (82)	3 (33)	88 (70)

Apostolic community[a]	African Apostolic (*N* = 6) *n* (%)	Gospel of God (*N* = 10) *n* (%)	Johane Masowe (*N* = 7) *n* (%)	Johanne Marange (*N* = 48) *n* (%)	Madida (*N* = 12) *n* (%)	Others (*N* = 8) *n* (%)	Total (*N* = 91) *n* (%)
Yes	6 (100)	8 (67)	4 (44)	10 (14)	3 (18)	6 (67)	37 (30)
Immunization card available (among ever vaccinated children)							
No	2 (33)	5 (63)	2 (50)	9 (90)	3 (100)	1 (17)	22 (59)
Yes	4 (67)	3 (37)	2 (50)	1 (10)	0	5 (83)	15 (41)
What should be done to make you accept vaccinations for your child (unvaccinated children only)[a]							
Will never accept, nothing can be done	0	1 (25)	3 (100)	32 (74)	7 (70)	2 (100)	45 (73)
Engage church leaders	0	1 (25)	0	3 (7)	0	0	4 (6)
Government–law enforcement	0	1 (25)	0	3 (7)	0	0	4 (6)
Anonymous/private visits	0	0	0	2 (5)	1 (10)	0	3 (5)
Health education	0	1 (25)	0	1 (2)	0	0	2 (3)
Other[d]	0	0	0	1 (2)	0	0	1 (2)
Do not know	0	0	0	1 (2)	2 (20)	0	3 (5)

[a]Open question, categories decided during analysis

[b]Other prevention included HIV testing

[c]Other desired sources of information were not specified

[d]Other ways to increase vaccination acceptance included coming to annual church gathering