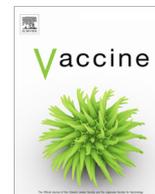




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Point-of-care vaccinators' perceptions of vaccine hesitancy drivers: A qualitative study from the cape metropolitan district, South Africa



Elizabeth O. Oduwole^{a,b,*}, Hassan Mahomed^a, Christina A. Laurenzi^c, Heidi J. Larson^{d,e}, Charles S. Wiysonge^{b,f}

^a Division of Health Systems and Public Health, Department of Global Health, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa

^b Cochrane South Africa, South African Medical Research Council, Cape Town, South Africa

^c Institute for Life Course Health Research, Department of Global Health, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa

^d Department of Infectious Disease Epidemiology, London School of Hygiene & Tropical Medicine, London, UK

^e Department of Health Metrics Sciences, University of Washington, Seattle, WA, USA

^f Division of Epidemiology and Biostatistics, Department of Global Health, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa

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ABSTRACT

Background: Vaccination coverage remains suboptimal in many parts of the world, especially in low- and middle-income countries (LMICs), including South Africa. Vaccine hesitancy, a recognized factor contributing to low vaccination uptake in many parts of the world, is suspect in the suboptimal vaccination coverage level in South Africa, particularly in the Western Cape Province. We aimed to investigate vaccine hesitancy and to describe point-of-care vaccinators' perceptions of the drivers of vaccine hesitancy in the Cape Metropolitan District, South Africa (Cape Metro).

We conducted in-depth interviews with 19 point-of-care vaccinators in 16 purposively selected health-care facilities in the Cape Metro between September and November 2019. Participants were sampled purposively as 'rich cases' who had been delivering vaccination services for at least five years post-qualification. We organized the data thematically in ATLAS.ti and report findings thematically by the types of reasons participants reported for vaccine hesitancy amongst clients.

Findings: Of the 19 interviewees, 11 (59%) reported having encountered vaccine-hesitant clients at some point in their careers. Reasons reported for vaccine hesitancy by clients included: (a) religion, (b) internet misinformation, (c) concern over causing the child pain, (d) natural immunity development, and (e) concern about possible adverse effect following immunization. Vaccine hesitancy in the Cape Metro cuts across all socio-economic classes. Also, some communities perceived to be vaccine-hesitant were mentioned by the participants in this study.

Conclusions: Attitude towards vaccination are generally positive in the Cape Metro. However, vaccine hesitancy is present. The issues of vaccine hesitancy at the reported levels can still be mitigated by continuous health education in the clinics and communities, as well as stakeholder engagement as suggested by the point-of-care vaccinators in the Cape Metro.

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1. Background

Vaccination is widely acknowledged as one of the most successful public health interventions, saving millions of lives and preventing thousands of disabilities annually [1–3]. Vaccination

therefore contributes significantly to the development of socio-economically healthier societies.

Despite its remarkable successes in reducing the burden of childhood diseases and increasing child survival rates globally, vaccination coverage still remains sub-optimal in many parts of the world [4–6]. Reasons for this are diverse, ranging from access and health system failures, through disruption of vaccination programmes and services due to conflicts and natural disasters, to psychological and socio-cultural reasons driving vaccine hesitancy [7–11].

Vaccine hesitancy, defined as the delay in acceptance or refusal of vaccination despite availability of vaccination services [7], has

* Corresponding author at: Division of Health Systems and Public Health, Department of Global Health, Faculty of Medicine and Health Sciences, Stellenbosch University, Francie Van Zijl Drive, Tygerberg, 7505 Cape Town, South Africa.

E-mail addresses: oduwoleelizabeth@gmail.com (E.O. Oduwole), hmahomed@sun.ac.za (H. Mahomed), Heidi.Larson@lshtm.ac.uk (H.J. Larson), Charles.wiysonge@mrc.ac.za (C.S. Wiysonge).

contributed to sub-optimal vaccination and outbreaks of vaccine preventable diseases [12]. It is complex and context specific, and varies across time, place and vaccines [7]. The increasing reports of vaccine hesitancy prompted the WHO Strategic Advisory Group of Experts on Immunization (SAGE) to establish a Working Group (WG), in March 2012, to assess and make recommendations to address vaccine hesitancy [13,14].

The challenge of vaccine hesitancy is global. A three-year (2015–2017) analysis of WHO/UNICEF Joint Reporting Forms (JRF) showed vaccine hesitancy to be present in all six WHO regions and in all categories of country income levels [15]. Vaccine hesitancy has been reported amongst people of high and low literacy, followers of different religions, across genders, and in people living in rural and urban settings [16]. In January 2019, the WHO named vaccine hesitancy as one of the top ten threats to global health [17]. In spite of concerted efforts to combat it, vaccine hesitancy continues to spread, driven in part by widespread access to digital communication allowing for the rapid spread of misinformation about vaccines, and anti-vaccination sentiments [9].

South Africa is not spared the challenge of vaccine hesitancy, though its full extent and reach is yet to be fully documented. The presence of anti-vaccination lobbyists on the South African web-space [9] is an indication of the possible presence of this global threat to the success of vaccination programs in South Africa.

The Western Cape Province has experienced challenges related to immunization coverage, reaching only 80.0% coverage with the third dose of the diphtheria-tetanus-pertussis vaccine (DTP3) in 2016/2017; 12 percentage points below the national target for the period [18]. Further investigations are needed to examine the role that vaccine hesitancy might have played in the province's suboptimal vaccination coverage.

The context-specific nature of vaccine hesitancy demands that researchers, policy makers and practitioners in Africa should intensify their efforts to better understand the scope and scale of vaccine hesitancy in the setting to inform the development of contextually-relevant interventions for the setting. We therefore conducted this qualitative study to investigate the presence of vaccine hesitancy, as perceived by point-of-care vaccinators, in the Cape Metropolitan District of South Africa (Cape Metro).

2. Methods

2.1. Study setting

The study was conducted between September and November 2019, in at least one health facility in each of the eight health sub-districts of the Cape Metro, the only urban district of the Western Cape Province of South Africa. According to Statistics South Africa, the Cape Metro had an estimated population of 4,181,107 in 2019, comprising approximately 61% of the total population of the Western Cape Province [19]. The demography of the Western Cape comprises of five socio-economic quintiles. Quintile 1 is described as the most deprived and quintile 5 least deprived quintile, between these two extremes are varying levels of classifications such as lower, middle, and upper socio-economic class which are all present in the Cape Metro. The socio-economic inequality that exists between these different quintiles has direct and indirect implications for the health, wellbeing and education of the population.

2.2. Study sites

Specific study sites (healthcare facilities) were purposively selected using the number of fully-immunized children under one year based on electronic facility data on immunization

between April 2017 and March 2018. We assume that the higher the number of immunizations carried out at a facility, the greater the chances of the vaccinators encountering vaccine-hesitant individuals. Written approval to access facilities and to interview point-of-care vaccinators was obtained from the City of Cape Town Municipality Health Department and the Western Cape Provincial Department of Health. The 16 facilities selected were mostly located in the *peri*-urban dwelling areas of the Metro, serving primarily the surrounding populations.

2.3. Study population and sample size

The study population consisted of current point-of-care vaccinators with preferably five years or more post-qualification experience. However, as some of the vaccinators had less than five years' experience, other senior health officers with requisite vaccination experience such as facility managers were included in the study population where available. Hence, a total of 19 interviews were conducted in the 16 approved facilities.

2.4. Data collection

The data collection process employed a simple exploratory descriptive qualitative method that allowed for the subjective descriptions of the phenomenon of interest which is the perceptions and experiences around vaccine hesitancy among the study participants [20].

The Principal Investigator (EO) conducted the interviews in person. The semi-structured interview guide purposively designed for the study was the tool used to conduct the in-depth key informant interviews with current point-of-care vaccinators. The interviews were conducted in English, a language that both the interviewer and interviewees were comfortable using to communicate, at the approved health facilities during official working hours. The length of the interviews varied, ranging between 5 and 30 min' duration; with an overall average of 15 min. Those interviewees who had encountered vaccine-hesitant individuals had longer interview times than those who had not. The interviews were conducted in conversational style, with open-ended questions used to probe deeper into issues of interest. All interviews were audio recorded and transcribed verbatim. Prior to the commencement of the interviews, there was a brief 'meet and greet' session where the researcher was introduced formally, the objectives of the research clearly explained, and the participants informed of the rights to participate or decline participation in the study. Questions by the participants were also encouraged and answered. None of the vaccinators approached declined participation and all participants signed informed consent forms.

2.5. Data analysis

Thematic analysis anchored on inductive methodology was used for data analysis, reflecting a recursive process, with constant back and forth among the different phases of thematic analysis as described by Braun and Clarke (2006) [21]. This allowed the data to 'speak for itself', that is; the constructs that were identified and analyzed as the final themes were inherent i.e. 'grounded' in the data [21–23].

Data analysis was done both manually and electronically using ATLAS.ti qualitative data analysis software version 8.4.24. The hard copies of the interview transcripts were given a preliminary review and segments of data relating to vaccine hesitancy and other issues of interests broadly 'coded' using highlighter pens of different colors. Electronic copies of the transcripts and the audio files were imported into the qualitative analysis software, and were diligently compared to assure the accuracy of the transcripts. The

transcripts were subsequently read thoroughly, and were coded electronically using an open coding technique relying on the initial manual codes for guidance. Iterative reading, coding and re-coding afforded the researcher the opportunity to further engage with and better understand the data, a process which was initiated at data collection. Related codes were grouped together, and displayed in a thematic map (network) using the qualitative data analysis software. In the course of the analysis, relationships within and among code groups were explored and used to further refine identified sub-categories and categories to the level of the overarching themes as described by Braun and Clarke (2006) [21]. Direct quotes from the participants expressing their opinions or relating their experiences are included to support the themes.

2.6. Participants

Eighteen out of the 19 of the point-of-care vaccinators interviewed were female, twelve participants had five years of experience or more as vaccinators, while six had less than five years of experience. There was no record for the years of experience of one who was a facility manager who had encountered vaccine-hesitant individuals at a previous facility where she had worked, and who volunteered to be interviewed to share her experiences. A total of eleven of the nineteen interviewees reported having ever encountered vaccine hesitant individuals at some point in their careers; ten of the participants heard hesitant sentiments expressed verbally, and one participant reported perceiving hesitancy in the facial expressions of some of the primary care givers. The overall experience of vaccinators was that the general attitudes of the populace they serve were positive towards vaccination; of those who did report experiencing vaccine hesitancy, most only recalled few incidents.

3. Findings

3.1. Religion and cultural drivers of vaccine hesitancy

Of the four main themes that were identified in this study as the major drivers of vaccine hesitancy in the Cape Metro, religion was the most common reason cited by the interviewed point-of-care vaccinators. Vaccine hesitancy was identified in members of the Christian and Islamic religions, as illustrated in the interview with one participant who had encountered it in adherents of both faiths. She recounted a story of a family with older children who had not been vaccinated as infants.

“Yes, once we did meet that case but already it was too late to help the family. Because of their belief; they did not believe in the injection for the baby and the child was already 12 years and the other one was already 11 years. But we did what we could for the children. But at this moment, they are not well; they are always catching the flu, both of them. The girl always has a rash, a skin problem, so the father who is the one who does not believe, he brought both their cards. There was nothing, only BCG from their birth. That is all, further more why, when you ask the family, they say it is because of their belief”.

When probed further as to what religion their ‘belief’ belonged, she said *“They are Christian”* and *“The father is a pastor”*. This same participant, identified in this study as C8.D2, also told of her encounter with a vaccine-hesitant Muslim client.

“The second was the family – they are Moslem. Their father did not believe [in immunization] but because we gave the education and the time was still early for the children, the wife did believe. The wife brought the husband and we discussed and then we won over the father. They brought in the children and everything is done, almost 18 months. And the baby is now almost 2 years. He’ll be coming in soon”.

Six (60%) of the 10 participants that reported having encountered verbally-expressed vaccine hesitancy among primary care-givers specifically mentioned religion as the reason, or one of the reasons, clients gave for their hesitancy. Other religious groups mentioned included: Seventh Day Adventists, Jehovah’s Witnesses and Rastafarians. One area in the Cape Metro was identified by a participant (C6.2.D1) to be at particularly high risk. As she explained:

“There are lots of Greenpeace people in the [names a specific area] area, no foreign things going into your body. [Specific area named] is very much a Greenpeace community”. When asked for further clarification, she confirmed that she meant “Greenpeace people” to be Rastafarians.

Related to the theme of religion is the sub-theme of ‘other cultural drivers’ of vaccine hesitancy in the perceptions of the participating point-of-care vaccinators. Three participants reported encountering some people from other cultures or countries which may have particular cultural, traditional or religious beliefs that might intersect to form their ideas about health, wellness and medicine. These may in turn inform and/or influence the individuals’ decision either to vaccinate or refuse vaccination. The quotes below documents such encounters.

Participant C2.2.D2 reported that:

“sometimes it is the Somalians, Moslems, some of the Muslim patients but it is not a lot, just here and there but most of them do” [immunize].

Another participant C7.D1, recounts:

“I don’t know but she is an African. She is from outside South Africa”. Searching her memory further, she added; *“can’t remember if it was Malawi or Tanzania but it’s between them. She’s either from East Africa or Southern Africa”.*

Participant C12.D2 noted:

“He was from upper African countries” and that *“I can’t remember which country. But he had four kids and they refused totally immunization for all. He was married to a colored lady and they had four kids. He refused.”*

Probed further on the reason this immigrant father gave for his hesitancy, participant C12.D2 responded:

“The reason was traditional. Traditionally, they are not allowed to have needles in their bodies.”

3.2. Internet misinformation

The use of the internet to access information about vaccines and vaccination was another commonly-identified driver of vaccine hesitancy in the Cape Metro. The effect of internet-sourced information in all reported cases was negative. None of the 19 participants, including those who said that they had not encountered vaccine-hesitant individuals, spoke about internet-sourced information as motivating people to get vaccinated. Rather, some did speak about how such information served as a dissuading factor. Alluding to the deleterious impact of internet misinformation, a participant said:

“I had one mother like that. She didn’t want the measles injection. She googled it and said ‘It’s going to make my child sick.’ And we experienced it at other clinics,” indicating the extent of the influence of the internet. *“They believe in that Google, and then we tell them, don’t believe in that Google.”*

Certain participants noted that some people in the middle and upper class strata of the society seemed to be commonly accessing misinformation from the internet that may explain their vaccine hesitancy. This was succinctly expressed by one participant (C6.2.D1)’s insightful comment based on her experience:

“... but as I mentioned, in my experience when I was managing the [names a specific area] area or the [another specific area named] area where you have the population that is more middle class, upper class that have access to internet etcetera, etcetera. Those are the ones who refuse immunizations, especially when we did mass campaigns, measles campaigns. If we had measles cases, they would refuse because you had to fill in a consent form. A good majority of them were not immunized, so obviously that is where the pool of infection comes from if the kids are not immunized. So that is my experience in the middle class to upper class communities.”

This sentiment was re-echoed by another participant (C1.D1), who had worked in a few different settings, including some upper-middle class areas. She shared her experience in the course of her interview, saying

“They will bring their children for weights, Vitamin A and deworming, when you open the card, they will say; “No sister, we’re not interested in immunizations...”

Explaining further, she said:

“That group of people there is nothing we can do, if the mother doesn’t consent to us, she doesn’t consent. Even if their baby is being born, they don’t even take the BCG. They will come in two weeks’ time; they will come and weigh the baby. They will see how the baby has grown on the breast milk but they don’t want immunizations”.

Describing further she explained:

“They’re rich. They will come there. They are rich. They only come do the weight of the baby and that’s it, nothing else”.

These two participants’ experiences and the pin-pointing of particular suburbs in the Metro seems to buttress the suspicion that vaccine hesitancy is rife among the middle to upper class population as it relates to internet-sourced information.

3.3. Concern over child’s pain and other identified drivers of vaccine hesitancy

Pain caused by the intramuscular injection mode of administration of most vaccines was reported to be another driver of vaccine hesitancy in the Cape Metro. This driver of vaccine hesitancy among clients was reported by three of the interviewed vaccinators, and clearly described by one point-of-care vaccinator who observed hesitancy in the facial expressions of the primary care givers.

“Not exactly that they refused but you can see the expression, the facial expression, they don’t want to”.

Nevertheless, after detailed explanation of the procedure and the importance of immunization by the vaccinator they hesitatingly agreed, and allowed their babies to be vaccinated.

“Alright, I’m going to do it,” seems to be their resigned expression.

“For now there are no mothers who [is] refusing. They sigh but you can see they think the injection is not nice working with a small baby. We can’t help that, we have to give the injection”, the participant (P2.D2) concludes.

Another participant (C9.D1), to whom a fellow health care worker explained her vaccine hesitancy and complacent attitude when as a mother she brought her child to the clinic and refused vaccination, stated:

“And then she said no, she’s not going to traumatize her child coming here for injections. And [that] there’s no evidence of any outbreak of any kind that could harm her child”. This vaccine-hesitant mother was identified as a dentist.

This leads to the sub-theme of literacy level. Vaccine hesitancy is not only confined to individuals of middle or higher education levels as the example of the vaccine-hesitant dentist cited above shows, another participant (C7.D1), opined in the course of the conversation:

“I think it is being illiterate at the same time. And still when you give education, they are still reluctant. I think it comes from older generations. Because if the mom taught you this, even if the things are changing, the mom doesn’t want because the family from the past didn’t. I think it comes from history, those years, maybe there wasn’t immunization. The kids weren’t going for immunization, why must they go now”.

This demonstrates that people of low or no educational status can also be vaccine-hesitant.

The fear of adverse events following immunization (AEFI) may be another driver of vaccine hesitancy in the Cape Metro.

“One mother said; “And my child got sick, huh-uh. My child is going to get sick; you’re not going to hurt my baby.”

Indicating a possible previous experience with AEFI.

“The child can get sick, whatever” was the response of the reporting vaccinator, stating her countering argument to this vaccine hesitant mother.

3.4. Natural immunity development

The notion that children should develop their own natural immunity was also another driver of vaccine hesitancy identified from the interviews with the point-of-care vaccinators in the Cape Metro. One participant (C5.2.D1) recalled her experience with one mother who explained:

“I want my child to build up his own immunity therefore I’m not going to have him vaccinated through the EPI (Expanded programme on Immunization) programme.”

Sourcing information from the internet seems to play a significant role in this respect, as mothers who refuse vaccination on this grounds frequently refer to the internet. This particular mother, also a health care professional, is said to have “Googled it” before making her decision. Another participant (C1.D1) quoted earlier also mentioned hearing a client say:

“No sister, we’re not interested in immunizations, the child must develop their own immunity”. The participant (C1.D1.)’s resigned conclusion was:

“And we do respect that also,”

4. Discussion

The main objective of this study was to conduct a qualitative and contextual enquiry into the major drivers of vaccine hesitancy in the opinion of point-of-care vaccinators in the Cape Metro. Vaccine hesitancy is reported in the Cape Metro, despite the overall positive attitude towards vaccination of its population in general.

4.1. Religion and other cultural drivers of vaccine hesitancy

Religion was found to be the most common reported driver of vaccine hesitancy in this specific context, and has been reported

in various parts of the world and amongst the adherents of different faiths [11,24,25]. The deep-rooted, personal nature of religion as a driver of vaccine hesitancy makes it a particularly difficult challenge to confront. Nevertheless, this can sometimes be done using effective communication means to engage with the relevant stakeholders. One of the main findings of this study is that, while vaccine hesitancy linked to religion is present, it is still an issue that might be tackled through effective public awareness campaigns and early government-backed stakeholder engagement as indicated by Olufowote in 2011 [26]. In his review article, he documented the harmful impact of the religion-linked boycott of the polio vaccine in northern Nigeria in 2003–2004, and its subsequent effect on some neighboring and other erstwhile polio-free countries. We recommend early and targeted intervention to mitigate this form of vaccine hesitancy before it becomes a complex and widespread issue.

In 2019, another team of researchers undertook a study on religious affiliation and immunization coverage in 15 countries in sub-Saharan Africa [27]. They found variability in vaccination coverage linked to religious affiliation, which is also reflected in parts of the findings from our current study. Moreover, some of our study participants mentioned encountering vaccine hesitant clients from other countries and cultures in the sub-Saharan African region, further corroborating the findings of Costa *et al* [27]. South Africa would likely benefit from implementing a standing recommendation under the International Health Regulation (IHR) 2005 [28] for vaccination against vaccine preventable childhood diseases similar to what is currently in place for yellow fever vaccination. It is expected that this will result in, and promote better health outcomes in indigenous and migrant populations.

4.2. Internet-sourced misinformation

Internet misinformation, a documented issue in the vaccination landscape of South Africa [9], emerged as the second key driver of vaccine hesitancy in the Cape Metro. This is a particularly worrisome issue as all participants reported that primary care givers who consulted internet sources acquiesced that the information they accessed either supported or instigated a vaccine-hesitant attitude. None reported a client who came for vaccination based on internet-sourced information. There are internet sources with correct, scientifically-backed information about vaccines, promoting good vaccination practices, but their impact seems minimal compared to those promoting anti-vaccination sentiments [29]. It has been documented that eight out of ten health-information seeking individuals including those searching for vaccine-related information, use a general search engine directly rather than go to health-related websites and health portals that abound on the internet [30]. The results generated by these search engines depend on their selection and sorting criteria, which varies from one search engine to another, but nonetheless have a tremendous influence on the global information spread and subconsciously influence the information seeker either positively or negatively [30].

Over the years, there has been a proliferation of Web 2.0 applications. These are websites that allow users to generate and disseminate their own content, comment on existing content and share content with other users [31,32]. The negative influence of the Web on vaccine attitudes is succinctly expressed by Guidry 2015 [29] who writes, “parents who do not vaccinate their children are more likely to have searched for vaccination information online”. The findings of this current study conducted in an LMIC setting and context also agree with this statement. Adequate measures to promote the pro-vaccination efforts and voices on relevant Web 2.0 platforms which is becoming increasingly available and easily accessible in the country, and to provide correct,

scientifically-backed counter responses to the anti-vaccination propaganda are urgently required.

4.3. Concern over child's pain, natural immune development and other drivers

The third of the four identified major drivers of vaccine hesitancy in this study is concern over child's pain at vaccination. The mode of administration of most vaccines is either intramuscular or subcutaneous, and this causes varying levels of pain and distress for the child and the primary care giver. This in turn may result in hesitancy on the part of the primary care giver to vaccinate their children or dependents. In 2010, Anna Taddio and her team published an evidence-based clinical practice guideline on reducing the pain of childhood vaccination [33]. These guidelines based on the 3-P pain management approach (pharmacologic, physical and psychological strategies), though developed in a high income country (Canada), includes recommendations that can be used or easily adapted even in LMIC context and setting like South Africa. It has been suggested that giving parents a physiological role to play in pain management during vaccination may give the parents some sense of control, and lead to a more satisfying overall vaccination experience [33]. This may possibly contribute to a positive vaccine attitude of the parents. It is unclear if South Africa has a clinical guideline specifically on pain mitigation during vaccination, if not, such an intervention should be developed to help stem the tide of vaccine hesitancy.

Adverse events following immunization (AEFI) were also indicated as one of the possible drivers of vaccine hesitancy in the Cape Metro by one point-of-care vaccinator. According to the previously referenced study of Burnett and her team [9], there are many reports of AEFI that are coincidental and not caused by vaccination, but because they happened around the same time vaccination was administered, and were reported by health care workers as per protocol for inclusion in appropriate databases. These or rumors of such are used by anti-vaccination lobbyists on the South African web space to further drive their agenda. Moreover, because many of the vaccine preventable diseases are now not as common as they once were (thanks to the successes of vaccination programmes in previous years), the occasional AEFI that are actually the result of vaccination tend to dwarf the benefit of the vaccination. When common adverse events following vaccination do happen, these are generally mild and transient, and they include symptoms such as tenderness, redness, soreness and mild fever. As rare as the chances of serious AEFIs are, they do occur, and their effects can be devastating [9]. The detection, handling and reporting of AEFIs in the Cape Metro requires further investigation.

Literacy levels of the primary care givers was also identified as one of the drivers of vaccine hesitancy in the Metro. One participant opined that illiteracy is a cause of vaccine hesitancy, while two separate participants mentioned fellow health care professionals, one a dentist, and the other one just referred to as a member of staff, both of whom had some form of tertiary education, yet were vaccine hesitant. Vaccine hesitancy was formerly associated with low literacy levels, but a shift has been observed in recent years to the converse [34]. The findings of this current study shows a conformity to the global trend in this respect. Moreover, association between higher education particularly in women, for instance being a health care worker with negative vaccine attitudes, has been previously documented [35,36]. Though these studies were conducted in high income countries, the findings of this study conducted in an LMIC context and setting is in alignment with them.

The findings of this study shows that the drivers of vaccine hesitancy as perceived by the participating point-of-care vaccinators can also be viewed to be happening on three broad levels. The first is on the individuals' level, which covers the themes of internet

misinformation, and the sub-theme of literacy levels. The second level is the social/contextual level, this covers the theme of religion and other cultural orientations that complicate individual's and families' willingness to get vaccinated. Finally, the themes of concern over child's pain, preference for natural immunity development and the sub-theme of adverse effect following immunization (AEFI) could be viewed to be happening on the broad level of vaccine/vaccination administration.

It is worth noting that these three levels corresponds to the three domains of vaccine hesitancy determinant matrix proffered by the WHO strategic advisory group of expert on immunization (SAGE) working group in 2014. These three domains are: individual and group influences, contextual influences and vaccine/vaccination-related influences[7].

Also noteworthy is the fact that all the major findings of the study has been encountered in different ways and varying degrees in other places and in different contexts as documented in cited literature. This affirms our findings, and provides a basis for its applicability and generalizability beyond the immediate location and context of the study.

This study, which investigated and documented drivers of vaccine hesitancy in the perception of point-of-care vaccinators in the Cape Metropolitan district, is not without limitations. One such limitation is the potential for information bias as the views of the vaccinators on vaccine hesitancy may not necessarily reflect that of the primary caregivers or that of the general population.

Another limitation is that we did not restrict our interviews to focus on a specific time period or range during which vaccinators encountered vaccine hesitant caregivers, making it challenging to draw further conclusions about shifts over time or specific motivating factors. Nevertheless, the fact that these perceptions has been previously reported in other places and at other times indicates that establishing the time period of the encounters may not have had a significant effect on the study's findings.

A final limitation is that a relatively small number of vaccinators were interviewed in each facility; however, most facilities included in the study had only one point-of-care vaccinator at the time the study was conducted.

5. Conclusion

This study aimed to gather empirical evidence of vaccine hesitancy in the Cape Metro. All of the drivers of vaccine hesitancy identified by the point-of-care vaccinator have been previously identified in other parts of the world, notably in high-income countries. This suggests that if the challenges are similar in these different context and settings, the interventions that have proven effective in high income settings could be explored in low and middle income countries (LMIC) context and settings such as the one in which this study was conducted. Identification of certain communities and areas as potential incubating grounds for outbreaks of vaccine preventable diseases by on-the-ground health care personnel requires urgent attention and targeted intervention.

We conclude that though vaccine hesitancy in the Cape Metro share similar characteristics with vaccine hesitancy observed elsewhere in the world, nevertheless, its effect on vaccination uptake and coverage is still relatively minimal when compared to those of pragmatic and social issues such as gangsterism, drug abuse and poverty (data not reported here).

Authors' contributions

EO led the conceptualization, design, and drafted the article. CAL provided qualitative research input for the thematic analysis, HM and CSW provided supervisory overview of the study and manuscript; and in conjunction with HJL, provided feedback on

the intellectual content of the manuscript. All authors have approved the final version of this manuscript.

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Ethics approval

The study received ethics approval from the University of Stellenbosch's Health Research Ethics Committee 1, HREC Reference # S19/01/014 (PhD). The study also obtained approval from the Western Cape Department of Health after application approval by the National Health Research Database (reference number WC 201,906 015) available at: <https://nhrd.hst.org.za/Proposal>, and from City Health, City of Cape Town (Reference number 24480; Project ID 8160) available at: <http://web1.capetown.gov.za/web1/Mars/ProjectAttachment/Read/0/8160>.

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Declaration of Competing Interest

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

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