Methodology and reporting quality of 544 studies related to ageing: a continued discussion in setting priorities for ageing research in Africa

Kalu, Michael E; Okeke, Chukwuebuka; Nwachukwu, Ernest; Okoh, Augustine; Akinrolie, Olayinka; Ezulike, Chigozie D; Adandom, Henrietha; Onyeso, Ogochukwu K; Egbumike, Joesph; Olatunji, Funmibi D; Ugwuodo, Ebere P; Ojembe, Blessing U; Adandom, Israel I; Anagbaso, Akaolisa J; Akinrolie, Omobolade M; Anieto, Ebuka M; Ekoh, Prince C; Makanjuola, John O; Ibekaku, Michael C; Iwuagwu, Anthony O; Onyekere, Chukwuebuka P; Muomaife, Kelechi J; Nkoroh, Chinonyerem; Odega, Adaobi; Ogbueche, Chukwudi M; Omeje, Chidimma; Onyekwuluje, Chisom I; Oyinlola, Oluwagbemiga; Rayner, Daniel; Ugwuja, Immaculata A

Published in:
Journal of Global Health Economics and Policy

DOI:
10.52872/001c.36188

Publication date:
2022

Document Version
Publisher's PDF, also known as Version of record

JOGHEP

Kalu ME, Okeke C, Nwachukwu E, et al. Methodology and reporting quality of 544 studies related to ageing: a continued discussion in setting priorities for ageing research in Africa. *Journal of Global Health Economics and Policy*. Published online June 10, 2022:2022010.

Original articles

Methodology and reporting quality of 544 studies related to ageing: a continued discussion in setting priorities for ageing research in Africa

Michael E Kalu[1] [a], Chukwuebuka Okeke[2], Ernest Nwachukwu, Augustine Okoh[3], Olayinka Akinrolie[4], Chigozie D Ezulike[5], Henrietha Adandom[6], Ogochukwu K Onyeso[6], Joesph Egbumike[7], Funmibi D Olatunji[8], Ebere P Ugwuodo[9], Blessing U Ojembe[10], Israel I Adandom[11], Akaolisa J Anagbaso[11], Omobolade M Akinrolie[12], Ebuka M Anieto[13], Prince C Ekoh[14], John O Makanjuola[15], Michael C Ibekaku[16], Anthony O Iwuagwu[17], Chukwuebuka P Onyekere[9], Kelechi J Muomaife[18], Chinonyerem Nkoroh[19], Adaobi Odega, Chukwudi M Ogbueche[20], Chidimma Omeje[21], Chisom I Onyekwuluje, Oluwagbemiga Oyinlola[22], Daniel Rayner[23], Immaculata A Ugwuja, for Emerging Researchers & Professionals in Ageing-African Network (www.erpaan.org) [b]

[1] School of Rehabilitation Science, McMaster University, [2] Birmingham Community NHS Foundation Trust, [3] Health Policy PhD program, Faculty of Health Science, McMaster University, [4] Applied Health Science Program, Faculty of Graduate Studies, University of Manitoba, [5] Department of Social Work, University of Nigeria; Department of Social and Behavioural Sciences, City University of Hong Kong, [6] Population Studies in Health, Faculty of Health Science, University of Lethbridge, [7] Evangel University, [8] Department of occupational Therapy, Faculty of Community and Health Sciences, University of the Western Cape, [9] Department of Medical Rehabilitation, College of Medicine, University of Nigeria, [10] Department of Health, Ageing & Society, McMaster University, [11] Physiotherapy Department, Cedacrest Hospitals, [12] Aborginal Health and Wellness, [13] Department of Health and Rehabilitation Sciences, University of Cape Town; School of Health and Life Sciences, Glasgow Caledonian University, [14] Department of Social Work, University of Nigeria; Faculty of Social Work, University of Calgary, [15] Faculty of Nursing Sciences, University of Medical Sciences, Ondo, [16] Department of Physiotherapy, Federal Medical Center, Jalingo, Nigeria, [17] Department of Social Work, University of Nigeria, [18] Physiotherapy Department, University of Portharcourt Teaching Hospital, [19] Public Health; Department of Optometry, Faculty of Medicine & Health Sciences, Abia State University, [20] School of Health and Life Sciences, Glasgow Caledonian University, [21] Physiotherapy unit, Asaba Specialist Hospital, [22] School of Social Work, University of Nigeria, [23] Department of Health Science, Faculty of Health Science, McMaster University

Keywords: Quality assessement, Ageing, Sub-Saharan Africa, Mapping review, Older adults

https://doi.org/10.52872/001c.36188

Journal of Global Health Economics and Policy

Background

The quality assessment provides information on the overall strength of evidence and methodological quality of a research design, highlighting the level of confidence the reader should place on the findings for decision making. This paper aimed to assess the quality (methodology and quality of reporting) of ageing studies in Sub-Saharan Africa (SSA).

Method

This paper is the second of a Four-Part Series paper of a previous systematic mapping review of peer-reviewed literature on ageing studies conducted in SSA. We updated the literature search to include additional 32 articles, a total of 544 articles included in this paper. Downs & Black checklist, Case Report guidelines checklist, the 45-items Lundgren et al. checklist, and the Mixed Method Appraisal Tool were used to assess the methodological quality of quantitative, case reports, qualitative, and mixed-method studies. Quality assessment was piloted and conducted in pairs for each study type. Depending on the checklist, each study was classified as excellent, good, fair, or poor.

Result

Of the 544 articles, we performed the quality assessment of a total of 451 quantitative studies [Randomized control trials (RCTs) and pre-post (n=15), longitudinal (n=122), case-control (n=15) and cross-sectional (n=300); 4 case reports, 74 qualitative and 15 mixed-method studies. Only 20.4% (n=111) articles were of high quality [one RCT, 27 longitudinal, 4 case-control, 48 cross-sectional studies, 19 qualitative, and 12

a **Corresponding author:**
Michael E Kalu (BMR.PT, MSc, Ph.D. (c), Emerging Researchers & Professionals in Ageing-African Network, 158 Bond Street South, Hamilton Ontario. L8S 1T2. Canada; mikebassey83@gmail.com

b All authors of this article are affiliated with Emerging Researchers & Professionals in Ageing-African Network (www.erpaan.org)

mixed-method studies]. The remaining 433 were rated as moderate quality (n=292, 53.7%), fair quality (n = 96, 17.7%) and poor quality (n = 45, 8.2%). Most (80%) quantitative articles' sample size is small, resulting in insufficient power to detect a clinically or significant important effect. Three-quarter (75%) of the qualitative studies did not report their research team characteristics and a reflexivity component of the 45-items Lundgren et al. checklist. Mixed-method studies with low quality did not report the qualitative studies properly.

Conclusion

We conclude that the methodological and quality reporting of published studies on ageing in SSA show variable quality, albeit primarily moderate quality, against high quality. Studies with a large sample size are recommended, and qualitative researchers should provide a section on research team members' characteristics and reflexivity in their paper or as an appendix.

INTRODUCTION

The world's ageing population is growing fast, and the population of older people is projected to reach 2.1 billion in the next three decades.[1] Similar trend of increasing elderly population has been observed in developed and developing countries, including the sub-Saharan African (SSA) region.[1] Although the population of older people aged 60 years in SSA constitutes less than 10% of the total population, a rapid demographic shift has been observed in this region - doubling the number of older people in some developed regions such as northern Europe by 2050.[2] By 2050, the population of older people in SSA is estimated to reach 163 million,[2] implying that more people will live longer than in previous generations. However, in this region, widespread poverty, lack of social security, and poor health outcomes characterize the living condition of the average older adult and hinder successful and healthy ageing.[1] Hence, strategies to address these issues are needed to prepare for the impending elderly population growth.

Despite the anticipated problems posed by the demographic shift, little consideration has been given to ageing research in SSA.[3] Compared to the global north, the scarcity of data or research limits the formulation of viable policies to prepare the SSA countries for the future needs of the growing elderly population.[4] However, efforts have encouraged research in the SSA region. Such efforts include, but are not limited to, stakeholders meetings organized by the National Institute in Ageing to advance ageing research in Africa in 2004[4]; establishing data collection centres for the Study of Global Ageing and Adult Health in three SSA countries – Ghana, South-Africa and Uganda (SAGE)[5]; and recently Emerging Researchers & Professionals in Ageing-African network's articles on setting priorities for ageing research in the SSA.[6] The latter group conducted a systematic mapping review of 512 ageing peer-reviewed studies, predominantly quantitative cross-sectional studies with a greater percentage of the included articles focused on HIV/AIDs, noncommunicable disease and cancer, followed by studies on the physical functioning of the older adults.[6] Another important finding from this review was that studies, regardless of study design, increased tremendously over a decade, 316% increase for quantitative studies, 293% for qualitative, and 300% for mixed-method studies.[6] While this proliferation of studies is a welcome development in preparation for the projected increase in the older adult population in the SSA region, little is known about the quality of these studies.

Quality assessment (also called quality appraisal or critical appraisal) systematically examines research evidence to assess its validity and relevance before using it for decision-making.[7] As Sanderson et al.[8] described, quality is an amorphous concept that typically entails two components: quality of reporting and methodology (i.e., what was done in a study's design, conduct, and analysis) in research. Examples of methodological qualities include bias assessment, such as selection, performance, detection, attrition, and reporting selective biases; tools have been designed to assess these qualities.[9] Reporting quality describes how well an article is written, often in a simple checklist.[9] The EQUATOR (Enhancing the QUAlity and Transparency Of health Research) network described reporting guidelines are tools designed to ensure accurate, complete, and transparent reporting of research studies to support research productivity and usefulness.[10] They have registered 256 guidelines on various health and social research study designs.[11,12] Methodology reporting is often challenging, especially when there is a poor quality of reporting. Therefore, authors are encouraged to assess articles with a tool containing sections for reporting and methodology quality, e.g., Downs & Black Checklist.[13] In summary, the quality assessment provides information on the overall strength of evidence and methodological quality of a research design, highlighting the level of confidence the reader should place on the findings for decision making.

Appraisal of the methodological characteristics of ageing studies in SSA could help determine the strengths and weaknesses of these studies and how they could impact evidence and recommendations. High-quality empirical research is needed in SSA to know the current situation of older people, improve quality of life, promote healthy ageing, and inform policies. Therefore, this study aimed to assess the quality of studies on ageing in SSA.

METHODS

This paper is the second in a four-part series that aims to set priorities for ageing research in the SSA.[6] The detailed methodology of the mapping review has been published elsewhere.[6] Summarily, this paper followed Grant and Booth's[14] description of a mapping review to categorize existing literature to commission further reviews and/or pri-

mary research by identifying gaps in the literature. The quality of existing literature is essential to identify the literature gaps and possibly commission further studies.

SEARCH STRATEGY, STUDY SELECTION, AND DATA EXTRACTION

Comprehensive search strategy, study selection and data extraction have been published elsewhere.[6] Summarily, we searched seven databases, including PubMed, Excerpta Medica database (EMBASE), Cumulative Index to Nursing and Allied Health Literature (CINAHL), PEDRO (physical evidence database), Cochrane CENTRAL, PsycINFO and Web of Science, using medical subheadings (MeSH) in two concepts - Ageing and countries in Africa. The last search in the Kalu et al.[6] was in February 2021, and we updated our search till December 2021. We included qualitative, quantitative or mixed-method studies focusing on older adults (55 years and older – 55years is considered to be older in the SSA region[15]), either directly (research conducted with or for older adults) or indirectly (e.g., studies that explored the experience of healthcare workers and students in providing care to older adults) (for full inclusion and exclusion criteria see Kalu et al.[6]). Multiple reviewers selected data (title/abstract/full-text screening) using predefined inclusion and exclusion criteria and extracted study data. Any disagreement was resolved in research meetings.

CURRENT PAPER METHODOLOGY – QUALITY ASSESSMENT OF THE INCLUDED STUDIES.

This current study focused on the quality assessment of the articles in Kalu et al.'s[6] review and articles retrieved from an updated search. Different tools were used for the quality assessment of the included studies. While the Down and Black Checklist was used to assess the quantitative studies,[13] Case reports were assessed using Case Report (CARE) guidelines checklist.[16] A 45-items tool described by Lundgren et al.[17] was used to assess the qualitative studies, and mixed-method studies were assessed using the Mixed Methods Appraisal Tool (MMAT).[18]

Quantitative studies. The methodological and quality reporting of randomized controlled trials was rated using the Downs and Black Checklist (maximum score 28) and non-randomized trials using a modified checklist version (maximum score 24).[13] The original checklist is comprised of 27 items over five domains [reporting (n=10 items), external validity (n=3), internal validity-bias (n=7), interval validity-cofounding (n=6), and power (n=1)]. Each item was rated as 0 (no or unable to determine) or 1 (yes), except for item 5, which was rated as 0 (no), 1 (partially), or 2 (yes).[13] Articles received a score of 0 on the Power domain if the sample size was <300 based on population-based calculation for cross-sectional studies[19] or if the authors did not state a prior sample size calculation for Randomized control trials (RCTs), to ensure that the study was adequately powered. The original version was used to rate the quality of RCTs and quasi-experimental studies, while the modified version[20] was used to rate cross-sectional, longitudinal studies and case-control studies. See Table 1 for modifications and scoring.[21]

Case report studies. The quality of reporting of case reports or case series was assessed using the CAse REport (CARE) guidelines checklist,[16] consisting of 31 items, which was rated as 0 (no - if the item is not identified in the report) or 1 (yes - if the item is identified in the description); the highest possible score is 31. We rated the quality of reporting of the included studies as high (26-31), moderate (20-25), and >20 (poor).

Qualitative studies. We assessed the quality of the included studies using a 45-items tool previously described by Lundgren et al.[17] We chose this tool because it provides additional items such as ethical issues, audit mechanism, relevance and transferability lacking in some other checklists used in assessing the quality of qualitative studies (e.g., Consolidated criteria for reporting qualitative research 32-item checklist). The Lundgren et al.'s[17] 45 items composite grid checklist has five domains: research team and reflexivity (8-items), scope and purpose (2-items), study design (17-items), analysis and findings (14-items), and relevance and transferability (4-items). We rated all 45-items as 0 (no or not applicable) or 1 (yes); the highest possible score is 45. We rated the quality of the included studies as high (39-45 points), moderate (31-38) and low (⩽30).[17]

Mixed-method studies. The Mixed Methods Appraisal Tool (MMAT), developed in 2006 and last revised in 2018,[18] was used to appraise the methodology qualities of the mixed-method studies. The tool consists of 6 sections with related questions, of which assessors are required to answer – *"Yes", "No", or "Can't tell"* with an option of writing a comment. Each of the six sections (qualitative, quantitative-RCT, quantitative-non-RCT, quantitative descriptive and mixed method) contains five questions, except the screening question has only two questions. For each study, we choose the appropriate quantitative study design and the qualitative study to appraise, in addition to the five questions mixed-method section. The five questions for mixed-method were grouped into *Justification* - Is there an adequate rationale for using a mixed-methods design to address the research question?; *Integration* - Are the different components of the study effectively integrated to answer the research question?; *Interpretation* - Are the outputs of integrating qualitative and quantitative components adequately interpreted?; *Disagreements* - Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?; and, *Adherence* - Do the different components of the study adhere to the quality criteria of each tradition of the methods involved? For a sample of the MMAT, see http://mixedmethodsappraisaltoolpublic.pbworks.com/w/file/fetch/127916259/MMAT_2018_criteria-manual_2018-08-01_ENG.pdf. The overall numerical scoring of the MMAT is discouraged because it is less informative and fails to show the aspects of articles (qualitative vs quantitative) that are problematic.[18] Instead, MMAT developers recommended that authors report the quality of each study design and the mixed method component and describe each study as a low or high MMAT studies. We classify a component (qualitative or quantitative) as low if they ⩽ 60% of the MMAT criteria (i.e., if ⩽ three questions were yes), and high if they > 60% (i.e., more than three questions were yes); this classification has been used previously.[22]

Table 1. Downs and Black Checklist scoring modifications for each study type

Study type	Maximum score	Excellent	Good	Fair	Poor
*RCT and Quasi -experimental studies	28	23 – 28	17 – 22	12 – 16	<12
#Case control and Longitudinal studies	24	19 – 24	13 – 18	8 – 12	<8
#Cross-sectional studies	23	19 – 23	13 – 18	8 – 12	<8

*The original checklist consists of 27 items, with each item rated as 0 (no or unable to determine) or 1 (yes), except for item 5, which was rated as 0 (no), 1 (partially), or 2 (yes), resulting in a maximum score of 28, was used to assess the quality of Randomised control trial (RCT) and quasi-experimental studies.[13]

The modified version removed some items, adapting them for case-control longitudinal studies and cross-sectional studies.[20] For cohort and case-control studies, three questions from the internal validity – bias section [blinding of subjects, blinding of assessors, and compliance with intervention] and two questions from the Internal validity – confounding section [randomization assignment concealed from both patients and interventionists, and accounting for losses to follow-up due to intervention] were removed, resulting in a maximum score of 24. For cross-sectional, additional item [analyses adjusted for different lengths of follow-up] was removed from the internal validity – bias selection, resulting in a maximum score of 23. The scoring was adapted from Hooper et al.[21]).

THE PROCEDURE OF THE QUALITY ASSESSMENT

We grouped reviewers based on their experience in quality assessment of quantitative, qualitative, or mixed-method studies. Author-reviewers were placed in each group based on their years of experience and the number of authorships in systematic review publications. That notwithstanding, we (Emerging Researchers & Professionals in Ageing - African Network - www.erpaan.org) conducted a two-day refresher training for all reviewers. Twenty-six author reviewers participated in the quality assessment of the included article. Because of the large volume of quantitative studies, 20 reviewers were assigned to assess the quality of RCTs and pre-post studies (n=2), longitudinal studies (n=4), case-control studies (n=2), cross-sectional studies (n=10), and case report (n=2). The remaining six reviewers assessed the quality of qualitative studies (n=4) and mixed-method studies (n=2). We performed pilot testing of the quality assessment of each study design, and the inter-rater reliability ranged from 0.78 to 0.87 across the groups, indicating a moderate to the high magnitude of agreement amongst raters.[23] Because we could not get a uniform agreement among raters in the pilot testing, the quality assessment for each study design was done in pairs. Summarily, two raters independently rated: 15 RCTs and pre-post studies, 56 longitudinal studies, 14 case-control studies, 60 cross-sectional studies, 4 case reports, 37 qualitative studies, and 15 mixed-method studies. The mean score of the raters was used as the final rating, provided the rating was in the same category. For instance, *rater1* total score for an RCT based on the Down and Black Checklist[13] is 18, and *rater2* scored 20 for the same study. The mean scores of *rater1 and rater2* are reported because both scorings are within the scoring classified as good [17 - 22] in the Down Black Checklist.[13] A third rater assessed the same articles if two raters' scores were not in the same category. Across all studies, a third rater was involved in only ten cross-sectional studies. The mean score of two out of the three raters in the same category was reported.

DATA EXTRACTION AND SYNTHESIS

We extracted the meta-data of the included articles: the countries in which each study was conducted, the study design, study settings, sampling method and recruitment strategies, participants' characteristics (sample size, sex, age), data analysis method and the main findings, and these were analyzed using descriptive statistics, such as mean and standard deviation (for continuous variables), median, interquartile range (for categorical variables), frequencies, and percentages. This information has been presented elsewhere.[6] The inter-rater reliability - the level of agreement between raters for quality assessment of the included articles,[23] was calculated using Kappa statistics. Values ranged from less than 60 (weak) 0.60 - 0.79 (moderate), 0.80 - 0.90 (strong) and Above 90 (almost perfect).[23] Each range was calculated using frequency count and percentages. We perform all data analysis in STATA (c).

RESULTS OF THE QUALITY ASSESSMENT

Additional 32 articles were added to the original 512 articles, totalling 544. Article type include: RCTs and pre-post (n=15), longitudinal (n=122), case-control (n=14) and cross-sectional (n=300); 4 case reports; 74 qualitative studies and 15 mixed-method studies. Studies were conducted 23 countries include South Africa (241, 44.3%), Nigeria (n=88, 16.2%), Ghana (n=53, 9.7%), Uganda (n=32, 5.9%), Tanzania (n=26, 4.8%), Kenya (n=24, 4.4%). Other studies were conducted: Cameroon, Central Africa Republic (9 studies); Senegal (6 studies); Malawi (5 studies); Burkina Faso (4 studies); Angola, Ethiopia, Zimbabwe (3 studies); Democratic Republic of Congo, Gambia (2 studies) and Benin, Eswatini, Namibia, Rwanda, Zambia (one each); and more than one African countries (25 studies). See Appendix A for a complete reference list of all the included articles.

Quality assessment of quantitative studies. Details of the quality assessment for RCT and quasi-experimental studies (n=15) can be found in Table 2. Only one was rated as excellent.[24] Four studies were rated as good,[25–28] eight as fair,[29–36] and the remaining two as poor quality.[37,38] Table 3 provides the quality assessment results of the 122 **longitudinal studies.** We rated 27 studies as excellent, 71 studies as good, 20 as fair,[39–58] and three as poor quality.[59–61] The quality assessment for the 14 **case-control studies** is described in Table 4. We rated four articles as excellent,[62–65] five as good,[66–70] and five as fair.[70–74] Out of the 300 ***cross-sectional studies,*** 48 were rated as excellent, 171 as good, 63 as fair, and 18 as poor quality[75–92] (see Table 5). Among the 49 studies rated as excellent, only three studies have insufficient power to detect a clinically meaningful effect.[93–95]

Table 2. Quality Assessment of Randomised control trial and Quasi- experimental studies (n = 15) using the original version of Down & Black checklist.[13]

S/N	Authors, year of publication, country	Reporting /11	External Validity /3	Internal Validity - Bias /7	Internal Validity - Confounding /6	Sufficient power to detect a clinically important effect / 1	TOTAL/ 28	Interpretation
1	Abelson. (2013). South Africa.	5	1	3	1	0	10	Poor
2	Adam. (2013). South Africa.	7	1	5	2	0	15	Fair
3	Boon et al. (2009). South Africa.	7	1	5	3	0	16	Fair
4	De Villiers et al. (2009). South Africa	9	1	7	5	1	23	Excellent
5	Ezenwa et al. (2020). Nigeria.	7	1	7	4	0	19	Good
6	Forrest et al. (2011). South Africa.	9	1	5	4	1	20	Good
7	Geerts. (2017). South Africa.	8	1	5	4	0	18	Good
8	Geffen et al. (2019). South Africa.	5	0	5	1	0	11	Poor
9	Rayner et al. (2012). South Africa.	7	1	5	2	0	15	Fair
10	Nanji, et al. (2020). Kenya	5	3	6	3	1	18	Good
11	Nwankwo et al. (2020). Nigeria.	6	1	4	3	0	14	Fair
12	Puckree et al. (2014). South Africa.	7	3	3	2	1	16	Fair
13	Skidmore et al (2015), South Africa	7	1	3	3	0	14	Fair
14	Vorobiof et al. (2004). South Africa.	8	0	5	2	0	15	Fair
15	Webb et al. (2015). South Africa.	5	1	3	2	1	12	Fair

Table 3. Quality Assessment of Longitudinal studies (n = 122) using a modified version of Down & Black Checklist.[13]

S/N	Authors, year of publication, country	Reporting /11	External Validity/3	Internal Validity -Bias /4	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL /24	Interpretation
1	Adhavaryu et al. (2012). Tanzania	11	2	3	3	1	20	Excellent
2	Akinyemi et al. (2017). Nigeria	11	1	3	4	1	20	Excellent
3	Alberts et al. (1991). South Africa	11	1	2	3	0	17	Good
4	Ardington et al. (2010). South Africa.	5	3	1	2	1	12	Fair
5	Asiimwe et al. (2020). South Africa	6	3	2	3	1	14	Good
6	Bastawrous et al. (2016). Kenya	7	2	2	3	1	15	Good
7	Beaugé et al. (2020). Burkina Faso	9	3	2	4	1	19	Excellent
8	Bennett et al. (2016). Kenya	7	3	2	2	1	15	Good
9	Biritwum et al. (2013). Ghana	6	3	2	2	1	14	Good
10	Charlton et al. (2021). South Africa	10	2	2	2	1	18	Good
11	Chepngeo-Langat et al. (2011). Kenya	10	2	2	2	1	17	Good
12	Chepngeo-Langat et al. (2021). Kenya	11	2	2	3	1	19	Excellent
13	Chepngeo-Langat. (2014). Kenya	10	2	2	2	1	17	Good
14	Clark et al. (2014). USA and Nigeria.	11	3	2	2	1	19	Excellent
15	*De Terline et al. (2020). Several countries	11	2	3	2	1	20	Excellent
16	Dewhurst et al. (2012). Tanzania.	11	2	2	2	1	18	Good
17	Dia et al. (2014). Senegal.	11	3	2	3	1	20	Excellent
18	Digenio et al. (1991). South Africa	9	2	1	3	1	16	Good
19	Dotchin et al. (2015). Tanzania	11	2	2	3	1	22	Excellent
20	Eduardo et al., (2014). Kenya, Tanzania, Mozambique, Rwanda.	7	1	3	2	1	14	Good
21	Fantahun, Berhane, Högberg, Wall & Byass (2009). Ethiopia	5	1	2	1	1	10	Fair
22	~Ferrari et al., (2015). Several countries	10	0	2	1	1	15	Good
23	Gaziano et al., (2017), South Africa.	10	2	1	2	1	16	Good
24	Gray et al., (2014). Tnazania	8	2	3	0	1	14	Good
25	Gray et al., (2016). Tanzania.	8	3	3	2	1	18	Good
26	Gray et al., (2017). Tanzania	8	2	3	1	1	16	Good
27	Gureje, et al. (2006). Nigeria	8	2	2	1	1	14	Good
28	Gureje, et al. (2011a). Nigeria.	9	2	2	1	1	15	Good
29	Gureje, et al. (2011b). Nigeria.	10	2	2	2	1	17	Good

S/N	Authors, year of publication, country	Reporting /11	External Validity/3	Internal Validity -Bias /4	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL /24	Interpretation
30	Gureje, et al. (2014). Nigeria.	10	2	2	1	1	16	Good
31	Gyasi, et al. (2019). Ghana	8	0	2	1	1	12	Fair
32	Hendrie et al. (2013). Nigeria and USA.	9	2	2	2	1	15	Good
33	Heyns, et al. (2003). South Africa.	6	1	2	2	1	13	Good
34	Hosegood and Timaeus. (2005). South Africa.	9	2	2	2	1	16	Good
35	Ice et al. (2008). Kenya	6	0	2	1	0	9	Fair
36	Ice, et al. (2010). Kenya	10	0	2	2	1	15	Good
37	Ice, et al. (2012). Kenya	10	0	2	2	1	15	Good
38	Jardim et al. (2018). South Africa.	8	1	2	2	1	13	Good
39	Kalula et al. (2006). South Africa.	9	1	2	1	1	13	Good
40	Kalula et al. (2010). South Africa.	2	1	1	1	1	13	Poor
41	Kalula et al. (2015). South Africa.	5	2	2	2	1	12	Fair
42	Kalula et al. (2016). South Africa.	8	3	2	3	1	18	Good
43	Kalula et al. (2017). South Africa.	9	2	2	2	1	14	Good
44	Karstaedt & Bolhaar. (2014). South Africa.	2	1	1	0	0	15	Poor
45	Kretchy et al. (2020), Ghana	10	1	1	1	0	12	Fair
46	Lartey et al. (2019). Ghana	9	2	3	3	1	18	Good
47	Lasisi et al. (2010). Nigeria.	10	0	3	4	1	18	Good
48	Lasisi & Gureje (2014). Nigeria	8	3	3	3	1	18	Good
49	Lazenby et al. (2012). Botswana	9	0	3	3	1	16	Good
50	Menyanu et al. (2017). Ghana and South Africa.	6	1	3	1	1	13	Good
51	Menyanu et al. (2021). Ghana and South Africa.	6	1	3	1	1	13	Good
52	#Moreno-Agostino et al. (2020). Several countries	7	2	2	3	1	16	Good
53	Namale, et al. (2020). Uganda	8	3	3	2	0	17	Good
54	Ojagbemi et al. (2015). Nigeria	10	3	3	4	1	21	Excellent
55	Ojagbemi et al. (2016). Nigeria	10	3	3	4	1	21	Excellent
56	Ojagbemi et al. (2017a). Nigeria	10	3	3	4	1	21	Excellent
57	Ojagbemi et al. (2017b). Nigeria	10	3	3	4	1	21	Excellent
58	Ojagbemi et al. (2018). Nigeria	10	3	4	4	1	23	Excellent
59	Okunade et al. (2020). Nigeria	11	3	3	4	0	21	Excellent
60	Ologe et al. (2005). Nigeria	6	0	3	3	1	13	Good

S/N	Authors, year of publication, country	Reporting /11	External Validity/3	Internal Validity -Bias /4	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL /24	Interpretation
61	Onakpoya et al. (2020). Nigeria.	10	0	3	3	1	17	Good
62	Onwubiko et al. (2020). Nigeria.	10	3	2	3	0	18	Good
63	Oshi et al. (2014). Nigeria	11	3	3	4	1	22	Excellent
64	Otitoola et al. (2015). South Africa	11	3	3	4	0	21	Excellent
65	Paddick et al. (2017). Tanzania.	11	0	3	4	0	18	Good
66	Parag and Buccimazza. (2016). South Africa.	5	1	0	3	0	9	Fair
67	Payne et al. (2013). Malawi.	6	2	1	2	1	12	Fair
68	Payne et al. (2017). South Africa.	6	3	2	2	1	14	Good
69	Puckree. (2002). South Africa.	4	1	2	1	1	9	Fair
70	Pupwe et al. (2020). Zambia.	6	2	2	2	1	13	Good
71	Putnam et al. (2018). Tanzania	7	2	2	3	1	15	Good
72	Ralston et al. (2019). South Africa	6	3	3	3	1	16	Good
73	Ramlall et al. (2014). South Africa	6	2	2	1	1	12	Fair
74	Rand et al. (2015). South Africa	7	1	3	1	0	12	Fair
75	Reiger et al. (2017). South Africa	7	3	2	2	1	15	Good
76	Rishworth et al. (2020). Uganda	6	3	2	2	1	15	Good
77	Rohr et al. (2017). South Africa.	6	2	0	1	0	9	Fair
78	Rosenberg et al. (2020). South Africa.	5	2	2	1	1	11	Fair
79	Segal et al. (1982). South Africa	2	1	0	0	0	3	Poor
80	Sanuade et al. (2019). Ghana	5	2	2	0	0	9	Fair
81	Sanya et al. (2011). Nigeria.	4	2	1	0	1	9	Fair
82	Schatz et al. (2018). South Africa	7	2	2	1	1	13	Good
83	Simiyu et al. (2021). South Africa	9	2	2	1	1	14	Good
84	Sissolak et al. (2013). South Africa	7	1	3	3	0	14	Good
85	Sliwa et al. (2010). South Africa	10	3	3	2	0	18	Good
86	Solomon et al. (2005). South Africa.	9	3	2	1	1	16	Good
87	Solomon. (1984). South Africa.	5	1	2	1	0	9	Fair
88	Swart et al. (2014). South Africa	8	2	2	3	0	15	Good
89	Tomita & Burns. (2013). South Africa	9	3	3	1	1	16	Good
90	Torgersen et al. (2019). Botswana	11	3	3	2	1	20	Excellent
91	Udjo. (2006). South Africa.	5	2	1	0	1	9	Fair

S/N	Authors, year of publication, country	Reporting /11	External Validity/3	Internal Validity -Bias /4	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL /24	Interpretation
92	van der Wielen et al. (2018). Ghana	11	2	3	2	1	19	Excellent
93	van Staden & Weich. (2007). South Africa.	6	2	3	2	0	13	Good
94	Vlantis, Gregor, Elliot & Oudes. (2003). South Africa	10	0	3	4	0	18	Good
95	von Klemperer, Bateman, Owen & Bryer. (2014). South Africa	8	2	3	4	0	18	Good
96	Vorster et al. (2015). South Africa	10	0	3	3	0	17	Good
97	Wachira & Tyler. (2015). Kenya.	9	2	3	3	0	18	Good
98	Walker & Walker. (2005). South Africa.	8	2	3	3	1	18	Good
99	Walker et al. (1986). South Africa.	9	3	3	3	0	19	Excellent
100	Wallrauch, Bärnighausen & Newell. (2010). South Africa	9	3	3	4	1	20	Excellent
101	Ware et al. (2017). South Africa	10	3	3	4	1	21	Good
102	Wasserman & Bryer. (2012). South Africa	9	2	3	4	0	19	Excellent
103	Wasserman, Apffelstaedt & Odendaal. (2007). South Africa.	9	2	3	4	1	20	Excellent
104	Wasserman, de Villiers & Bryer. (2009). South Africa	9	3	3	4	0	20	Excellent
105	Waterhouse, van Der Wielen, Banda & Channon (2017). South Africa.	9	3	3	4	1	20	Excellent
106	Wentink et al. (2010). South Africa.	9	3	3	4	0	20	Excellent
107	Westaway, Jordaan, & Tsai. (2015). South Africa	10	3	3	4	1	21	Excellent
108	Westaway, Olorunju & Rai. (2007). South Africa	9	3	3	4	1	20	Good
109	Westaway, Rheeder, & Gumede. (2001). South Africa	9	3	3	4	1	20	Excellent
110	Westaway. (2010b). South Africa	10	0	3	4	1	18	Good
111	Whitelaw et al. (1992). South Africa.	4	0	2	2	0	8	Fair
112	Whittaker et al. (1991). South Africa.	5	0	2	1	1	9	Fair
113	Whittaker et al. (1991). South Africa.	5	0	2	1	1	9	Fair
114	Wood et al. (2007). South Africa.	6	3	2	3	0	14	Good
115	Yawson et al. (2013). Ghana	6	3	2	2	1	14	Good
116	Yawson et al. (2014). Ghana	6	3	2	2	1	14	Good
117	Yoro-Zohoun et al. (2019). Central Africa	7	3	2	2	1	15	Good
118	Yoro-Zohoun et al. (2019). Central Africa Republic & Republic of Congo	7	3	2	2	1	15	Good
119	Yorston et al. (2002). Kenya	6	3	2	3	1	15	Good
120	Zengin et al. (2017). Gambia	7	3	2	3	1	16	Good

S/N	Authors, year of publication, country	Reporting /11	External Validity/3	Internal Validity -Bias /4	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL /24	Interpretation
121	Zengin et al. (2018). Gambia	7	3	2	3	1	16	Good
122	Zwi et al. (1989). South Africa.	6	3	2	3	1	15	Good

*= Benin, Cameroon, Congo, D.R Congo, Gabon, Guinea, Cote d'Ivoire, Mauritania, Mozambique, Niger, Senegal, Togo; #= China, Ghana, India, Mexico, South Africa, Finland, Poland, Spain; ~= Western/Central Europe; Canada/South Africa/Australia/UK; Eastern Europe; Central/South America; Middle East; East Asia; and India.

Table 4. Quality Assessment of Case-control studies (n = 14) using a modified version of Down & Black Checklist.[13]

S/N	Authors, year of publication, country	Reporting / 11	External Validity /3	Internal validity – Bias /4	Internal -Cofounding /4	Sufficient power to detect a clinically important effect /1	TOTAL /24	Interpretation
1	Adebajo et al (1991). Nigeria.	9	3	3	3	1	19	Good
2	Akinyemi et al. (2014). Nigeria	11	2	4	3	0	20	Excellent
3	Ayuk et al. (2020). Nigeria.	6	0	3	2	1	12	Fair
4	Bloomfield et al. (2016). Kenya.	8	0	4	3	1	16	Good
5	Diamond et al (1986). South Africa	11	3	2	3	1	20	Excellent
6	Meiring et al. (1983). South Africa	10	1	3	4	0	18	Good
7	Schnaid et al. (2000). South Africa	6	2	2	1	0	11	Fair
8	Segal et al. (1988). South Africa.	5	3	2	0	0	10	Fair
9	Solomon et al. (2011). South Africa.	8	1	2	3	1	15	Good
10	van Vuuren, Rheeder & Hak (2009). South Africa	10	3	4	4	1	22	Excellent
11	Walker et al (1989). South Africa	6	1	4	2	0	13	Good
12	Walker et al (1992). South Africa	10	3	3	2	1	19	Excellent
13	Whigham et al (2011). South Africa	4	1	3	2	0	10	Fair
14	Williams et al (2010). South Africa.	6	1	3	2	0	12	Fair

Table 5. Quality Assessment of Cross-sectional studies (n = 300) using modified version of Down & Black checklist.[13]

S/N	Authors, year of publication, country	Reporting / 11	External Validity / 3	Internal Validity – Bias / 3	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL/ 23	Interpretation
1	Abbai et al. (2018). South Africa	11	0	2	2	1	16	Good
2	Abene et al. (2020). Nigeria	11	1	3	2	1	18	Good
3	Aboderin et al. (2017). Kenya	9	2	3	2	1	17	Good
4	Ackuaku et al. (2015). Ghana	11	1	3	3	0	18	Good
5	Adebusoye et al (2018). Nigeria	11	1	3	3	1	19	Good
6	Agboghoroma et al (2020). Nigeria	10	1	3	3	0	17	Good
7	Agbozo et al. (2018). Ghana	9	2	1	1	0	13	Good
8	Aheto et al. (2020). Ghana	11	3	3	3	1	21	Excellent
9	Akande-Sholabi et al. (2020). Nigeria	11	2	3	2	0	18	Good
10	Akande-Sholabi et al. (2020). Nigeria	9	2	3	3	1	18	Good
11	Akinyemi et al. (2008). Nigeria	11	0	2	1	1	15	Good
12	Akinyemi et al. (2017). Nigeria	11	0	3	3	0	17	Good
13	Akinyemi et al. (2014). Nigeria	9	1	3	3	1	17	Good
14	Akinyemi et al. (2015). Nigeria	11	1	3	2	0	16	Good
15	Akor et al. (2020). Nigeria	11	3	3	3	0	20	Excellent
16	Akosile et al. (2014). Nigeria	11	1	3	2	0	17	Good
17	Akosile et al. (2018). Nigeria	11	0	3	2	0	16	Good
18	Akosile et al. (2021). Nigeria	11	0	3	2	0	16	Good
19	Akuamoah et al. (2013). Ghana	11	3	2	2	1	19	Excellent
20	Allain et all. (2014). Malawi	10	0	2	2	0	14	Good
21	Amegbor et al. (2018). Ghana	7	3	2	2	1	15	Good
22	Amegbor et al. (2020). Ghana	7	3	1	2	1	14	Good
23	Ameh et al. (2014). South Africa	5	0	2	2	1	10	Fair
24	Amoo et al. (2020). Nigeria	6	0	2	2	1	11	Fair
25	Amosun et al. (2007). South Africa	6	0	1	3	0	10	Fair
26	Amosun et al. (2014). South Africa	5	0	2	2	0	9	Fair
27	Annin et al. (2014). Ghana	5	3	2	2	1	13	Good

S/N	Authors, year of publication, country	Reporting / 11	External Validity / 3	Internal Validity – Bias / 3	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL/ 23	Interpretation
28	Asiamah et al. (2019). Ghana	6	0	2	2	1	11	Fair
29	Awoke et al. (2017). Ghana	6	3	2	3	1	15	Good
30	Awuviry-Newton et al. (2020). Ghana	7	0	2	2	1	12	Fair
31	Awuviry-Newton et al. (2020). Ghana	5	0	2	2	1	10	Fair
32	Ayernor, P.K. (2012). Ghana.	6	0	2	2	1	11	Fair
33	Ayodapo et al. (2020). Nigeria.	7	0	2	3	1	13	Good
34	Balogun et al. (2018). Nigeria.	6	3	2	2	1	14	Good
35	Bello et al. (2019). Nigeria.	6	0	2	2	1	11	Fair
36	Boateng et al. (2017). Ghana	5	3	2	2	1	12	Fair
37	Boateng et al. (2021). Ghana	11	3	3	4	1	22	Excellent
38	Bolaji et al. (2021). Nigeria	5	0	2	2	0	9	Fair
39	Bomman & Reif. (2007). South Africa	2	0	0	0	0	2	Poor
40	Boon et al. (2010). South Africa	5	0	2	2	1	10	Fair
41	Brathwaite et al. (2002). South Africa	5	0	2	2	0	9	Fair
42	Cadmus et al. (2017). Nigeria.	6	0	2	2	1	11	Fair
43	Callixte et al. (2015). Cameroun.	6	0	2	2	1	11	Fair
44	Calys-Tagoe et al. (2014). Ghana	11	3	2	2	1	20	Good
45	Calys-Tagoe et al. (2020). Ghana	6	3	2	2	1	13	Good
46	Charlton et al. (2007). South Africa	11	3	2	2	1	20	Excellent
47	Chepngeo-Langat et al. (2012). Kenya	11	2	2	3	1	19	Excellent
48	Chepngeo-Langat et al. (2019). Kenya	11	2	2	2	1	18	Good
49	Chepngeo-Langat. (2013). Kenya	10	2	2	3	0	17	Good
50	Chilima et al. (1991). Malawi.	11	2	2	2	1	17	Good
51	Chilima et al. (2001). Malawi.	11	3	2	2	1	18	Good
52	Chukwuorji et al. (2017). Nigeria.	11	3	2	4	1	22	Excellent
53	Clausen et al. (2005). Botswana	11	2	2	2	1	18	Good
54	Dake and Van der Wiolen. (2020). Ghana.	11	3	3	3	1	21	Excellent

S/N	Authors, year of publication, country	Reporting / 11	External Validity / 3	Internal Validity – Bias / 3	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL/ 23	Interpretation
55	De Jager et al. (2017). South Africa.	11	2	2	3	1	19	Excellent
56	De Picciotto & Friedland. (2001). South Africa	5	0	2	2	0	9	Fair
57	De Rouvray et al. (2014). Central Africa	7	3	2	2	1	15	Good
58	De Villiers et al. (2011). South Africa	6	0	2	2	0	9	Fair
59	Dei and Sebastian. (2018). Ghana.	11	3	3	3	1	21	Excellent
60	Desomais et al. (2015). Central Africa Republic & Republic of Congo	7	3	2	2	1	15	Good
61	Dewhurst et al. (2012a). Tanzania.	11	2	2	2	1	18	Good
62	Dewhurst et al. (2012b). Tanzania.	11	3	2	2	1	19	Excellent
63	Dewhurst et al. (2013a). Tanzania	10	3	3	3	1	20	Excellent
64	Dewhurst et al. (2013b). Tanzania	10	3	3	2	1	19	Excellent
65	Dewhurst et al. (2014). Tanzania	6	3	2	2	1	14	Good
66	Dobsene et al. (2020). Cameroon.	11	3	2	3	1	22	Excellent
67	Drah, B.B. (2014). Ghana.	11	3	2	3	1	20	Excellent
68	Dur and Engelbrocht. (2001). South Africa	11	3	2	3	1	21	Excellent
69	Eales & Stewart (1996). South Africa	8	1	2	1	0	12	Good
70	Eales & Stewart (1997). South Africa	8	1	2	1	0	12	Fair
71	Elk, Swartz & Gillis (1983). South Africa	5	2	1	1	1	10	Fair
72	Enikuomehin et al. (2020). Nigeria	10	2	3	1	1	17	Good
73	Eze, Mbaeri & Orakwe (2020). Nigeria	7	2	3	2	0	14	Good
74	Faber et al., (1992). South Africa.	4	3	3	1	0	11	Poor
75	Fakoya et al., (2018). Nigeria	9	2	2	2	0	14	Good
76	Fawale, et al. (2017). Nigeria	10	2	3	2	1	17	Good
77	Folorunso et al., (2020). Nigeria	8	2	2	1	0	13	Good
78	Gildner et al. (2014). China, Ghana, India, Mexico, Russian Federation, and South Africa	6	2	2	0	1	11	Fair
79	Gillis (1981). South Africa.	5	3	2	1	0	11	Fair
80	Gillis, Welman, Koch & Joyi (1991). South	5	3	2	1	1	12	Fair

S/N	Authors, year of publication, country	Reporting / 11	External Validity / 3	Internal Validity – Bias / 3	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL/ 23	Interpretation
	Africa							
81	Goehler et al. (2018). Uganda	11	1	2	4	1	19	Excellent
82	Golaz, Wandera, & Rutaremwa (2017). Uganda	3	1	1	0	0	5	Poor
83	Gómez-Olivé et al. (2014). South Africa	9	3	3	2	1	19	Excellent
84	Gómez-Olivé, et al. (2013). South Africa	9	3	3	1	1	17	Good
85	Govender & Barnes (2014). South Africa	5	2	2	2	1	12	Fair
86	Guerchet et al., (2009). Benin/West Africa	10	2	3	2	1	18	Good
87	Guerchet et al., (2010). Central Africa	10	2	3	2	1	18	Good
88	Guerchet et al., (2012). Central Africa	10	2	2	2	1	17	Good
89	Guerchet et al., (2013). Central Africa	10	2	2	2	1	17	Good
90	Gureje, Ademola & Olley (2008). Nigeria	7	2	1	2	1	13	Good
91	Gureje, et al. (2006). Nigeria	9	2	2	2	1	16	Good
92	Gureje, et al. (2007). Nigeria	9	2	2	2	1	16	Good
93	Gutiérrez, et al. (2014). Angola	9	1	2	0	1	13	Good
94	Gyasi, et al. (2018a). Ghana	9	2	2	1	1	14	Good
95	Gyasi, et al. (2018b). Ghana	9	2	2	1	1	15	Good
96	Gyasi, et al. (2020a). Ghana	9	1	2	0	1	15	Good
97	Gyasi, et al. (2020b). Ghana	8	0	2	2	1	13	Good
98	Gyasi, et al. (2020c). Ghana	8	2	2	1	1	13	Good
99	Gyasi, et al. (2020d). Ghana	8	2	2	1	1	14	Good
100	Gyasi, et al. (2020e). Ghana	9	2	2	1	1	15	Good
101	Hao, et al. (2017). South-Africa	9	2	2	1	1	15	Good
102	Harris, et al. (2021). Eswatini	8	0	2	2	0	12	Fair
103	Heyns, et al. (2011). South Africa	9	1	2	2	1	15	Good
104	Hien, et al. (2014). Burkina Faso	8	0	2	1	1	12	Fair
105	Hontelez, et al. (2011). South Africa	4	0	2	1	1	9	Fair
106	Houser, et al. (2016). Democratic Republic of Congo	9	2	2	1	1	15	Good

S/N	Authors, year of publication, country	Reporting / 11	External Validity / 3	Internal Validity – Bias / 3	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL/ 23	Interpretation
107	Huang, et al. (2020). China, Ghana, India, Russia, and South Africa	9	1	2	1	1	13	Good
108	Hughes, et al. (2013). South Africa.	8	0	2	1	0	11	Fair
109	Ibrahim, et al. (2015). Nigeria.	8	0	2	1	0	11	Fair
110	Igbokwe et al. (2020). Nigeria	8	2	2	2	1	14	Good
111	Jacobs et al. (1984). South Africa	7	3	2	2	1	14	Good
112	Jesus et al. (2013). Central African Republic and Republic of Congo.	3	2	2	1	1	12	Fair
113	Joffe et al. (1975). South Africa	9	0	2	0	1	11	Fair
114	Joska et al. (2019). South Africa	8	2	2	2	1	14	Good
115	Kailembo et al. (2017). China, Ghana, India, and South Africa	8	1	3	1	1	13	Good
116	Kakongi et al. (2020). Uganda	7	2	2	1	1	11	Fair
117	Kalu et al. (2019). Nigeria.	5	1	2	1	0	10	Fair
118	Kellett et al. (2021). Tanzania	7	1	2	1	0	4	Poor
119	Kimuna et al. (2007). South Africa	9	2	2	1	1	15	Good
120	Kiplagat et al. (2019). Kenya	6	1	1	2	1	11	Fair
121	Kinyanda et al. (2016). Uganda	7	0	2	2	1	13	Good
122	Klemz et al. (2015). South Africa	6	0	1	2	1	12	Fair
123	Kobayashi et al. (2019). South Africa	8	3	1	1	1	14	Good
124	Kolbe-Alexandar et al. (2006). South Africa	10	0	1	1	1	12	Fair
125	Kolbe-Alexandar et al. (2015). South Africa	9	0	1	1	0	12	Fair
126	Koyanagi et al. (2019). South Africa	9	0	1	1	0	11	Fair
127	Kunna et al. (2017). China, Ghana.	7	1	1	1	1	13	Good
128	Kuteesa et al. (2012). Uganda.	7	1	1	1	1	13	Good
129	Kuteesa et al. (2014). Uganda.	8	1	3	3	0	15	Good
130	Kyobutungi et al. (2009). Kenya	10	1	3	3	1	18	Good
131	Kyobutungi et al. (2010). Kenya	11	0	3	2	1	17	Good

S/N	Authors, year of publication, country	Reporting / 11	External Validity / 3	Internal Validity – Bias / 3	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL/ 23	Interpretation
132	Lambert et al. (2017). Ghana, India, and Russian	9	2	3	2	1	16	Good
133	Le Roux, et al. (2007). South Africa.	10	1	3	2	0	16	Good
134	Legesse et al. (2019). Ethiopia	11	1	3	4	1	20	Excellent
135	Lekpa et al. (2013). Senegal	9	2	3	2	1	17	Good
136	Lenger et al. (1996). South Africa	7	1	2	2	0	13	Good
137	Lewis et al. (2017). Tanzania	11	3	3	4	1	23	Excellent
138	Longdon et al. (2012). Tanzania	9	1	3	4	1	18	Good
139	Lowis et al. (1997). South Africa	7	0	0	0	0	18	Good
140	Lwanga et al. (2019). Uganda.	11	1	3	4	1	18	Good
141	Mabaso et al. (2016). South Africa	10	3	3	2	0	18	Good
142	Mabeku et al. (2020). Cameroon	9	0	3	3	0	18	Good
143	Macia et al. (2011). Senegal.	9	0	3	4	1	18	Good
144	Macia et al. (2012). Senegal.	9	0	3	3	1	18	Good
145	Macia et al. (2015). Senegal	7	0	3	2	1	18	Good
146	Maina Gatimu, Williesham Milimo & San Sebastian (2016). Ghana.	8	1	2	2	1	14	Good
147	Manlragaba et al. (2019). Uganda	9	1	3	3	1	17	Good
148	Maritz et al. (2018). South Africa.	11	1	3	4	1	20	Excellent
149	Martinez et al. (2014). South Africa.	10	2	3	3	1	19	Excellent
150	Matlho et al. (2019). Botswana	8	0	3	1	1	13	Good
151	Mbada et al. (2020). Nigeria.	10	0	3	1	0	14	Good
152	Mbui et al. (2017). Kenya	11	1	3	2	0	17	Good
153	McKinnon et al. (2013). Sub-Saharan African	11	3	3	4	1	23	Excellent
154	Mhaka-Mutepfa, et al. (2014). Zimbabwe	6	2	3	1	1	13	Good
155	Minicuci, et al. (2014). Ghana	5	1	3	0	1	10	Fair
156	Molete, et al. (2014). South Africa.	8	0	3	3	1	15	Good
157	Mtowa et al. (2017). Tanzania	9	2	3	0	1	15	Good

S/N	Authors, year of publication, country	Reporting / 11	External Validity / 3	Internal Validity – Bias / 3	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL/ 23	Interpretation
158	Mugisha, et al. (2015). Uganda	6	2	3	1	1	13	Good
159	Mugisha, et al. (2016). Uganda	9	1	3	2	1	15	Good
160	Mugisha, et al. (2017). Uganda	7	1	3	0	1	12	Fair
161	Mugisha, et al. (2020). Uganda	9	1	3	4	1	18	Good
162	Mwanyangala, et al. (2010). Tanzania	9	2	3	1	1	16	Good
163	Mworozi, et al. (2019). Uganda	9	2	3	1	0	15	Good
164	Myroniuk. (2017). Malawi.	7	3	3	3	1	17	Good
165	Nash, et al. (1983). South Africa.	9	2	2	3	1	17	Good
166	Negin, et al. (2010). Kenya.	10	2	3	2	1	18	Good
167	Negin et al. (2012a). South Africa	11	3	3	3	1	22	Excellent
168	Negin et al. (2012b). Malawi, Nigeria, Senegal, Rwanda & Tanzania	8	2	2	3	1	16	Good
169	Negin, et al. (2015). Uganda.	8	1	3	4	1	17	Good
170	Negin, et al. (2016). South Africa.	6	3	3	4	1	17	Good
171	Negin, et al. (2017). South Africa.	11	2	3	3	1	20	Excellent
172	Njemini, et al. (2002). Cameroon.	5	1	3	0	0	9	Fair
173	Njemini, et al. (2011). Cameroon.	8	1	3	2	1	15	Good
174	Nutakor et al. (2020). Ghana.	11	3	3	4	1	22	Excellent
175	Nwakasi, et al. (2019). Ghana.	10	1	2	1	1	17	Good
176	Nyanguru. (2007). Zimbabwe.	6	1	0	1	1	9	Fair
177	Nyirenda, et al. (2012). South Africa.	9	1	3	2	1	17	Good
178	Nyirenda, et al. (2012). Uganda and South Africa.	9	1	3	1	1	16	Good
179	Obuku, et al. (2013). Uganda.	8	2	3	2	0	15	Good
180	Ogun et al. (2021). Nigeria	10	2	3	3	1	19	Excellent
181	Ojagbemi et al. (2013). Nigeria.	10	3	3	4	1	21	Excellent
182	Okoye et al. (2020). Nigeria.	11	0	2	4	0	17	Good
183	Oladeji et al. (2011). Nigeria	11	3	3	4	1	22	Excellent

S/N	Authors, year of publication, country	Reporting / 11	External Validity / 3	Internal Validity – Bias / 3	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL/ 23	Interpretation
184	Olamoyegun e al. (2020). Nigeria.	11	2	3	4	0	20	Excellent
185	Olatayo et al. (2015). Nigeria	8	0	3	3	0	13	Good
186	Olusanya et al. (2019). Nigeria	9	3	3	3	0	18	Good
187	Omenai et al. (2020). Nigeria	8	3	3	3	1	18	Good
188	Onadja et al. (2013). Burkina Faso	11	3	3	4	1	22	Excellent
189	Onakpoya et al. (2021). Nigeria.	10	0	3	3	0	16	Good
190	Onwuchekwa et al. (2009). Nigeria.	9	3	2	3	0	17	Good
191	Osberg. (2014). Tanzania.	10	3	3	4	1	21	Excellent
192	Ottie-Boakye. (2020). Ghana	11	3	3	4	1	22	Excellent
193	Oyeyemi et al. (2019). Nigeria.	11	3	3	4	1	22	Excellent
194	Oyeyemi et al. (2020). Nigeria.	11	3	3	4	1	22	Excellent
195	Padayachey et al. (2017). South Africa	11	3	3	4	1	22	Excellent
196	Paddick et al. (2015). Tanzania.	11	3	3	4	0	21	Excellent
197	Paddick et al. (2018). Tanzania	11	3	3	4	1	22	Excellent
198	Paquissi et al. (2016). Angola	9	0	3	3	0	15	Good
199	Parmar et al. (2014). Ghana and Senegal	7	2	0	2	1	12	Fair
200	Payne et al. (2017). South Africa.	6	2	2	2	1	13	Good
201	Peil et al. (1988). Nigeria.	1	2	2	2	1	8	Fair
202	Peltzer and Phaswana-Mafuya. (2012a). South Africa	5	0	1	2	1	9	Fair
203	Peltzer and Phaswana-Mafuya. (2012b). South Africa	6	3	2	2	1	14	Good
204	Peltzer and Phaswana-Mafuya. (2013a). South Africa	5	3	2	2	1	13	Good
205	Peltzer and Phaswana-Mafuya. (2013b). South Africa	6	3	2	2	1	14	Good
206	Peltzer and Phaswana-Mafuya. (2013c). South Africa	6	3	2	2	1	14	Good
207	Peltzer and Phaswana-Mafuya. (2014). South Africa	6	3	2	2	1	14	Good

S/N	Authors, year of publication, country	Reporting / 11	External Validity / 3	Internal Validity – Bias / 3	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL/ 23	Interpretation
208	Peltzer and Phaswana-Mafuya. (2017). South Africa	6	3	2	2	1	14	Good
209	Peltzer and Pengpig. (2018). South Africa	5	3	2	2	1	13	Good
210	Peltzer and Phaswana-Mafuya. (2012c). South Africa	6	3	2	2	1	14	Good
211	Peltzer and Phaswana-Mafuya. (2012d). South Africa	5	3	2	2	1	13	Good
212	Peltzer and Phaswana-Mafuya. (2013d). South Africa	5	3	2	2	1	13	Good
213	Peltzer. (2012). South Africa	6	3	2	2	1	14	Good
214	Peltzer. (2017). South Africa	6	3	2	2	1	14	Good
215	Pengpid and Peltzer. (2019). South Africa	8	3	2	3	1	16	Good
216	Perold and Muller. (2000). South Africa	4	3	1	2	1	11	Fair
217	Pfttifor et al. (1978). South Africa	3	0	0	2	0	5	Poor
218	Phaswana-Mafuya and Peltzer. (2018). South Africa	8	3	2	2	1	15	Good
219	Phaswana-Mafuya et al. (2013a). South Africa	6	3	2	2	1	14	Good
220	Phaswana-Mafuya et al. (2013b). South Africa	6	3	2	2	1	14	Good
221	Phukubye and Oyedele. (2011). South Africa	3	0	2	0	0	5	Poor
222	Pieterse et al. (2002). Rwanda.	6	3	2	2	1	14	Good
223	Pilleron et al. (2015a). Central African Republic	9	2	2	2	1	16	Good
224	Pilleron et al. (2015b). Central African Republic	9	2	2	3	1	17	Good
225	Pilleron et al. (2015c). Central African Republic	9	2	2	3	1	17	Good
226	Pilleron et al. (2017). Central African Region.	7	3	2	2	1	15	Good
227	Pilleron et al. (2019). Kenya, South Africa, Uganda, and Zimbabwe	5	3	2	2	1	13	Good
228	Preux et al. (2014). Central African Republic & Republic of Congo	8	1	1	1	1	12	Fair

S/N	Authors, year of publication, country	Reporting / 11	External Validity / 3	Internal Validity – Bias / 3	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL/ 23	Interpretation
229	Prinsloo et al. (1991). South Africa	4	2	1	2	1	10	Fair
230	Puckree et al. (1997). South Africa	4	2	2	2	1	11	Fair
231	Raal et al. (2013). South Africa	5	1	2	2	1	11	Fair
232	Raal et al. (2011). South Africa	5	3	2	2	1	13	Good
233	Rabie et al. (2015). South Africa	5	3	2	2	0	12	Fair
234	Ralston. (2018). South Africa	7	2	2	2	1	14	Good
235	Ralston. (2015). South Africa	6	2	2	1	1	12	Fair
236	Ramjeeth. (2008). South Africa	6	2	2	2	1	13	Good
237	Ramlagan et al. (2013). South Africa	8	3	2	2	1	15	Good
238	Ramlagan et al. (2014). South Africa	7	3	2	2	1	15	Good
239	Ramocha et al. (2016). South Africa	7	3	2	2	0	14	Good
240	Randall & Coast. (2016). Sub-Saharan Africa	5	3	2	2	1	14	Good
241	Ranjith et al. (2016). South Africa.	8	3	0	2	1	14	Good
242	Rayner et al. (2007). South Africa	7	2	2	2	1	14	Good
243	Reddy et al. (1985). South Africa	5	2	2	2	1	12	Fair
244	Robb et al. (2017). South Africa	5	3	2	2	1	13	Good
245	Rossouw and Smith. (2017). South Africa	5	2	2	1	1	11	Fair
246	Rotchford and Johnson. (2000). South Africa	5	2	1	0	0	8	Poor
247	Rotchford et al. (2002). South Africa	7	2	3	2	1	15	Good
248	Rotchford et al. (2003). South Africa	5	2	2	0	1	10	Fair
249	Rotchford, Alan, and Johnson. (2017). South Africa	5	2	1	0	1	9	Fair
250	Rodriguez. (2002). South Africa	4	2	2	1	0	0	Poor
251	Saeed et al. (2016). Ghana.	4	2	2	0	1	9	Poor
252	Saka et al. (2019). Nigeria and South Africa.	4	1	0	1	0	6	Poor
253	Samba et al. (2019). Republic of Congo	8	2	2	1	1	13	Good
254	Sarfo et al. (2020). Ghana	3	0	1	0	0	4	Poor
255	Sarkodie et al. (2020). Ghana.	7	1	1	2	0	11	Poor

S/N	Authors, year of publication, country	Reporting / 11	External Validity / 3	Internal Validity – Bias / 3	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL/ 23	Interpretation
256	Schatz et al. (2012). South Africa	5	0	0	0	0	5	Poor
257	Schatz et al. (2015). South Africa	7	1	1	1	0	10	Fair
258	Schmidlin et al. (2018). South Africa	4	0	2	0	0	6	Poor
259	Scholten et al. (2011). South Africa	6	0	2	0	0	8	Fair
260	Segal et al. (1980). South Africa	3	2	1	0	1	7	Poor
261	Silbert. (1977). South Africa	2	1	0	0	0	3	Poor
262	Simo et al. (2020). Cameroon	9	2	2	3	0	16	Good
263	Singo et al. (2015). South Africa.	4	0	1	0	1	6	Poor
264	Smith & Grove. (2009). South Africa.	6	0	2	2	1	11	Fair
265	Solomon et al. (1982). South Africa	5	1	2	1	0	9	Fair
266	Somdyala et al. (2010). South Africa.	7	3	2	1	1	14	Good
267	Ssensamba et al. (2019). Uganda	8	2	2	2	0	14	Good
268	Ssonko et al. (2017). Uganda	8	3	3	2	1	17	Good
269	Surka & Hussain. (2001). South Africa.	7	3	2	2	1	15	Good
270	Tanor et al. (2017). South Africa	9	2	2	3	0	16	Good
271	Tarekgne et al. (2017). Ghana and South Africa	8	3	2	2	1	16	Good
272	Tegegn et al. (2019). Ethiopia	8	2	2	3	0	15	Good
273	Till et al. (1999). South Africa	7	2	3	2	0	15	Good
274	Tipping et al. (2006). South Africa	9	3	3	3	1	18	Good
275	Togonu-Bickersteth et al., 1986, Nigeria	7	3	3	2	1	16	Good
276	Tolani et al. (2020). Nigeria.	5	2	2	0	0	9	Fair
277	Tomas et al. (2012). Angola	10	3	2	3	1	19	Excellent
278	Toure et al. (2012). Senegal	11	2	3	1	1	18	Good
279	Tumaini et al. (2019). Tanzania	11	3	3	2	1	20	Excellent
280	Uwakwe et al. (2009). Nigeria	10	2	2	2	1	17	Good
281	Uys and Hunt. (1990). South Africa	6	1	0	0	0	7	Poor
282	Van Biljon et al. (2015). South Africa	11	2	3	1	0	17	Good

S/N	Authors, year of publication, country	Reporting / 11	External Validity / 3	Internal Validity – Bias / 3	Internal Validity – Confounding /4	Sufficient power to detect a clinically important effect / 1	TOTAL/ 23	Interpretation
283	van der Pas et al. (2015). South Africa.	10	2	3	1	1	17	Good
284	van Rensburg et al. (2017). South Africa	11	2	0	0	0	14	Good
285	Van Wyk et al. (1997a). South Africa	9	3	3	4	1	20	Excellent
286	Van Wyk et al. (1997b). South Africa	9	3	3	4	1	20	Excellent
287	Walker et al. (1989). South Africa	9	1	3	4	0	17	Good
288	Walker et al. (1999). South Africa	9	0	3	4	0	16	Good
289	Wandera, Golaz, Kwagala & Ntozi. (2015). Uganda	10	3	3	4	1	21	Excellent
290	Wandera, Ntozi & Kwagala. (2014). Uganda	9	3	3	4	1	20	Excellent
291	Wandera, Ntozi & Kwagala. (2015). Uganda	9	3	3	4	1	20	Excellent
292	Werfalli et al. (2018). South Africa	10	3	3	4	1	21	Excellent
293	Wessels & Riback. (2012). South Africa	9	3	3	4	1	21	Excellent
294	Westaway. (2010a). South Africa	8	3	3	4	1	19	Excellent
295	Whitelaw et al. (1994). South Africa	4	0	2	3	0	9	Fair
296	Williams et al. (2015). South Africa	6	0	2	2	1	11	Fair
297	Wilunda et al. (2015). Kenya	6	3	2	2	1	14	Good
298	Wolff. (1978). South Africa	6	1	2	2	0	11	Fair
299	Xavier Gómez-Olivé et al. (2010). South Africa	7	3	3	3	1	17	Good
300	Zimmer & Dayton. (2005). 25 Sub-Saharan African countries.	7	3	2	3	1	16	Good

Quality assessment of case reports. Table 6 shows the quality assessment of 4 case reports; all were rated as moderate quality reporting.

Quality assessment of qualitative studies. We presented the quality assessment result of the 74 qualitative studies in Table 7. We rated 19 as high-quality qualitative studies, 37 as moderate-quality, and 18 as low-quality qualitative studies. The domain with the least score was 'Research team and reflexivity', with one-third of the studies scoring above average.[96–117] However, only three studies scored below average in the 'study design'[85,118,119] and 'analysis and findings'[85,119,120] domains.

Quality assessment for mixed-method studies. We also assessed the quality of fifteen mixed-method studies (Table 8). Most of the studies (n=12, 80%) were rated high MMAT studies, and three were low MMAT studies.[121–123] Across the three low MMAT studies, one had poor scores in the quantitative domain,[122] and the other two had poor qualitative domains.[121,123] In terms of the MMAT appraisal criteria, four studies did not satisfy the *Justification* criterion,[121–124] three studies did not satisfy the *Integration* criterion,[121–123] and six studies satisfied the *Disagreement* criterion.[121–123,125,126] Five studies did not satisfy the *Interpretation* criterion[121–123,126,127] and *Adherence* criterion.[121–123,126–128]

Table 6. Quality Assessment of Case reports (n = 4), using the CAse REport (CARE) guidelines checklist.[16]

S/N	Name of authors, Year of publication, Country	Title/1	Keyword/1	Abstract/5	Intro/1	PI/4	CF/1	Ti/1	DA/4	TI/3	FC/4	Disc /4	Pp/ IF/ 2	Total (/31) / Interpretation
1	Amod et al. (2005). South Africa	1	1	5	1	3	1	0	3	2	1	4	1	23/Moderate
2	Jingi et al. (2017). Sub-Saharan Africa	1	1	5	1	4	1	0	2	2	0	4	1	22/Moderate
3	Rajak et al. (2009). West Africa (Nigeria, Sierra Leone, Ghana)	1	0	5	1	3	1	0	2	2	0	4	1	20/Moderate
4	Sobnach et al. (2009). South Africa	1	1	5	1	3	1	0	2	2	0	4	0	20/Moderate

Notes: PI - Patient information; CF - clinical finding; Ti - Timeline; DA - Diagnostic Assessment; TI - Therapeutic intervention; FC - follow-up and controls; Disc - Discussion; PP/IF - Patient perspective/Informed consent

Table 7. Quality Assessment of Qualitative studies (n = 75), using the 45-items Lundgren et al.[17]

S/N	Name of authors, Year of publication, Country	Domain 1: Research team and reflexivity (/8)	Domain 2: Scope and purposes (/2)	Domain 3: study design (/17)	Domain 4: analysis and findings (/14)	Domain 5: Relevance and transferability (/4)	Total score (/45)/interpretation
1	Aboderin, I. (2004). Ghana	2	2	11	13	4	32/Moderate
2	Adam, A., & Koranteng, F. (2020). Ghana	4	2	15	9	4	34/Moderate
3	Adandom, I. et al. (2020). Nigeria	7	2	17	14	4	44/High
4	Agunbiade, O. M., & Akinyemi, A. I. (2016). Nigeria	7	2	16	13	4	42/High
5	Agunbiade, O. M., & Ayotunde, T. (2012). Nigeria	4	2	17	12	4	39/High
6	Agyemang-Duah, W., Arthur-Holmes, F., Peprah, C., Adei, D., & Peprah, P. (2020). Ghana	4	2	15	12	4	37/Moderate
7	Agyemang-Duah, W., Peprah, C., & Peprah, P. (2019). Ghana	6	2	16	13	4	41/High
8	Agyemang-Duah, W., Peprah, C., & Peprah, P. (2019). Ghana	4	2	16	13	4	39/High
9	Akinrolie, O., Okoh, A. C., & Kalu, M. E. (2020). Nigeria	8	2	17	14	4	45/High
10	Alidu, L., & Grunfeld, E. A. (2020). Ghana	6	2	12	11	4	35/Moderate
11	Angotti, N., Mojola, S. A., Schatz, E., Williams, J. R., & Gómez-Olivé, F. X. (2018). South Africa	3	2	14	13	2	34/Moderate
12	Atata, S. N. (2019). Nigeria	2	2	10	7	4	25/Low
13	Ayokunle, M et al. (2015). Nigeria	1	2	4	6	2	15/Low
14	Bayuo, J. (2017). Ghana	7	2	16	12	4	41/Moderate
15	Bohman, D. M., Van Wyk, N. C., & Ekman, S. (2014). South Africa	5	2	14	11	4	37/Moedrate
16	Bohman, D. M., Van Wyk, N. C., & Ekman, S. L. (2009). South Africa	5	2	16	11	3	37/Moderate
17	Bohman, D. M., van Wyk, N. C., & Ekman, S. L. (2011). South Africa	4	2	16	12	4	38/Moderate
18	Bohman, Doris M., Vasuthevan, S., Van Wyk, N. C., & Ekman, S. L. (2007). South Africa	7	2	16	14	4	43/High
19	Cadmus, E. O., Adebusoye, L. A., Olowookere, O. O., Olusegun, A. T., Oyinlola, O., Adeleke, R. O., ... & Alonge, T. O. (2019). Nigeria	3	2	16	10	4	35/Moderate
20	Cadmus, E. O., Owoaje, E. T., & Akinyemi, O. O. (2015).	3	2	16	13	4	38/Moderate

S/N	Name of authors, Year of publication, Country	Domain 1: Research team and reflexivity (/8)	Domain 2: Scope and purposes (/2)	Domain 3: study design (/17)	Domain 4: analysis and findings (/14)	Domain 5: Relevance and transferability (/4)	Total score (/45)/interpretation
	Nigeria						
21	de Klerk, J., & Moyer, E. (2017). Camerron	3	2	15	13	3	36/Moderate
22	Diameta, E., Adandom, I., Jumbo, S. U., Nwankwo, H. C., Obi, P. C., & Kalu, M. E. (2018). Nigeria	5	2	17	13	4	41/High
23	Golaz, V., Wandera, S. O., & Rutaremwa, G. (2017). Uganda	0	2	5	0	4	11/Low
24	Hien, H et al., (2015). Burkina Faso	4	2	9	5	2	22/Low
25	Howorth, K., Paddick, S. M., Rogathi, J., Walker, R., Gray, W., Oates, L. L., ... & Dotchin, C. (2019). Tanzania	6	2	14	12	4	40/High
26	Kakongi, N., Rukundo, G. Z., Gelaye, B., Wakida, E. K., Obua, C., & Okello, E. S. (2020). Uganda	4	2	16	12	4	38/Moderate
27	Kelly, G., Mrengqwa, L., & Geffen, L. (2019). South Africa	5	2	17	14	4	42/High
28	Kerr, P. P., & Schulze, S. (2004). South Africa	3	2	13	11	4	33/Moderate
29	Kiplagat, J., Mwangi, A., Chasela, C., & Huschke, S. (2019). Kenya	3	2	13	10	4	32/Moderate
30	Knight, L., Schatz, E., & Mukumbang, F. C. (2018). South Africa	3	2	12	11	4	32/Moderate
31	Kuteesa, M. O., Seeley, J., Cumming, R. G., & Negin, J. (2012). Uganda	1	2	13	8	4	28/Low
32	Lekalakala-Mokgele, E. (2014). South Africa	6	2	12	9	3	32/Moderate
33	Lekalakala-Mokgele, E. (2016). South Africa	6	2	13	12	3	36/Moderate
34	Leuning, C., Small, L., & Van Dyk, A. (2000). Namimbia	5	2	15	11	2	32/Moderate
35	Lopes Ibanez-Gonzalez, D., & Tollman, S. M. (2015). South Africa	6	2	16	13	4	41/High
36	Matovu, S. N., & Wallhagen, M. I. (2020). Uganda	6	2	13	12	4	37/Moderate
37	Matovu, S., Rankin, S., & Wallhagen, M. (2020). Uganda.	2	2	14	11	4	33/Moderate
38	Mkhonto, F., & Hanssen, I. (2018). South Africa	4	2	14	12	4	36/Moderate
39	Moroe, N., & Vazzana, N. (2019). South Africa	0	2	10	11	3	26/Low
40	Muchiri, J. W., Gericke, G. J., & Rheeder, P. (2012). South Africa	7	2	16	14	4	43/High
41	Mushi, D., Rongai, A., Paddick, S. M., Dotchin, C., Mtuya,	1	2	11	13	4	31/Moderate

S/N	Name of authors, Year of publication, Country	Domain 1: Research team and reflexivity (/8)	Domain 2: Scope and purposes (/2)	Domain 3: study design (/17)	Domain 4: analysis and findings (/14)	Domain 5: Relevance and transferability (/4)	Total score (/45)/interpretation
	C., & Walker, R. (2014). Tanzania.						
42	Nadasen, K. (2008). South Africa	4	2	11	12	3	32/Moderate
43	Naidoo, K., & Van Wyk, J. (2019). South Africa	2	2	13	8	4	29/Low
44	Ntuli, M., & Madiba, S. (2019). South Africa	1	2	12	12	3	30/Low
45	Nwankwo, H. C., Akinrolie, O., Adandom, I., Obi, P. C., Ojembe, B. U., & Kalu, M. E. (2019). Nigeria.	3	2	13	12	4	34/Moderate
46	Obi, P. C., Nwankwo, H. C., Emofe, D., Adandom, I., & Kalu, M. E. (2019). Nigeria	5	2	14	14	4	39/High
47	Ojembe, B. U., & Kalu, M. E. (2018). Nigeria.	2	2	14	13	4	35/Moderate
48	Ojembe, B.U. & Kalu, M. E. (2019). Nigeria.	3	2	14	14	4	37/Moderate
49	Okoh, A. E., Akinrolie, O., Bell-Gam, H. I., Adandom, I., Ibekaku, M. C., & Kalu, M. E. (2020). Nigeria	2	2	14	13	4	35/Moderate
50	Richards, E., Zalwango, F., Seeley, J., Scholten, F., & Theobald, S. (2013). Uganda	1	1	8	8	2	20/Low
51	Roos, V., & Klopper, H. (2010). South Africa	7	2	16	12	4	42/High
52	Roos, V., & Malan, L. (2012). South Africa	1	2	13	12	4	32/Moderate
53	Roos, V., Keating, N., & Kahl, C. (2019). South Africa	7	2	15	12	4	40/High
54	Roos, V., Kolobe, P. S., & Keating, N. (2014). South Africa	1	2	11	13	4	31/Moderate
55	Roos, V., & Wheeler, A. (2016). South Africa.	2	2	12	13	2	31/Moderate
56	Roos, V., Silvestre, S., & De Jager, T. (2017). South Africa.	0	2	11	13	3	29/low
57	Rotchford, A. P., Rotchford, K. M., Mthethwa, L. P., & Johnson, G. J. (2002). South africa.	5	2	16	13	3	39/High
58	Rutagumirwa, S. K., & Bailey, A. (2019). Tanzania	3	2	13	13	4	35/Moderate
59	Schatz, E. J. (2009). South Africa	4	2	10	10	3	29/Low
60	Schatz, E., & Gilbert, L. (2014). South Africa	3	2	10	9	4	28/Low
61	Schatz, E., & Knight, L. (2018). South Africa	2	2	11	13	4	32/Moderate
62	Schatz, E., Seeley, J., Negin, J., Weiss, H. A., Tumwekwase, G., Kabunga, E., Nalubega, P., & Mugisha, J. (2019). Ugandans.	4	2	13	14	4	37/Moderate
63	Sidloyi, S. S., & Bomela, N. J. (2016). South Africa	1	2	13	13	4	33/Moderate

S/N	Name of authors, Year of publication, Country	Domain 1: Research team and reflexivity (/8)	Domain 2: Scope and purposes (/2)	Domain 3: study design (/17)	Domain 4: analysis and findings (/14)	Domain 5: Relevance and transferability (/4)	Total score (/45)/interpretation
64	Singo, V. J., Lebese, R. T., Maluleke, T. X., & Nemathaga, L. H. (2015). South Africa	1	2	14	13	4	34/Moderate
65	Skovdal, M., Campbell, C., Madanhire, C., Nyamukapa, C., & Gregson, S. (2011). zimbabwe	1	2	11	10	3	27/Low
66	Ssengonzi, R. (2007). Uganda	5	2	16	13	4	40/High
67	Tanyi, P. L., Pelser, A., & Okeibunor, J. (2018). Cameroon	7	2	15	13	4	41/High
68	Udvardy, M & Cattell, M (1992). South Africa	2	1	3	2	1	9/Low
69	van Biljon, L., Roos, V., & Botha, K. (2015). South Africa	0	2	9	8	3	22/Low
70	Van Der Geest, S. (2002). Ghana	4	1	11	5	2	23/Low
71	Van Der Geest, S. (2004). Ghana	4	2	14	11	2	33/Moderate
72	Van Dongen, E. (2003). South Africa	2	2	6	6	3	19/Low
73	Van Dongen, E. (2005). South Africa	3	1	4	3	2	13/Low
74	Wilkinson, M., & Vember, H. (2013). South Africa	1	3	15	13	4	36/Moderate

Table 8. Quality Assessment of Mixed-method studies (n = 15), using the Mixed Method Appraisal Tool.[18]

S/N	Name of authors, Year of publication, Country	Qualitative component score (%)/rating	Quantitative component score (%)/rating	Mixed methods/integration					
				rating	Justification	Integration	Interpretation	Disagreement	Adherence
1	Afolabi et al., 2019/ Nigeria	100/high	80/ high	High	Yes	Yes	Can't tell	No	Yes
2	Deist et al., 2017/South Africa	100/high	100/high	High	Yes	Yes	Yes	Yes	Yes
3	Drah, 2014/Ghana & South Africa	100/high	80/ high	High	No	Yes	Yes	Yes	Yes
4	Frost, 2015/Sub-Saharan Africa	80/ high	80/ high	High	Yes	Yes	Yes	Yes	Can't tell
5	Geyer, 2010/South Africa	100/high	100/high	High	Yes	Yes	Yes	Yes	Yes
6	Kuteesa et al., 2014/ Uganda	100/high	100/high	High	Yes	Yes	Yes	Yes	Yes
7	Naah et al., 2020/ Cameroon	100/high	100/high	High	Yes	Yes	Yes	Yes	Yes
8	Ndou et al., 2013/South Africa	100/high	80/ high	High	Yes	Yes	Yes	Yes	Yes
9	Peltzer, 2004/South Africa	80/ high	80/ high	High	Yes	Yes	Yes	Yes	Yes
10	Phillips-Howard et al., 2014/Kenya	100/high	100/high	High	Yes	Yes	Yes	Yes	Yes
11	Pienaar et al., 2010/ South Africa	0/ low	80/ high	Low	No	No	No	No	No
12	Rhoda et al., 2015/South Africa	100/high	80/ high	High	Yes	Yes	Yes	No	Yes
13	Schatz, 2007/South Africa	100/high	0/ low	Low	Can't tell	No	No	No	No
14	Semeere et al., 2014/ Uganda	0/ low	100/high	Low	No	No	No	No	No
15	Watson et al., 2013/ South Africa	80/ high	100/high	High	Yes	Yes	No	No	Can't tell

DISCUSSION

This article is the second in a Four-Part series[6] to describe the quality (methodological quality and reporting quality) of ageing-related peer-review articles in the SSA. The methodological and quality reporting of published studies relating to ageing in SSA showed variable quality, albeit primarily good quality, suggesting room for improvement, especially for RCTs. The quality assessment provides information on the overall strength of evidence and methodological quality of a research design, conduct and analysis, highlighting the level of confidence the reader should place on the findings for decision making. It is important to note that, even though the quality is generally good, the quality assessment reflects more on the quality of reporting rather than the methodological qualities (bias assessment) used in the included studies. Because of limited word counts and lack of use of reporting guidelines across the included article, it was challenging to assess the methodological qualities of the included articles. The first step to allow for practical methodological qualities assessment is encouraging ageing researchers in SSA to adopt reporting guidelines for any study design (See https://www.equator-network.org, for different reporting guidelines). After achieving this (ageing researchers using reporting guidelines to report their article), we can practically assess the methodological qualities (biases) that could reduce the reader's confidence in the findings for decision-making.

Previous studies have argued that poor-quality research, either quality or methodology reporting in the SSA, is somewhat related to poor quality data on surveys or objective measures, such as incomplete reporting.[129] Generally, the unreliability of the data may be caused by sampling in the developing world, such as convenience sampling, which limits generalization, thereby impeding the use of such information in making a national or regional policy decision. Although the issue of sample size may not be specific to the ageing research in SSA, sample sizes were generally small in most studies included in our review. This highlighted the importance of longitudinal studies with an extensive data set and its accessibility for SSA researchers. Although longitudinal studies on ageing in the SSA region are increasing, pockets of community data sets in different forms are extensive, as shown in the articles included in this review. Therefore, global organizations, such as World Health Organisation-Ageing Africa or HelpAge-Africa, should create a data depository specific to ageing studies and develop standards/requirements to encourage researchers in different regions of Africa to deposit their study data. To guide against depositing poor quality or incomplete data, researchers depositing their collected data should clearly describe how it is collected. In addition, a committee should be commissioned to oversee and manage the data deposition; such a committee could be housed in already established centres for longitudinal studies, for instance, the WHO - SAGE collection centres in Ghana and South Africa. We recommend a standard data deposition reporting guideline for researchers, as it is promising to guide the researchers in providing a detailed description of their data collection methods. Besides, this checklist will guide the committee in reviewing and deciding which data should be deposited. To encourage researchers, any data deposit will be compensated with a fee. These data should be made available for researchers to answer different research questions and promote the global concept of data accessibility.

Could the implementation of National ageing policies in some African countries or the training and research in geriatric or gerontological have influenced the quality of ageing studies in this review? While we cannot measure this quantitatively, we could argue that it may indirectly impact the quality of studies. Currently, eleven countries, including South Africa, Ghana, Mozambique, Uganda, Tanzania, Zimbabwe, Kenya, Ethiopia, Malawi, and Nigeria, have implemented ageing policies.[130,131] These countries relatively have the highest number of high-quality articles across all study design; for instance, Nigeria: [62,93,108]; South Africa: [24,64,117,132,133]; Tanzania: [116,134,135]; Mozambique: [136]; Kenya: [137,138]; Ethiopia: [139]; Uganda: [140–142]; Ghana: [143–145]. Even though Rwanda and Cameroon's ageing policies are at the drafting stage, studies from these countries were not of high quality and further highlighted our assertion that implementing ageing policies could help improve the quality of ageing studies in SSA. Nevertheless, there is a need to critically evaluate the impact of ageing policies on the quality of ageing studies. Furthermore, SSA countries with training and research in gerontology and geriatrics, and funding, such as South Africa,[125,146] have the expertise to produce high-quality studies. This highlights the importance of geriatric and gerontological training and its potential impact on Africa's quality of ageing research. Since training and research in gerontology and geriatrics are hardly supported by the governments in SSA,[130] strategies to ensure adequate and continuous training in gerontology and geriatrics are recommended.

We observed that majority of the RCT/quasi-experimental studies (n=12/15, 80%) were conducted in South Africa, including one rated excellent and two rated good. The remaining two quasi-experimental studies were conducted in Nigeria and Kenya and were rated good. We also noticed that South African studies with ratings ranging between excellent and good were published in journals whose impact factors were higher (0.66 - 4.38) than studies from other countries with similar ratings published in 0.51 - 2.61 journals. This finding raises some questions to be considered by researchers and higher education institutions in SSA. First, could the dominance of South African studies within the RCT category be a function of the researchers' training or knowledge in this design? Second, do more South African studies having better ratings (excellent and good) imply that the researchers better know the methods and feasibility of conducting RCTs or quasi-experimental research? Third, could the low representation of some SSA countries and the absence of others within this study category imply a lack of training of researchers or inadequate knowledge in this study design? Fourth, could it also be a function of resource-setting in terms of funding available for research? For instance, high-resource setting (in the case of South Africa) versus low resource-setting (in the case of other SSA countries). These questions are important areas to explore to understand better or highlight the discrepancies in the quality reporting of ageing studies in SSA.

While RCTs are considered the highest level of evidence for decision-making,[147] the cost of planning and managing RCTs is often high, limiting the number of high-quality RCTs in the SSA areas. Scholars have argued that non-RCTs can also provide substantial evidence, especially if they are of high-quality study design.[148] Both RCTs and non-RCTs are important in examining cause-effect relationships between an intervention and outcome; however, non-RCTs cannot eliminate the possibility of mediating factors in the outcomes. Where funding is an issue in developing and conducting RCTs, we encourage ageing researchers to plan quasi-experimental studies employing and describing the methodology using a reporting guideline to assess the methodological biases efficiently.

We observed moderate to low-quality qualitative ageing studies conducted in SSA. These low reporting qualities ranged from not reporting qualitative study type, sampling, and poor strategies reporting to ensure rigour. This information is needed to allow readers a logical process that will add credibility to the findings informing policies. Most studies did not provide a thick description of their methodology, making the study's replicability in another setting challenging; this further doubts the study findings limiting its use in making clinical and policy decisions. Member checking, peer debriefing, data triangulation, and reflexive statement of the research team's characteristic and how it influences data collection and analysis were lacking in most qualitative studies. Qualitative ageing research in SSA is increasing and has been under intense scrutiny for its methodology and reporting, hindering its use in clinical practice.[149] Therefore, qualitative ageing researchers use some of the qualitative reporting guidelines, such as consolidated criteria for reporting qualitative research (COREQ),[150] standards for reporting qualitative research (SRQR),[151] or Lundgren et al.'s[17] 45 checklist, is encouraged.

While the debates on quantitative research's relative merits versus qualitative research are unending,[152] researchers are encouraged to use both. Remarkably, 80% of mixed-method studies were high MMAT studies, and for the remaining 20%, the deficiency mainly was in qualitative studies, highlighting the need for training of qualitative ageing researchers in the SSA region. We should not celebrate this success story yet, since only 15 mixed-method studies were included and assessed in this review—a focused review on studies that utilized a mixed-method approach is warranted to either support to refute this success story.

While this is the first study to assess the quality of ageing research in SSA, it has some limitations. Even though our study strategy is robust, we may have missed some articles since some of the national Journals in SSA are not indexed in PubMED or related databases,[153] and access to African Journal Online [https://www.ajol.info/index.php/ajol], which houses most journals in SSA region is limited. This study did not include articles published in languages other than French and English; some articles may have been missed in several African languages like Afrikaans and Hausa. While we conducted the quality assessment in pairs and used the mean scores for reporting, there is still the possibility of quality assessment bias since quality assessment tools are inherently biased because of their subjective nature. We believed that using quality assessment tools for specific study designs would have yielded different ratings. For instance, using COCHRANE Risk of Bias tools[154] for RCT would have yielded different quality ratings.

We conclude that the methodological and quality reporting of published studies on ageing in SSA show variable quality, albeit primarily good quality, against excellent quality. Studies with a large sample size are recommended, and qualitative researchers should provide a section on research team members' characteristics and reflexivity in their paper or as an appendix. Since this is the first study that describes the quality of published studies on ageing in SSA, a repeat quality assessment should be performed in the next decade. This paper is Part 2 of Kalu et al.'s[6] review, and Part 3 of the paper will focus on a review of longitudinal studies of ageing in SSA, identifying areas that require longitudinal studies to explain the cumulative advantages and disadvantages across life course trajectory for the older adults population in the SSA region.

ACKNOWLEDGEMENTS

We want to acknowledge other members of the Emerging Researchers & Professionals in Ageing - African Network.

FUNDING

None.

AUTHORS CONTRIBUTIONS

All authors contributed to the conceptualization, data screening, inclusion and extraction and manuscript drafting. All authors reviewed and approved the final manuscript for publication.

COMPETING INTEREST

The authors completed the Unified Competing Interest form (available upon request from the corresponding author) and declare no conflicts of interest.

Submitted: May 08, 2022 CEST, Accepted: May 24, 2022 CEST

REFERENCES

1. United Nations. Ageing and disability. Published 2018. Accessed May 2, 2021. https://www.un.org/development/desa/disabilities/disability-and-ageing.html

2. WHO. World report on ageing and health 2015. World Health Organisation. Published 2015. Accessed May 2, 2021. http://www.who.int/ageing/events/world-report-2015-launch/en/

3. Aboderin JB. Older people's health in sub-Saharan Africa. *Lancet*. 2014;285:E9-E11.

4. Cohen B, Menken J. *Aging in Sub-Saharan Africa: Recommendations for Furthering Research*. Preprint Epub. National Academies Press (US); 2006. doi:10.17226/11708

5. Biritwum R, Community Health. *Ghana - Study on Global Ageing and Adult Health-2007 / 8 , Wave 1*.; 2013.

6. Kalu ME, Ojembe BU, Akinrolie O, et al. Setting Priorities For Ageing Research In Africa: A Systematic Mapping Review Of 512 Studies From Sub-Saharan Africa. *J Glob Health*. 2021;11:1-14. doi:10.7189/11.15002

7. Heyvaert M, Hannes K, Onghena P. *Using Mixed Methods Research Synthesis for Literature Reviews*. Preprint Epub. SAGE Publications, Inc.; 2017. doi:10.4135/9781506333243

8. Sanderson S, Tatt ID, Higgins JPT. Tools for assessing quality and susceptibility to bias in observational studies in epidemiology: a systematic review and annotated bibliography. Published online June 1, 2007.

9. Harrison JK, Reid J, Quinn TJ, Shenkin SD. Using quality assessment tools to critically appraise ageing research: a guide for clinicians. Published online May 1, 2017.

10. The EQUATOR Network | Enhancing the QUAlity and Transparency Of Health Research. Accessed January 8, 2022. https://www.equator-network.org/

11. Johansen M, Thomsen SF. Guidelines for Reporting Medical Research: A Critical Appraisal. *Int Sch Res Not*. 2016;2016:1-7. doi:10.1155/2016/1346026

12. Ma LL, Wang YY, Yang ZH, Huang D, Weng H, Zeng XT. Methodological quality (risk of bias) assessment tools for primary and secondary medical studies: what are they and which is better? *Mil Med Res*. 2020;7(1). doi:10.1186/S40779-020-00238-8

13. Downs SH, Black N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *J Epidemiol Community Health*. 1998;52(6):377-384. doi:10.1136/jech.52.6.377

14. Grant MJ, Booth A. A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Info Libr J*. 2009;26(2):91-108. doi:10.1111/j.1471-1842.2009.00848.x

15. Ayokunle AM, Oyeyemi FT, Onipede W, et al. The Definitions and Onset of an Old Person in South-Western Nigeria. *Educ Gerontol*. 2015;41(7):494-503. doi:10.1080/03601277.2014.1003492

16. Gagnier JJ, Kienle G, Altman DG, et al. The CARE guidelines: consensus-based clinical case reporting guideline development. *Headache*. 2013;53(10):1541-1547. doi:10.1111/head.12246

17. Lundgren I, Begley C, Gross MM, Bondas T. "Groping through the fog": a metasynthesis of women's experiences on VBAC (Vaginal birth after Caesarean section). *BMC Pregnancy Childbirth*. 2012;12. doi:10.1186/1471-2393-12-85

18. Hong QN, Fàbregues S, Bartlett G, et al. The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. *Educ Inf*. 2018;34(4):285-291. doi:10.3233/EFI-180221

19. Loney PL, Chambers LW, Bennett KJ, Roberts JG, Stratford PW. Critical Appraisal of the Health Research Literature: Prevalence or Incidence of a Health Problem. *Chronic Dis Can*. 1998;19(4):170-176.

20. Trac MH, McArthur E, Jandoc R, et al. Macrolide antibiotics and the risk of ventricular arrhythmia in older adults. *CMAJ*. 2016;188(7):e120-e129. doi:10.1503/cmaj.150901

21. Hooper P, Jutai JW, Strong G, Russell-Minda E. Age-related macular degeneration and low-vision rehabilitation: a systematic review. *Can J Ophthalmol*. 2008;43(2):180-187. doi:10.3129/I08-001

22. Luo TC, Aguilera A, Lyles CR, Figueroa CA. Promoting physical activity through conversational agents: mixed methods systematic review. *Journal of Medical Internet Research*. 2021;23(9). doi:10.2196/25486

23. Landis JR, Koch GG. The Measurement of Observer Agreement for Categorical Data. *Biometrics*. 1977;33(1):159. doi:10.2307/2529310

24. De Villiers PJT, Steele AD, Hiemstra LA, et al. Efficacy and safety of a live attenuated influenza vaccine in adults 60 years of age and older. *Vaccine*. 2009;28(1):228-234. doi:10.1016/j.vaccine.2009.09.092

25. Ezenwa VE, Osaghae SO, Ozah EO, Okparanta G. Apical peri-prostatic nerve block versus intra-rectal xylocaine gel for trans-rectal ultrasound guided prostate biopsy among Nigerian patients: a prospective randomized study. *Niger J Clin Pract*. 2020;23(9):1183-1187. doi:10.4103/njcp.njcp_219_19

26. Forrest BD, Steele AD, Hiemstra L, Rappaport R, Ambrose CS, Gruber WC. A prospective, randomized, open-label trial comparing the safety and efficacy of trivalent live attenuated and inactivated influenza vaccines in adults 60 years of age and older. *Vaccine*. 2011;29(20):3633-3639. doi:10.1016/j.vaccine.2011.03.029

27. Geerts GAVM. Neutral zone or conventional mandibular complete dentures: a randomised crossover trial comparing oral health-related quality of life. *J Oral Rehabil*. 2017;44(9):702-708. doi:10.1111/joor.12533

28. Nanji K, Kherani I, Damji K, Nyenze M, Kiage D, Tennant M. The muranga teleophthalmology study: a comparison of virtual (teleretina) assessment with in-person clinical examination to diagnose diabetic retinopathy and age-related macular degeneration in Kenya. *Middle East Afr J Ophthalmol*. 2020;27(2):91-99. doi:10.4103/meajo.MEAJO_144_19

29. Adam S, Godlwana L, Maleka D. Effect of pre-fracture mobility on the early post-operative functional outcome in elderly patients with a hip fracture. *South African J Physiother*. 2013;69(3). doi:10.4102/sajp.v69i3.28

30. Boon H, Ruiter RAC, James S, Van Den Borne B, Williams E, Reddy P. The impact of a community-based pilot health education intervention for older people as caregivers of orphaned and sick children as a result of HIV and AIDS in South Africa. *J Cross Cult Gerontol*. 2009;24(4):373-389. doi:10.1007/s10823-009-9101-2

31. Rayner B, Ramesar R, Steyn K, Levitt N, Lombard C, Charlton K. G-protein-coupled receptor kinase 4 polymorphisms predict blood pressure response to dietary modification in Black patients with mild-to-moderate hypertension. *J Hum Hypertens*. 2012;26(5):334-339. doi:10.1038/jhh.2011.33

32. Nwankwo TO, Umeh UA, Aniebue UU, Onu JU, Umeh CR. Impact of neoadjuvant chemotherapy in improving operative intervention in the management of cervical cancer in low resource setting: a preliminary report. *Pan Afr Med J*. 2020;36:1-6. doi:10.11604/pamj.2020.36.210.24141

33. Puckree T, Uthum P. Effectiveness of a community based programme of physiotherapy on stability, balance and function of stroke patients. *South African J Physiother*. 2014;70(1). doi:10.4102/sajp.v70i1.257

34. Skidmore ER, Whyte EM, Butters MA, Terhorst L, Reynolds CF. Strategy Training During Inpatient Rehabilitation May Prevent Apathy Symptoms After Acute Stroke. *PM R*. 2015;7(6):562-570. doi:10.1016/J.PMRJ.2014.12.010

35. Vorobiof DA, Rapoport BL, Chasen MR, et al. First line therapy with paclitaxel (Taxol®) and pegylated liposomal doxorubicin (Caelyx®) in patients with metastatic breast cancer: a multicentre phase II study. *Breast*. 2004;13(3):219-226. doi:10.1016/j.breast.2004.01.006

36. Webb EM, Rheeder P, Van Zyl DG. Diabetes care and complications in primary care in the Tshwane district of South Africa. *Primary Care Diabetes*. 2015;9(2):147-154. doi:10.1016/j.pcd.2014.05.002

37. Abelson M. Left atrial appendage closure in patients with atrial fibrillation in whom warfarin is contra-indicated: initial South African experience. *Cardiovasc J Afr*. 2013;24(4):107-109. doi:10.5830/CVJA-2013-018

38. Geffen LN, Kelly G, Morris JN, Howard EP. Peer-to-peer support model to improve quality of life among highly vulnerable, low-income older adults in Cape Town, South Africa. *BMC Geriatr*. 2019;19(1):1-12. doi:10.1186/s12877-019-1310-0

39. Ardington C, Case A, Islam M, et al. The impact of AIDS on intergenerational support in South Africa: evidence from the cape area panel study. *Res Aging*. 2010;32(1):97-121. doi:10.1177/0164027509348143

40. Fantahun M, Berhane Y, Högberg U, Wall S, Byass P. Ageing of a rural Ethiopian population: who are the survivors? *Public Health*. 2009;123(4):326-330. doi:10.1016/J.PUHE.2008.10.019

41. Rohr JK, Xavier Gómez-Olivé F, Rosenberg M, et al. Performance of self-reported HIV status in determining true HIV status among older adults in rural South Africa: a validation study. *J Int AIDS Soc*. 2017;20(1). doi:10.7448/IAS.20.1.21691

42. Rosenberg M, Gómez-Olivé FX, Wagner RG, et al. The relationships between cognitive function, literacy and HIV status knowledge among older adults in rural South Africa. *J Int AIDS Soc*. 2020;23(3). doi:10.1002/jia2.25457

43. Sanuade OA, Dodoo FNA, Koram K, De-Graft Aikins A. Prevalence and correlates of stroke among older adults in Ghana: evidence from the Study on Global AGEing and adult health (SAGE). *PLoS ONE*. 2019;14(3). doi:10.1371/JOURNAL.PONE.0212623

44. Solomons K, Ch MBB. Malignant mesothelioma-clinical and epidemiological features A report of 80 cases. *Arch Intern Med*. 1970;126:827-830. doi:10.10520/AJA20785135_11366

45. Whitelaw DA, Rayner BL, Willcox PA. Community-Acquired Bacteremia in the Elderly: A Prospective Study of 121 Cases. *J Am Geriatr Soc*. 1992;40(10):996-1000. doi:10.1111/j.1532-5415.1992.tb04475.x

46. Whittaker S, Prinsloo r. F, Wicht CL, Janse van Rensburg MP. Frail aged persons residing in South African homes for the aged who require hospitalisation. Part I. Urban areas. *South African Med J*. 1991;79(1):39-44.

47. Udjo EO. Demographic impact of HIV/AIDS on the young and elderly populations in South Africa. *J Intergener Relatsh*. 2006;4(2):23-41. doi:10.1300/J194v04n02_03

48. Sanya EO, Abiodun AA, Kolo PO, Olanrewaju T, Adekeye K. Profile and causes of mortality among elderly patients seen in a tertiary care hospital in Nigeria. *Ann Afr Med*. 2011;10(4):278-283. doi:10.4103/1596-3519.87043

49. Ramlall S, Chipps J, Bhigjee AI, Pillay BJ. Sensitivity and specificity of neuropsychological tests for dementia and mild cognitive impairment in a sample of residential elderly in South Africa. *South African J Psychiatry*. 2014;20(4):153-159. doi:10.7196/SAJP.558

50. Whittaker S, Prinsloo r. F, Wicht CL, Janse van Rensburg MP. Frail aged persons residing in South African homes for the aged who require hospitalisation. Part II Urban areas. *South African Med J*. 1991;79(1):39-44.

51. Gyasi RM, Adam AM, Phillips DR. Financial Inclusion, Health-Seeking Behavior, and Health Outcomes Among Older Adults in Ghana. *Res Aging*. 2019;41(8):794-820. doi:10.1177/0164027519846604

52. Ice GH, Zidron A, Juma E. Health and health perceptions among Kenyan grandparents. *J Cross Cult Gerontol*. 2008;23(2):111-129. doi:10.1007/S10823-008-9063-9

53. Parag Y, Buccimazza I. How long are elderly patients followed up with mammography after the diagnosis of breast cancer? A single-centre experience in a developing country. *South African Med J*. 2016;106(7):721-723. doi:10.7196/SAMJ.2016.v106i7.10405

54. Kalula SZ, Ferreira M, Swingler GH, Badri M. Ethnic differences in rates and causes of falls in an urban community-dwelling older population in South Africa. *J Am Geriatr Soc*. 2015;63(2):403-404. doi:10.1111/jgs.13277

55. Kretchy IA, Koduah A, Ohene-Agyei T, Boima V, Appiah B. The Association between Diabetes-Related Distress and Medication Adherence in Adult Patients with Type 2 Diabetes Mellitus: A Cross-Sectional Study. *J Diabetes Res*. 2020;2020. doi:10.1155/2020/4760624

56. Payne CF, Mkandawire J, Kohler HP. Disability Transitions and Health Expectancies among Adults 45 Years and Older in Malawi: A Cohort-Based Model. *PLoS Medicine*. 2013;10(5). doi:10.1371/JOURNAL.PMED.1001435

57. Puckree T, Mkhize M, Mgobhozi Z, Lin J. African traditional healers: what health care professionals need to know. *Int J Rehabil Res*. 2002;25(4):247-251. doi:10.1097/00004356-200212000-00001

58. Rand D, Eng JJ. Predicting daily use of the affected upper extremity 1 year after stroke. *J Stroke Cerebrovasc Dis*. 2015;24(2):274-283. doi:10.1016/J.JSTROKECEREBROVASDIS.2014.07.039

59. Kalula SZ, Ferreira M, Thomas KGF, de Villiers L, Joska JA, Geffen LN. Profile and management of patients at a memory clinic. *South African Med J*. 2010;100(7):449-451. doi:10.7196/samj.3384

60. Karstaedt AS, Bolhaar M. Tuberculosis in older adults in Soweto, South Africa. *Int J Tuberc Lung Dis*. 2014;18(10):1220-1222. doi:10.5588/IJTLD.14.0210

61. Segal I, Walker ARP. Diverticular disease in urban Africans in South Africa. *Digestion*. 1982;24(1):42-46. doi:10.1159/000198773

62. Akinyemi RO, Allan L, Owolabi MO, et al. Profile and determinants of vascular cognitive impairment in African stroke survivors: the CogFAST Nigeria Study. *J Neurol Sci*. 2014;346(1-2):241-249. doi:10.1016/j.jns.2014.08.042

63. Diamond TH, Botha JR, Kalk WJ, Shires R. Primary hyperparathyroidism. A study of 100 patients in Johannesburg. *South African Med J*. 1986;69(2):94-97. doi:10.10520/AJA20785135_5895

64. van Vuuren A, Rheeder P, Hak E. Effectiveness of influenza vaccination in the elderly in South Africa. *Epidemiol Infect*. 2009;137(7):994-1002. doi:10.1017/S0950268808001386

65. Walker ARP, Walker BF, Tsotetsi NG, Sebitso C, Siwedi D, Walker AJ. Case-control study of prostate cancer in black patients in Soweto, South Africa. *Br J Cancer*. 1992;65(3):438-441. doi:10.1038/bjc.1992.89

66. Adebajo AO, Cooper C, Evans JG. Fractures of the hip and distal forearm in west africa and the United Kingdom. *Age Ageing*. 1991;20(6):435-438. doi:10.1093/AGEING/20.6.435

67. Meiring P, Blake AJ, Grobbelaar JP. Identification and definition of the geriatric patient in a teaching hospital. *South African Med J*. 1983;64(17):670-673. doi:10.10520/AJA20785135_9877

68. Bloomfield GS, Delong AK, Akwanalo CO, et al. Markers of Atherosclerosis, Clinical Characteristics, and Treatment Patterns in Heart Failure A Case-Control Study of Middle-Aged Adult Heart Failure Patients in Rural Kenya. *Glob Heart*. 2016;11(1):97-107. doi:10.1016/J.GHEART.2015.12.014/GALLEY/332/DOWNLOAD/

69. Solomon A, Christian BF, Woodiwiss AJ, Norton GR, Dessein PH. Burden of depressive symptoms in South African public healthcare patients with established rheumatoid arthritis: a case-control study. *Clin Exp Rheumatol*. 2011;29(3):506-512.

70. Walker ARP, Segal I, Posner R, Shein CH, Tsotetsi NG, Walker AJ. Prevalence of gallstones in elderly black women in Soweto, Johannesburg, as assessed by ultrasound. *Am J Gastroenterol*. 1989;84(11):1383-1385.

71. Whigham BT, Williams SEI, Liu Y, et al. Myocilin mutations in black South Africans with POAG. *Mol Vis*. 2011;17:1064-1069.

72. Williams ER, Jone RE, Baker SN. Slow orthostatic tremor can persist when walking backward. *Mov Disord*. 2010;25(6):795-797. doi:10.1002/mds.23024

73. Ayuk A, Omoronyia O, Asibong U, et al. Impact of diabetes mellitus on sexuality in a developing country setting: a case-control study in Calabar, Nigeria. *Niger J Clin Pract*. 2020;23(6):870-878. doi:10.4103/njcp.njcp_5_20

74. Schnaid E, MacPhail AP, Sweet MBE. Fractured neck of femur in black patients. *J Bone Joint Surg Br*. 2000;82-B(6):872-875. doi:10.1302/0301-620x.82b6.0820872

75. Bornman MS, Reif S. Serum testosterone levels in South African men and the onset of androgen decline in ageing males. *South African Journal of Surgery*. 2007;45(2):62-64. doi:10.7196/sajs.75

76. Faber M, Kriek JA, Wolmarans P, et al. Dietary patterns and nutritional status in free-living older white men with established vascular disease. *South African Med J*. 1992;82(4):232-236.

77. Sarkodie BD, Botwe BO, Brakohiapa EKK. Percutaneous transhepatic biliary stent placement in the palliative management of malignant obstructive jaundice: initial experience in a tertiary center in ghana. *Pan Afr Med J*. 2020;37:1-7. doi:10.11604/pamj.2020.37.96.20050

78. Pfttifor JM, Ross FT, Solomon L. Seasonal variation in serum 25-hydroxycholecalciferol concentrations in elderly South African patients with fractures of femoral neck. *Br Med J*. 1978;1:826-827. doi:10.1136/bmj.1.6116.826

79. Uys LR, Hunt BN. Standards for the nursing care of the frail aged. *Curationis*. 1990;13:19-20. doi:10.4102/CURATIONIS.V13I1/2.277

80. Schatz E, Gómez-Olivé X, Ralston M, Menken J, Tollman S. The impact of pensions on health and wellbeing in rural South Africa: does gender matter? *Soc Sci Med*. 2012;75(10):1864-1873. doi:10.1016/j.socscimed.2012.07.004

81. Schmidlin EJ, Steyn M, Houlton TMR, Briers N. Facial ageing in South African adult males. *Forensic Sci Int*. 2018;289:277-286. doi:10.1016/j.forsciint.2018.05.006

82. Segal I, Solomon A, Ou Tim L, Rabin M, Walker AR. Hiatus hernia in Johannesburg Blacks. *South African Med J*. 1980;58(10):404-405.

83. Silbert VM. Medical and psychosocial problems of the aged. *South African Med J*. 1977;51(13):421-424.

84. Singo VJ, Lebese RT, Maluleke TX, Nemathaga LH. The views of the elderly on the impact that HIV and AIDS has on their lives in the Thulamela Municipality, Vhembe District, Limpopo province. *Curationis*. 2015;38(1). doi:10.4102/CURATIONIS.V38I1.1166

85. Golaz V, Wandera SO, Rutaremwa G. Understanding the vulnerability of older adults: extent of and breaches in support systems in Uganda. *Ageing Soc*. 2017;37(1):63-89. doi:10.1017/S0144686X15001051

86. Kellett-Wright J, Flatt A, Eaton P, et al. Screening for HIV-Associated Neurocognitive Disorder (HAND) in Adults Aged 50 and Over Attending a Government HIV Clinic in Kilimanjaro, Tanzania. Comparison of the International HIV Dementia Scale (IHDS) and IDEA Six Item Dementia Screen. *AIDS Behav*. 2021;25(2):542-553. doi:10.1007/s10461-020-02998-9

87. Phukubye P, Oyedele O. The incidence and structure of the fabella in a South African cadaver sample. *Clin Anat*. 2011;24(1):84-90. doi:10.1002/ca.21049

88. Rotchford AP, Johnson GJ. Rapid assessment of cataract surgical coverage in rural Zululand. *South African Med J*. 2000;90:1030-1032.

89. Rodriguez H, Brathwaite D, Dorsey S. Depression and social support in the elderly population: a study of rural South African elders. *ABNF J*. 2002;13(2):45-48.

90. Saeed BII, Yawson AE, Nguah S, Agyei-Baffour P, Emmanuel N, Ayesu E. Effect of socio-economic factors in utilization of different healthcare services among older adult men and women in Ghana. *BMC Health Serv Res*. 2016;16(1). doi:10.1186/S12913-016-1661-6

91. Saka SA, Oosthuizen F, Nlooto M. Potential inappropriate prescribing and associated factors among older persons in Nigeria and South Africa. *Int J Clin Pharm*. 2019;41(1):207-214. doi:10.1007/S11096-018-0770-1

92. Sarfo FS, Akassi J, Agyei M, Kontoh S, Ovbiagele B. Risk Factor Control in Stroke Survivors with Diagnosed and Undiagnosed Diabetes: A Ghanaian Registry Analysis. *J Stroke Cerebrovasc Dis*. 2020;29(12). doi:10.1016/j.jstrokecerebrovasdis.2020.105304

93. Akor AA, Bamidele A, Erhabor GE. Predictors of Health-Related Quality of Life (HRQOL) in Patients With Chronic Obstructive Pulmonary Disease using the COPD Assessment Test (CAT). *West Afr J Med*. 2020;37(3):275-280.

94. Olamoyegun MA, Raimi TH, Ala OA, Fadare JO. Mobile phone ownership and willingness to receive mhealth services among patients with diabetes mellitus in south-west, Nigeria. *Pan Afr Med J*. 2020;37(29):1-12. doi:10.11604/pamj.2020.37.29.25174

95. Paddick SM, Kisoli A, Longdon A, et al. The prevalence and burden of behavioural and psychological symptoms of dementia in rural Tanzania. *Int J Geriatr Psychiatry*. 2015;30(8):815-823. doi:10.1002/gps.4218

96. Adandom I, Jumbo S, Diameta E, Nwankwo HC, Akinola B, Kalu ME. Managing Psycho-Social-Cognitive Factors during Hip/knee Fracture Rehabilitation for Older Adults: Clinicians' Experiences. *Niger Hosp Pract*. 2020;26(1-2):23-32.

97. Agunbiade OM, Akinyemi AI. Neoliberalism and resilience among older yoruba people in a semiurban community, South West Nigeria. In: *Cross-Cultural and Cross-Disciplinary Perspectives in Social Gerontology*. Springer Singapore; 2016:85-107. doi:10.1007/978-981-10-1654-7_5

98. Lekalakala-Mokgele E. Exploring gender perceptions of risk of HIV infection and related behaviour among elderly men and women of ga-rankuwa, Gauteng province, South Africa. *Sahara J*. 2016;13(1):88-95. doi:10.1080/17290376.2016.1218790

99. Leuning CJ, Small LF, Van Dyk A. Meanings and expressions of care and caring for elders in urban Namibian families: *Curationis*. 2000;23(3). doi:10.4102/CURATIONIS.V23I3.711

100. Lopes Ibanez-Gonzalez D, Tollman SM. Clinics and Churches: Lifeworlds and health-seeking practices of older women with noncommunicable disease in rural South Africa. *BMC Int Health Hum Rights*. 2015;15(1). doi:10.1186/S12914-015-0051-1

101. Matovu SN, Wallhagen MI. Perceived Caregiver Stress, Coping, and Quality of Life of Older Ugandan Grandparent-Caregivers. *J Cross Cult Gerontol*. 2020;35(3):311-328. doi:10.1007/S10823-020-09403-X

102. Muchiri JW, Gericke GJ, Rheeder P. Needs and preferences for nutrition education of type 2 diabetic adults in a resource-limited setting in South Africa. *Heal SA Gesondheid*. 2012;17(1). doi:10.4102/hsag.v17i1.614

103. Obi P, Nwankwo H, Emofe D, Adandom I, Kalu M. The Experience and Perception of Physiotherapists in Nigeria re: Fall Prevention in Recurrent-Faller Older Adults. *Internet J Allied Heal Sci Pract*. 2019;17(2):11. doi:10.46743/1540-580x/2019.1798

104. Roos V, Klopper H. Older Persons' Experiences of Loneliness: A South African Perspective. *J Psychol Africa*. 2010;20(2):281-289. doi:10.1080/14330237.2010.10820377

105. Roos V, Keating N, Kahl C. Loneliness of older black South African women subjected to forcible relocation. *Glob Health Action*. 2019;12(1). doi:10.1080/16549716.2019.1672329

106. Rotchford AP, Rotchford KM, Mthethwa LP, Johnson GJ. Reasons for poor cataract surgery uptake - a qualitative study in rural south africa. *Trop Med Int Heal*. 2002;7(3):288-292. doi:10.1046/j.1365-3156.2002.00850.x

107. Ssengonzi R. The plight of older persons as caregivers to people infected/affected by HIV/AIDS: evidence from Uganda. *J Cross Cult Gerontol*. 2007;22(4):339-353. doi:10.1007/S10823-007-9043-5

108. Akinrolie O, Okoh AC, Kalu ME. Intergenerational Support between Older Adults and Adult Children in Nigeria: The Role of Reciprocity. *J Gerontol Soc Work*. 2020;63(5):478-498. doi:10.1080/01634372.2020.1768459

109. Tanyi PL, Pelser A, Okeibunor J. Hiv/aids and older adults in cameroon: emerging issues and implications for caregiving and policy-making. *Sahara J*. 2018;15(1):7-19. doi:10.1080/17290376.2018.1433059

110. Agyemang-Duah W, Peprah C, Peprah P. Factors influencing the use of public and private health care facilities among poor older people in rural Ghana. *J Public Heal*. 2020;28(1):53-63. doi:10.1007/S10389-018-01010-Y

111. Alidu L, Grunfeld EA. 'What a dog will see and kill, a cat will see and ignore it': an exploration of health-related help-seeking among older Ghanaian men residing in Ghana and the United Kingdom. *Br J Health Psychol*. 2020;25(4):1102-1117. doi:10.1111/bjhp.12454

112. Bayuo J. Experiences with out-patient hospital service utilisation among older persons in the Asante Akyem North District- Ghana. *BMC Health Serv Res*. 2017;17(1). doi:10.1186/S12913-017-2604-6

113. Bohman DM, Van Wyk NC, Ekman SL. Tradition in transition - Intergenerational relations with focus on the aged and their family members in a South African context. *Scand J Caring Sci*. 2009;23(3):446-455. doi:10.1111/j.1471-6712.2008.00640.x

114. Bohman DM, Vasuthevan S, Van Wyk NC, Ekman SL. "We clean our houses, prepare for weddings and go to funerals": daily lives of elderly Africans in Majaneng, South Africa. *J Cross Cult Gerontol*. 2007;22(4):323-337. doi:10.1007/s10823-007-9040-8

115. Diameta E, Adandom I, Jumbo SU, Nwankwo HC, Obi PC, Kalu ME. The Burden Experience of Formal and Informal Caregivers of Older Adults With Hip Fracture in Nigeria. *SAGE Open Nurs*. 2018;4. doi:10.1177/2377960818785155

116. Howorth K, Paddick SM, Rogathi J, et al. Conceptualization of depression amongst older adults in rural Tanzania: a qualitative study. *Int Psychogeriatrics*. 2019;31(10):1473-1481. doi:10.1017/S1041610218002016

117. Kelly G, Mrengqwa L, Geffen L. "they don't care about us": Older people's experiences of primary healthcare in Cape Town, South Africa. *BMC Geriatr*. 2019;19(1). doi:10.1186/s12877-019-1116-0

118. Richards E, Zalwango F, Seeley J, Scholten F, Theobald S. Neglected older women and men: exploring age and gender as structural drivers of HIV among people aged over 60 in Uganda. *African J AIDS Res*. 2013;12(2):71-78. doi:10.2989/16085906.2013.831361

119. Van Dongen E. "Die lewe vat ek net soos ek dit kry." Life stories and remembrance of older coloured people on farms in the western cape province. *J Cross Cult Gerontol*. 2003;18(4):303-335. doi:10.1023/B:JCCG.0000004900.01896.AC

120. Van Der Geest S. "They don't come to listen": the experience of loneliness among older people in Kwahu, Ghana. *J Cross Cult Gerontol*. 2004;19(2):77-96. doi:10.1023/B:JCCG.0000027846.67305.F0

121. Pienaar E, Stearn N, Swanepoel DW. Self-reported outcomes of aural rehabilitation for adult hearing aid users in a South African context. *S Afr J Commun Disord*. 2010;57. doi:10.4102/SAJCD.V57I1.44

122. Schatz EJ. "Taking care of my own blood": older women's relationships to their households in rural South Africa. *Scand J Public Health*. 2007;35:147-154. doi:10.1080/14034950701355676

123. Semeere AS, Lwanga I, Sempa J, et al. Mortality and immunological recovery among older adults on antiretroviral therapy at a Large Urban HIV clinic in Kampala, Uganda. *J Acquir Immune Defic Syndr*. 2014;67(4):382-389. doi:10.1097/QAI.0000000000000330

124. Drah BB. "Older Women", Customary Obligations and Orphan Foster Caregiving: The Case of Queen Mothers in Manya Klo, Ghana. *J Cross Cult Gerontol*. 2014;29(2):211-229. doi:10.1007/s10823-014-9232-y

125. Frost L, Liddie Navarro A, Lynch M, et al. Care of the Elderly: Survey of Teaching in an Aging Sub-Saharan Africa. *Gerontol Geriatr Educ*. 2015;36(1):14-29. doi:10.1080/02701960.2014.925886

126. Watson MJ, Klopper HC, Kruger A. Community-based collaboration in support of older persons. *J Psychol Africa*. 2013;23(3):515-518. doi:10.1080/14330237.2013.10820661

127. Afolabi AO, Eboiyehi FA, Afolabi KA. Gender analysis of nurses' attitude towards care of the elderly with dementia in Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Osun State, Nigeria. *J Women Aging*. 2020;32(2):203-219. doi:10.1080/08952841.2019.1682488

128. Rhoda A, Cunningham N, Azaria S, Urimubenshi G. Provision of inpatient rehabilitation and challenges experienced with participation post discharge: quantitative and qualitative inquiry of African stroke patients. *BMC Health Services Research*. 2015;15. doi:10.1186/s12913-015-1057-z

129. Kinyondo A, Pelizzo R, Asongu SA, Nwachukwu JC, Kinyondo A, Kinyondo Z. Poor Quality of Data in Africa: What Are the Issues? *Polit Policy*. 2018;46(6):851-877. doi:10.1111/polp.12277

130. Saka S, Oosthuizen F, Nlooto M. National policies and older people's healthcare in sub-saharan africa: a scoping review. *Ann Glob Heal*. 2019;85(1). doi:10.5334/aogh.2401

131. Lamai S. FG Approves National Policy On Ageing For Older Persons In Nigeria - Federal Ministry of Information and Culture. Accessed January 14, 2022. https://fmic.gov.ng/fg-approves-national-policy-on-ageing-for-older-persons-in-nigeria/

132. Otitoola OC, Oldewage-Theron WN, Egal AA. Trends in the development of obesity in elderly day care attendees in Sharpeville, South Africa, from 2007-2011. *South African J Clin Nutr*. 2015;28(1):12-17. doi:10.1080/16070658.2015.1173452 0

133. Charlton KE, Kolbe-Alexander TL, Nel JH. The MNA, but not the DETERMINE, screening tool is a valid indicator of nutritional status in elderly Africans. *Nutrition*. 2007;23(7-8):533-542. doi:10.1016/j.nut.2007.04.015

134. Adhvaryu AR, Beegle K. The long-run impacts of adult deaths on older household members in Tanzania. *Econ Dev Cult Change*. 2012;60(2):245-277. doi:10.1086/662577

135. Dewhurst MJ, Dewhurst F, Gray WK, Chaote P, Orega GP, Walker RW. The high prevalence of hypertension in rural-dwelling Tanzanian older adults and the disparity between detection, treatment and control: a rule of sixths? *J Hum Hypertens*. 2013;27(6):374-380. doi:10.1038/jhh.2012.59

136. Macquart de Terline D, Kramoh KE, Bara Diop I, et al. Poor adherence to medication and salt restriction as a barrier to reaching blood pressure control in patients with hypertension: cross-sectional study from 12 sub-Saharan countries. *Arch Cardiovasc Dis*. 2020;113(6-7):433-442. doi:10.1016/j.acvd.2019.11.009

137. Phillips-Howard PA, Laserson KF, Amek N, et al. Deaths ascribed to non-communicable diseases among rural kenyan adults are proportionately increasing: evidence from a health and demographic surveillance system, 2003-2010. *PLoS ONE*. 2014;9(11). doi:10.1371/JOURNAL.PONE.0114010

138. Chepngeno-Langat G, Madise N, Evandrou M, Falkingham J. Gender differentials on the health consequences of care-giving to people with AIDS-related illness among older informal carers in two slums in Nairobi, Kenya. *AIDS Care - Psychol Socio-Medical Asp AIDS/HIV*. 2011;23(12):1586-1594. doi:10.1080/09540121.2011.569698

139. Legesse M, Abebe Z, Woldie H. Chronic energy deficiency and associated factors among older population in Ethiopia: a community based study. *PLoS ONE*. 2019;14(4). doi:10.1371/JOURNAL.PONE.0214861

140. Manne-Goehler J, Kakuhikire B, Abaasabyoona S, et al. Depressive Symptoms Before and After Antiretroviral Therapy Initiation Among Older-Aged Individuals in Rural Uganda. *AIDS Behav*. 2019;23(3):564-571. doi:10.1007/S10461-018-2273-4

141. Wandera SO, Ntozi J, Kwagala B. Prevalence and correlates of disability among older ugandans: evidence from the uganda national household survey. *Glob Health Action*. 2014;7(1). doi:10.3402/gha.v7.25686

142. Wandera SO, Golaz V, Kwagala B, Ntozi J. Factors associated with self-reported ill health among older Ugandans: a cross sectional study. *Arch Gerontol Geriatr*. 2015;61(2):231-239. doi:10.1016/j.archger.2015.05.006

143. Agyemang-Duah W, Peprah C, Peprah P. "Let's talk about money": How do poor older people finance their healthcare in rural Ghana? A qualitative study. *Int J Equity Health*. 2019;18(1). doi:10.1186/S12939-019-0927-0

144. Ottie-Boakye D. Coverage of non-receipt of cash transfer (Livelihood Empowerment Against Poverty) and associated factors among older persons in the Mampong Municipality, Ghana – a quantitative analysis. *BMC Geriatr*. 2020;20(1). doi:10.1186/S12877-020-01786-3

145. Nutakor JA, Dai B, Gavu AK, Antwi OA. Relationship between chronic diseases and sleep duration among older adults in Ghana. *Qual Life Res*. 2020;29(8):2101-2110. doi:10.1007/S11136-020-02450-4

146. Dotchin CL, Akinyemi RO, Gray WK, Walker RW. Geriatric medicine: services and training in Africa. *Age Ageing*. 2013;42(1):124-128. doi:10.1093/ageing/afs119

147. Guyatt GH, Oxman AD, Kunz R, Vist GE, Falck-Ytter Y, Schünemann HJ. What is "quality of evidence" and why is it important to clinicians? *BMJ*. 2008;336:995-998.

148. Sterne JA, Hernán MA, Reeves BC, et al. ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions. *BMJ*. 2016;355. doi:10.1136/bmj.i4919

149. Kalu ME, Ebuka A, Anieto E, Okeke O, Ibekaku M, Abaraogu U. Qualitative research in physiotherapy: a systematic mapping review of 20 years literature from sub-Saharan Africa. *Physiother Theory Pract*. Published online 2022:1-23. doi:10.1080/09593985.2022.2028952

150. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Heal Care*. 2007;19(6):349-357. doi:10.1093/intqhc/mzm042

151. O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med*. 2014;89(9):1245-1251. doi:10.1097/ACM.0000000000000388

152. Sackett DL, Rosenberg WMC, Gray JAM, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. 1996. *Clin Orthop Relat Res*. 2007;455:3-5. doi:10.1136/bmj.312.7023.71

153. Hofman KJ, Kanyengo CW, Rapp BA, Kotzin S. Mapping the health research landscape in Sub-Saharan Africa: a study of trends in biomedical publications. *J Med Libr Assoc*. 2009;97(1):41-44. doi:10.3163/1536-5050.97.1.007

154. Higgins JPT, Altman DG, Gøtzsche PC, et al. The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *BMJ*. 2011;343(7829). doi:10.1136/BMJ.D5928