



Female respondent acceptance of computer-assisted personal interviewing (CAPI) for maternal, newborn and child health coverage surveys in rural Uganda



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ABSTRACT

Introduction: High maternal and child mortality continues in low- and middle-income countries (LMIC). Measurement of maternal, newborn and child health (MNCH) coverage indicators often involves an expensive, complex, and lengthy household data collection process that is especially difficult in less-resourced settings. Computer-assisted personal interviewing (CAPI) has been proposed as a cost-effective and efficient alternative to traditional paper-and-pencil interviewing (PAPI). However, the literature on respondent-level acceptance of CAPI in LMIC has reported mixed outcomes. This is the first study to prospectively examine female respondent acceptance of CAPI and its influencing factors for MNCH data collection in rural Southwest Uganda.

Methods: Eighteen women aged 15–49 years were randomly selected from 3 rural villages to participate. Each respondent was administered a Women's Questionnaire with half of the survey questions asked using PAPI techniques and the other half using CAPI. Following this PAPI/CAPI exposure, semi-structured focus group discussions (FGDs) assessed respondent attitudes towards PAPI versus CAPI. FGD data analysis involved an immersion/crystallization method (thematic narrative analysis).

Results: The sixteen FGD respondents had a median age of 27 (interquartile range: 24.8, 32.3) years old. The majority (62.5%) had only primary level education. Most respondents (68.8%) owned or regularly used a mobile phone or computer. Few respondents (31.3%) had previously seen but not used a tablet computer. Overall, FGDs revealed CAPI acceptance and the factors influencing CAPI acceptability were 'familiarity', 'data confidentiality and security', 'data accuracy', and 'modernization and development'.

Discussion: Female survey respondents in our rural Southwest Ugandan setting found CAPI to be acceptable. Global health planners and implementers considering CAPI for health coverage survey data collection should accommodate influencing factors during survey planning in order to maximize and facilitate acceptance and support by local stakeholders and community participants. Further research is needed to generate best practices for CAPI implementation and LMIC; higher quality, timely, streamlined and budget-friendly collection of MNCH indicators could help direct and improve programming to save lives of mothers and children.

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Abbreviations: CAPI, computer-assisted personal interviewing; MNCH, maternal, newborn and child health; LMIC, low- and middle-income countries; PAPI, paper-and-pencil interviewing.

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1. Introduction

Each year, an estimated 300,000 maternal and six million under-five deaths occur globally [1,2]. Though these rates are an improvement from two decades ago, maternal and child mortality remains a challenge, and few low- and middle-income countries (LMIC) successfully achieved the reduction targets of both Millennium Development Goals 4 and 5 [3].

Measurement of progress towards maternal, newborn and child health (MNCH) goals is difficult [4]. National-level MNCH data in

LMIC are commonly collected using comprehensive household coverage surveys such as Demographic and Health Surveys (DHS) [5] or Multiple Indicator Cluster Surveys (MICS) [6]. However, coverage survey data collection processes are complex and lengthy [7]. Survey implementation, quality assurance, and data management are especially challenged by weak infrastructure such as poor roads and inconsistent electricity, as well as limited resources, funds, and trained personnel. Costs and time for questionnaire printing, collation, quality checks, data entry, and analysis are limiting factors [8–10].

Computer-assisted personal interviewing (CAPI) involves interviewer-administered digital questionnaires using a computerized device and has been proposed and tried as an alternative to overcome the challenges associated with traditional paper-and-pencil interviewing (PAPI). CAPI is increasingly being implemented in LMIC settings, such as for district-level maternal and neonatal health evaluations in Burkina Faso [11], Tanzania, Uganda [12], and Malawi [13], and for national-level DHS data collection in Nepal [14]. When compared to PAPI, the technical advantages of CAPI include improved data quality [14–19], lower long-term costs [13,15,19–24], and time-efficiency (e.g. direct export of collected data into an electronic database) [20,25–30].

However, shifting from PAPI to CAPI in LMIC involves potential obstacles. While some papers have documented acceptance of electronic data collection among local health professionals and data collectors based on post-survey feedback [8,16,19,23,27,31–35], acceptance among survey respondents and community members has been variable. Anecdotal experiences documented from Costa Rica [8], Tanzania [27,32], Nepal [14], Sri Lanka [30], and Fiji [16] expressed positive CAPI uptake by survey respondents, citing local intrigue for CAPI devices and the perception of professionalism associated with CAPI. Suspicion towards CAPI has been reported from South Africa [34] and Angola [36], especially related to concerns of being secretly recorded by the cameras on CAPI devices. In Ethiopia, significantly more refusals in CAPI versus PAPI cohorts were noted [10]. In Kenya, devices used for ‘audio computer-assisted self-interviewing’ were reportedly associated with devil worship by community members [37].

The Healthy Child Uganda (HCU) partnership within the Maternal, Newborn and Child Health Institute at Mbarara University of Science and Technology in Uganda frequently collects coverage-type data among women and households for evaluation and research purposes. Understanding respondent perceptions are important in helping to determine the appropriateness and best practice methods of shifting from PAPI to CAPI for MNCH-coverage surveys. To date, no published studies have prospectively explored acceptability of CAPI for MNCH-specific surveys among Ugandan or female survey respondents, nor evaluated the factors influencing CAPI acceptability. This study assessed the acceptability of CAPI and its influencing factors to inform MNCH data collection in rural Southwest Uganda.

2. Methods

2.1. Study design and recruitment

HCU has implemented community-based MNCH interventions in rural Southwest Uganda for over a decade, traditionally utilizing PAPI-administered DHS-based household surveys to evaluate project outcomes. This qualitative study conducted in early 2014 was designed to inform potential CAPI use for future HCU evaluation purposes.

Survey respondents were recruited from three randomly selected rural villages in Mbarara District, Uganda. Within each selected village, six respondents were randomly selected based on

locally provided village lists. Women were eligible if they were of reproductive age (15–49 years) with a maximum of one respondent per household. Sample size was determined based on logistical limitations while encouraging theme saturation [38].

2.2. PAPI/CAPI exposure

All eighteen respondents who were approached for the study consented and participated in the PAPI/CAPI exposure simulation. Trained and experienced interviewers verbally administered a DHS-based Women’s Questionnaire to each respondent in local vernacular. The questionnaire asked women 145 questions regarding demographics, reproductive history, ante- and post-natal care access, child health and nutrition, and fertility planning and preferences

Half of the questionnaire was administered using PAPI, and the other half was administered using CAPI. Computer-based surveys were conducted using the Epi Info™ software application loaded onto the ASUS Transformer Book T100 tablet computer (10.1-inch touchscreen display, Microsoft Windows 8.1 OS). To control for question order bias, interviewers alternated PAPI/CAPI administration order between respondents. Surveys were approximately one hour in duration and data collected during this simulation were not analyzed.

2.3. Data collection

Immediately following PAPI/CAPI exposure, a brief nine-item survey was administered via PAPI to gather information on respondent demographics, previous exposure to technology, and their overall PAPI/CAPI preference if they completed the survey a second time.

Respondents in each village were then invited to attend a focus group discussion (FGD) in the same afternoon to explore their attitudes towards PAPI versus CAPI and their experiences with each method. Of the eighteen respondents who participated in the simulation, two (11.1%) did not attend a follow-up FGD citing lack of availability for the afternoon sessions. Discussions were led by a trained local facilitator using local vernacular, and followed a semi-structured format based on the following previously piloted guideline questions:

1. How would you describe your level of technology use in your day-to-day life?
2. How did you feel about the tablet computer being used during the interview?
3. Do you consider it acceptable or unacceptable to use tablet computers during an interview? Why or why not?
4. How do you feel about the tablet computer being brought inside your home?
5. Does the topic of the interview have an effect on your feelings about using tablet computers for the interview?
6. How was your relationship with the interviewer throughout the survey?
7. How does your community feel about a tablet computer being brought inside the village?
8. What are some benefits and challenges to using tablet computers to conduct an interview?

FGDs were digitally audio-recorded and accompanied by handwritten notes.

2.4. Data analysis

Audio recordings were transcribed verbatim in vernacular, translated into English, and checked for accuracy by

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