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Beliefs and practices of Somali citizens concerning malaria

Findings from interactive radio programmes aired in September 2016

A report by Africa's Voices Foundation for UNICEF Somalia, June 2017



Acronyms used in this report:

- **AVF** Africa's Voices Foundation
- **C4D** Communications for Development
- **FM** Frequency Modulation
- **IDP** Internally Displaced Person
- **MICS** Multiple Indicator Cluster Survey
- **NEZ** North East Zone
- **NWZ** North West Zone
- **OR** Odds Ratio
- **PESS** Population Estimate Survey of Somalia
- **SCZ** South-Central Zone
- **SMS** Short Message Service
- **UNFPA** United Nations Population Fund
- **UNGASS** Special Session of the United Nations General Assembly
- **UNICEF** The United Nations Children's Fund

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Front cover: A woman sells merchandise at an Internally Displaced Persons camp in Doolow, Gedo region, Somalia. UN Photo / Ilyas Ahmed

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Beliefs and practices of Somali citizens concerning malaria

Findings from Africa's Voices Foundation's interactive radio programmes aired on 2nd and 9th of September 2016 for UNICEF Somalia

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EXECUTIVE SUMMARY

In September 2016, Africa's Voices Foundation deployed a communication for development (C4D) and social research intervention for UNICEF Somalia. Using interactive radio, we gathered insights into Somali peoples' beliefs and practices.

Two radio shows focused on malaria and were designed to elicit audience feedback via SMS to the following research question: What are the health beliefs and demographics associated with appropriate prevention and treatment practices around malaria?

In partnership with Hargeisa-based MediaINK, the radio shows were broadcast on 26 FM radio stations across Somalia, with a combined range estimated to cover 70% of the Somali population.

A total of 6,335 people participated in the two shows by sending free text messages. 46% of the participants were women. 10,976 messages were received that could be used for in-depth multidisciplinary analysis.

The resulting insights and recommendations are aimed at informing UNICEF Somalia to deliver more impactful behaviour change campaigning around malaria prevention and treatment.

This report also reflect on the suitability and efficacy of AVF's methods as a:

- culturally-sensitive, flexible, and time-sensitive approach to social research
- complementary C4D intervention with in-built feedback and evidence gathering tools
- remote monitoring and evaluation tool.

Our main findings include:

1. Radio participants hold a number of misconceptions on what works as an effective form of malaria prevention and what does not. This included the misconception that malaria could be prevented by vaccination/injection, antibiotics, or other medication (excluding antimalarials). These beliefs are more prevalent in large urban centres (than in rural areas) where the public is exposed to multiple sources of information, with possibly contradictory messages, reducing the efficacy of communications from medical professionals.

2. A misconception circulating in radio discussions was the belief that hygiene and sanitation practices are effective at preventing malaria. Whilst hygiene behaviours can prevent certain diseases, they do not offer protection against vector-borne diseases such as malaria. Health C4D messaging needs to form clear and distinct links between the causes of specific diseases and how they can be individually prevented. Otherwise the perceived risk of diseases such as malaria may be reduced, potentially leading to increased prevalence.

3. Participants who believed that mosquito nets are an effective way to prevent malaria, are slightly more likely to put their children to sleep under mosquito nets. The odds of parents putting their children to sleep under a mosquito net are 40% higher for those who perceive the effectiveness of nets than those who do not. Put differently, 24.1% of parents who participated and cited mosquito nets as an effective way to prevent malaria, did not use a mosquito net to protect their

children. Despite believing that mosquito nets are effective, many still choose not to use them. Reasons given include that there are no mosquitoes where the participants live, that they do not have a mosquito net, or that they are not able to afford one. Further research is required to identify the barriers to using mosquito nets among different groups in Somalia.

4. C4D programmes and initiatives should provide clear and accurate information on what works to prevent and treat malaria. Specifically, communications around immunisation should clarify that only some diseases are covered by specific vaccinations and emphasise which diseases these are. If people do not have a clear understanding of which diseases they are protected against, they

may have a lower perceived risk of diseases for which immunisation is not an effective prevention. This should be borne in mind for communications campaigns as well as during immunisation interventions to avoid spreading misconceptions.

5. Interactive radio can be a powerful research and evidence-driven C4D tool for shaping health seeking-behaviour concerning malaria. Our interactive radio shows were a successful format for sparking inclusive discussion at scale around malaria in Somalia.

This method could be expanded to meet other programmatic needs, gathering much needed social data on topics relevant to UNICEF Somalia's programmes.



Radio station in Mogadishu, Somalia. AU-UN IST, TOBIN JONES

1. INTRODUCTION

1.1. Context: Malaria in Somalia

Malaria prevalence is low in Somalia, but continues to account for 3% of post-neonatal under-five deaths. 90% of infections occur in South Central Zone (SCZ)¹.

UNICEF and other partners are working to cut prevalence by half in southern and central Somalia, and to reduce prevalence to near-zero in areas of historically low transmission (such as parts of Somaliland).

A key step towards achieving this goal is universal uptake and proper usage of Long Lasting Insecticidal Nets (LLIN) in SCZ and malaria epidemic-prone areas of Puntland and Somaliland.²

Despite mass LLIN distribution campaigns, the percentage of households with a mosquito net of any kind remains low nationally, at 27.1%³. This leaves many children at risk of being infected with malaria and vulnerable to its potentially life-threatening symptoms.

Behavioural change interventions are an essential part of ensuring universal LLIN uptake. Firstly, this is because nets are often acquired by citizens, through their own agency, at health clinics or private shops, rather than through national distribution campaigns that have a limited reach.

Secondly, LLINs are only effective at reducing

malaria prevalence if they are actively used on a nightly basis and in an appropriate manner.⁴

How caregivers respond to a child with malaria symptoms is a related issue that can put children at risk. A survey in Central South Zone (2015) found that only 28% of citizens sought advice from a health facility or provider when their child showed signs of a fever.⁵

Effective behavioural change interventions and Communications for Development (C4D) programming have the potential to help increase LLIN uptake and ensure that appropriate malaria treatment is sought.

Existing literature shows that behaviour change interventions are more effective when they:

1. stem from theories that address change at individual, interpersonal, and community levels⁶;
2. are adapted to the sociocultural context⁷ with a clear understanding of the target audience;⁸
3. involve the community in the planning, implementation, and ownership of interventions.⁹

Therefore, it is necessary to have a granular understanding of the target beneficiaries' beliefs, opinions, practices, and barriers to adoption of certain behaviours, as well as how these vary between different groups in the population.

1. WHO, Somalia: Neonatal and Child Health Profile (2014)
 2. Somalia National Strategic Plan for malaria 2011-2015 (2010)
 3. The First malaria Indicator Survey in Somalia (2016)
 4. The First malaria Indicator Survey in Somalia (2016)
 5. WHO, Baseline Survey in Central South Zone (2015)
 6. Aboud, F.E and Singla, D.R. (2012). "Challenges to changing health behaviours in developing countries: A critical overview." Social Science and Medicine. 75: 589-594
 7. Campbell, C. (2003). 'Letting them die': Why HIV/AIDS

programmes fail. Oxford: James Currey.
 8. Joffe, H. Bettega, N. (2003). Social representations of AIDS among Zambian adolescents. Journal of Health Psychology, 8(5): 616-31.
 9. Cornish, F., Priego-Hernandez, J., Campbell, C., Mburu, G., McLean, S. (2014). The impact of community mobilisation on HIV prevention in middle and low income countries: A systematic review and critique. Aids and Behaviour, 18(11): 2110-34.

However, because of limited infrastructure and areas of political insecurity in Somalia, traditional, on-the-ground qualitative research to explore the diverse beliefs and practices of Somali citizens is difficult to undertake and costly to reproduce at scale.

1.2. Africa's Voices Approach

Africa's Voices Foundation (AVF) has a growing track record of overcoming such obstacles. We leverage the popularity of interactive radio in Somalia and the ubiquity of mobile phones to reach wide sections of society while addressing evidence and data gaps.

AVF shapes inclusive discussions through radio broadcasts to which audiences contribute their opinions via SMS. Combined with follow-up SMS

questions on health practices and demographic information, these messages create a large dataset on people's beliefs, opinions, and practices.

Using our unique multi-disciplinary analysis of this local language dataset, we are then able to provide rich insights and evidence that meet our partners' data and knowledge needs, thereby informing their programmes to be more effective and impactful.

Since 2015, AVF has partnered with UNICEF Somalia to generate insights into a range of issues using interactive radio as a research tool. This report refers to two radio shows on malaria, which were part of an 8-week series of interactive radio shows broadcast from July to September, 2016.



2. METHOD

2.1. Research design

AVF worked with the Malaria Team at UNICEF Somalia to devise the following research question:

What are the health beliefs and demographics associated with appropriate prevention and treatment practices around malaria?

To answer this, we employed an ex-post facto design to identify health beliefs that were associated with different groups based on health practices. Subsequently, we developed the following questions to be asked to radio audiences via two radio broadcasts and follow-up SMS questionnaires. The below SMS questions were posed after we asked for socio-demographics by SMS (including gender, age, location and parent-status):

Questions posed to radio audience	
Radio Question to gather data on beliefs	SMS Question to gather data on practices - asked to parents only
Show 1: What do you think is the best way to prevent children from being infected with malaria?	SMS Q1a: Do your children sleep under a mosquito net each night? <i>[If answered 'no' to Q1a]</i> SMS Q1b: Why don't your children sleep under a mosquito net each night?
Show 2: What do you think is the best way to treat children who are infected with malaria?	SMS Q2. What do you do when your child has a fever?

10. Sudman, S., Bradburn, N. M., & Schwarz, N. (1996). Thinking about answers: The application of cognitive processes to survey methodology. San Francisco, CA: Jossey-Bass.

11. Lopes, C. and Srinivasan, S. (2014). Africa's Voices: Using

'The radio questions were open-ended and designed to elicit responses through which audience members could express their beliefs, while the SMS questions were geared towards gathering insight into individual practices. The radio questions were designed with attention to socio-cognitive theories that consider how questions are processed and, in turn, answered by audiences.¹⁰ To ensure wide comprehension and tailoring to the cultural context¹¹, specific wordings were decided together with the MediaINK team, AVF's media partner in Somalia.

2.2. Data collection: Radio & SMS

In partnership with MediaINK, AVF deployed interactive radio programmes across a network of 26 FM radio stations covering all three zones of Somalia. Our own estimates put this range to be 49% of Somali territory, and 70% of the population (see circles indicating radio broadcast coverage, fig.1, right). The use of radio and mobile phone technology in tandem allows for the gathering of digital data uninhibited by poor infrastructure and insecurity.

Ahead of the malaria-related radio shows, the radio questions were broadcast in short promos, along with a toll-free SMS shortcode, on all of the radio stations from Sunday 28th August until Saturday 10th September, 2016.

Some of these initial audience responses were incorporated into two 30-minute radio shows that were broadcast on Friday 2nd September and Friday 9th September and encouraged further participation from audiences.

mobile phones and radio to foster mediated public discussion and gather public opinions in Africa. Centre of Governance and Human Rights, Working Paper 9. Cambridge: University of Cambridge.

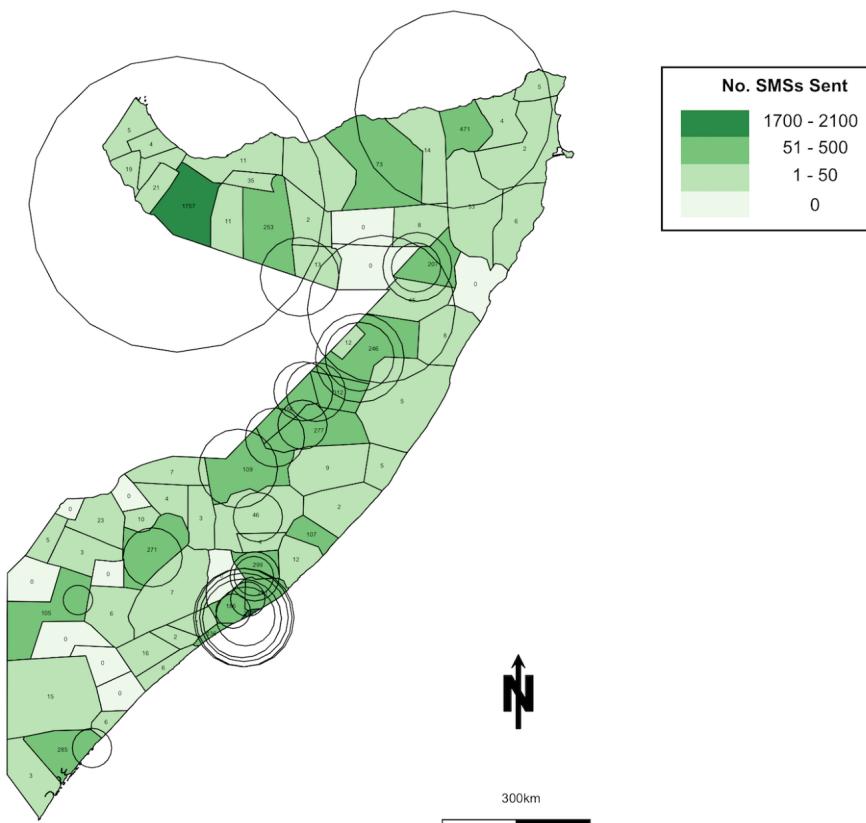


FIGURE 1: Radio coverage (circles) and SMS responses, 8-week show season, July-September 2016

To those who participated, AVF sent follow-up SMS questions using UNICEF's RapidPro platform, which allows for two-way SMS communication. These asked for demographic information (e.g., age, gender, and district) and their health practices (e.g., Do your children sleep under a mosquito net each night?). All SMS sent and received were free to participants.

2.3. Overview of data analysis

AVF uses a mixed method approach combining semantic networks, grounded theory, thematic analysis and machine learning. This allows us to gain insights from local language data and on a scale otherwise difficult for qualitative methods.

The raw audience data first undergoes

pre-processing to remove noise and non-relevant messages as well as to structure the data for analysis. Once the dataset is prepared for analysis, a thematic analysis is undertaken to discover and organise beliefs expressed in the messages, resulting in a coding frame that is applied to the data with manual and automatic techniques.

The resulting dataset consists of text messages labelled with one or more themes, which is then analysed for associations with geographical and socio-demographic groups and health practices. Insights are complemented with further qualitative interrogation, and illustrated by a selection of translated text messages.

The insights that follow reflect the social reality of radio discussions and their participants. When the group of participants is heterogeneous and inclusive, it allows us to capture sets of beliefs that are prevalent in different groups. Contrary to surveys, this approach gathers opinions in cultural contexts and through a conversational mode, which is more aligned to the socio-cognitive processes that generate and shape these opinions.

2.4. Limits of the approach

Our theoretical framework assumes that the relationship between beliefs and behaviour is bi-directional.¹² Because there was neither manipulation of causes nor random assignment

of participants into groups, it is not possible to isolate beliefs as the causes of behaviour.

The coverage error¹³ -- the difference between the target population (Somali population) and the accessible population (listeners of radio shows) – is substantial due to the fact that roughly 30% of the Somali population lives in a geographical area not reached by the radio shows. Among those reached, a limited group listened to the show depending on their media habits, availability, and interest in the topic. The participants are self-selected and are therefore non-representative of the population of listeners of the radio shows. Factors related to access to mobile phones, literacy, gender roles, and dynamics of participation influence participation.¹⁴

These methodological limitations restrict the external validity of results (generalisation to the population of Somalia) based on prevalence of health beliefs and practices in the group of participants. Nonetheless, considering that selection bias affects associations (e.g., odds ratio) to a lesser extent -- particularly when the data gathering process is inclusive¹⁵, the distributions of key variables in the analysis are not skewed¹⁶ and sample size is large enough ($n>1000$)¹⁷ -- the robustness of the main findings in this report is not threatened by the lack of representativeness of participants.

12. Joffe, H. (2002). Social Representations and Health Psychology. *Social Science Information*, 41(4), 559-580.

13. Groves, R. M., Fowler, F. J., Couper, M. P., (2009). *Survey Methodology*. New Jersey: John Wiley and Sons.

14. Srinivasan, S., and Lopes, C. (2016). Africa's Voices Versus Big Data? The Value of Citizen Engagement through Interactive Radio. In Oscar Hemer, Thomas Tufte (eds.), *Voice & Matter: Communication, Development and the Cultural Return* (pp.157-171), Publisher: NORDICOM.

15. Inclusiveness is enhanced by reading messages from all strata of population during the show, giving particular relevance to

Therefore, the insights about collective beliefs and social norms contained in this report can be used for UNICEF programming decisions that involve groups of the population that share the same social, demographic, and geographical characteristics/identities with participants of the radio shows.

Finally, a note on the challenge of parsing and analysing Somali text-based data, which has extended the timeframe for delivery of this report. Somali is a low-resource language (a language for which existing tools and assets for computational and automated analysis are very limited) and much of the data that this and other AVF reports are based on is rich in detail and contextual nuance.

Since beginning its work with UNICEF Somalia, AVF has been building its tools for textual analysis from scratch. This has required extensive and on-going verification of data quality to ensure high levels of confidence in our findings.

Although this process is time-consuming, one key outcome of this effort is the package of more robust, tested and customised set of language tools and resources for analysing Somali language data. This provides us with a unique opportunity to replicate and scale up the research, in a more efficient and timely way, for UNICEF and others working in Somalia.

messages from women, nomads, and those living in rural communities.

16. Deviations of the distribution of main demographic variables to the Somali population are tested, but certain characteristic of the listeners may simultaneously influence participation and opinions, for example, having experience with the disease discussed in the show.

17. Nemes, S., Jonasson, J., Genell, A., Steineck, G. (2009). Bias in odds ratios by logistic regression modelling and sample size. *BMC Medical Research Methodology*, 9, 56.

3. RESULTS

3.1. Participants

6,335 people participated sending over **10,976** text messages that could be used for analysis. Via follow-up SMS questions, we gathered the following socio-demographics:

- 45.8% of the participants were female (*response rate of 52%*)
- 4.5% were nomads (*response rate of 18%*)
- 50.4% came from major urban centres (Mogadishu, Hargeisa, Bossaso and Garowe) (*response rate of 52.7%*)
- 60.7% of the participants were parents (*response rate of 55%*)

Participants came from all age groups (*response rate of 37.2%*):¹⁸

- 37.0% of participants were 15-19 years
- 43.1% were 20-29 years
- 12.6% were 30-39 years
- 7.2% were aged over 40 years.

There is a strong association between gender and age. As Fig. 4. shows women who responded were generally younger than men ($\chi^2 = 13.18$, p-value < 0.015), and they were over represented in the 15-19 age group.

Please note, the categories of gender, location and age, along with IDP, are considered mutually exclusive in order to reflect the categorization in UNFPA, Population Estimation Survey for the 18 pre-war regions of Somalia, 2014. All population Figures are based on the Population Estimate Survey of Somalia (PESS).¹⁹

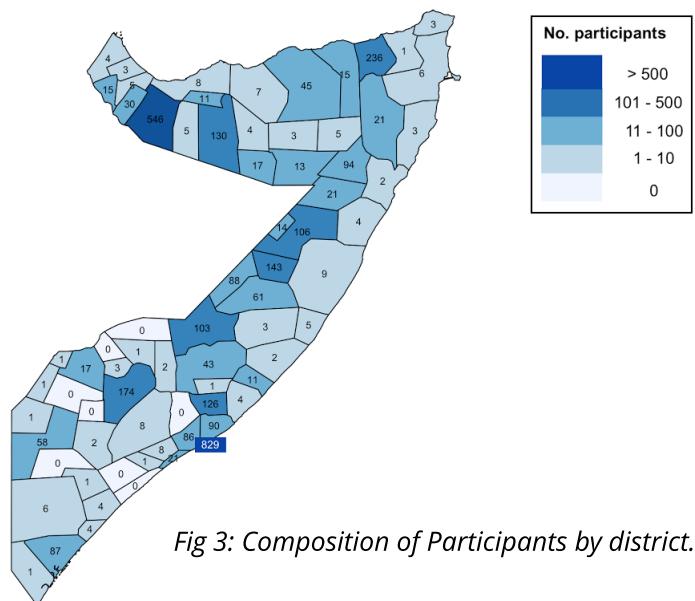


Fig 3: Composition of Participants by district.



● Female ● Male

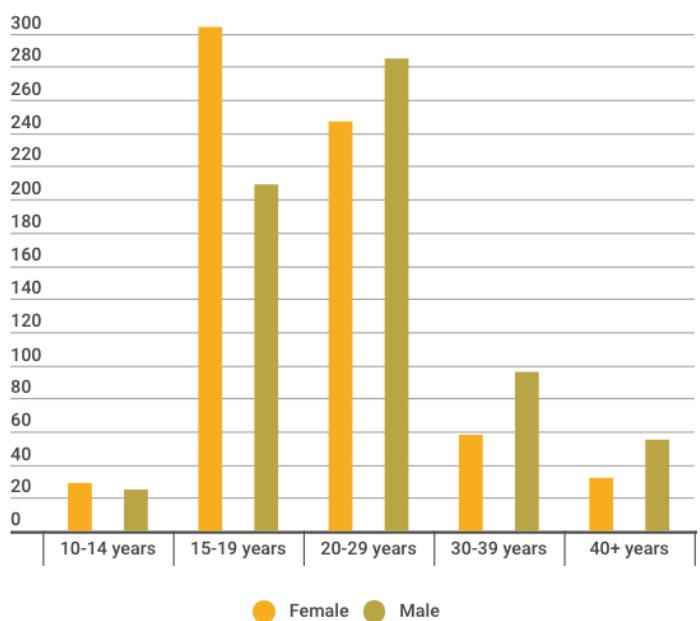


Fig 4: Age distribution of participants in the radio shows by gender (n=6335).

18. As we excluded anybody under 10 from the analysis, so the youngest participant was 10 years old and the oldest one was 89

19. All population figures taken from: UNFPA, Population

Estimation Survey for the 18 Pre-War Regions of Somalia, 2014.

3.2 . Beliefs and practices

Beliefs

Our analysis specifically on beliefs included a total of 2605 text messages.²⁰ First, we carried out a thematic analysis of the responses. Based on this, we developed coding frames that categorised beliefs into themes and sub-themes (see tables 1-4). The coding frames were then used to label the most frequent codes across the entire dataset.

Radio question 1: What do you think is the best way to prevent children from being infected with malaria?. For the first radio question, using a mosquito net was given as the most frequent response. This was followed by beliefs in inappropriate medical interventions such as relying on vaccination/injection, antibiotics, or the use of coartem (medication) to prevent malaria (fig. 5).

Radio question 2: What do you think is the best way to treat children who are infected with malaria?. Conversely, for the second radio question the most common beliefs about the treatment of malaria were using health services, followed by a only a few responses which referenced food or drink as a form of treatment (fig. 6).

Practices

SMS question 1: Do your children sleep under a mosquito net each night? A total of 964 participants responded to the first SMS question (*response rate of 20.9%*). Out of these, 616 (63.9%) of parents responded positively.

Fig. 7 shows the frequencies in the positive response to using mosquito nets, grouped by geographical and socio-demographic characteristics.

To those who responded negatively, we asked via SMS: **Why don't your children sleep under a mosquito net each night?**. Out of 187 respondents, the two most frequent reasons given were that they did not have a mosquito net (56 participants) and that there were no mosquitoes where they lived (51 participants). Other answers included: a lack of money to buy a net (40 participants), do not like using a net or do not know about them (25 participants), weather conditions (hot/cold/dry/windy) (7 participants), and that they use mosquito deterrents instead (e.g. insecticide spray, mosquito coil) (7 participants).

SMS question 2: What do you do when your child has a fever? 672 participants responded to the second SMS question (*response rate of 15.2%*). Out of these: giving medicine was mentioned 119 times, visiting the health facility was mentioned 106 times, cooling the child with a wet cloth was mentioned 31 times, traditional medicine was mentioned 14 times, and prayer 11 times (see fig. 8). There were overlaps between categories where the participants responded with more than one type of treatment. These included a number of participants who recommended visiting a health facility together with herbal treatment and/or camel milk, visiting a health facility together with prayer, and visiting a health facility together with cooling the child with a wet cloth.

20. Relevant messages were extracted after excluding messages that were considered noise and messages that

were considered non-relevant to the specific questions asked.

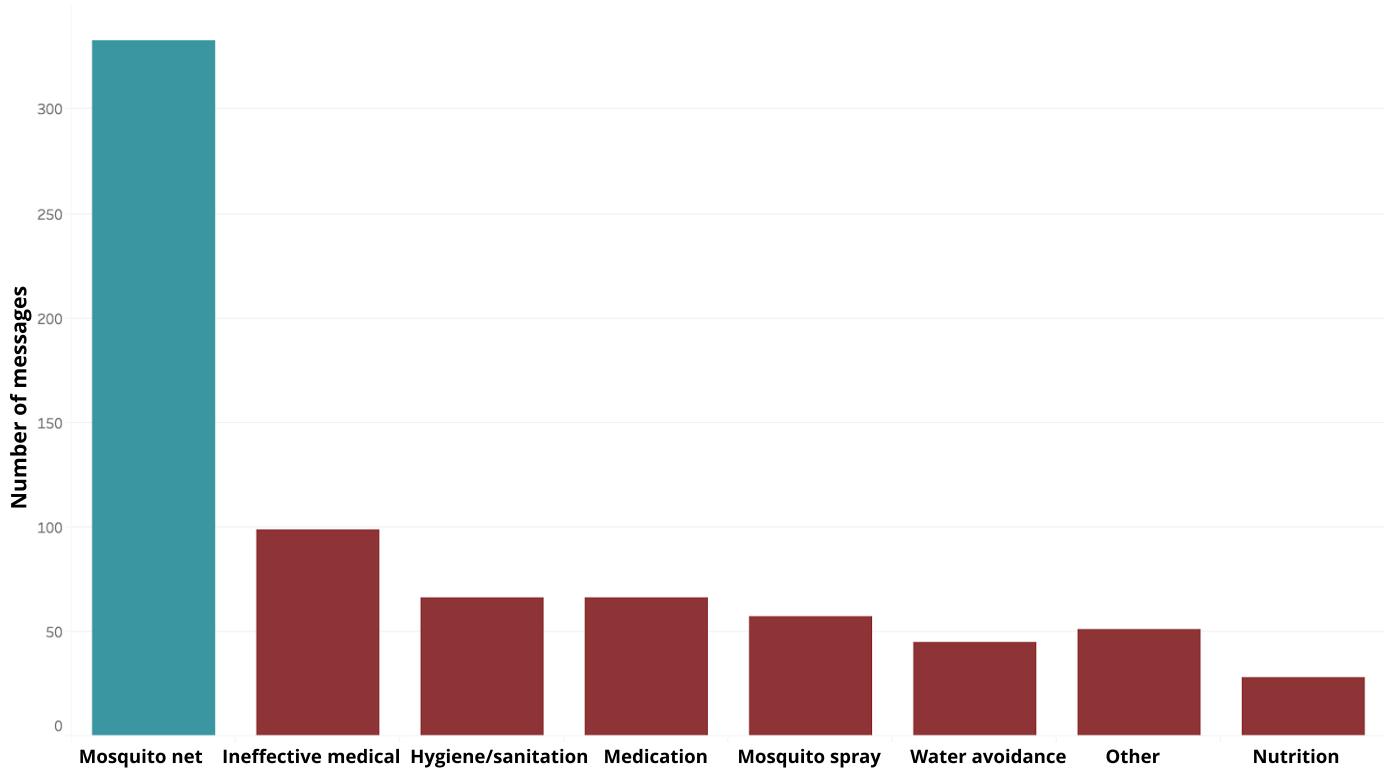


Fig 5: Frequency of the most common beliefs concerning malaria prevention in the messages analysed (n=2605)

PREVENTION OF MALARIA

Table 1: Coding frame for beliefs related to appropriate methods for preventing malaria

Malaria can be prevented	Includes
Mosquito net	Treated mosquito net

Table 2: Coding frame for beliefs related to inappropriate methods for preventing malaria

Malaria can be prevented	Includes
Avoidance of water	House water, Wet areas, Stagnant water outside, River banks, Prevent rain water accumulating.
Cleanliness/ hygiene/ sanitation	General cleanliness, of children, the community, the house, water, of drains,. Putting chlorine in water
Nutrition	Avoid bacteria in food, Nutritious meals, Detox stomach, (Fresh) camel milk
Ineffective medical interventions	Vaccination/ injection, Antibiotics, Coartem
Medication	Anti-malaria medication· <i>Whilst the use of anti-malaria medication is indeed an effective way to prevent malaria, we have included it the coding frame here for "inappropriate" methods. This is because they are not widely distributed in Somalia.</i>
Other	Cut down tree/grass, seek information

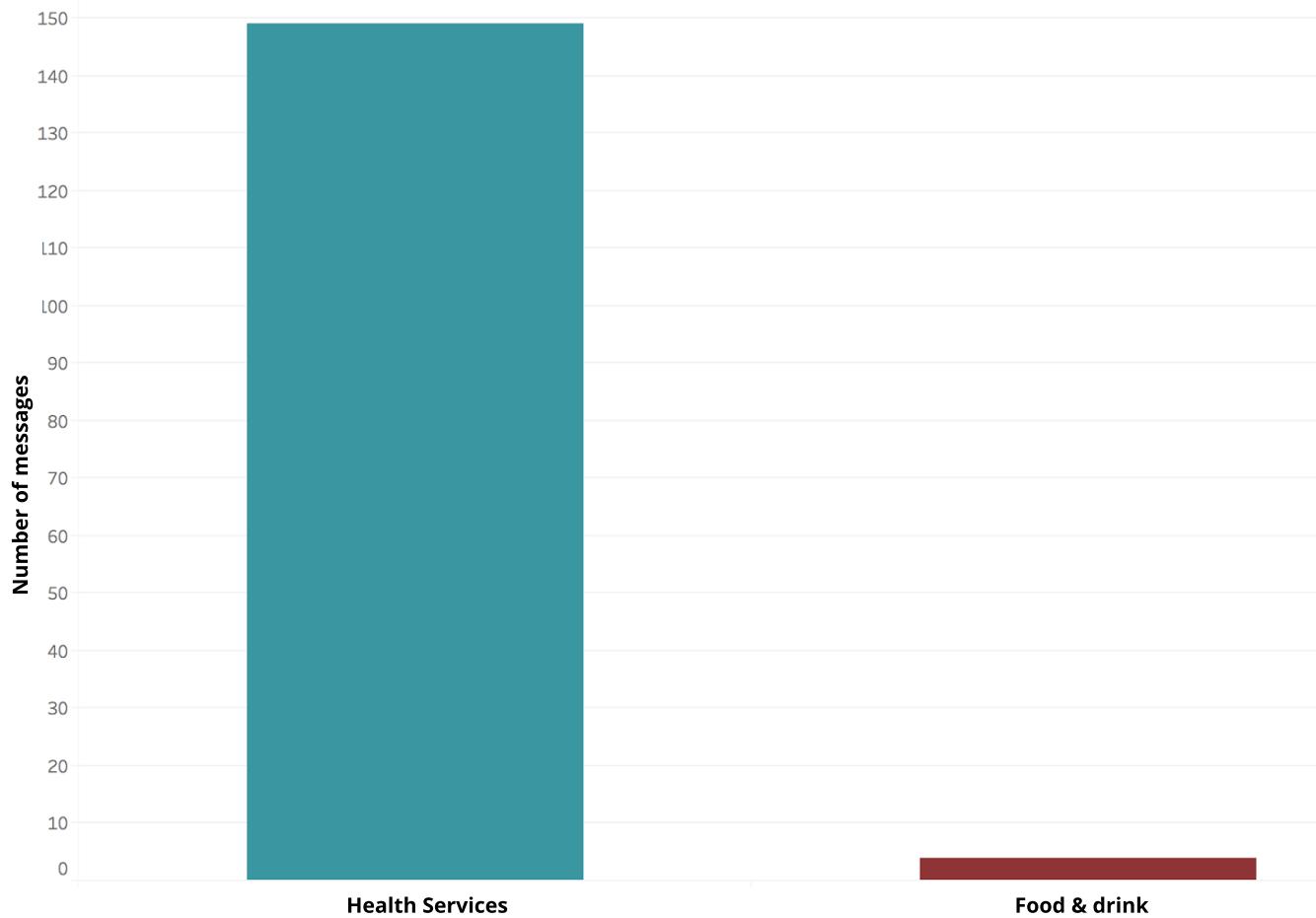


Fig 6: Frequency of the most common beliefs about malaria treatment (n=2605).

TREATMENT OF MALARIA	
Table 3: Coding frame for beliefs related to appropriate methods for treating malaria	
Malaria can be treated through	Includes
Health Services	Consult doctor/ pediatrician, Contact/visit medical centre, Take "right" medication, Medication given by professionals, Specific medication (Anti-malarials, injection, pills), Syrup, Examine (Including take blood)
Table 4: Coding frame for beliefs related to inappropriate methods for treating malaria	
Malaria can be treated through	Includes
Food/drink	Nutritious meals, Avoid foods that affect liver, Detox/ cleanse, Drink/ hydrate, Lemon juice, Breast milk, Clean milk, (Fresh) camel milk (including ghee)
Religion	Consult/use Koran, prayer
Herbal	Use herbal plants (including 'geed mirmir')
Other	Reduce fever, Seek information

Fig 7: Sociodemographic distribution of answers to SMS question 1a: 'Do your children sleep under a mosquito net?'(right)

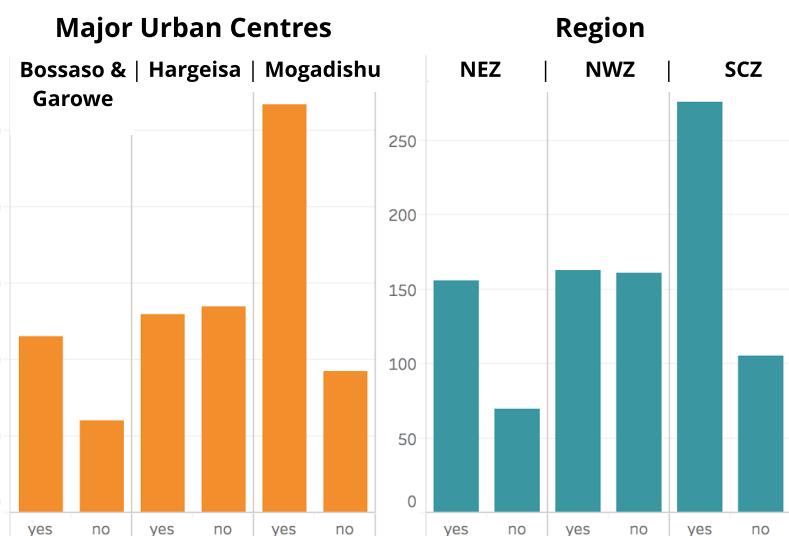
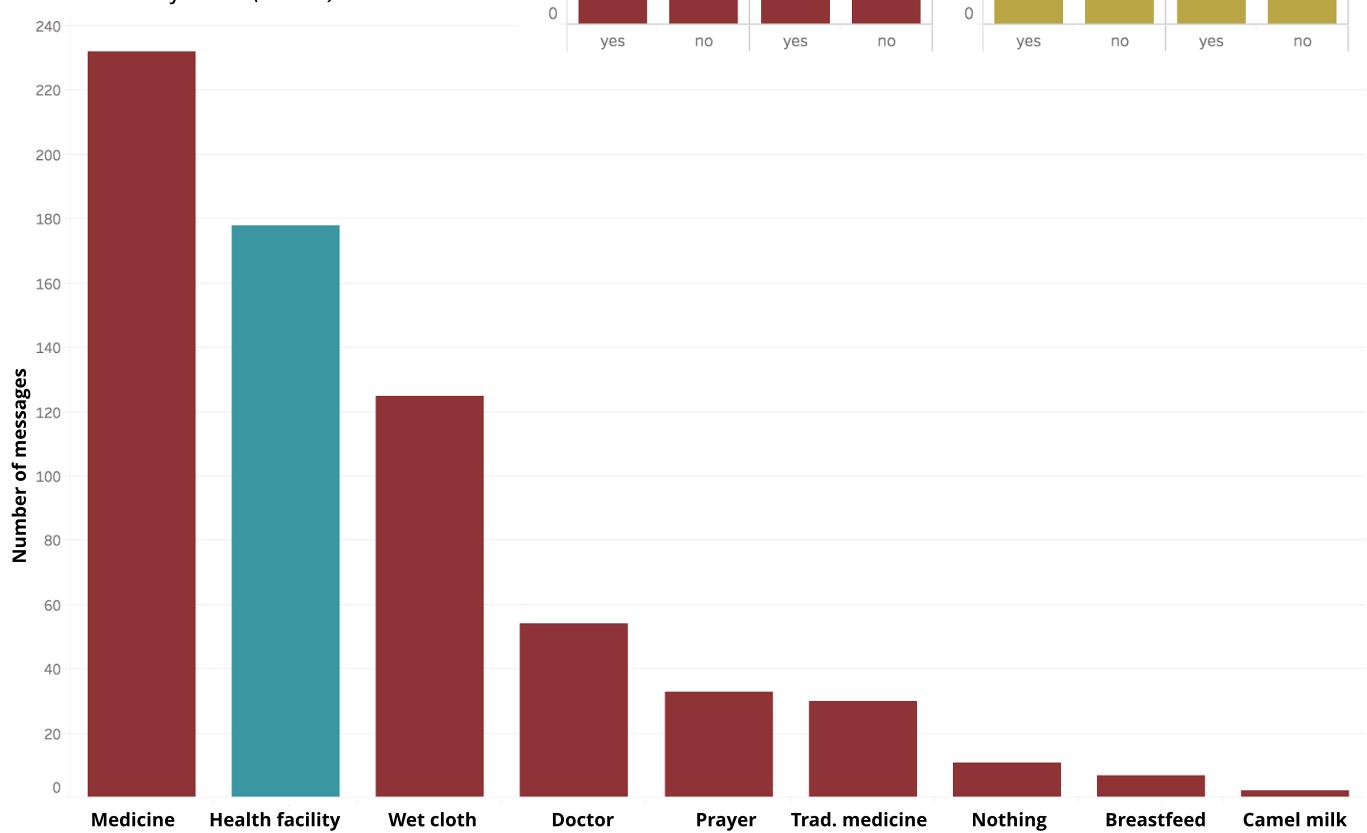


Fig 8: Distribution of answers to the question 'What do you do when your child has a fever?' (below)



We present below a “thick description”²¹ of the beliefs expressed in the messages. For this purpose, we divided the beliefs into two categories on which we carried out a qualitative analysis to capture nuances expressed in them:

- (a) beliefs related to appropriate methods for preventing and treating malaria; and
- (b) beliefs related to inappropriate methods for preventing and treating malaria.

A. Beliefs related to appropriate methods for preventing and treating malaria

Many of the responses correctly identified the use of mosquito nets as the most effective form of malaria prevention. The responses also often combined the use of mosquito nets with other medical practices such as giving children medication.

“It can be prevented by properly giving the child malaria medicine, and to cover them with mosquito net so they are not bitten by mosquitoes.”

- Female, Mogadishu, 17

“The best way to prevent malaria is giving the child preventive [medicines] and medicines, and to cover them with mosquito net.”

- Female, Baidoa, 17

Other voices also argued that the use of mosquito nets, in conjunction with other non-medical practices, were also effective for malaria prevention. This included getting rid of wet areas, cutting grass and small shrubs and

spraying the house with mosquito spray.

“One can prevent malaria by covering mosquito net on the children, and cleaning the sites where water settles, such as gutters, to cut small trees such as grass.”

- Female, Bosasso, 23

“It [malaria] can be prevented by using mosquito nets, [and] to cut down the plants that grow near homes”

- Female, Gebiley

“It is responsible to do 1) to be aware of the hygiene/cleanliness of the house, 2) to release all water that settles, 3) cover children with mosquito net, 4) to spray places where mosquitoes are suspected of breeding, 5) if children are suspected of malaria, to take them to the health facility immediately.”

- Female, Hargeisa

In regards to treatment of fever many voices accurately stressed the importance of taking children to health facilities as well as consulting doctors to test for malaria.

*“It is best to take to the health facility when a fever is felt, without giving any medications. Test him/her from the eyes.”*²²

- Female, Cadaado.

“When the laboratories test and find malaria in the child, the doctor must prescribe malaria medications to the sick child, and must be given according to the prescription. If anything else is felt on the child, he/she must be returned to the doctor that prescribed the medicine. It is dangerous if he/she is taken to new health facility everyday.”

- Male, Bossaso, 37

21. Thick descriptions of human behavior is used to not just explain behaviour but also its broader context, aimed at making it meaningful to an outsider (see See Geertz, C. (1973). The Interpretation of Cultures. New York: Basic Books)

22. In the Somali language, to “test someone from the eyes” is to roughly evaluate how severe their illness is just by looking at their eyes.



A mother speaks with her daughter while standing in the shade on the outskirts of Mogadishu, Somalia, UN Photo/Tobin Jones

B. Beliefs related to inappropriate methods for preventing and treating malaria

Inaccurate beliefs about the prevention of malaria were also varied. Many of the misconceptions were related to inaccurate types of medical treatment, including using alternative medication or administering medicine that is not considered effective for malaria prevention (including herbal medication, antibiotics, and chlorine).

Other voices emphasised the importance of proper nutrition, and adequate hygiene as effective ways to prevent malaria.

"I think that the best way to prevent malaria is by adding oil to places where water settles, you and the children have to cover with mosquito net, in the term that is known to you, you have to vaccinate the children to prevent malaria. Second of all, if a mosquito bites you, you have to shower instantly or wash the place

that it bit you....you have to work hard on hygiene and dry wet places."

- Belet Weyne, 13

"...most of the time, children get diseases due to the lack of hygiene, because dirt can bring them a disease, and it's even worse at the time when [children] are crawling. Therefore, hygiene is important."

- Bulo Burto, Female, 21

"The mother is required to, during the time of birth, for her and the small child to receive special medical attention, the mother has to use specific foods, so she gets a lot of milk and breastfeeds the child."

- Female, Hargeisa, 26

It is important to note here that a total of 282 responses specifically indicated the use of vaccination as a form of malaria prevention -- even if malaria vaccines are not widely available in Somalia. This suggests that vaccination is widely considered a method for preventing malaria among the respondents.

"Malaria can be prevented by vaccinating the child, to also vaccinate the pregnant mother, and to complete the vaccination for children."

- Female, Afgooye

"One can prevent the disease of malaria by vaccination, the reason being it is a prevention method that is better than medication."

- Female, Caluula

"[malaria] can be prevented by vaccination, covering with mosquito net, and by cleaning the children and houses."

- Mogadishu, Female.

Inaccurate beliefs about the treatment of malaria, in turn, were also diverse and varied. A number of the voices argued that using cool water (i.e. a wet cloth to cool the head of a child) and administering appropriate nutrition (i.e. milk and oatmeal) or bathing a child were effective way to treat malaria.

"It can be treated with clean milk, clean food, clean water, bathe the child 3 times a day and bathe them with hot water, and to take-care of the hygiene of the house, such as the bedsheet the child is sleeping on. That is my advice."

- Female, Mogadishu, 20

"The children have to be bathed first thing in the morning. Bathing a child first thing in the morning is the easiest way to treat malaria."

- Kismayo, 23

"The people of my village/county use meat, milk, drink, and oatmeal and other things that have nutrients." Male, Galgaguud

Other beliefs about treatments included using traditional remedies, such as camel milk or fish from rivers. In Somalia, camel milk is believed to cure diseases such as diabetes, and is

regularly used as a method for boosting the immune system.

"The best treatment when some is diagnosed is with camel milk"

- Female, Mogadishu

"It can be treated with aloe vera fluid (put on the tongue of the child) and sheep oil"

- Male, Burco

"Children are treated with beans, eggs, meat or fish."

- Male, Mogadishu

Other voices suggested that using religion and prayer, such as reading the Quran and the general belief was that God has control or power over everything, was linked to preventing and treating malaria.

"Mosquitoes can be prevented by reading the Quran, God heals people."

- Male, Owdweyene

"First of all, one has to pray to the same God that brought the diseases/illness, because God is sufficient for all his slaves."

- Male, Hargeisa, 20

4. INSIGHTS

4.1. Associations between beliefs, practices, and demographics

We found the following associations in the dataset:

- Participants who believe that mosquito nets are an effective prevention against malaria are only slightly more likely to put their children to sleep under a mosquito net at night than participants who did not.** The odds of parents putting their children to sleep under a mosquito net are 40% higher for those who perceive their effectiveness. (odds ratio = 1.4, p = 0.085, 95% Confidence Intervals: 0.95, 2.05). Put differently, 24.1% of parents who participated and cited mosquito nets as a way to prevent malaria still did not use a mosquito net to protect their children. Reasons given include that there are no mosquitoes where the participants live, that they do not have a mosquito net, or that they are not able to afford one. Future research should investigate why people are not using mosquito nets even when believing in their effectiveness (Fig 13)²³
- Participants from Somalia's four major urban centres (Mogadishu, Bosasso, Hargeisa and Garowe), are almost twice as likely to hold inaccurate beliefs about malaria prevention than participants from outside major urban centres,** irrespective of age and gender (odds ratio = 1.91, p < 0.001) (Fig. 14, 95% Confidence Intervals: 1.42, 2.60). This suggests that people in urban areas are may be more

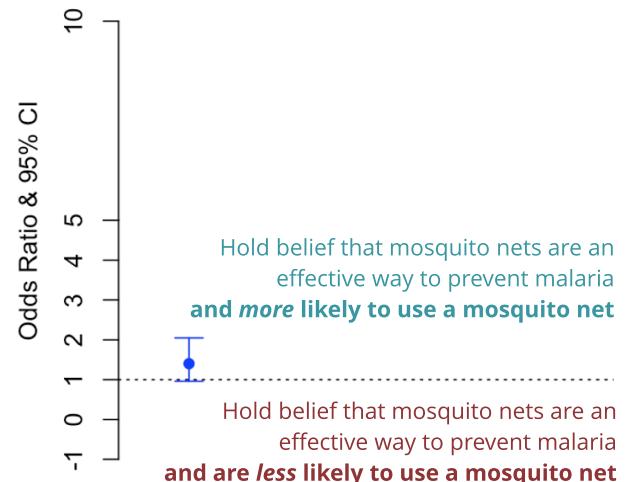


Fig. 13. Positive relationship found between belief in effectiveness of mosquito nets to prevent malaria and the practice of putting their children to sleep under a mosquito net each night (odds ratio = 1.4, p = 0.085). Neither variable was related to any demographic variable.

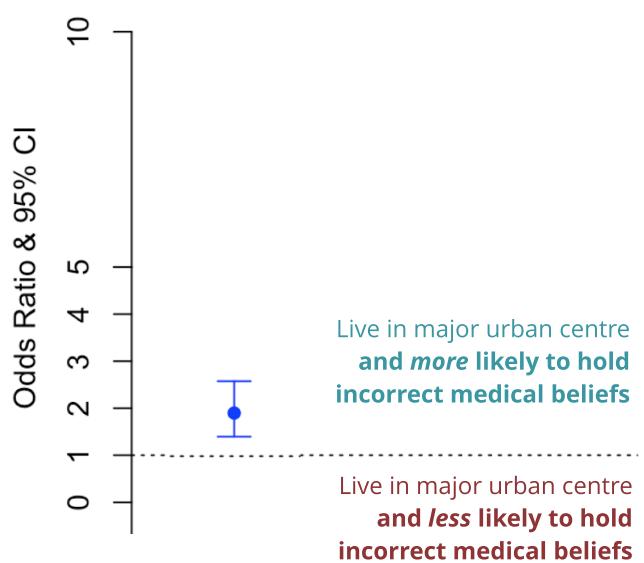


Fig. 14 Positive relationship between those holding incorrect medical beliefs (for example, that malaria can be prevented by vaccination) and those living in Somalia's four major urban centres (odds ratio = 1.9, p = 0.0002). Neither variable was related to any other demographic variable.

23. While the p-value and confidence intervals are high, this is

largely due to the small sample sizes

exposed to multiple sources of information with contradictory health messages. These results stress the importance of a convergence of information for effective health campaigns, with trusted sources providing the same information.

- **Nomadic participants are nearly twice as likely to use a mosquito net at night to protect their children compared to non-nomadic participants** (odds ratio = 1.97, p = 0.02, 95% confidence intervals: 1.15, 3.74). While the sample sizes were relatively low for this demographic group, this seems to further suggest that there is a positive urban bias towards misconceptions about mosquito prevention.
- **Participants aged 30-39 years, irrespective of gender, are slightly less likely to have inaccurate beliefs (misconceptions) about malaria prevention than participants from other age groups.** The odds of holding inaccurate beliefs are 56% lower for 30-39 age group compared to participants from other age groups (odds ratio = 0.44, p < 0.05, 95% Confidence Intervals: 0.21, 0.92). This suggests that the younger group of participants hold less accurate beliefs about malaria prevention in comparison to the older 30-39 years old age group.

4.2. Recommendations

Together with the Malaria Team at UNICEF Somalia, AVF can support the development of specific recommendations based on this report's findings. Two initial recommendations

to build upon are:

- **C4D programmes and initiatives in Somalia need to provide accurate information on what practices work to prevent and treat malaria and other vector-borne diseases.** Indeed, if people lack a clear understanding of what preventative measures work for which diseases, they may also have a lower perception of risk of getting infected by the disease. For instance, one popular misconception among the radio show participants was that immunisation is an effective form of malaria prevention. Other misconceptions include the belief that appropriate hygiene and sanitation practices can be effective in preventing malaria, or that malaria can be treated through better nutrition such as the use of camel milk or detoxing the stomach. These misconceptions can be tackled by inoculating the public with factual information before misconceptions arise, for example, by communicating that there is currently no vaccination for malaria (Compton, Jackson, Dimmock, 2016)²⁴.
- **More research is needed on why misconceptions related to malaria are more prevalent in urban compared to rural areas.** Participants from urban areas are considerably more likely to have misconceptions about the prevention of malaria, yet they have, in theory, easier access to health services as well as multiple sources of information. Further research is needed to understand where these beliefs and opinions originate from,

24. Compton, J., Jackson, B., Dimmock, J.A., (2016). Persuading Others to Avoid Persuasion: Inoculation Theory and Resistant

Health Attitudes. Frontiers in Psychology. Vol. 7, 122.



Man on his mobile phone in Mogadishu, Somalia, AU UN IST PHOTO/ David Mutua

especially in urban centres such as Mogadishu, Bosasso, Hargeisa, and Garowe. In addition, research could explore how health services play a role in the development of misconceptions, or indeed how they address them.

4.3. Future directions

We have found that malaria is a topic that is suitable for exploration via interactive radio in Somalia. When rigorous analysis is applied to conversational SMS data, findings can complement other evidence bases for deepening, adding nuance, and updating UNICEF's understanding of people's knowledge, attitudes and perceptions towards the prevention and treatment of malaria. Qualitative insights can be gained across different demographic groups, with findings feeding new hypotheses to be tested and explored. When deployed in a robust manner, research via interactive radio can track social change over time. Research can be designed in

a way that it assesses progress amongst and between socio-demographic groups, changes in their practices, and associations between beliefs and practices. As the group of engaged radio audience members grows over time, these changes can be assessed using follow up SMS surveys, independent of radio shows, providing a channel to interact with hard-to-reach populations across Somalia.

While there are still challenges ahead with big data textual analysis in low-resource languages such as Somali, our techniques in machine learning have shown great promise of extending manual coding to larger datasets, thereby offering a means to scale up and speed up analysis in the future. With each interactive radio research project in Somalia, Africa's Voices Foundation is able to build its language analysis assets. With time, accuracy grows and the process becomes more efficient. Each project is thus also an investment in the future towards a unique analytical capability of value to the wider development and governance community



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