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Article Title: Perceptions of oral cholera vaccine and reasons for full, partial and non-acceptance during a humanitarian crisis in South Sudan

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1 **Abstract (300 words max):**

2 Oral cholera vaccination (OCV) campaigns were conducted from February to April 2014 amongst
3 internally displaced persons (IDPs) in the midst of a humanitarian crisis in Juba, South Sudan. IDPs
4 were predominantly members of the Nuer ethnic group who had taken refuge in United Nations bases
5 following the eruption of violence in December 2013. The OCV campaigns, which were conducted by
6 United Nations and non-governmental organizations (NGOs) at the request of the Ministry of Health,
7 reached an estimated 85% of the target population. As no previous studies on OCV acceptance have
8 been conducted in the context of an on-going humanitarian crisis, semi-structured interviews were
9 completed with 49 IDPs in the months after the campaigns to better understand perceptions of
10 cholera and reasons for full, partial or non-acceptance of the OCV. Heightened fears of disease and
11 political danger contributed to camp residents' perception of cholera as a serious illness and increased
12 trust in United Nations and NGOs providing the vaccine to IDPs. Reasons for partial and non-
13 acceptance of the vaccination included lack of time and fear of side effects, similar to reasons found
14 in OCV campaigns in non-crisis settings. In addition, distrust in national institutions in a context of
15 fears of ethnic persecution was an important reason for hesitancy and refusal. Other reasons included
16 fear of taking the vaccine alongside other medication or with alcohol. The findings highlight the
17 importance of considering the target populations' perceptions of institutions in the delivery of OCV
18 interventions in humanitarian contexts. They also suggest a need for better communication about
19 the vaccine, its side effects and interactions with other substances.

20

1 **1. Introduction**

2 Cholera remains a significant public health problem in South Sudan where an ongoing political crisis
3 has led to over half a million refugees and 1.5 million internally displaced persons (IDPs) (1). In 2010,
4 WHO recommended that oral cholera vaccination (OCV) be used in conjunction with other cholera
5 prevention and control measures (2). Three years later, 2013, a global OCV stockpile was created to
6 improve access to the vaccine in event of outbreaks and humanitarian emergencies. Two United
7 Nations bases in Juba became protection of civilian areas (PoC), housing over 30,000 IDPs, after the
8 onset of violence in December 2013. An assessment indicated that PoC residents were at high risk of
9 cholera given the density of population, inadequate water and sanitation facilities and imminent onset
10 of seasonal rains. OCV campaigns were conducted in both PoCs following a request for stockpiled
11 vaccines by the Ministry of Health (3).

12 Cholera outbreaks are often associated with humanitarian emergencies but the use of OCV in
13 humanitarian crises represents a new public health intervention. Only 7 countries have documented
14 experiences with OCV campaigns and reasons influencing vaccine acceptance, three of which included
15 humanitarian actors (4). In Guinea and Haiti, non-vaccination was mostly attributed to being absent
16 during the time of the campaign (5, 6). The greatest barrier to OCV uptake in Tanzania was described
17 as an extended absence from home because of competing obligations or priorities in relation to work,
18 education or visiting relatives. This was followed by lack of information about the campaign, sickness
19 and fear of possible side effects (7). OCV campaigns in Haiti, Guinea and Thailand, indicated a lower
20 level of acceptance among adult men (5, 6).

21 No studies of OCV acceptance have been conducted in the context of an on-going humanitarian crisis
22 characterized by violence as found in South Sudan. This context presents unique circumstances with
23 respect to the relationships between the affected population, and the national and international
24 organizations governing access to care. This paper presents the results of an in-depth study of reasons
25 for full, partial and non-acceptance of the OCV among IDPs in South Sudan.

1 2. Methodology

2 *Study Setting and Population*

3 This study was set in two PoC sites (Tompson and UN House) in Juba, South Sudan. PoCs were
4 established as safe havens for people who sought protection in United Nation bases from the effects
5 of violence. Due to the ethnic nature of the conflict, these PoCs came to be predominantly occupied
6 by Nuer peoples. The security of PoCs is maintained by peacekeeping forces under the United Nation's
7 Mission in South Sudan (UNMISS), while health, food and education services are provided by various
8 non-governmental organizations (NGOs). Although the government of the Republic of South Sudan
9 (RoSS) does not provide services in the PoCs, they serve a gatekeeping role by determining which
10 NGOs can operate in the country.

11 OCV vaccination campaigns were conducted among IDPs in both PoCs from February to April 2014.
12 Population estimates of Tompong and UN House at the time of the campaigns were 19,000 and 12,000,
13 respectively (3). The campaigns were pre-emptive as no cases of cholera had occurred in the PoCs
14 at the time of vaccination. The WHO pre-qualified OCV Shanchol was used, which has a two dose
15 regimen given two weeks apart for complete vaccination. In preparation for the campaign, PoC
16 residents were provided with health education messages on cholera, its prevention and treatment
17 and the planned vaccination campaign. OCVs were given to all >1year old who presented at
18 designated stations within each PoC, excluding pregnant women. Paper cards documenting the date
19 and dose of the vaccination were provided to all recipients. WHO estimates that 85 to 96% of the
20 target population in each PoC received one or two doses of OCV as based on self-reporting or evidence
21 from vaccination cards (3, 8). Complaints concerning the taste of the vaccine and physical symptoms
22 such as nausea, diarrhoea and stomach pains were reported (3). Turnout among men was lower than
23 that of women and children in both PoCs (3).

24 *Study Design*

1 This qualitative study took place four months after the OCV campaigns. Semi-structured interviews
2 were conducted with adult residents of both PoCs. Respondents were purposively selected on the
3 basis of their vaccination status: fully vaccinated (received both doses of the vaccine), partially
4 vaccinated (received one dose) and refused vaccination (received no dose). Vaccine doses were
5 validated by presentation of vaccine cards. Respondents were found by walking through different
6 sections of the PoC and approaching people for interviews. Potential respondents were approached
7 in their homes and told about the study. If they expressed interest in participation, then they were
8 screened for eligibility and taken through the process of informed consent. Respondent selection also
9 prioritized gender balance and those living with young children. PoC residents who were health
10 workers (including health and hygiene promoters and medical assistants) were excluded from
11 participation in the study.

12 Interviews occurred in and around respondents' homes at times convenient for them and lasted
13 between 30 and 45 minutes. Interviews were conducted by trained research assistants from the PoC
14 populations in the Nuer language. All interviews were recorded and simultaneously translated and
15 transcribed immediately after interviews. A subset of transcripts and recordings were given to
16 research assistants from the other PoC to check for accuracy of translations. Informed consent was
17 obtained in writing from each participant after the nature and possible consequences of the study had
18 been fully explained.

19 *Data Analysis*

20 Data analysis began during interviews with reviews and clarifications of transcripts with research
21 assistants. Quotes were edited only as needed to improve readability while maintaining the structure
22 and intention of the language. The results of discussion of cultural relevance of various phrases and
23 ideas were documented with notes. Transcripts were then sorted in Nvivo 10. After a second reading
24 of all transcripts, coding began under the main themes covered in the interview guide. Themes
25 included perceptions of cholera, perceptions of the cholera vaccine and reasons for full, partial and

1 non-vaccination. A validation of coding structures took place through two open-coding seminar
2 sessions during which a subset of transcripts was shared with colleagues to generate and discuss
3 themes. This iterative process allowed for additional themes to emerge which were later reorganized
4 as sub-themes after additional reading of transcripts by DP.

5 **Results**

6 *Characteristics of Respondents*

7 A total of 49 interviews were conducted – 25 from Tomping and 24 from UN House. All respondents
8 were Nuer who were 7-10 months into their residence in the PoCs. The average age of respondents
9 was 33 years (range 20 - 56 years). Less than half of the respondents had any primary schooling.
10 With the exception of one person, all respondents were from the immediate vicinity of Juba. All
11 respondents reported using the communal tap stands and latrines as their sole basis of hygiene
12 activity. Hand washing facilities with water and soap were observed in most homes.

13 *Perceptions of Cholera*

14 All respondents perceived cholera as a very serious illness. Cholera was consistently named along with
15 malaria, typhoid and HIV/AIDS as the worst illnesses facing residents. Although malaria was
16 considered the most common illness, cholera was considered the most serious. The word for cholera,
17 *caamjiec kepitiboor*, “diarrhoea which is white”, evoked feelings of anxiety and fear because of the
18 speed of illness onset and demise if not quickly treated.

19 Perceptions of cholera appeared to be influenced by philosophical and political associations of
20 causality. While some conceptualised cholera in matter of fact terms such as a recurring aspect of the
21 disease landscape and as God’s will, others situated cholera within a larger discourse of injustice
22 related to the ongoing political context. For them, cholera was the result of being in the PoCs. And
23 being in the PoCs was a result of the political crisis:

1 *"If people will continue living in PoCs, as there is no peace, it will be a threat since cholera*
2 *comes as a result of poor hygiene and sanitation and high population of people in a small*
3 *area." (R48), 1 dose*

4 Respondents were aware of their own ability to prevent cholera. The prevention behaviors described
5 related to personal hygiene and environmental cleanliness, and included: drinking clean water,
6 washing hands, washing utensils, food hygiene (keeping food covered) and "keeping [surroundings]
7 clean." Latrine use was less frequently mentioned. Most descriptions of prevention behaviors were
8 accompanied by the rationale of preventing flies, which were commonly discussed both as an
9 indication of poor hygiene and as transmitters of cholera. The limitations of individual preventative
10 behaviors within the PoC environment caused concern among some respondents. Several people
11 referred to communal latrines, crowding and a lack of control over one's domestic environment as
12 inescapable barriers to their prevention efforts:

13 *"I can [protect] myself. I am sure for that, but children can still increase my chances of getting*
14 *it. I make sure I wash my utensils and keep my environment clean but children if I am away*
15 *will find their way to contaminate the utensils especially the cups for drinking." (R07), 2 doses*

16 *Perceptions of OCV and reasons for full vaccination*

17 The OCV campaigns were positively perceived by all respondents. They described vaccination in terms
18 of an individual decision to protect against cholera. Most felt less worried after receiving the
19 vaccination although many reported feeling nauseous for up to two days afterwards. There was
20 generally a high level of confidence that the vaccination campaign prevented a cholera outbreak
21 within the PoCs. Many hoped to be vaccinated again and recommended the same to others.

22 *Reasons for partial vaccination*

23 Most respondents who were partially vaccinated received the first dose but missed the second.
24 Respondents gave a range of reasons for partial vaccination, including being busy, lack of awareness,

1 avoidance of discomfort and fear of combining the vaccine with other medication and alcohol. Being
2 busy at the time of the second dose was a common reason. Activities described as keeping people
3 busy included childcare, day labor or housework.

4 All partially vaccinated respondents were aware of the need for two doses. Their awareness of other
5 factors such as knowing the timing of the second round and about contraindications around OCV were
6 less certain. Furthermore, awareness of the need for 2 doses did not preclude questioning the dosage
7 recommendation. Some simply felt they were adequately protected with one dose while others felt
8 that dosage needed to increase to 3 or 4, depending on body size:

9 *“Yes, I refuse to take two doses because there is no difference from getting two or one. I*
10 *been confused by people by saying you can take only one and [one] should be enough to*
11 *protect you from getting cholera.”(R45), 1 dose*

12 Most respondents complained of the taste and smell of the vaccine, regardless of number of doses.
13 In more extreme instances this experience resulted in nausea and vomiting which led a person to
14 believe the vaccine could be spreading cholera:

15 *“[after first dose] I felt nausea and I was worried may be it can contaminate me.”(R02), 1 dose*

16 Alcohol consumption was often linked to partial vaccination and vaccine refusal but only among men.
17 In the case of partial vaccination, alcohol consumption was said to lead to feelings of illness when
18 combined with the vaccine:

19 *“Yes after vaccination [with the] first dose when I took different thing (alcohol), I feel dizzier*
20 *and friends told me it is that vaccine you took. I suspended drinking for five days. After I get*
21 *myself well, I resumed and joined my friends. So I fear to go for second dose. During second*
22 *dose I increased the amount of alcohol and I was drunk and sleeping to avoid people*
23 *reminding me to go for vaccination.” (R29), 1 dose*

1 One participant interviewed received only the second dose of OCV. Her story of rejecting the first
2 dose and accepting the second dose involved a process of overcoming distrust of the government in
3 favor of trust in the UN and her friends:

4 *“Of course in the beginning I was about to refuse because of distress in [my] mind. I thought*
5 *the government sent us a poison to kills us in UNMISS but later I realized the vaccine is from*
6 *UN and the NGOs then I decided to take....I saw a lot of people going for it then even me I made*
7 *a decision to go....I admitted some advice from people. No one can stay without being*
8 *advised.”(R27), 1 dose*

9 *Reasons for not getting vaccinated*

10 Respondents who refused to be vaccinated generally described the severity, causes and prevention of
11 cholera in the same way as those who were vaccinated. Their choice not to be vaccinated was
12 described in terms of active decision making driven by reasons such as preference for drinking alcohol,
13 preference for traditional medicine, distrust in the authenticity of the vaccines, and witnessing
14 adverse reactions among those who had been vaccinated.

15 Both alcohol and traditional medicines were described as part of wider plan of resilience which had
16 served people well thus far. One man described alcohol as one of the factors contributing to his
17 personal invincibility as a soldier who had survived South Sudan’s cycles of war dating back to 1956.
18 Another man described the vaccine as being at odds with his preferred approach of using traditional
19 medicine. But this preference was entangled with the issue of unreliable access to modern medicines
20 such as vaccines:

21 *“I use traditional medicine because sometimes you can go to where there is no medicine. When*
22 *I was in the village, I use neem and other traditional trees that are very bitter and sour....God*
23 *works on his own way. I acquainted myself [with] avoiding these modern medicines. That is*
24 *why I did not take that vaccination.” (R33), 0 doses*

1 Those refusing OCV also cited issues of distrust as a reason. In this instance, lack of trust in the
2 authenticity of the vaccine came to the fore. Although the connection was not always explicit,
3 statements about distrust often accompanied references to national institutions, which were
4 commonly seen by PoC residents as persecutory:

5 *“Yes because the drug they give are photocopies [fake]. If they are good medicines which*
6 *prevent or cure disease, I could go but some of medicine are fake so I like to die without getting*
7 *that medicine... Let me die here from cholera and HIV/AIDS....Why should I look for vaccination*
8 *that contaminated people?”(R35), 0 dose*

9 For those who were partially vaccinated, the physical characteristics of OCV, smell and taste were
10 reported as the reasons for hesitancy. However, additional social influences such as witnessing or
11 hearing others talk about adverse reactions was sufficient to lead to vaccine refusal for one
12 participant. Furthermore, it was not clear the extent to which some of these side effects might have
13 been perceived as contracting cholera after being vaccinated. This perception led one man to
14 question the value of the vaccine altogether.

15 *“Yes I have seen that the vaccine helps nothing because even those who took it got cholera.*
16 *Then why I have to take it? I just [have] to protect myself by following the instructions [for]*
17 *prevention.”(R40), 0 dose*

18 *Future of OCV and cholera control*

19 Half of respondents had further questions about OCV. Their questions touched on specific facts about
20 the vaccine, such as its composition and duration of protection, and the possibility of further
21 vaccination campaigns for future cholera outbreaks. When asked about the possibility of future
22 outbreaks, most said this was possible. They put responsibility for prevention on UN and NGOs
23 working in the PoCs.

24 **3. Discussion and Conclusion**

1 This study identified several reasons influencing full, partial and non-acceptance of OCV in a
2 humanitarian crisis. The high level of acceptance of OCVs in this context can be attributed in part to
3 perceptions of cholera as a severe disease evoking fear and perceptions of PoCs as places of increased
4 risk of cholera. Perceptions of cholera risk extended beyond the domain of health to incorporate
5 contextual circumstances of the political crisis which led to displacement into PoCs. In the context of
6 ethnic conflict, explanations of cholera and cholera vaccine uptake drew upon a broader social and
7 political narrative which constructed international organizations such as the United Nations and NGOs
8 as protective intermediaries between the PoC populations and the government which many camp
9 residents feared. Within this narrative, there was a high level of confidence in the OCV campaign and
10 it was credited with the prevention of cholera outbreaks in both PoCs by residents.

11 This confidence in and acceptance of OCV was not uniform, however. Some reasons for partial and
12 non-acceptance of OCV such as lack of time and fear of side effects were consistent with reasons
13 found in other settings and with reasons captured in WHO's vaccine coverage survey data from the
14 PoCs (5-7). These reasons are increasingly important aspects of research on vaccination uptake as
15 public perceptions have led to declines in rates of routine vaccination, and to barriers to the
16 introduction of new vaccinations (9, 10).

17 Trust in international organizations was an important aspect of vaccination decision-making in the
18 Juba PoCs. A recent global review of attitudes towards vaccination found that mistrust in institutions
19 often underpins the most common reasons for vaccine hesitancy (11). The nature of institutional trust
20 in this context may be construed slightly differently however, since it worked in two directions—as a
21 reason for hesitancy if the recommendations were perceived as coming from the government and a
22 reason for acceptance if they were coming from the UN and NGOs.

23 Alcohol consumption also recurred as a reason for partial and non-acceptance of OCV among men in
24 the study. Fear of illness from combining the vaccine with alcohol and the perception of alcohol as a
25 means for personal resilience affected decisions. The problem of alcohol abuse in conflict affected

1 populations warrants further study since it relates to behaviours that lead to greater risk of cholera
2 and as a potential contributor to lower rates of vaccination among men (5, 6, 12).

3 Although most respondents described the decision to be vaccinated as an autonomous choice, social
4 influences also appear to have played a role in overcoming hesitancy in relation to distrust and
5 witnessing side-effects, and it was striking that most respondents reported recommending others to
6 be vaccinated. Further research should explore how to capitalise on social influence in this context.

7 **Conclusion**

8 Although reasons for full, partial and non-acceptance of OCV among respondent POC populations in
9 Juba largely mirrored the reasons for non-acceptance in non-crisis settings, some context-specific
10 socio-political nuances also emerged in this setting affected by ethnic violence. Heightened fears of
11 disease and political danger contributed to camp residents' perception of cholera as a serious illness
12 and increased trust in those providing the vaccine. These were significant reasons for high (estimated
13 85%) acceptance of the OCV campaign in PoCs in Juba. These findings indicate the importance of
14 monitoring and taking into account target population perceptions of service providers in planning the
15 delivery of OCV interventions in humanitarian crises. Future OCV campaigns in crisis settings might
16 also benefit from greater coverage by taking the role of alcohol into account and incorporating
17 strategies to specifically target alcohol users in this target population. As in other settings, OCV
18 campaigns in humanitarian contexts should not neglect the importance of communicating information
19 about the vaccine dosage, expectations of side effects and interaction with other medication and
20 alcohol consumption.

21 There are two main limitations of this study. The first is the length of time between the vaccination
22 campaign and the conduct of interviews was approximately four months. The potential impact of this
23 time delay with regards to respondents' recall is not known. However, it is plausible that a degree of
24 recall bias existed, with participants who were not vaccinated being more likely to recall negative
25 perceptions or discussions about the vaccine than those who were vaccinated. The second limitation

1 of this study are the limitations in generalizability. As a qualitative study, sampling was purposive and
2 not designed to be statistically representative. Further studies using statistically representative and
3 standardized sampling methods or more qualitative studies in different contexts are recommended
4 for purposes of generalizability.

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16 *Author Contributions:* DP led the study. JP, GJR, HL contributed to conceptualization of study and
17 tools development. AA, AC, SM and WP contributed to data collection. JP contributed to analysis of
18 results. All authors contributed to the preparation of the manuscript.

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2 **Table A: Vaccination Status of Study Respondents**

		Tong Ping PoC	UN House PoC	Total
Study Respondents	Fully vaccinated	(8 males; 5 females)	(4 males; 2 females)	19
	Partially vaccinated	(3 males; 4 females)	(5 males; 6 females)	18
	Not vaccinated	(4 males; 1 female)	(5 males; 2 females)	12
	Totals	25	24	49

3