Gender and performance of community treatment assistants in Tanzania

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Abstract

Objective. To examine the effects of gender and demographics of community treatment assistants (CTAs) on their performance of assigned tasks and quantity of speech during mass drug administration of azithromycin for trachoma in rural Tanzania.

Design. Surveys of CTAs and audio recordings of interactions between CTAs and villagers during drug distribution.

Setting. Mass drug administration program in rural Kongwa district.

Participants. Fifty-seven randomly selected CTAs, and 3122 residents of villages receiving azithromycin as part of the Kongwa Trachoma Project.

Interventions. None.

Main Outcome Measures. Speech quantity graded by Roter interaction analysis system, presence of culturally appropriate greeting and education on facial hygiene for trachoma prevention from coded analysis of audio-recorded interactions.

Results. At sites with all female CTAs, each CTA spent more time and spoke more in each interaction in comparison with CTAs at sites with only male CTAs and CTAs at 'mixed gender' sites (sites with both male and female CTAs). At 'mixed gender' sites, males spoke significantly more than females. Female CTAs mentioned trachoma prevention with facial cleanliness more than twice as often as male CTAs; however, both genders mentioned hygiene in <10% of interactions. Both genders had culturally appropriate greetings in <25% of interactions.

Conclusions. Gender dynamics affect the amount of time that CTAs spend with villagers during drug distribution, and the relative amount of speech when both genders work together. Both genders are not meeting expectations for trachoma prevention education and greeting villagers, and novel training methods are necessary.

Keywords: trachoma, community health worker, gender, Tanzania, mass drug administration

Introduction

Trachoma, an ocular infection caused by *Chlamydia trachomatis*, is the leading infectious cause of blindness with 146 million active cases in 46 endemic countries [1, 2]. A key element of control programs for trachoma-endemic countries is mass drug administration (MDA) with single-dose antibiotic (azithromycin) as part of the WHO's SAFE strategy (surgery, antibiotic, facial cleanliness and environmental improvement) [1]. In many countries, community treatment assistants (CTAs) are recruited from within the local community to carry out MDA [3]. These CTAs not only distribute azithromycin but also play a key role in educating the village to improve facial cleanliness, which is a key factor for trachoma control [1, 2, 4].

Persons who chose not to participate in MDA do not occur at random but cluster in families [3], possibly contributing to the need for multiple rounds of MDA [5]. If non-participation is not random, the quality of the CTA's performance in their interactions with community residents may be a factor. This is particularly true given the cultural norms that dictate interpersonal interactions in the Gogo and Kaguru cultures, which includes a formulaic greeting that precedes every formal conversation. In particular, recent research in Kongwa, Tanzania, of free MDA illustrates that even when correcting for other factors that affected early termination in multiple rounds of MDA participation, residents who had a male CTA were twice as likely to terminate their participation the following year [6].

The reason dropouts are more associated with male CTAs is not clear. Previous research on CTA performance in MDA has been limited to medication application and does not examine qualitative factors affecting interactions with villagers. Other qualitative research in Tanzania has shown substantial gender differences in interpersonal interactions and its negative impact on health-related discussions [7–9]. We hypothesize that the same phenomenon may be present here. While gender dynamics are highly variable between households and individuals, the institutional structures and history of patriarchy in rural Tanzania have reinforced a system that dictates the majority of gender roles [10–12].

There is no published research to elucidate the impact of CTA gender on the quality of CTA–resident interaction. We evaluate gender differences in the interaction of CTAs with community residents during MDA.

Methods

Study design and data collection

As part of another study, 32 villages underwent MDA using CTAs supervised by the Tanzanian study team in 2011 [13]. CTAs were selected by the village leadership and the study team and were paid TSH1000 ($0.80 USD) per day of work, typically 3–5 days. The CTAs were provided training in best practices for providing and recording MDA, and training included respect for villagers and the importance of mentioning facial cleanliness for trachoma prevention to each villager receiving MDA. Within each village, MDA occurred at multiple drug distribution sites depending on population and geographic size. At each site, 2–3 CTAs distributed medication and information simultaneously. CTAs were assigned to sites by the village chairman.

This project was conducted in 9 of the 32 villages, chosen based on geographic diversity and high rates of CTA-gender-based differences in villager participation [6].

There were two primary methods of data collection. The first was a survey carried out among CTAs, and the second was a series of audio recordings of the interactions of the CTAs and the community residents during MDA. CTAs provided written informed consent before participating in the study. Consent was obtained orally from community participants prior to drug distribution. All procedures and protocols were approved by the Johns Hopkins Institutional Review Board and the National Medical Research Council in Tanzania. CTAs were reminded that no study official would listen to the tapes, and the research would not affect their employment with the project.

Surveys were administered to all CTAs following their training session. Surveys were administered and entered in Kiswahili. The survey included demographic questions as well as CTA opinions on difficulties and barriers to drug distribution and was based on previous research done on villager non-adherence in MDA [6].

Within each village, sites were chosen at random for audio recording. If a site was chosen, the senior investigator (A.J.) went to the site on the first day of MDA and provided a recorder (Sony ICD-PX312 Digital Voice Recorder, New York, NY, USA) for audio recordings. CTAs were instructed to start the tape when a villager arrived for medication and to continue that recording until all villagers had left. Thus, a single recording may include interactions between multiple villagers and CTAs over time, as the process involved many villagers waiting in line to talk to CTAs and receive MDA. The CTAs were monitored for the first 2 h to ensure they were recording interactions correctly. Every morning, a randomly selected 15 min of audio from the previous day was listened to and evaluated for quality assurance, with re-training performed as needed. No recordings were used if the author was present at the site, to prevent the effect of bias due to investigator observation on the performance of CTAs [14]. Recordings continued for every day during MDA, and recorders were collected following MDA completion.

Data coding

Questionnaires were entered into a custom built Excel database for analyzes.

Audio data included 2–3 CTAs interacting with multiple villagers over varying lengths of time. From the tapes, 'recordings' were created that were chronologic interactions at a single site of between 5 and 15 min, ending at a discernible end in conversation. Within each recording, an 'interaction' was defined as the number of unique villagers whose voice was heard on that recording—because each interacted with the CTAs at the site during that time period. Data could not be analyzed at the individual interaction, due to the complex and overlapping nature of interactions at treatment sites, with multiple CTAs working simultaneously with multiple villagers. Audio recordings were individually labeled based on village, site, day and recording number. Also, the number and gender of villagers and CTAs within each recording were noted.

Recording data were analyzed using the Roter interaction analysis system (RIAS) [15]. RIAS was altered, as was done previously with other forms of health care interactions internationally [16–18]. The coding unit of analysis is a complete thought, which may be expressed as a full sentence, a clause or a single word. Each unit is assigned to one category, and the categories are both mutually exclusive and exhaustive such that all speech is assigned. In addition to the RIAS method, each recording was analyzed for the presence or absence of specific CTA proficiencies, including mentioning of trachoma prevention by improved hygiene and provision of culturally appropriate greetings.

Recordings were analyzed by three trained research assistants who were masked to the identity of the CTAs. Research assistant training in RIAS was conducted by the principle investigator (A.J.) over 5 days with exercises to determine understanding and accuracy in analysis and coding. Recordings were then randomized to prevent repeated coding of the same site. When coding, assistants made note of CTA gender and coded each utterance based on the gender of the CTA speaking at that time.

Outcomes were first number of utterances (RIAS defined individual thoughts), and amount of time spent per interaction.

In addition, coders counted performance of specific tasks for each CTA. First, they counted any mention of hygiene, facial cleanliness or trachoma prevention. In addition, each culturally appropriate greeting (a specific and well-defined set of questions about the state of health, family and loved ones) was counted. Coders were instructed to define these greetings as broadly as possible.

A 10% random sample of recordings was double-coded to assess inter-coder reliability. Also, the senior investigator coded recordings in 10% and compared them with the research assistants' coding, to ensure accuracy. Inter-coder reliability was measured at 91%, and accuracy was measured at 95% agreement, meeting RIAS criteria for use in the study [15]. Exercises to ensure continued accuracy were done throughout the coding process.

Data analysis

Data were analyzed using the STATA 10.0 and SAS statistical software. Odds ratios and regressions were calculated with associated 95% confidence intervals. Two-tailed *t*-tests and χ^2 analyses were performed to assess correlation between CTA gender and outcome metrics. All analyses accounted for the clustering of recordings both at the level of village (nine clusters) and by site within each village (23 sites included). Regressions of CTA demographic information accounted for other CTA demographic information, including CTA age, gender, education status, leadership role within the community and perceptions of villager nonparticipation.

Results

Hundred and ten CTAs completed the survey (99% of hired CTAs in the nine villages included in the study). Of the 110 CTAs, 57 were audio-recorded (31 male and 26 females). These CTAs worked at 23 sites, of which 4 were exclusively male CTAs, 15 were mixed gender, 4 exclusively female CTAs. No significant differences were seen between the 57 CTAs who were chosen for recording and the 53 CTAs who were excluded from recording (Table 1).

The average age was 32.9 years, and the slight majority of CTAs were male. Only 11% had any secondary education, which was defined as moving past the seventh grade (the last year of free education in Tanzania). No difference in education by gender was seen. Male CTAs were more likely to be married (89%) than female CTAs (52%) ($P < 0.0001$) and were also more likely to be community leaders (39%) than female CTAs (17%) ($P < 0.01$). Male CTAs were significantly more likely to attribute villager nonparticipation to distance (26 vs. 17%) and a lack of villager understanding (56 vs. 40%) than female CTAs, whereas female CTAs were more likely to attribute nonparticipation to medication side effects (40 vs. 15%) ($P = 0.02$).

From these 23 sites, 436 recordings and 3122 distinct interactions were collected and coded, a total of 63 h of audio (Table 2).

Figure 1 illustrates that sites with exclusively female CTAs spent more time per interaction (104.9 s per interaction) than

Table 1 Characteristics of CTA survey respondents ($n = 110$)

Characteristic	Included	Not included	Total
Number of CTAs	57	53	110
Demographics			
Age (mean years)	33.3	32.5	32.9
% Male	54.4	58.5	56.4
% With secondary education	14	7.5	10.9
% Married	24.6	20.8	22.8
% Community leaders	45.6	44.4	45.0
% Residing with children less than 10 years old	80.7	88.7	84.6
Opinions on villager non-acceptance			
% Who think it is due to side effects	21.8	30.2	25.8
% Who think it is due to distance	21.8	20.8	21.3

Table 2 Recording characteristics by gender composition

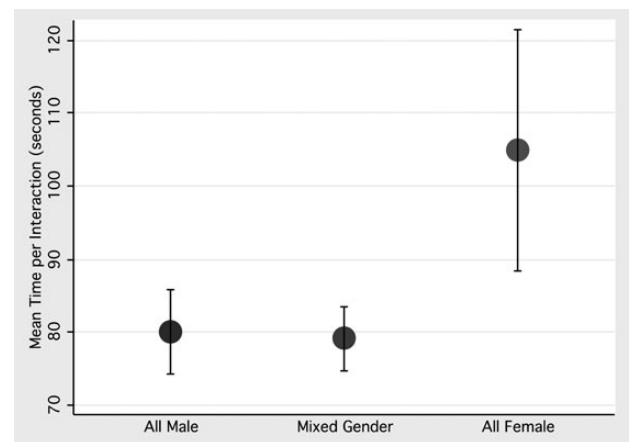|	Coded audio (h)	Interactions	Recordings
Exclusively male	19	973	128
Mixed gender	32	1613	218
Exclusively Female	12	536	80
Total	63	3122	436

Figure 1 Mean time per interaction by gender composition of CTAs at MDA site ($P < 0.05$).

'all male' sites (80.1 s per interaction) and 'mixed gender' sites (70.1 s per interaction) ($P = 0.01$). In those interactions, females at all female sites also made more statements per interaction (15.9 statements per interaction) than males at all male sites (11.4 statements per interaction) ($P = 0.02$). Female CTAs at all female sites did not speak significantly more per interaction than CTAs at mixed gender sites, however.

Table 3 Percentage of acceptable greetings per interaction

Characteristics	Rate	P-value
Gender at CTA site		
All male	0.22	0.92
Mixed gender	0.23	0.88
All female	0.23	Ref
Village leader[a]		
No	0.23	0.31
Yes	0.22	
Children <10 year at CTA house[a]		
No	0.25	0.99
Yes	0.22	
>2 years as CTA[a]		
No	0.23	0.99
Yes	0.22	
CTA perceptions of non-participation[b]		
Side effects		
No	0.21	0.1
Yes	0.25	
Distance to site		
No	0.24	0.24
Yes	0.21	

[a]Presence of single CTA with characteristic.
[b]Presence of single CTA with this perception of nonparticipation.

Table 4 Percentage of mentioning hygiene per interaction

Characteristics	Rate	P-value
Gender at CTA site		
All male	0.04	0.03***
Mixed gender	0.07	0.06
All female	0.08	Ref
Village leader[a]		
No	0.02	0.91
Yes	0.08	
Children <10 at CTA house[a]		
No	0.16	0.94
Yes	0.06	
>2 years as CTA[a]		
No	0.06	0.99
Yes	0.06	
CTA perceptions of non-participation[b]		
Side effects		
No	0.07	0.63
Yes	0.05	
Distance to site		
No	0.07	0.18
Yes	0.05	

[a]Presence of single CTA with characteristic.
[b]Presence of single CTA with this perception of nonparticipation.
*** $P < 0.05$.

At mixed gender sites, male CTAs spoke substantially more than female CTAs [6.8 vs. 5.9 statements per interaction ($P = 0.01$)].

Tables 3 and 4 illustrate the correlation between CTA performance and CTA demographics. Because these were measured at the site level, demographics were defined as the presence of at least one member of the site team with one of the characteristics/perceptions. None of the demographic variables were associated with increased odds of performing an acceptable greeting. The only characteristic associated with an increased percent of mentioning hygiene during an utterance was CTA gender, with all female sites mentioning cleanliness twice as much as all male sites ($P \leq 0.03$).

The overall coverage of the communities of the CTAs who responded to the survey was high, >80% in children similar to that found in all 32 villages.

Discussion

We found evidence of significant differences by gender in the interaction between CTAs and residents of the village during MDA. Sites with exclusively female CTAs spent more time, and spoke more, than sites with exclusively male CTAs. This is consistent with prior research of the way that gender affects health care discussions in the developed world [18–21], and the way that gender roles dictate health care discussions in the developing world [7, 12]. Previous research has underscored the importance of spending time in health care discussions in Tanzania, as it is common courtesy to include lengthy discussions of family and general well-being in addition to pertinent medical issues [22].

The average age of participating CTAs was young, especially given the preference and importance of age and experience in rural Tanzanian culture [12]. Additionally, while the low rates of secondary education were not surprising given the low levels of secondary school attendance in rural Tanzania [23], it was surprising that there was no difference in secondary school attendance between male and female CTAs. Overall, women have much lower rates of secondary school attendance in the region [11, 12]. The lack of difference may reflect the preferential choice of females with education to be CTAs. The difference in marital status between men and women is not surprising, as low levels of male employment in an agricultural society in the dry season informed high levels of married male participation, whereas female domestic responsibilities explain lower levels of married female participation [10, 11, 24].

It is also worth noting that male and female CTAs attributed villager nonparticipation to different reasons. More research is needed to further investigate CTA perceptions of villager non-participation, but these perceptions did not associate with interaction length or CTA performance.

Within mixed-gender sites (sites with both male and female CTAs), the statements per CTA per interaction confirmed our understanding of the social role of women, with men speaking more per interaction. Within each site, there are usually two responsibilities: one CTA fills in the census book and one doses the medication. Although both male and female CTAs had
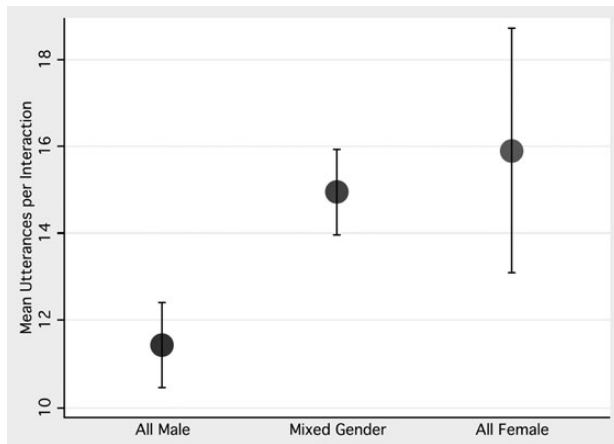
Figure 2 Mean utterance per interaction by gender composition of CTAs at MDA site ($P < 0.05$).

comparable levels of education, men still took the lead role a majority of the time, asking questions and filling in the census book [7, 11, 12]. There was a large variation in time and utterances per interaction in the all-female treatment site, likely due to the effect of clustering and the relatively low number of all-female treatment sites ($n = 4$) (Fig. 2).

We were surprised at the low rates of culturally appropriate greetings and explanations of hygiene. Greetings are particularly important in rural Tanzanian culture, as a formulaic greeting precedes many conversations and indicates respect for the other participant in the conversation [22]. Yet, few of the conversations had 'culturally appropriate' greetings, according to the coders who were members of the same ethnic groups. The percentage of interactions with greetings was not significantly associated with any demographic variable including CTA gender. Greetings may not be part of what is perceived as a 'service delivery' interaction by the village CTAs, but training will need to stress this is part of 'good service'. There may also be an issue of time, as often there is a backlog of persons waiting to receive MDA. We had no information on the wait time or crowding at the time of the recordings to judge if this was a factor.

Facial cleanliness has been established as a key element of trachoma prevention [1, 4, 24] and has ancillary benefits of preventing other forms of bacterial transmission [4, 25]. As a result of these benefits, each CTA is instructed on the importance of facial cleanliness as a means of trachoma prevention and was instructed to relay this information to each villager. Despite this instruction, only 6% of interactions with villagers had any mention of hygiene. Sites with exclusively female CTAs mentioned facial cleanliness the most and mentioned it twice as frequently as 'all male' sites. This could be explained by the role of women in the home, and its association with their understanding of the importance of hygiene [25]. This again may reflect the backlog of residents waiting for MDA, and the perceived need to shorten the interactions.

The only other study concerning CTA performance found that unmarried women were less likely to dose medication appropriately as measured by trachoma reduction in treated

children. This was not measured here but should not affect the mentioning of hygiene or the amount of time spent per villager [24]. In addition, with advancements in the dispensing method and approval of single dose azithromycin for trachoma treatment, drug dispensing has been simplified. However, our study does provide a possible explanation for differences in return rates by CTA gender as discovered by Ssemanda *et al.* [6], as we show CTA gender affects speech quantity and performance quality, which may affect return rates.

The power of this study is derived from the amount of interactions coded (>3000). However, there are limitations. First, analyses were performed at the level of a 'site', which included multiple CTAs, preventing association with individual CTA demographic variables. This was unavoidable due to the complex nature of the interaction and the fact that no one CTA performed all of the tasks within a site. In addition, at single gender sites, coders were only able to differentiate male or female CTA voices on the tape but were unable to differentiate among the voices. This prevented associations at the individual level. Finally, although none of the study team was physically present for CTA–villager interactions, the process of soliciting recordings from CTAs, who had to start and stop the recorder before and after interactions with villagers, might introduce bias, as the CTAs knew they were being recorded [14]. This was unavoidable given technology constraints and study design.

This research raises further questions regarding the impact of these metrics of CTA performance on village coverage and return rates. More detailed analysis is needed regarding the content of the interactions between CTAs and villagers, to detail differences in empathetic statements and information provision between male and female CTAs. Ideally, studies are needed providing prospective analysis on the quality and length of an interaction and whether a villager returns for treatment the subsequent year.

Implications

The conclusions drawn from this study that female CTAs greet villagers and mention the importance of hygiene more than male CTAs needs to be seen within the broader finding that both genders fall short of expectations. First, retraining is necessary for key elements of the interaction and efforts are needed to revise the training protocol. Possible solutions include providing handouts that CTAs would distribute to villagers to remind both villagers and CTAs to talk about facial hygiene. Second, this data have implications on future site design, as all male sites faired substantially worse in some of the metrics for CTA performance. This data would indicate that males should work alongside females and that training protocols are needed that reinforce a woman's role within the CTA team, so that she feels empowered to speak and lead within a team of assistants.

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