

Effectiveness of caregiver-led screening for severe acute malnutrition: a systematic review

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Abstract

Background and objectives

There is increasing evidence that caregivers are screening their own children for Severe Acute Malnutrition (SAM). However, there are limited informative and comprehensive reviews. The systematic review aims to summarise published evidence on the accuracy of caregiver-led or CHWs screening for acute malnutrition and its effect on case detection and recovery rates for SAM.

Materials and methods

We systematically reviewed published studies from January 2010 to January 2026 across seven databases in accordance with the PRISMA guidelines. Of the 989 studies identified, 16 were selected for full-text review. The studies reviewed assessed self-screening for SAM by caregivers or CHWs using MUAC and bilateral Oedema. We extracted data on study objectives, design, population, intervention types, anthropometric assessments, follow-up durations, outcomes, and key findings. The results were synthesized to draw our conclusions. PROSPERO ID: CRD420251161745.

Results

A few studies were randomized controlled trials (RCTs), and most were limited in scope and geographical location. Findings showed that caregivers could screen their children using the MUAC assessment with high accuracy as that of the CHWs. Studies reported improved case detection and recovery rate for SAM children screened by minimally trained caregivers.

Conclusion

Caregivers could screen their children using the MUAC tape with high accuracy, comparable to that of community health workers. We recommend conducting further RCTs and incorporating the caregiver-led screening for acute malnutrition, a task-shifting strategy, into the public health framework for managing acute malnutrition.

1 Introduction

Severe Acute Malnutrition (SAM) remains a leading cause of global morbidity and mortality among children under five years of age, and it is unlikely to decrease without significant concerted interventions and actions [1]. Malnutrition is a state of relative or absolute deficiency or excess of one or more essential nutrients [2]. It affects 49 million children (7.3%) worldwide, accounting for 45% of deaths among children under five, especially in developing countries. Africa bears 28% of the global burden of malnutrition [3].

Improving early diagnosis and management of SAM is crucial to the reduction of morbidity and mortality resulting from acute malnutrition [4]. Despite different interventions implemented to reduce the burden of malnutrition, the economic situation and the recent COVID-19 pandemic have further worsened the nutritional status of children under 5 years old [5]. The Community Management of Acute Malnutrition (CMAM) approach is used to intensify screening and referral for acute malnutrition in the community, and to manage SAM with Ready-To-Use Therapeutic Food (RUTF) [6].

Trained Community Health Workers (CHWs) have been engaged in community-based screening, referral, and caregiver sensitization on acute malnutrition [6, 7]. However, their full participation in the CMAM approach has been hampered by a shortage of funds and resources to sustain their community activities [8]. In the absence of appropriate incentives, the majority of CHWs are typically not actively engaged in the community. The hindrance to the continuation of CHW services at the community level has contributed to low SAM screening coverage, late presentation, and delayed or low recovery rates [9, 10]. Earlier studies in Africa have reported average SAM cure rates of 56% [11] and 48% [12], respectively. The low cure rate compromises the program's ability to respond to needs and reduce the burden of malnutrition effectively.

There is growing evidence on the use of MUAC screening for acute malnutrition by caregivers [13, 14, 15, 16]. Engaging caregivers in MUAC screening has the potential to enhance the early detection and management of SAM in children, reduce late presentation and hospitalization, and thereby increase coverage of CMAM programs. Although primary studies have explored the effects of caregivers' or CHWs' MUAC screening on SAM management in Sub-Saharan Africa [13, 14, 15, 16], there are inadequate informative, comprehensive reviews. The systematic review aims to summarize the published evidence on the accuracy of caregiver-led or CHWs screening for acute malnutrition and its effect on case detection and recovery rates for SAM. The findings of the review could support planning and implementation of nutrition and related interventions, as well as inform policy and practices on community management of acute malnutrition in vulnerable settings.

2 Materials and methods

The systematic review was conducted in accordance with the standards set by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement [17]. It was registered before the review was conducted (PROSPERO 2025 CRD420251161745). The literature search was limited to studies published from January 2010 to January 2026 (the date the search concluded) across seven databases. Studies that addressed screening for acute malnutrition by caregivers or CHWs were eligible for the systematic review. We restricted the search to studies conducted in Africa, but we did not restrict the methods or the languages of the studies reviewed, as we aimed to capture a broad range of findings that might otherwise be limited.

2.1 Inclusion criteria

The inclusion criteria included studies with a target population of caregiver-child pairs aged 6–59 months, which engaged either the caregivers or CHWs in screening children for acute malnutrition, the MUAC measurement was included as an anthropometric measure to screen children for acute malnutrition, and those that were observational (cross-sectional, case-control, prospective, and retrospective cohort), experimental, intervention, and qualitative.

2.2 Exclusion criteria

The exclusion criteria include unrelated topics, unavailable documents, ongoing trials, protocols, and unpublished studies.

We identified studies that met our inclusion criteria by screening titles and abstracts. Following this process, articles that met the eligibility criteria were retained and screened for full-text review.

2.3 Data sources and search strategies

Seven databases or information sources used to retrieve records for review studies include PubMed, BASE, ScienceDirect, MedlinePlus, African Journals Online, Scopus, and Medline.

The electronic terms and queries used to search for studies were: “caregiver” OR “community health worker” AND “acute malnutrition” OR “SAM” OR “uncomplicated SAM” OR “MAM” OR “Mid Upper-arm circumference”; “sensitivity” OR “specificity” OR “reliability” AND “caregiver” AND “CHW” AND “anthropometry”; OR “community diagnosis” OR “community detection” AND “family MUAC” OR “MUAC” OR “oedema”; “malnutrition” AND “child”; “home-based therapy” AND “SAM” OR “acute malnutrition”; “Self-screening”; “CMAM” AND “coverage”; “effectiveness” OR “efficacy” AND “community SAM screening”, and referral for acute malnutrition.

2.4 Outcome Measures

The study's primary outcome measures are (1) accuracy of MUAC measurement and (2) SAM case detection and recovery.

2.5 Study selection, Data Extraction, and Quality Assessment

The study selection process followed four key steps, as previously done in a study [17]. A list of potential research studies was independently compiled by two authors (AMA and OPO) through a database search. Thereafter, the titles and abstracts of the studies were exported to EndNote version 21 and screened against the eligibility criteria. Duplicate studies were removed, and the remaining ones were independently assessed and selected for full-text reading and further screening by author IOA. Lastly, all authors included the articles that met the eligibility criteria for data extraction. The Covidence web-based collaboration software platform was used to develop the data extraction form and extract data [18] (Covidence). The three authors trial outcomes simultaneously. Trial inclusion issues or disagreements were resolved through discussion and consensus or, if need be, through third-party arbitration. The extracted data include record reference, country, study objectives, design, population, sample size, type of intervention, anthropometry used, follow-up period, study outcomes, and key findings. A qualitative synthesis and a descriptive summary of the included studies were conducted. For missing data or unclear information, two authors (AMA and IOA) contacted the study authors.

The risk of bias was independently assessed by the three authors (AMA, IOA and OPO) according to the recommendations of the Cochrane Handbook for Systematic of Interventions (version 5.1.0, <http://www.handbook.cochrane.org>). The authors resolved all disagreements through discussion. The risk-of-bias domains considered include selection (random sequence generation and allocation concealment), performance (patient blinding), detection bias (assessor blinding), attrition bias (incomplete outcome/missing data), selective outcome reporting, and information bias (including recall bias).

We presented outcome measures using tables of synthesised studies. Effect measures such as risk ratios, mean differences, and weighted Kappa coefficients were used to reveal the results of the included studies.

3 Results

3.1 Study selection and participants

A total of 989 studies were screened, and 321 were selected for full-text review. For the review, 16 studies met our inclusion criteria (Fig 1). Of the 16 published studies, 2 were conducted in Nigeria [19, 20] while 14 others were conducted in other African countries. A summary of the studies reviewed is shown below (Tables 1)

Table 1: Summary of published studies reviewed (n=16)

S/N	Author, publication year	Country	Objective	Study design	Population, sample size	Type of intervention	Anthropometry	Follow-up period	Study outcome
1	Isanaka et al., 2020	Niger	Assess caregivers' ability to retain knowledge related to surveillance of clinical danger signs and anthropometric measurement over 28 days.	Cohort Pilot	Caregivers of children with SAM. n=128	30 minutes training on clinical danger signs among children and the use of MUAC tape	MUAC	28 days	1. No clinical signs before and after 2. Accuracy of MUAC measurement with
2	Daures et al., 2020	Burkina Faso	Determine whether optimizing treatment of malnutrition using train mothers conforms with recovery rate of > 75%	Single-arm proof-of-concept trial	Mothers/caretakers of children aged 6-59 months. n=4,958	Training on screening for SAM	MUAC + Oedema	-	Recommendation for SAM
3	Ale et al., 2016	Niger	Evaluate the efficacy of two community-based strategies to SAM screening.	Non- RCT	Mothers of children aged 6- 59 months. n=12, 893	A-day training + quarterly refresher training	MUAC + Oedema	-	1. Accuracy of MUAC and HW. 2. No SAM referral 3. Proportion of infants for SAM
4	Blackwell et al., 2015	Niger	Determine whether minimally trained mothers could use a colour-banded MUAC strap.	Non-RCT	Mother-child pairs n= 103	A-day community session training on MUAC screening for mothers.	MUAC	-	Agreement between MUAC and CHW (Sensitivity and specificity NPV)
5	Tickell et al., 2023	Kenya	Assess the effectiveness of a maternal administered monitoring system (supported by two-way SMS) on the time to diagnose of moderate or severe wasting	RCT	Children 5- 12 months. n= 1, 200	10-minutes training on MUAC assessment + receives weekly two-way SMS	MUAC	6 months	-Time to diagnosis confirmed wasting - Treatment coverage
6	Oladeji et al., 2022	Ethiopia	Assess the use of family MUAC for screening acute malnutrition	Pilot records review	Mentored mothers of children aged < 5 years. n=100	4-day training + self-screening for SAM once monthly	MUAC	-	-Accuracy of MUAC measurement - Referral for SAM

7	Bountogo et al., 2026	Burkinafaso	Assess the acceptability and feasibility of engaging trained caregivers on SAM relapse prevention.	RCT	Caregivers of children 6 – 59 months recovered from SAM. n = 200	Onsite and follow-up training + screening of child	MUAC, WHZ	6 months	• • •
8	Ali et al., 2025	Nigeria	Effect of training on the knowledge and confidence of home surveillance for uncomplicated SAM cases	Cross-over RCT	Caregivers of SAM children 6- 59 months. n = 3,945	Onsite and monthly follow-up training + MUAC and clinical danger signs identification	MUAC	4 to 12 weeks of programme discharged + 3 months post follow-up	Nutri reco' Know confi hom and anth surve Accu MUA mea:
9	Kozuki et al., 2020	Sudan	Assess the treatment outcomes of SAM children treated by low-literate CHWs/CBDs	Prospective cohort study	SAM children aged 6-59 months n= 320	6-day training of CBDs	MUAC	16 weeks	-SAM reco' - Dur reco'
10	LaCourse et al., 2014	Malawi	Evaluate the use of lay screeners to identify SAM children	Cross-sectional study	Children aged 6-60 months n = 3,116	-Training of ward-based Lay-screeners for 10 days.	MUAC+Height-Length-weight+Oedema	-	- Nur SAM
11	Wilunda et al., 2021	Tanzania	Assess the effectiveness and coverage of SAM treatment by CHWs compared with OTC	Non-inferiority quasi-experimental study	Children aged 6-59 months. n= 364	CHWs' weekly home management of SAM children	MUAC+ weight	6- 12 weeks	-Cure SAM - SAM treat cove
12	Mwangome et al., 2012	Kenya	Assess the inter-observer variability and accuracy of MUAC and	Cross-sectional study	Infants < 6 months old n = 150	One-day training of CHWs.	MUAC+Weight, height/length	-	Accu MUA and I mea:

					WFLz performed by CHWs.				
13	Charle-Cuellar et al., 2021	Mauritania	Assess the effectiveness and coverage of SAM treatment delivered by CHWs	non-RCT	SAM children aged 6-59 months n = 869	Outpatient treatment for uncomplicated SAM by CHWs	MUAC +Oedema	6-12 weeks	-Prop cure -CM/ cove
14	Lopez-Ejeda et al., 2020	Mali	Assess whether SAM treatment delivered by CHWs close to households may improve early identification of cases compared to OTC	Prospective cohort study	SAM children 6 – 59 months n = 930	CHWs received 2 weeks training + one month onsite practice	MUAC+ Oedema+Weight-height	12 weeks	-Nun com case - Cur defa
15	Adesoro et al., 2021	Nigeria	Determine the effectiveness of non-clinical CHWs in curing SAM children.	Sequential multi-method design	Child 6-59 months enrolled n= 290	60 CHW trained for 6 days on SAM management	MUAC	6 months	Recc for S
16	Alvarez-Moran et al. 2017	Mali	To assess the technical capacity and quality of care of CHWs managing cases of uncomplicated SAM at the community level.	Cross-sectional study	-Children < 5 years old n=125	CHWs were trained for 6 months on SAM assessment.	MUAC+ Oedema	-	1. Qu child asse for S

SAM= Severe acute malnutrition, MUAC= Mid-upper arm circumference, SAM= Severe acute malnutrition, WFA= Weight for Age, WFH= Weight for Height, HFA= Height for Age, CHW= Community health worker, LHW= Lady Health Workers, NPV= Negative Predicted Value, PPV= Positive Predicted Value, CBDs= Community-based distributors, CMAM= Community Management of acute malnutrition, NA= Not applicable, HW= Health worker, FGD= Focus Group Discussion, RCT= Randomised control trial, OTC=outpatient therapeutic care, MIYCN= Maternal Infant and Young Child Nutrition

3.2 Review of studies on screening for acute malnutrition by caregivers and Community Health Workers

Of the 16 published studies on screening for acute malnutrition, 8 involved caregiver self-screening [13, 14, 15, 16, 20, 21, 22, 23], whereas the other 8 engaged CHWs in screening [19, 24 - 30]. The MUAC was used only for anthropometric assessment in 7 studies, 4 studies used the combination of MUAC and bilateral pitting Oedema, and 5 studies used the combination of MUAC, Oedema, and weight-for-height for SAM screening. Fourteen (14) of the 16 studies reported training for those who were to screen for SAM, ranging from a minimum of 10 minutes to a maximum of 6 months of refresher monthly training, as noted in many of the studies. Of the 9 follow-up studies reviewed, participants were followed for 6-16 weeks in 5 studies and for 6 months in 4 studies.

The studies showed high agreement (80%, sensitivity >98%) between MUAC measurements conducted by caregivers with the nutrition officers, and CHWs [13, 15, 16, 20]. In addition, other studies among CHWs reported a high agreement of 96.8% compared to health workers [30]. Ale et al. (2016) also reported similar findings, noting that the 1.9 risk ratio of mothers' MUAC matched that of health workers [15].

Some studies found that caregiver or CHW engagement in screening for acute malnutrition improved case detection [15, 25]. Isanaka et al. (2020) assessed caregivers' ability to recognize clinical danger signs and perform anthropometric assessments, and found an increase in the mean number of clinical danger signs they identified [13]. In Malawi, LaCourse et al. (2014) reported increased case findings for SAM among CHWs [25], while 2 other studies among caregivers/mothers reported an increase in the mean number of danger signs identified / case detection by caregivers after training [13,15].

Many studies reported increased recovery rates for SAM cases [14, 15, 19, 20, 21, 24, 26, 28, 29, 30]. The recovery rate was as high as 86.3% for SAM screened by trained caregivers [14] and 75% for CHWs [19]. The recovery rate for SAM screened by CHWs reported by Daures et al., (2020) and Adesoro et al., (2021) was below the sphere standard (< 80%) for management of SAM cases [14,19]. In addition, some studies reported few hospitalizations or inpatient rates among children screened by caregivers or community health workers [15, 21, 29].

4 Discussion

The study reviewed published literatures on the use of MUAC for screening for Severe Acute Malnutrition (SAM) by caregivers and community health workers. Specifically, the accuracy of MUAC measurement and the effects on case detection and recovery rates for SAM cases were explored. Given the need to intensify early case detection and management of SAM, the evidence base on engaging caregivers in screening for acute malnutrition is likely to expand in the coming years. Despite the high burden of malnutrition in Nigeria, very few studies have examined interventions in the country [19, 20]. The dwindling funding for nutrition interventions and limited knowledge and skills in implementation science may have contributed to the low level of evidence in the country [25, 31]. There may be a need to conduct further implementation research studies on caregiver-focused screening or diagnosis of SAM in Nigeria.

Engaging CHWs in case detection of SAM in the community has been the model in most African countries implementing community management of acute malnutrition (CMAM) [26]. According to national CMAM guidelines, trained CHWs conduct household-level screening for SAM using the MUAC tape, refer cases to the treatment center, and provide nutritional messages to caregivers in the community [6]. The paradigm shift of engaging caregivers in household-level screening of children using the MUAC tape has been explored in studies conducted in Africa. Many of these studies found high agreement between MUAC measurements taken by caregivers and those by facility health workers [13, 15, 16, 20, 21, 23]. Additionally, other studies reported higher agreement between caregivers and facility workers' MUAC than that observed between CHWs and facility staff [15]. The long duration of caregiver training may have contributed to the high MUAC agreement rate compared with other related studies with shorter training durations [13, 16]. In Ale et al.'s (2016) study, caregivers received daily, 6-hour, and quarterly individual training, and mothers' MUAC was more likely to align with the nutrition officer's than with the CHWs' [15]. In Mwangome et al. (2012) study, CHWs were trained for a day, and found that the MUAC measures differed from those of their trainers [27].

The studies showed improved community-based SAM screening coverage [22], identification of danger signs for acute malnutrition [13, 15], and higher recovery rates for SAM cases [14, 15, 19, 20, 21, 24, 26, 28, 29, 30] following caregiver or CHW engagement in acute malnutrition screening. These findings showed that both the caregiver and CHW-focused models for detecting and classifying SAM using MUAC have the potential to improve case outcomes. Charle-Cuellar et al. (2021) reported that CMAM coverage increased by 18% when CHWs were engaged in SAM screening [28], and a similar finding was reported among caregivers in Niger [13]. However, understanding how best to ensure caregivers continue MUAC screening, as well as the challenges they may encounter, needs to be explored in future research.

4.1 Limitations

We found limited evidence on caregivers' screening for acute malnutrition, particularly in Nigeria, which has a high burden of malnutrition. Few studies were randomized controlled trials, which may be affected by selection bias and confounding factors, making it difficult to apply the findings to a broader, real-world population. Some studies may be affected by performance bias, as no blinding was reported for assessors or participants. In addition, different studies reported incomplete data and exclusion of participants from the analysis. This may result in attrition bias and significantly affect the power of the studies.

5 Conclusion

In conclusion, studies on caregiver-led or community health workers screening for acute malnutrition using the MUAC tape found high accuracy, clinical case detection, and recovery rates for severe acute malnutrition, particularly among those trained. Furthermore, some studies reported reduced inpatient care rates for children with Severe Acute Malnutrition (SAM) when caregivers or CHWs performed MUAC assessment; however, evidence on caregivers' involvement in MUAC screening is limited.

Few studies used the randomized controlled trial (RCT) design, despite its potential to minimize bias that may affect study outcomes. We suggest further RCTs that focus on caregivers' direct engagement in screening children for SAM. Given the positive outcomes reported among caregivers' self-screening for acute malnutrition, there is a need to incorporate this task-shifting into the health system or public health framework for the management of acute malnutrition.

Declarations

Data availability

No datasets were generated or analysed during the conduct of the study.

Code availability

None

Competing interest

The authors declare no competing financial and non-financial interests.

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Author contributions

The study was conceptualized by authors AMA and IOA. Authors AMA and OPO conducted the analysis and wrote the initial draft of the manuscript. Authors AMA and IOA reviewed the first draft, and the final version of the manuscript was approved by all authors

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Figures

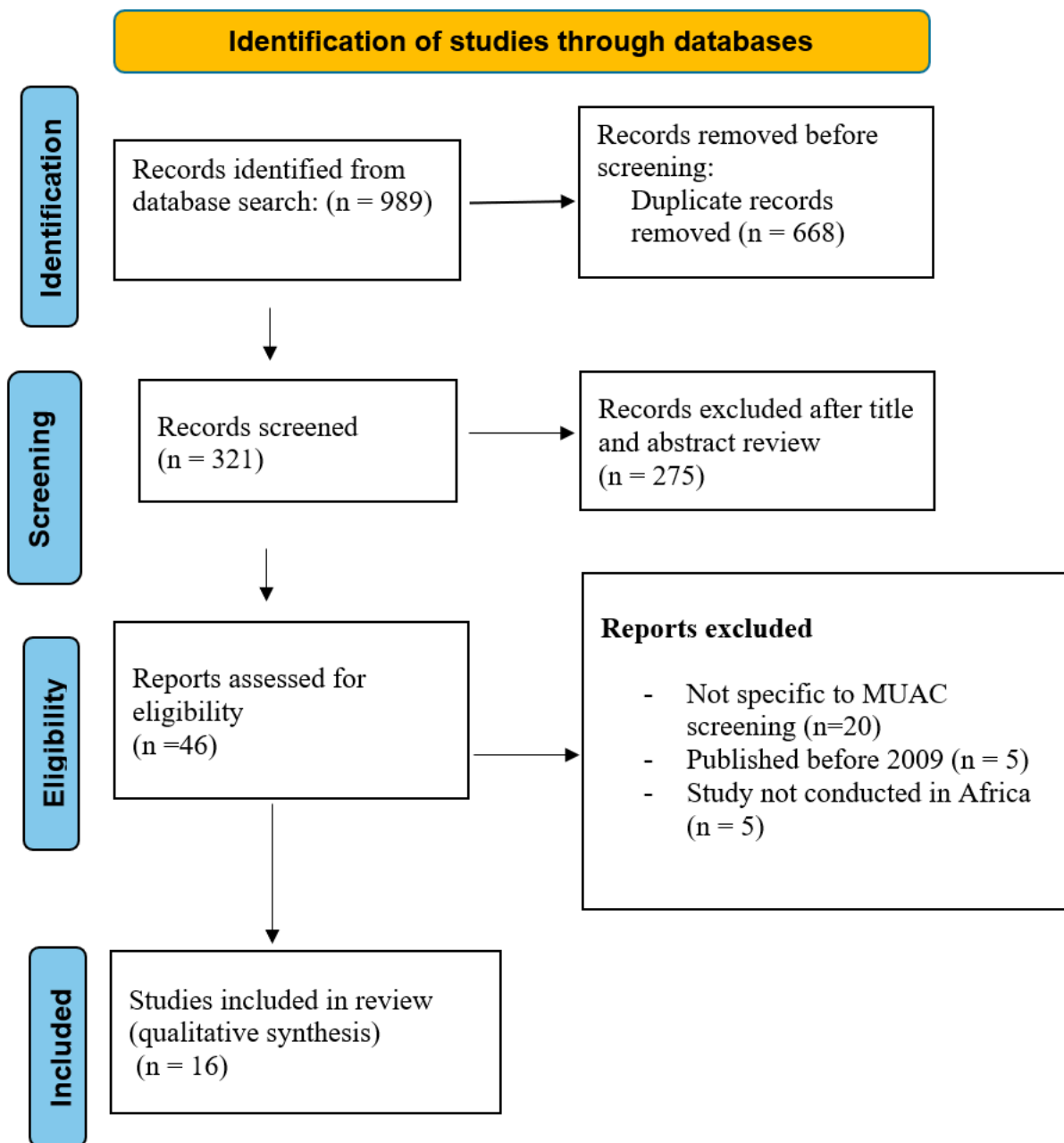


Figure 1

Flow diagram of study selection process