

# Symptom awareness measures for breast and cervical cancer in sub-Saharan Africa: A scoping review



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**Background:** In sub-Saharan Africa (SSA), breast cancer is the most commonly diagnosed cancer among women, while cervical cancer remains the leading cause of cancer death. Women often fail to recognise or misinterpret possible symptoms, so breast and cervical cancer symptom awareness information can promote timely help-seeking behaviour, diagnosis and start of treatment.

**Aim:** To identify tools that have been utilised to measure breast and cervical cancer symptom awareness in SSA and to establish if such tools have been validated in SSA populations.

**Methods:** A scoping review of articles published between January 1997 and February 2017, written in English and describing primary research in breast and/or cervical cancer symptom awareness-related topics in SSA contexts, was undertaken across five databases. The approach was supported by Colquhoun et al.'s methodological framework for scoping reviews.

**Results:** A total of 41 studies were included from 11 SSA countries. Almost half (20/41) used breast and/or cervical cancer symptom awareness tools but did not report on tool validation processes. The rest (21/41) made reference to some tool validation, yet only two reported a detailed account of their tool validation processes. One explored lay perceptions of breast cancer, while the other sought to establish the validity and reliability of a UK tool in a Kenyan context.

**Conclusion:** The findings point to the dearth of comprehensively validated and culturally relevant tools to measure breast and cervical cancer symptom awareness in the SSA context. They have informed the development and validation of an African Women Awareness of CANcer (AWACAN) tool, which can support the development and evaluation of interventions relevant to the SSA context.

**Keywords:** scoping review; breast and cervical cancer; symptom awareness measures; sub-Saharan Africa.

## Introduction

Breast and cervical cancers are the leading cause of cancer morbidity and mortality in women. In sub-Saharan Africa (SSA), breast cancer is the most commonly diagnosed cancer among women, while cervical cancer remains the leading cause of cancer death.<sup>1</sup> Yet, if diagnosed early, both cancers are treatable with curative intent. Worldwide, most cancers (85% – 90%) are diagnosed following symptomatic presentation.<sup>2</sup> Consequently, understanding processes related to cancer symptom epidemiology, symptom awareness and responses to symptoms are important in developing interventions to promote timely cancer diagnosis. For both breast and cervical cancers, women often fail to recognise or misinterpret these symptoms or wait until symptoms (and disease) progress before they seek medical attention.<sup>3,4,5,6</sup> For example, patients in Nepal have been shown to be more likely to recognise vaginal bleeding and seek care for symptoms, in contrast to recognising foul smelling vaginal discharge.<sup>5</sup> For breast cancer, women are more likely to recognise and seek care for breast lumps in contrast to non-lump symptoms.<sup>6</sup> There is evidence that interventions to increase awareness lead to better outcomes.<sup>7</sup> For instance, a Malaysian study reported earlier help-seeking for breast and cervical cancers following an intervention targeted at raising public awareness of symptoms of these cancers.<sup>8</sup> This suggests that breast and cervical cancer symptom awareness and interpretation can promote timely help-seeking behaviour, diagnosis and start of treatment.

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Accurate measurement of cancer symptom awareness, knowledge and beliefs using validated tools would enable precise measurement of the impact of cancer awareness interventions. Against this background, we conducted a scoping review to identify tools which have been utilised to measure breast and cervical cancer symptom awareness in SSA and evidence of their validity. Scoping reviews differ from systematic reviews in scope, criteria and quality assessment.<sup>9,10,11</sup> Scoping reviews cover a broader scope than systematic reviews which have a more clearly defined, narrow scope. This renders scoping reviews useful when attempting to encapsulate and disseminate findings from a diverse body of knowledge. Inclusion and exclusion criteria in a scoping study are developed during study selection unlike in a systematic review where such criteria are predetermined prior to study selection, during protocol development. Scoping reviews present evidence based on key themes but do not delve into assessment of the quality of such evidence, as is the case in systematic reviews. Scoping reviews may be conducted as a preamble – to determine if it is necessary to conduct a full systematic review – or as an autonomous exercise, as we did in this review.

## Methods

The review was guided by two questions: (1) Which tools have been used to measure symptom awareness in SSA? (2) Have these tools been validated in any SSA populations? Following Colquhoun et al.,<sup>12</sup> the review process incorporated the first five stages of Arksey and O'Malley's six-stage framework for conducting scoping reviews<sup>9</sup> with Levac et al.'s enhancements of each stage.<sup>10</sup> The five stages are as follows: stage 1: identifying the research question, purpose and objectives of the scoping study; stages 2–4: identifying relevant studies, study selection and charting the data, respectively; and stage 5: collating, summarising and reporting the results.

Identification of relevant studies commenced with a basic search for the terms 'breast cancer, cervical cancer, awareness, beliefs, measures, Africa' on Web of Science, Scopus and Ebscohost electronic databases. We then sifted through key studies for potential broader search terms, which generated a list of terms (see Appendix 1). A scoping review of literature was then undertaken in PubMed, Web of Science, Ebscohost, Scopus and Cochrane databases. This process entailed refining the search strategy with the aim of generating as many relevant articles as possible. The final search strings contained the terms 'breast; cervix\*; cancer; neoplasm; symptom\*; sign; knowledge; perception\*; appraisal; understand\*; beliefs; attitudes; behavior; tool; scale; measure\*]' in various combinations, with the Boolean phrases AND/OR. The database search was supplemented by articles identified by searching through reference lists of key articles.

We included peer-reviewed journal articles published between January 1997 and February 2017, written in English

and describing primary research in breast and/or cervical cancer symptom awareness-related topics in SSA contexts. Given the focus on tool validation which involves evaluating 'if the measurement tool employed actually measures the intended research concept or construct or if the measurement tools used to quantify the variables provides table or consistent responses',<sup>13</sup> that is, validity and reliability, respectively, the research team limited articles to quantitative research studies. The exclusion criteria were articles in languages other than English, non-peer-reviewed articles and book chapters, grey literature, qualitative studies and studies from low-and-middle-income countries outside SSA. Selection of studies involved consultations among the authors who met as a team to establish consensus.

## Ethical considerations

This article followed all ethical standards for a research without direct contact with human or animal subjects.

## Results

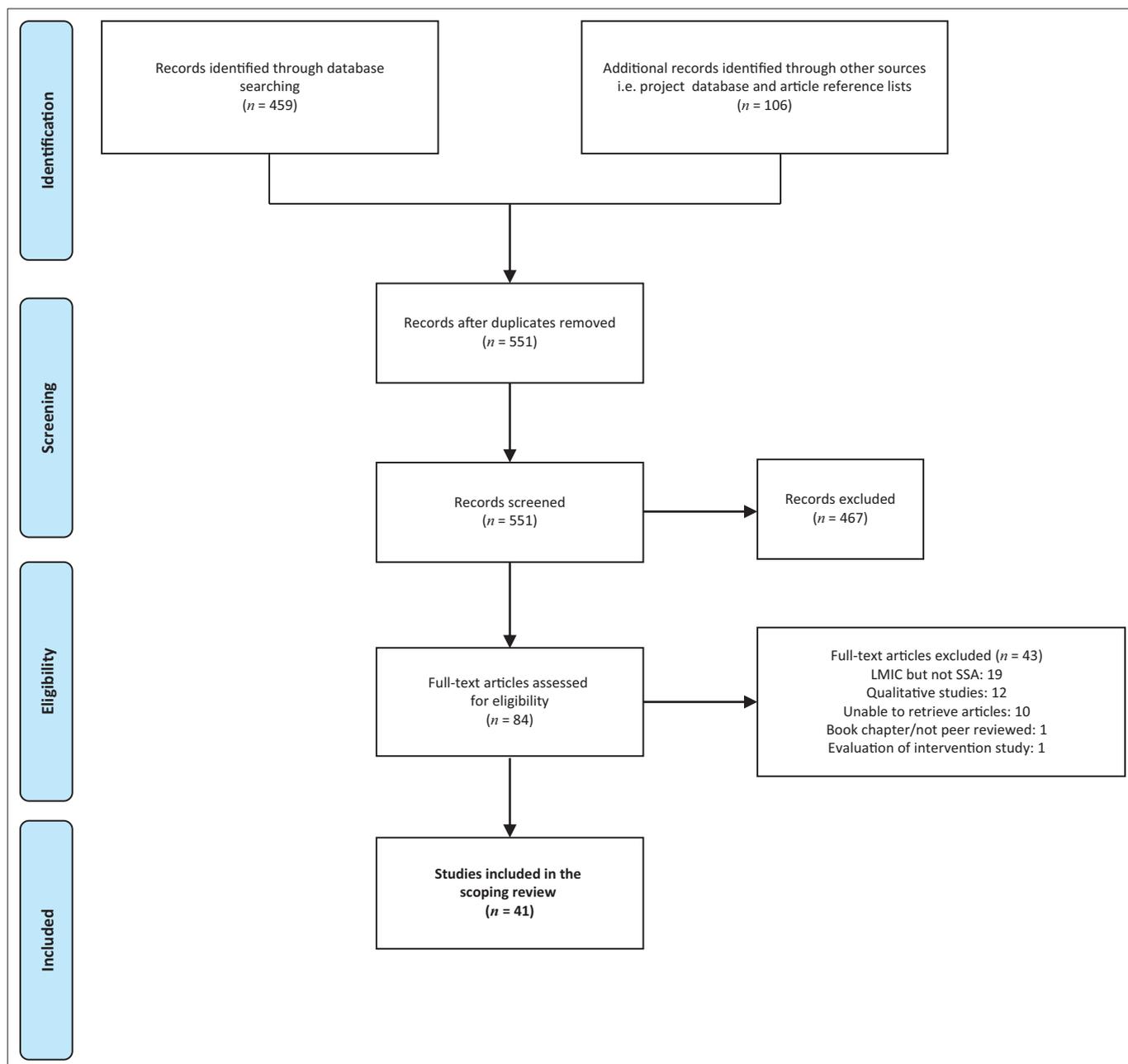
The PRISMA flow diagram and checklist (see Figure 1)<sup>14</sup> demonstrate our search strategy and included studies.

Forty-one studies were included. In these studies, cancer awareness is discussed from various perspectives including symptom knowledge, awareness, perceptions and attitudes about breast cancer, cervical cancer or cancer in general, including risk factors. The studies also discussed healthcare use including delays in seeking treatment, pathways to treatment and screening practices.

## Tools and validation processes

Twenty of the 41 studies used symptom awareness tools but gave no detail on tool validation processes<sup>3,4,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32</sup> (see Table 1). Twenty-one studies referred to some tool validation processes. Of these, 19 had limited detail of validation (see Table 2),<sup>33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52</sup> and two documented thorough validation processes (see Table 3).<sup>53,54</sup> Regarding the 19 studies that made some limited reference to validation, two studies noted that they used validated tools but did not test the validity of the tools for themselves.<sup>33,34</sup> Three studies tested for internal reliability.<sup>35,36,37,38</sup> One of the three studies published two articles each of which assessed test-retest reliability with 20 women.<sup>35,36</sup> The second study assessed test-retest reliability with an unspecified group of women with similar characteristics to the study sample,<sup>37</sup> while the third study utilised Cronbach's alpha internal reliability test.<sup>38</sup>

Fourteen studies utilised pilot testing<sup>39,40,41,42,43,44,45,46,47,48,49,50,51,52</sup> as follows: two studies documented that they pilot tested their tools but gave no further information<sup>39,40</sup>; one study specified that they used pilot testing to test reliability of their tool<sup>41</sup>; one study alluded to their pilot test serving as a reliability (stability) test by identifying their participants as a



Source: Moher D, Liberati A, Tetzlaff J, Altman DG, Prisma Group. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med.* 2009;6(7):e1000097. LMIC, low and middle-income countries; SSA, sub-Saharan Africa

**FIGURE 1:** PRISMA flow diagram.<sup>14</sup>

separate group from that in the actual study<sup>42</sup>; six studies tested content validity using pilot tests followed by modification of items based on outcomes of the pilot tests<sup>43,44,45,46,47,48</sup>; four studies utilised piloting for a combination of validity and reliability tests.<sup>49,50,51,52</sup> For instance, use of peer review<sup>49</sup> and expert review<sup>50</sup> to test for content validity or testing construct validity by structuring content in line with relevant subject literature.<sup>49</sup> One study provided additional information on the number of items discarded and those retained after piloting, with content categories for the latter.<sup>50</sup>

Table 3 shows the two articles that gave a detailed account of their validation processes.<sup>53,54</sup> Both articles reported a study conducted by a research team from the Academic Model

Providing Access to Healthcare (AMPATH) Oncology Institute, based in Eldoret, Kenya. One explored lay perceptions of breast cancer,<sup>53</sup> while the other sought to establish the validity and reliability of the UK Breast Cancer Awareness Measure (BCAM)<sup>55</sup> in a Kenyan context.<sup>54</sup>

Naanyu et al.<sup>53</sup> modified BCAM items by adding open-format questions relating to symptoms, severity and treatment of breast cancer, to suit their Kenyan audience. The specific questions were not detailed in the article. Furthermore, two open-ended questions were added to the tool as follows: (1) 'What are some beliefs, opinions and traditions that you have heard from others about breast cancer?' (2) 'In your opinion, what are some of the early warning signs of breast

**TABLE 1:** Symptom awareness tools identified, no validation details provided.

Study	Country	Focus	Design	Tools	Validated
Mukama et al. <sup>15</sup>	Uganda	Knowledge and attitudes towards cervical cancer (CC) prevention	community-based cross-sectional survey	Questionnaire	No
Ndejio et al. <sup>16</sup>	Uganda	Uptake of CC screening & associated factors	cross-sectional descriptive survey	Semi-structured questionnaire	No
Azubuikwe and Unuoha <sup>17</sup>	Nigeria	Breast cancer (BC) awareness, risk factors, signs & symptoms, preventive measures, attitudes, cure prevention, causes, practices, and associated factors	cross-sectional community survey	Semi-structured questionnaire developed from previous published studies (studies not cited)	No
Dreyer et al. <sup>18</sup>	South Africa	School based human papillomavirus (HPV) vaccination & CC knowledge	cross-sectional school based study	Interviewer-administered structured questionnaire	No
Ali-Risasi et al. <sup>19</sup>	DRC	Knowledge, attitude & practice about cancer of the uterine cervix	cross-sectional survey	Interviewer-administered questionnaire	No
Morema et al. <sup>20</sup>	Kenya	Determinants of CC screening services uptake	cross-sectional survey	Self-administered structured questionnaires	No
Ahmed et al. <sup>21</sup>	Nigeria	Knowledge, attitude & practice of CC screening	cross-sectional descriptive survey	Questionnaire (closed & open-ended questions)	No
Azubuikwe and Okwuokei <sup>22</sup>	Nigeria	Level of BC awareness, attitudes and practices towards early detection strategies	cross-sectional descriptive survey	Self-administered semi-structured questionnaire with 23 items developed from previous published studies [studies not cited]	No
Sudenga et al. <sup>23</sup>	Kenya	CC: Knowledge, attitudes, practices & perceived risk	cross-sectional survey	Interviewer-administered questionnaire	No
Irurhe et al. <sup>24</sup>	Nigeria	Knowledge & awareness of BC	cross-sectional survey	Self-administered questionnaire	No
Kahesa et al. <sup>25</sup>	Tanzania	Determinants of acceptance of CC screening	cross-sectional survey	Structured questionnaire	No
Were et al. <sup>26</sup>	Kenya	CC screening: Perceptions of risk & barriers	cross-sectional survey	Semi-structured questionnaire	No
Maree and Wright <sup>27</sup>	South Africa	Cancer understanding, awareness, and health seeking behaviours	exploratory, contextual, quantitative door-to-door survey	Structured questionnaire	No
Clegg-Lamprey et al. <sup>3</sup>	Ghana	BC: late presentation and treatment absconding	cross-sectional survey	Interviewer-administered questionnaire	No
Osime et al. <sup>28</sup>	Nigeria	BC knowledge, attitudes and practice	cross-sectional survey	structured self-administered questionnaire	No
Tebeu et al. <sup>29</sup>	Cameroon	CC: attitude & knowledge	hospital-based survey	Questionnaire	No
Ukwenya et al. <sup>4</sup>	Nigeria	Delayed treatment of symptomatic BC	cross-sectional study	Structured open-ended questionnaire	No
Kazaura et al. <sup>30</sup>	Tanzania	Health seeking behaviour among patients with cancer	hospital-based survey	Structured and semi-structured interviews	No
Kidanto et al. <sup>31</sup>	Tanzania	CC: Knowledge and attitudes of female patients	comparative cross-sectional survey	Structured questionnaire	No
Pillay <sup>32</sup>	South Africa	BC & CC: Awareness	community-based survey	Interviewer-administered structured questionnaire (fixed format) – sample questions included; informed by oncology literature (not specified)	No

**TABLE 2:** Symptom awareness tools identified, some validation details provided.

Study	Country	Focus	Design	Tools	Evidence of validity
Omotara and Yahya <sup>33</sup>	Nigeria	BC awareness, attitudes and practice	Cross-sectional descriptive community-based study	Interviewer-administered structured validated questionnaire (23 items)	States validated questionnaire, but no further information provided
Hyacinth et al. <sup>34</sup>	Nigeria	CC and Pap smear awareness and utilisation	Cross-sectional survey	Validated questionnaire	Referenced an unpublished thesis and one other study which pretested the questionnaire with participants ( $n = 20$ ) before the final questionnaire was developed
Oluwatosin <sup>35</sup> ; Oluwatosin and Oladepo <sup>36</sup>	Nigeria	a) Rural women's perceptions of BC and its early detection measures b) Knowledge of BC and its early detection measures	Cross-sectional survey	Structured questionnaire with 4 questions & 56 items	Literature, focus groups to refine, test / retest reliability = 0.95; One article specified 20 women participated in test/retest reliability
Oluwatosin <sup>37</sup>	Nigeria	BC: Assessment of risk factors and predictive factors for breast examination	Cross-sectional survey	Self-developed three-part semi-structured questionnaire; one section used a validated tool (Gail Model); questionnaire tested for reliability	Test/retest reliability score = 0.95; tested with group of women with similar characteristics to study sample
Twinomujuni et al. <sup>38</sup>	Uganda	Understanding the low level of CC screening	Cross-sectional community survey	Semi-structured interviewer-administered questionnaire	Developed from previously published studies and validated tools (articles referenced); estimated Cronbach's internal reliability = 0.75
Akhigbe and Omuemio <sup>39</sup>	Nigeria	Knowledge, attitudes and practice of BC screening	Cross-sectional descriptive survey	Pre-tested self-administered questionnaire	Pretest; no further details given on pretest process and function of the same
Kayode et al. <sup>40</sup>	Nigeria	Knowledge, attitude and practice of breast self-examination	Descriptive cross-sectional survey	Pre-tested structured questionnaire	Pre-tested; no further details given on the pretest process and function of the same
Shepherd and McInerney <sup>41</sup>	Sierra Leone	BC knowledge	Quantitative descriptive-exploratory design	Questionnaire	Pilot study to test reliability ( $n = 5$ ); no results provided

Table 2 continues on the next page →

**TABLE 2 (Continues...):** Symptom awareness tools identified, some validation details provided.

Study	Country	Focus	Design	Tools	Evidence of validity
Obaji et al. <sup>42</sup>	Nigeria	Awareness and practice of breast self-examination	Cross-sectional descriptive study	Interviewer-administered questionnaire	Validated and pre-tested with a separate sample of women
Lyimo and Beran <sup>43</sup>	Tanzania	CC screening: Demographic, knowledge, attitudinal, and accessibility factors	Cross-sectional survey	Structured questionnaire	Pilot testing in similar context, identification and modification of problematic questions
Mingo <sup>44</sup>	Botswana	CC: Awareness and screening	Hospital-based survey	Questionnaire	Content validity ( $n = 3$ ) and revised questionnaire accordingly
Mupepi et al. <sup>45</sup>	Zimbabwe	Knowledge, attitudes and demographic factors influencing CC screening behaviour	Cross-sectional community survey	Questionnaire	Six focus groups of eight participants each ( $n = 48$ ) to test content and construct validity
Kiguli-Malwadde et al. <sup>46</sup>	Uganda	Knowledge, attitude and practice of women on BC and mammography	Cross-sectional descriptive survey	Interviewer-administered questionnaire	Content validity – questionnaire reviewed for information quality and legitimacy and relevant corrections made
Mugivhi et al. <sup>47</sup>	South Africa	Rural women's knowledge of prevention and care related to BC	Quantitative survey	Structured interview	Pre-tested for validity and reliability ( $n = 10$ ) and relevant modifications made to questionnaire
Salaudeen et al. <sup>48</sup>	Nigeria	Knowledge and attitudes towards BC and breast self-examination	Cross-sectional descriptive survey	Self-administered questionnaire	Pre-tested ( $n = 30$ ) and revisions made accordingly
Ramathuba et al. <sup>49</sup>	South Africa	BC knowledge, attitudes and screening practices	Quantitative descriptive cross-sectional design	Closed-ended questionnaire pretested for validity and consistency	Content (literature and peer review) and construct validity; pretest reliability ( $n = 15$ )
Okobia et al. <sup>50</sup>	Nigeria	BC: Knowledge, attitude and practice	Cross-sectional community survey	Interviewer-administered questionnaire	Content validity (literature and expert review) pre-tested for reliability ( $n = 25$ ) and ambiguous questions discarded
Francis et al. <sup>51</sup>	South Africa	Attitudes and knowledge about HPV and CC risk	Brief survey	Questionnaire	Developed based on literature review (articles referenced), pilot tested and revised with a clinic-based population similar to the clinic sample
Mwaka et al. <sup>52</sup>	Uganda	Community awareness of CC risk factors and symptoms	Cross-sectional population-based survey	Structured questionnaire	Developed based on literature review (articles referenced) and pilot test

**TABLE 3:** Symptom awareness tools identified, thorough validation.

Study	Country	Focus	Design	Tools
Naanyu et al. <sup>53</sup>	Kenya	Lay perceptions of BC in Western Kenya	Cross-sectional survey	BCAM adapted opinions about causes, symptoms, severity and treatment of BC captured as free-text responses to open-ended questions added to the BCAM tool.
Wachira et al. <sup>54</sup>	Kenya	Psychometric assessment of BCAM for assessment of BC knowledge and barriers to screening in Kenya	Cross-sectional survey	BCAM: Assessment of face and psychometric validity of BCAM using cognitive testing (and adaptation of some items), factor analysis of survey data and correlations.

BC, breast cancer; BCAM, breast cancer awareness measure.

cancer, the ways in which one may know first that she or he has this condition?' (p. 149) The questionnaire was translated into Kiswahili, Kenya's national language, and this version was subjected to content validation via three focus group discussions consisting of men and women without cancer aged 18 years and above, attending non-cancer outpatient clinics.

Wachira et al.<sup>54</sup> focused on the validation of the BCAM in a Kenyan setting, based their work on 1061 women and an additional 48 women who participated in six cognitive focus group discussions. The authors opted to use BCAM in the absence of locally validated tools applicable in the Kenyan context. Of specific interest to this research team were two BCAM domains, breast awareness and perceived barriers to screening, which the Kenyan researchers associated with delays in timely interventions to enhance early breast cancer detection. Cognitive focus group interviews revealed that compound questions in the BCAM knowledge domain (for example, 'do you think *discharge or bleeding* [italics added] from your nipple could be a sign of breast cancer?') were confusing to participants, who recommended that these questions be rephrased for clarity. The study observed variances in cultural interpretation of some items as well as nuances around translation of BCAM items into Kiswahili. For example,

participants requested clarification on the BCAM question 'do you think that redness of your breast skin could be a sign of breast cancer', noting that unless the top surface of the skin peels off, dark skin would not usually turn red. This resulted in rephrasing of the question to read 'change in skin colour' in lieu of redness for contextual relevance.

## Discussion

Our scoping review provides a synthesis of research<sup>12</sup> on tools used to measure symptom awareness in SSA and determine if such tools have been validated in SSA settings. In this regard, our review identified gaps in SSA breast and cervical cancer tool validation literature by presenting the extent of research and how this research was conducted<sup>11</sup> in the period between 1997 and 2017. Scoping reviews are useful in various research aspects, including: examining the extent, range and nature of research activity; establishing the relevance of conducting a full systematic review; succinctly presenting and circulating research results; and identifying gaps in literature.<sup>9</sup> In addressing how the research was conducted, the scoping review was limited to a narrative descriptive account of studies included and not a detailed analysis of the quality of these studies, which would be possible in a systematic review.<sup>9</sup>

Our findings demonstrate that several tools have been utilised to measure breast and cervical cancer in SSA contexts. SSA countries featured in this review are Botswana,<sup>44</sup> Cameroon,<sup>29</sup> Democratic Republic of Congo,<sup>19</sup> Ghana,<sup>3</sup> Kenya,<sup>20,23,26,54,55</sup> Nigeria,<sup>21,22,24,28,35,36,37,39,40,42,48,50</sup> Sierra Leone,<sup>41</sup> South Africa,<sup>18,27,32,47,49,51</sup> Tanzania,<sup>25,30,31,43</sup> Uganda,<sup>15,16,38,46,52</sup> and Zimbabwe.<sup>43</sup> Of the 41 SSA studies reviewed, 20 studies utilised tools that were not validated.<sup>15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32</sup> The other 21 studies identified tools used and offered information of varying detail regarding validation processes.<sup>33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54</sup> with only two of these demonstrating detailed and systematic tool validation processes.<sup>53,54</sup> Even so, these two studies are limited in that they show evidence of thorough validation focused on (1) breast cancer but not cervical cancer and (2) only two of the BCAM domains, namely knowledge and/or perceptions of breast cancer and barriers to screening.

Twenty of the 41 studies reviewed were on breast cancer. Of these 20, six utilised tools that were not validated,<sup>3,4,17,22,24,28</sup> while 14 used validated tools,<sup>33,35,36,37,39,40,41,42,46,47,48,49,50,53,54</sup> including the (1) single study that yielded two articles<sup>35,36</sup> and (2) two studies that furnished detailed accounts of their validation process.<sup>53,54</sup> Eighteen of the 41 studies reviewed focused on cervical cancer themes. Of these 18, 11 studies utilised tools that were not validated,<sup>15,16,18,19,20,21,23,25,26,29,31</sup> while seven utilised validated tools.<sup>34,38,43,44,45,51,52</sup> Overall, more breast cancer studies (14) utilised validated tools than cervical cancer studies (7), most of which (11) utilised tools that were not validated. Of the 41 studies, one combined breast and cervical cancer themes,<sup>32</sup> while two studies investigated cancer symptom awareness in general but also made mention of breast and cervical cancer symptom awareness among women in SSA.<sup>27,30</sup> All three studies used tools that were not validated.

## Conclusion

Our results point to the dearth of comprehensively validated and culturally relevant tools to measure breast and cervical cancer symptom awareness in the SSA context and the need for systematic efforts to develop and validate such tools. These findings are consistent with a study on understanding low cervical cancer screening in Uganda, which noted lack of validated tools in African settings.<sup>51</sup> Using consistent and reliable measures in cancer studies contributes to the quality of research results,<sup>56</sup> which, in turn, will inform oncology practice in so far as 'standardised, valid measurement is essential for monitoring levels of cancer awareness, examining its risk factors and consequences, and evaluating interventions to promote it'.<sup>55</sup>

Furthermore, validated tools should be culturally relevant for their intended study populations.<sup>53,54,57</sup> The Cancer Awareness Measure (CAM) and the Awareness and Beliefs about Cancer (ABC) tools were developed in the UK to assess cancer awareness in the public; they include generic cancer awareness and cancer-specific measures for breast cancer (BCAM) and cervical cancer (CCAM).<sup>58</sup> These tools could be

of value in SSA; however, as they were developed in a very different sociocultural setting, they are likely to need adaptation for use in SSA. In our specific study context, validated tools that are culturally relevant in SSA settings will serve as standardised comparative measures to (1) assess breast and cervical cancer awareness, knowledge and beliefs; and (2) enable precise appraisal of breast and cervical cancer awareness interventions. Our findings have informed the development of an African Women Awareness of CANcer [AWACAN] tool to measure breast and cervical cancer awareness.

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### Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

### Authors' contributions

J.M., F.M.W., S.E.S. and A.D.M. initiated the study and developed the study protocol. J.N.G. conducted the literature search, drafted the manuscript, incorporated revisions and prepared the final draft. J.M., F.M.W. and S.E.S. reviewed the articles for eligibility. All the authors reviewed the draft and approved the final manuscript.

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### Data availability statement

Data sharing is not applicable to this article as no new data were created or analysed in this study.

### Disclaimer

The views expressed in the submitted article are those of the authors and not the official position of any of the funders or institutions represented.

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Appendix starts on the next page →

## Appendix 1

1. Breast cancer	14. Knowledge	27. Scales	40. Timely diagnosis
2. Cervical cancer	15. Literacy	28. Patterns	41. Treatment
3. Symptom*	16. Ignorance	29. Measures	42. Cancer control
4. Signs	17. Culture	30. Questions	43. Cancer management
5. Symptom appraisal	18. Stigma	31. Validation	44. Qualitative
6. Symptom interpretation	19. Abscond	32. Management	45. Quantitative
7. Beliefs	20. Awareness	33. Disclosure	46. Africa
8. Attitudes	21. Understanding	34. Report	47. Sub-Saharan Africa OR Africa South of the Sahara
9. Expressions	22. Construct*	35. Risk*	48. Low resource countries
10. Communication	23. Expectations	36. Barriers	49. Rural
11. Conceptualization	24. Challenges	37. Facilitators	50. Urban
12. Lay perceptions	25. Opportunities	38. Screening	
13. Behaviour	26. Tools	39. Delayed diagnosis	

\*, represents root words utilised in the search e.g. symptom\* includes all words that contain the root word symptom e.g. symptomatic and symptoms.

**FIGURE 1-A1:** List of potential search terms from existing literature.