# Public Knowledge and Attitudes towards Clinical Trial Participation: A Mixed-Method Study in Pwani Region, Tanzania

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*Article*

# Public Knowledge and Attitudes towards Clinical Trial Participation: A Mixed-Method Study in Pwani Region, Tanzania

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**Abstract**

**Background:** The clinical trials are important for advancing medical knowledge and improving healthcare delivery. However, participants' knowledge and attitudes towards clinical trials remain a key challenge affecting clinical trial recruitment and retention of participants. Therefore, this study was aimed at assessing the knowledge and attitudes of the general community towards participation in clinical trials. **Methods:** A convergent parallel mixed-methods study was conducted, among adults in Bagamoyo district. A multistage Stratified random sampling was used to select participants. Quantitative data were analyzed descriptively and using logistic regression, while Qualitative data were analyzed thematically using NVivo. **Results:** Among 394 recruited participants, 293 (74.4%) were females and 101 (25.6%) males. Most participants had a primary level education (266, 67.5%), while 128 (32.5%) had secondary or tertiary education. The majority were married, 297 (75.4%) and 97 (24.6%) were either separated or unmarried. Regarding economic status, 244 participants (61.9%) earned less than Tsh. 50,000. The general population Knowledge regarding clinical trial was low with majority of participants scoring below 60%. However, we found a positive attitude towards participation in the clinical trial. Logistic regression revealed that poor knowledge was significantly associated with being male (AOR, 22.95 (95% CI: 10.27–51.28, p = 0.001)), age above 55 years (AOR of 2.43 (95% CI: 1.29–4.55, p = 0.006)) and unemployment (AOR of 2.39 (95% CI: 1.27–4.53, p = 0.007)). Positive attitudes towards clinical trial participation were significantly associated with being female (AOR) 7.61 (95% CI: 4.32–13.39, p < 0.001), Age of 44 years and below, (AOR: 2.22 (95% CI: 1.27–3.86, p = 0.005) and employment (AOR of 1.89 (95% CI: 1.08–3.32, p = 0.03). **Conclusion:** Despite low levels of knowledge, the general population in Bagamoyo district demonstrated a high willingness to participate in clinical trials. To address the knowledge gap, targeted educational interventions should focus on older adults and the unemployed. Furthermore, policies supporting community outreach and awareness campaigns may help strengthen public understanding and sustain positive attitudes toward clinical research.

**Keywords:** clinical trials; awareness; public knowledge; attitudes; participation; mixed-methods; perception; Tanzania

## 1. Introduction

Clinical trials are investigations that assign one or more participants to one or more interventions (either a control or a placebo) to evaluate the effects of the interventions on behavioural or biological outcomes relevant to health [1]. They are an essential part of the drug development process, and they play a vital role in improving the health of people around the world [2]. Because clinical trials are meticulously planned to reduce bias and give a high degree of evidence, they are regarded as "the gold standard for assessing the safety and efficacy of experimental medical treatments.[3] For clinical trials to provide reliable results and address the research question at hand, sufficient sample size and

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high retention of human participants are required [4,5]. Therefore, novel strategies that would increase clinical trial participant participation and retention are desperately needed. To increase community participation in research, it is necessary to develop such interventions with thorough understanding of the factors influencing recruitment and sustained participation within our community, as well as to improve the relationship between researchers and study participants [6,7].

The clinical trial is important for advancing medical knowledge and improving healthcare delivery. However, limited knowledge and negative attitudes towards clinical trials remain a key challenge affecting recruitment and retention of participants in clinical trials [8,9]. Poor understanding and engagement can compromise the sample size, thereby reducing the validity and reliability of study findings. Inadequate participation also increases the cost of research in terms of time, resources, and personnel, and may delay the completion of drug development processes and the approval of new interventions [10,11]. Lack of awareness, limited access to accurate information, negative perceptions, and fear or mistrust of the clinical research process are the main causes of poor participation of general community in clinical trials[12–15]. Other factors may include misconceptions or fears about the risk of participating in a clinical trial, unfavorable study design, or medical issues that make participation difficult or impossible [16]. Several studies have been conducted in Tanzania to address the awareness, attitudes, and perception related to interventions delivered in clinical trials, [17,18]. However, there remains a gap in research specifically understanding the community knowledge and attitudes s regarding participation in clinical trials. Therefore, this study was aimed at assessing the knowledge and attitudes of the general community towards participation in clinical trials with the goal of informing future engagement and educational strategies.

## 2. Materials and Methods

### *2.1. Study Design and Setting*

A convergent parallel mixed-methods study was conducted, among the general community of Bagamoyo district. Bagamoyo was chosen because of its clinical trial facility which we believed our data could be valid and reliable to answer our research questions.

### *2.2. Sample Size Estimation and Sampling Method*

The sample size was calculated using a significance level of 0.05 with a confidence interval of 95%. Assuming that a proportion of the population of 21% [19] is aware of clinical trials, a Z-score of 1.96 and a design effect (stratified sampling of 1.5) was a sample size of 384 is sufficient.

$n = \frac{z^2 * p(1-p)}{e^2}$ $n = \frac{1.96^2 * 0.5(1-0.5)}{0.05^2} = 384$

Where:

n- sample size

Z-z-score

e-margin of error

P-standard of deviation

A multistage stratified random sampling method was used. Bagamoyo district wards were divided into two strata based on their prior inclusion in clinical trial activities (previously included vs. not included). This information was obtained through a desk review of records from the IHI Bagamoyo Clinical Trial Facility. Two villages were randomly selected from each stratum, resulting in a total of four study villages. Within each village, systematic random sampling was used to select households.

### *2.3. Inclusion and Exclusion Criteria*

The participants included were 18 years old and above, living in Bagamoyo district and were able to give written informed consent. The participants who were less than 18 years of age, visitors, and tourists in the study areas were excluded.

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*2.4. Ethical Aspects*

The study was commenced after receiving approval from the Ifakara Health Institute-Institutional Review Board (IHI-IRB), by decision number IHI/IRB/NO: 41-2023. On 20th February the data collection started and ended on 31st May 2024. The study was carried out in accordance with the ethical standards set by the relevant institutions or national research regulators, and in accordance with the principles of the Declaration of Helsinki.

*2.5. Data Collection*

Quantitative data: The KAP (knowledge, Attitude and Practice) survey questionnaire was used to collect the data. The questionnaire was prepared in English and translated into Swahili and administered using the Open Data Kit (ODK) application integrated with Kobo Toolbox. Responses were recorded on a 3-Likert scale: agree, disagree, or "not sure".

Qualitative data: After collecting the quantitative data, ten participants were purposively selected and invited to the in-depth interviews and focus group discussion. This number was considered to be sufficient to reach saturation. Purposive sampling was used and included a mixture of participants who had previously participated in the clinical trial and those who had not. The interviews were conducted at mutually agreed locations and times by the trained research assistants.

*2.6. The data Analysis*

The categorization of knowledge and attitude scores was based on assigning 1 point for each correct or favorable response. (e.g., "Yes"/"Agree" to positively framed statements), while "No"/"Disagree" or "Not Sure" responses were scored as 0. Total knowledge and attitude scores were calculated as continuous variables, and then converted to percentages. Attitude scores were also dichotomized as positive or negative, using the mean score as the cut-off point for group comparison.

SPSS version 17.0 was used to analyze the data. Sample characteristics were reported using descriptive statistics. The data were further analyzed descriptively to get an overview of knowledge and attitude frequencies followed by binary logistic regression to examine the degree of correlation between the primary outcome variables of interest (knowledge and attitude) and the independent variables (age, gender, educational, marital status, employment status and income).

The overall knowledge and attitude was categorized using Bloom's cut-off point, as good if the score was between 80 to 100%, moderate if the score was between 60 to79%, and poor if the score was less than 60% [11,20,21].

The information gained from the focus groups and in-depth interviews was examined using a thematic framework content analysis. NVivo software was used to organize the analysis of qualitative data.

## 3. Results

*3.1. Participants' Demographic Attributes*

Data were obtained from 394 participants including 293 women (74.4%) and 101 men (25.6%). The largest proportion of participants, 140 (35.5%), were aged between 18 and 44 years. Most of respondents had attained only a primary level education (266, 67.5%) and the majority were married 297 (75.4%). Regarding income, 244 participants (61.9%) reported earning less than Tanzanian Shillings 50,000 per month. (see Table 1).

**Table 1.** Demographic characteristics of the study population (n = 394) (Researcher 2024).

| | n | % |
|---|---|---|
| **Gender** | | |
| Male | 101 | 25.6 |
| Female | 293 | 74.4 |

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| | | |
|---|---|---|
| **Age** | | |
| 18-24 years | 8 | 2 |
| 25-34years | 25 | 6.3 |
| 35-44years | 115 | 29.2 |
| 45-54years | 126 | 32 |
| 55-64years | 54 | 13.7 |
| 65-74years | 47 | 11.7 |
| 75+above | 19 | 4.8 |
| **Level of education** | | |
| None | 49 | 12.4 |
| Primary | 217 | 55.1 |
| Secondary | 109 | 27.7 |
| Certificate | 12 | 3 |
| Diploma | 6 | 1.5 |
| Bachelor | 1 | 0.3 |
| **Resident** | | |
| Bago | 37 | 9.4 |
| Kiwangwa | 157 | 39.8 |
| Mazizi | 100 | 25.4 |
| Msata | 100 | 25.4 |
| **Employment status** | | |
| Formal Employed | 168 | 42.6 |
| Housewife | 104 | 26.4 |
| Student | 8 | 2 |
| Self employed | 18 | 4.6 |
| Not employed | 96 | 24.4 |
| **Marital status** | | |
| Married | 297 | 75.4 |
| single | 52 | 13.2 |
| Divorced | 45 | 11.4 |
| **Income per month (in Tsh)** | | |
| less than 50,000 | 244 | 61.9 |
| 50,000-100,000 | 110 | 27.9 |
| 110, 000-150,000 | 21 | 5.3 |
| 150,000-300,000 | 6 | 1.5 |
| 300,000-450,000 | 10 | 2.5 |
| 450,000 + above | 3 | 0.8 |

### *3.2. Knowledge of Clinical Trials in the General Population*

The results revealed that overall knowledge of clinical trials (CTs) was low with the majority of respondents scoring below 60%. Respondents had moderate knowledge in certain areas such as understanding that participation in clinical trial is voluntary (67.5%), that the medicines are tested before they are used in humans (60.3%), and the fact that participant may withdraw from the CTs at any moment (60.2%). The low Knowledge was mainly revealed in domains such as the meaning of the clinical trials (47.2%), the difference between clinical trials and standard care (46%), and risk involved in the participation of the clinical trials (25.9%). The lowest levels of knowledge were observed in key methodological and ethical areas. Only 8.4% of respondents were familiar with the concept of randomization, 5% understood the use of placebos, and 14% were aware of the role of ethics review committees in overseeing clinical trial conduct. See Table 2.

**Table 2.** Responses of the participants for the knowledge items (n = 394) (Researcher, 2024).

| **Knowledge about CTs.** | **Responses** | |
|---|---|---|
| | **Yes (%)** | **No/don't know (%)** |
| Do you know that the medicines you have been given are tested before use? | 228(60.3) | 150(39.7) |
| Do you know what clinical trials (CTs) are? | 228(57.9) | 116(42.1) |
| Do you know the meaning of clinical trials? | 186(47.2) | 208(52.8) |

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| | | |
|---|---|---|
| Have you ever heard about the clinical trial center of the Ifakara health institute in Bagamoyo? | 243(63.8) | 138(36.2) |
| Do you know the difference between clinical trial and standard care? | 174(46.0) | 204(54.0) |
| Clinical trial includes things like human subjects, testing new drugs, vaccines, medical devices. | 222(58.7) | 156(41.3) |
| There are benefits to participating in CTs. | 231(58.6) | 163(41.4) |
| Participating in clinical trials has risks. | 102(25.9) | 292(74.1) |
| Clinical trial procedures follow a plan known as a protocol. | 208(55.0) | 170(45.0) |
| Each clinical trial has its own set of rules that determines who may participate. | 218(55.3) | 176(44.7) |
| Do you know what randomization in clinical trials is? | 33(8.4) | 361(91.6) |
| Do you know what placebo is? | 19(5.0) | 359(95.0) |
| Have you ever heard of an ethics review committee for a CT? | 55(14.0) | 339(86.0) |
| Each clinical trial is conducted by following ethical guidelines for managing CTs? | 216(57.1) | 162(42.9) |
| Informed consent is a requirement for all clinical trials. | 227(57.6) | 167(42.4) |
| Can CT be started by the research team without participant consent? | 40(10.2) | 354(89.8) |
| Participation in research is completely voluntary | 265(67.5) | 129 (32.7) |
| Any participant may leave the CT at any moment. | 237(60.2) | 157(39.8) |
| A participant's name or other private information may be disclosed in the published article. | 48(12.2) | 346(87.8) |

**Legend from Table 2 above: Yes**—respondent is aware of clinical trial or has heard about them. **No**—respondent is not aware about clinical trials. **Don't know**—the respondent is unsure or has little trust in their expertise of clinical trials. **Note:** For analysis purposes, "No and I don't know" responses, were combined to represent a general lack of awareness or uncertainty. Their separate responses are available whenever requested.

A logistic regression analysis was conducted to identify factors associated with knowledge of clinical trials. The results revealed that gender was significantly associated with knowledge levels, with men being more likely to have low knowledge compared to women (AOR = 22.95; 95% CI: 10.27–51.28; p = 0.001).

Older age was also significantly associated with poor knowledge, with individuals aged 55 and above more likely to have low knowledge compared to younger participants (AOR = 2.43; 95% CI: 1.29–4.55; p = 0.006). Furthermore, unemployed participants were more likely to have poor knowledge than those who were employed or homemakers (AOR = 2.39; 95% CI: 1.27–4.53; p = 0.007). Detailed regression results are presented in Table 3.

**Table 3.** Factors associated with general population low knowledge towards CTs. The test applied: binomial logistic regression analysis (n = 394) (Researcher, 2024).

| Variable | Knowledge about CTs (low/high) | | | |
|---|---|---|---|---|
| | Crude | | Adjusted | |
| | OR (95%CI) | P-value | AOR (95%) | P-value |
| **Gender** | | | | |
| Male | Ref | | Ref | |
| Female | 22.7 (11.0-46.9) | <0.001 | 22.95(10.27-51.28) | <0.001 |
| **Age** | | | | |
| 18 to 44 years | 2.9(1.8-4.8) | <0.001 | 2.43(1.29-4.55) | 0.006 |
| 45 to 54 years | 1.5(0.9-2.4) | 0.13 | 1.35(0.72-2.51) | 0.35 |
| Above 55 years | Ref | | Ref | |
| **Level of education** | | | | |
| None + primary level | Ref | | | |
| Secondary+ tertiary level | 1.0(0.7-1.6) | 0.92 | | |
| **Employment status** | | | | |
| Employed+ Self-employed | 3.12(1.89-5.16) | <0.001 | 2.39(1.27-4.53) | 0.007 |
| H/wife | 2.91(1.66-5.12) | <0.001 | 1.76(0.89-3.43) | 0.10 |
| Unemployed | Ref | | Ref | |
| **Marital status** | | | | |
| Single+ Divorced | 1.32(0.83-2.10) | 0.24 | | |

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| | | | | |
|---|---|---|---|---|
| Married | Ref | | | |
| **Income per month** | | | | |
| Less than 50,000Tsh | 1.88(0.96-3.69) | 0.07 | 1.00(0.37-2.69) | 0.99 |
| 50,000-100,000Tsh | 0.65(0.41-1.76) | 0.65 | 0.35(0.12-0.99) | 0.05 |
| Above 110,000Tsh | Ref | | Ref | |

*3.3. Attitudes Toward Participation in the CTs among the General Population*

Overall, the study population demonstrated a positive attitude toward clinical trials (Table 4). The majority (89.6%) expressed a willingness to participate, and 80.7% reported they would recommend others to participate in clinical trials. Most respondents recognized the benefits of clinical research (90.9%), its importance for medical advancement (84.5%), and the necessity of human participation in scientific progress (87.8%).

However, moderate levels of concern were observed regarding privacy protection (75.1%), trust in information provided (70.6%), and the expectation of financial compensation (66.2%) during participation.

**Table 4.** Responses of the participants for attitude towards CTs (n =394) (Researcher, 2024).

| Attitude of toward CTs | Agree (%) | Disagree/Not sure (%) |
|---|---|---|
| If given adequate information, would you be willing to take part in a CT? | 353(89.6) | 41(10.4) |
| Clinical trials that are conducted are beneficial to the society. | 358(90.9) | 36(9.1) |
| Clinical trials conducted harms society | 212(53.8) | 182(46.2) |
| Clinical trial research is a crucial step in the development of novel medical treatments and products. | 333(84.5) | 61(15.5) |
| Conducting experiments on humans is essential to the progress of science. | 346(87.8) | 48(12.2) |
| I would recommend a friend or family member to participate in a clinical trial. | 318(80.7) | 76(19.3) |
| The way clinical trials are conducted is unethical. | 24(6.1) | 370(93.9) |
| People participate in clinical trials mainly for financial reasons | 162(41.1) | 232(58.9) |
| Volunteers must be remunerated while participating in clinical trials | 261(66.2) | 133(33.8) |
| Privacy is maintained for volunteers involved in clinical trials. | 296(75.1) | 98(24.9) |
| There are barriers to participating in Clinical trials | 225(57.1) | 169(42.9) |
| Information on clinical trials can be trusted. | 278(70.6) | 116(29.4) |
| Patients are forced by doctors to take part in research. | 32(8.1) | 362(91.9) |
| In clinical research, humans are treated similarly to laboratory animals or “human guinea pigs”. | 124(31.5) | 270(68.5) |

After adjusting for potential confounding variables including **age, gender, education level, socioeconomic status, marital status, and previous engagements with clinical trials**, the logistic regression analysis showed that positive attitudes were significantly associated with female gender (AOR = 7.61; 95% CI: 4.32–13.39; $p < 0.001$), younger age (AOR = 2.22; 95% CI: 1.27–3.86; $p = 0.005$), and employment status, with employed individuals more likely to report positive attitudes compared to the unemployed (AOR = 1.89; 95% CI: 1.08–3.32; $p = 0.03$). For detailed results, refer to Table 5.

The logistic regression after adjusting with the other covariable showed that the clinical trial attitude was significant associated with gender (AOR) 7.61 (95% CI: 4.32–13.39, $p < 0.001$), age with AOR of 2.22 (95% CI: 1.27–3.86, $p = 0.005$) and employment status with AOR of 1.89 (95% CI: 1.08-3.32, $p = 0.03$) for employed versus unemployed. See Table 5.

**Table 5.** Factors associated with the general population’s attitude towards CTs. The test applied: binomial logistic regression analysis (n = 394) (Researcher, 2024).

| Variable | Attitude toward CTs (Negative/positive) | | | |
|---|---|---|---|---|
| | Crude | | Adjusted | |
| | OR (95%CI) | P-value | OR (95%) | P-value |
| **Gender** | | | | |
| Male | Ref | | Ref | |

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| | | | | |
|---|---|---|---|---|
| Female | 7.94 (4.63-13.62) | <0.001 | 7.61 (4.32-13.39) | <0.001 |
| **Age** | | | | |
| 18 to 44 years | 2.99 (1.81-4.92) | <0.001 | 2.22 (1.27-3.86) | 0.005 |
| 45 to 54 years | 1.83 (1.11-3.00) | 0.18 | 1.42 (0.82-2.48) | 0.22 |
| Above 55 years | Ref | | Ref | |
| **Level of education** | | | | |
| None + primary level | Ref | | | |
| Secondary+ tertiary level | 1.20 (0.78-1.84) | 0.40 | | |
| **Employment status** | | | | |
| Employed+ Self-employed | 2.62 (1.60-4.29) | <0.001 | 1.89 (1.08-3.32) | 0.03 |
| H/wife | 1.86 (1.07-3.23) | 0.03 | 1.03 (0.56-1.89) | 0.93 |
| Unemployed | Ref | | Ref | |
| **Marital status** | | | | |
| Single+ Divorced | 1.26 (0.79-2.00) | 0.34 | | |
| Married | Ref | | | |
| **Income per month** | | | | |
| Less than 50,000Tsh | 1.65 (0.84-3.23) | 0.14 | | |
| 50,000-100,000Tsh | 0.75 (0.36-1.54) | 0.43 | | |
| Above 110,000Tsh | Ref | | | |

### *3.4. Qualitative Findings*

#### 3.4.1. Knowledge Towards Clinical Trials

During our in-depth interviews and focus group discussions, we discovered various perspectives regarding the knowledge of clinical trials. Notably, majority of respondents who had more information about clinical trials were women. We found that most participants were aware that a drug must be tested in a clinical trial before being approved for use. Additionally, they were able to differentiate between clinical trials and other types of research. On the other hand, people who had previously participated in clinical trials had greater knowledge than those who had never done so.

> *"Clinical trial is like the experiment of testing drug. You test to see if it is a medicine?" Will it help the intended disease? so once it is accepted, it is sent to people to be used for treatment. But it starts with trials. Without trials, people don't put medicine in the hospital, it is tested first", so our children have been tested with the three-hour injection. My son was in the testing of the injection for one year and a half. For example, after finishing the project, that injection dose was distributed to the hospitals for injecting a new-born baby, but they started with experiments."* [P8 FGD (female, age 34yrs].

> *"I know the drug must be tested, because you cannot use something before it has been verified for use"*. [P1 FGD (female, age 46 years)].

> *"I once heard "when I took my son to the project. We were given a lesson and information about the trial project, and we were well-educated. I agreed to take part in the trial, but two of our colleagues denied on the same day and said they were not participating*." [P5 FGD (female, age 51 years)]

Furthermore, participants were asked whether they were aware of the advantages and disadvantages or side effects of taking part in the trial, they were able to explain the advantages and side effects of participating in the clinical trial and that they are always getting informed by a doctor who conducts the trial. However, the majority of participant mentioned that clinical trials made their children get free treatment throughout the trial as illustrated in the quotes below:

> *"There are advantages. For example, my son used to be sick with various diseases, but since I registered him in the project, all the diseases stopped, in my case that is a benefit."* [P4 FGD (female, age 39 years)]:

> *"The biggest benefit is getting free health services throughout the project. The services are good and reliable."* [P1 FGD (female, age 41 years)]:

> *"There are side effects. Some suffered side effects and some did not, there was one whose son got sick right away when he entered the project, but my son didn't get sick anymore. But the doctor also*

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*explained to us about the injections that it is possible that the child got convulsions or a high temperature, but he said that it is a normal symptom"* [P1 FGD (female, age 46 years)]:

*"The drug can be more powerful and affect the person being tested"* [P6 FGD (female, age 34 years)]

3.4.2. Attitude toward Clinical Trial

In the attitudes, we wanted to know what makes positive or negative attitude towards clinical trials among the general population. Participants expressed reluctance and concerns about participating in the clinical trials. They mentioned that trials involving blood often require large blood samples, and they sometimes felt uninformed about how their blood would be used. Additionally, some cited peer influence as a source of misinformation which develops negative attitude among the community towards clinical trials. Others associated clinical trials with profit-making ventures and were hesitant to participate, feeling that scientists were using them to generate profit.

*"I always get scared because I don't know what will happen after the project." [P7 FGD* (female, age 36 years*)]*

*"Many are worried due to the wrong information about the projects. Because there is many wrong information like sucking blood or drawing a lot of blood from children. So, parents refuse to participate in the projects."* [CHW IDI (male, age 56 years)]

*"Many people have been demanding money even before the project has started. From their point of view, they claim that the projects are funded, so scientists get money while for them they only volunteer, they don't get anything, so they are not ready to participate if they are not paid."* [CHW IDI (male, age 38 years.)]

*"We were told that they suck the blood of children, or draw a lot of blood, then they go to sell abroad"* [P4 FGD (female, age 39 years)]

*"Many projects involve either donating blood for testing, or testing blood, now when a citizen hears about donating blood, he is worried. Many say that the blood is sent to be sold abroad because the whites are the ones funding the projects, so they don't trust the projects at all"* [CHW IDI (male, age 56 years)]

## 4. Discussion

The present study aimed to assess the knowledge and attitude of the general population in Bagamoyo district towards clinical trials. The finding indicated that while majority of participants held a positive attitude, overall knowledge of clinical trial was low as supported by data in the result section. However, participants had moderate knowledge that drugs are being tested before use and that participation in the study is voluntary and participant can withdraw from the study at any time. The majorities were found to have a good attitude where 89.6%, reported their willingness to participate, 80.7% recommended others to participate in the trials, and 90.9% recognizing the benefit of CTs 87.8% agree the necessity of human participation in scientific progress (87.8%).

Similar findings have been reported in other studies showing high knowledge and positive attitude among the general population toward clinical trials [22,23].

Contrary to other studies, which found that higher levels of education influenced knowledge and attitudes towards clinical trials [20,24], the current study found no significant association between education level or marital status and knowledge or attitude scores. This aligns with findings from study conducted in n India, suggesting that education may not universally predict clinical trial literacy [24].

Interestingly, gender, age, and employment status emerged as significant predictors of knowledge and attitudes. Males had lower knowledge and more negative attitudes compared to females. Similar findings was observed in one study done in China [25] and contrasts with results

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from Jordan where men were found to have higher levels of knowledge. In the Bagamoyo context, this may be explained by the higher involvement of women in pediatric vaccine trials, particularly at the Ifakara Clinical Trial Centre, where women, often primary caregivers, are more directly engaged in research activities [23].

It was also found that younger and employed individuals had significantly better knowledge and more positive attitudes [25]. Younger people may have greater health literacy, more exposure to health information, and fewer barriers to participation than older adults. Employed individuals likely benefit from access to information and communication technologies, workplace health programs, and peer networks that facilitate awareness of clinical research.

Contrary to findings from Jordan and Saudi Arabia, which linked higher income with greater knowledge [19,20], our study observed greater participation and engagement among lower-income individuals. Qualitative data suggested that economic incentives such as free medical care and modest compensation may drive participation among this group. This suggests a complex interplay between economic status, perceived benefit, and motivation. While such incentives may raise ethical concerns, particularly regarding the potential for undue inducement, they are typically reviewed and approved by local ethics committees to ensure they are appropriate and ethically sound. Adherence to the Declaration of Helsinki remains essential, guiding ethical review processes to ensure that research addresses the genuine needs of the population without compromising voluntary participation.

### *4.1. Strength and Limitation*

To the best of our knowledge, this is the first study conducted in Bagamoyo, Tanzania to assess the knowledge and attitudes of the general population towards clinical trials. The results of this study provide valuable baseline data for researchers conducting CTs and who seek to improve recruitment strategies and minimize barriers to enrolling participants in CTs.

However, the study has limitations. The use of convenience sampling may have introduced selection bias, particularly with the overrepresentation of females (74.4% of respondents). This gender imbalance may limit the generalizability of findings, particularly regarding the observed differences between men and women. Furthermore, the current research findings cannot be generalized to another context due to the differences in social and cultural characteristics across the country.

## 5. Conclusions

This study highlights a disparity between knowledge and attitude regarding clinical trials in a Tanzanian community setting. While knowledge remains low, the attitude toward participation is generally positive, especially among younger, female, and employed individuals. These findings underscore the importance of tailored health education programs, particularly for older adults and the unemployed, who may face barriers to understanding or accessing trial opportunities.

Economic status appears to influence trial engagement, with lower-income individuals more likely to participate, possibly driven by access to free medical care and compensation. While these factors may contribute positively to equitable access and participation, they also underscore the importance of careful ethical oversight to ensure that recruitment remains voluntary and appropriate. Ongoing adherence to ethical guidelines and context-specific review by local ethics committees helps safeguard participant welfare and promote fairness in recruitment strategies.

We recommend developing targeted educational campaigns to improve clinical trial literacy, increasing access to information for underrepresented and vulnerable populations, ensuring representative sampling in future studies through stratified or oversampling methods, and supporting policy initiatives that fund community outreach and engagement to strengthen public trust and participation in clinical research.

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