

Health Related Quality of Life and Its Determinants Among Breast Cancer Patients in Africa: A Systematic Review and Meta-Analysis

Teshome Demelash Bitew (✉ teshomebitew121@gmail.com)

Addis Ababa University Faculty of Medicine: Addis Ababa University School of Medicine <https://orcid.org/0000-0001-9442-5234>

Wondim Ayenew

University of Gondar College of Medicine and Health Sciences

Tenaw Baye

Woldia University

Eskinder Eshetu

Addis Ababa University School of Medicine

Research

Keywords: Breast cancer, Determinants, Quality of life, Africa

Posted Date: May 11th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-482636/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Abstract

Background

Breast cancer remains the most common cancer disease in the world. Higher breast cancer incidence and poor survival is also seen in different African countries. Diagnosed with breast cancer and treatment is a very stressful event that greatly diminished the quality of life of the patient. Therefore, the aim of this review was to assess health related quality of life and its determinants among breast cancer patients in Africa.

Methods

A systematic search of literatures was conducted from August 10 to September 5, 2020 without limitation of publication year in PubMed, HINARI, Science direct and Google scholar. The review followed PRISMA guidelines. Data were extracted in a well prepared Microsoft excel and exported to open meta-analysis software for analysis. The methodological quality of included studies was assessed based on 14 item modified quality of life assessment checklist. The pooled estimate quality of life scales were analyzed by open Meta analyst software and presented with forest plot. The results of included studies which were not suitable for meta-analysis were synthesized narratively. The heterogeneity of included studies was evaluated with I^2 statistics.

Results

A total of ten studies which reported 2,190 breast cancer patients were included in the systematic review and meta- analysis. This review summarized five different standard instruments that used to measure health related quality of life. The pooled estimates mean score of general quality of life based on EORTC QLQ-C30 standard tool was 52.77 (95% CI: 42.199 to 63.345; $I^2 = 99.21\%$, $P < 0.001$). Age, level of education, marital status and financial difficulties were determinants health related quality of life in breast cancer patients in Africa.

Conclusions

The general health related quality of life of African breast cancer patients was not good. Therefore, more attention must be paid to the quality of life of breast cancer patients along with proper access to treatment.

Protocol registration:

The study protocol is registered at PROSPERO with reference ID CRD42020213726 and available at <https://www.crd.york.ac.uk/prospero/displayrecord.php?id=crd42020213726>

Background

According to the international agency for research on cancer (IARC) report, the global burden of cancer is estimated to have risen to 18.1 million new case and 9.6 million deaths in 2018. Breast cancer is the most frequently diagnosed cancer which is approximately 2.1 million diagnoses are estimated worldwide in 2018 and contributes around 11.6% incidences from the total cancer [1].

Even though insights for epidemiology and risks which associated with breast cancer showed relative improvements across population, especially high-income countries, many challenges such as incomplete vital registration, poor health infrastructure, lack of population awareness, low levels of female education, delayed health seeking behavior led to increase mortality from breast cancer in Africa and low- and middle-income countries [2].

Being diagnosed with breast cancer is a very stressful event that affects all aspects of life and greatly diminished quality of life of the patient [3]. There are different treatment strategies for breast cancer. The effectiveness of treatment intervention can be measured by overall survival (OS), progression free survival (PFS), overall radiographic response (ORR), and health related quality of life (HRQOL). OS, PFS and ORR do not incorporate patient perspective but HRQOL is a self-perspective approach and evaluates the patient's health status [4].

Even though it is defined differently in different literatures, HRQOL can be defined as "how well individuals function on a specific activity in their life and wellbeing in social, physical, and mental domains of the health [5]. Quality of life is a multidimensional construct which assess physical, emotional, sexual, and social domains [6]. A physical domain is subjective evaluation of the health status and bodily functions like (pain, fatigue, lymphedema), the emotional component relates psychological functioning that includes positive or negative indicators of mood (e.g., anxiety, depression, distress, affect). Sexual quality of domain refers to perceived sexual activity or function, change of sexual desire and body image distress, whereas the social domain refers the impacts of the diseases on an individual's social role and also perceived utility of social support. The social domain is not orthogonal, but it is inter-related [6, 7]. For example, the experience of pain or fatigue on an individual may limit his or her social and familial role performance. Additional indicator of quality of life is perceived cognitive function like memory and spiritual well-being [7].

There are different determinants of QOL in breast cancer patients but the factors vary from study to study. In general socio-demographic, clinical and treatment characteristics were factors that affect breast cancer patients' QOL [8–11]. Critical assessment of the HRQOL of breast cancer patient is crucial for both patients and health care professionals. Even though HRQOL is a subjective perception of patients, it may help clinicians or other health professionals to select the best option in making treatment decision and determine a good way to support improve the HRQOL of breast cancer patients particularly during the

difficult time of their disease [12]. The aim of this systematic review and meta-analysis was to assess HRQOL among breast cancer patients and to identify factors affecting their QOL in Africa. The findings of this systematic review and meta-analysis may help policy makers in planning and implementing strategies to reduce factors affecting QOL and improve HRQOL of breast cancer patients.

Methods

Study protocol

The review protocol was performed in accordance with preferred reporting items for systematic review and meta-analysis (PRISMA) [13].

Screening and eligibility of studies

TB selected the title of the study. Three authors (TB, WA and TB) screened the title and abstracts of the studies based on the inclusion and exclusion criteria. TB, WA and TB also collected the full texts, evaluated the eligibility of the studies for final inclusion and assessed the quality of the study. TB and WA analyzed the data. EE solved the disagreement between the authors.

Inclusion and exclusion criteria

Observational studies (cross-sectional and prospective observational studies) that assessed QOL in breast cancer patients and those published only in English language without time limit were included. The exclusion criteria applied in this review and meta-analysis was: the study which did not investigate HRQOL in people with breast cancer; the study which did not provide any data about HRQOL among study population; reviewed articles; the study which was not a journal article (for example conference abstracts) and the study which was not done in Africa.

Data source and search strategy

A systematic search was conducted from August 10 to September 5, 2020 to review the studies that evaluated HRQOL among breast cancer patients in Africa without limitation of publication year. International data bases like Medline/PubMed, HINARI, Science direct and Google scholar were used for literature searching. These searching strategies were performed through alone and a combination of medical subject heading terms and free keywords: [("breast cancer" or "breast neoplasm" or "breast tumor" or "breast carcinoma") and ("quality of life" or "health related quality of life") and ("determinants" or "predictors" or "factors of quality of life") and (Africa)]. In addition to this, the reference lists of the reviewed article were manually scrutinized in order to identify and included potentially relevant studies. All published and unpublished articles were searched.

Data extraction

Titles and abstracts of the studies were screened in order to identify all potential eligible studies using predefined data extraction form. Depending on the data extraction form, the following data were extracted: first author's last name, year of publication, study location (country), study design, type of data collection method, types of questioner, study setting, sample size, age of participants, and type of score with its measurement domains and determinants of quality of life of breast cancer patients.

Methodological quality assessment of studies

The methodological qualities of included studies were assessed based on a modified checklist developed to assess the methodological quality aspect of QOL reporting. It was assessed according to a predefined 14 item checklist. The 14 items include: two items (sampling), one item (QOL measurement tool selection), two items (data collection method), two items (response rate), one item (group comparison), five items (reporting clarity) and one item (prognostic factor determination).

A score of 1 or zero was given for each item. A score of one was given for an item if meeting the methodological criteria. A score of zero was given for an item if an item neither met the criteria nor described the related parameter sufficiently. A score of ≤ 6 (lower than 50% of the maximum attainable score) indicated as low quality. A score 7 to 9 (between 50% and 75% of the maximum attainable score) and ≥ 10 ($\geq 75\%$ of the maximum attainable score) indicated as moderate and high quality respectively [14].

List of criteria to assess the methodological quality of studies on QOL of breast cancer patients

1. Socio-demographic and medical data is described (e.g., age, race, employment status, educational status, tumor stage at diagnosis etc.)
2. Inclusion and/or exclusion criteria are formulated
3. The process of data collection is described (e.g., interview or self-report etc.)
4. The type of cancer treatment is described
5. The results are compared between two groups or more (e.g., healthy population, groups with different cancer treatment or age, comparison with time at diagnosis etc.)
6. Mean or median and range or standard deviation of time since diagnosis or treatment is given
7. Participation and response rates for patient groups have to be described and have to be more than 75%
8. Information is presented about patient/disease characteristics of responders and non-responders or if there is no selective response
9. A standardized or valid quality of life questionnaire is used
10. Results are not only described for quality of life but also for the physical, psychological and social domain

11. Mean, median, standard deviations or percentages are reported for the most important outcome measures
12. An attempt is made to find a set of determinants with the highest prognostic value
13. Patient signed an informed consent form before study participation
14. The degree of selection of the patient sample is described

Outcome measurements

QOL is the primary outcome of this review and meta-analysis. Mean is the summary measure.

Data analysis

The results of included studies which were not suitable for meta-analysis were synthesized narratively. The pooled estimate GQOL and QOL scales were analyzed by open Meta analyst software and presented with forest plot. Dersimonian and laird's random effect model was used [15].

The heterogeneity of included studies was evaluated with I^2 statistics. Based on I^2 statistics, a value less than 25% were considered low heterogeneity, between 50 and 75% medium heterogeneity and greater than 75% were considered as high heterogeneity [16]. Subgroup analysis was performed based on country to determine heterogeneity.

Results

Study selection

Based on the search strategy in the data bases, a total of 1081 studies were retrieved initially. About 754 studies were remained after 327 duplicate studies were removed. 737 studies were excluded due to unrelated title and abstracts. Then, the remaining 17 studies were evaluated based on the eligibility criteria for inclusion and exclusion. Finally, ten studies met the eligibility criteria and included for final review and meta-analysis (Fig 1).

Study characteristics

A total of 10 articles which reported QOL of 2,190 breast cancer patients were analyzed. The mean age of patients was 46.97 years. From ten included articles, eight articles were cross-sectional studies and the remaining two articles were prospective observational studies. All included studies were done in Hospitals. The studies were conducted on five countries (four from Ethiopia; two from Egypt; two from Nigeria; one from Kenya and one from Morocco). The included studies collected the data through interview. To measure health related quality of life of breast cancer patients, studies were used EORTC QLQ-C30, EORTC QLQ-BR23, FACT B, FACT G and WHOQOL-BR23 questionnaires (Table 1).

Methodological quality

Based on the 14 quality assessment criteria, eight studies had high quality (attained a score of 10 or higher) whereas the remaining two studies had moderate quality (attained a score of 9). Most of (about 90%) the studies didn't compared two groups. All of the included studies lacked information on the characteristics of non-respondents (Table 2).

Quality of life based on EORTC QLQ-C30 standard tool

Seven studies reported QOL in breast cancer patients based on EORTC QLQ-C30 questionnaires. Based on this standard tool, the pooled estimate of the mean score of GQOL was 52.77(95% CI: 42.199 to 63.345; $I^2=99.21\%$, $P < 0.001$) (Fig 2).

Subgroup analysis was performed based on country. The analysis showed that highest GQOL was observed in Kenya 65.48 (95% CI: 62.209 to 68.751) whereas lowest GQOL was observed in Egypt 28.38 (95% CI: 26.631 to 30.129) (Fig 3).

A leave- one-out meta-analysis was performed to show how each individual study affects the pooled estimate of the remaining studies. From the analysis, there was no change in the pooled estimate mean GQOL of breast cancer patients. There was no single study that substantially influenced the overall effect size. The pooled estimates mean GQOL was between the confidence interval of the pooled mean GQOL when one study was leaving out (Fig 4).

Functional scores in breast cancer patients based on EORTC QLQ-C30 standard tool

Six included studies reported five domains (cognitive, emotional, role, physical and social domains). The pooled score of social domain was scored highest than other domains with a mean of 72.91(95% CI: 62.14, 83.68) whereas role domain scored lowest with a mean of 56.64(95%CI: 36.42, 76.86) (table 3). In one study, QOL was dichotomized into poor and good QOL. This study showed that majority of breast cancer patients had poor emotional functioning (mean=47.61±25.83) whereas cognitive functioning was good (mean=80.06 ± 22.89) (Table 3)

Breast cancer-specific symptoms scores based on EORTC QLQ-C30

Six studies reported breast cancer specific symptoms. Based on EORTC QLQ-C30, the pooled estimate score showed that financial difficulties (mean 68.86 with 95% CI: 56.51, 81.21) and fatigue (mean 44.33with 95% CI: 32.75, 55.91) were the most cancer specific symptoms. Diarrhea (mean 14.75 with 95% CI: 6.55, 22.96) and nausea/vomiting (mean 18.81with 95% CI: (9.83, 27.79) were the least breast cancer specific symptoms (Table 4).

In one study, QOL was dichotomized into poor and good QOL. This study showed that about 79.2% of breast cancer patients faced financial difficulties whereas nausea/vomiting was least affected symptom scales of 26.6 (66%).

Breast cancer-specific functional and symptom scores based on EORTC QLQ-BR23

Five studies reported cancer specific functional and symptoms based on EORTC QLQ-BR23. The pooled estimate score of body image and future perspective were highest whereas breast and arm symptoms were lowest (Table 5). In one study, QOL was dichotomized into poor and good QOL. This study showed that about 79.2% of breast cancer patients faced financial difficulties whereas nausea/vomiting was least affected symptom scales (266 (66%)). Future perspective was less affected (mean \pm SD=55 \pm 38.48) whereas sexual functioning (mean \pm SD=89 \pm 21.10) was the most affected functional scale. Breast symptom (663(90.1% of participants)) was the most unbearable symptom whereas body image was the least affected (16.6% of participants)

QOL based on WHOQOL-BREF breast cancer-specific-BR23 and FACT G/FACT B

One study assessed the QOL of breast cancer patients based on WHOQOL-BR23. In this study, environmental domain (mean \pm SD=93.31 \pm 19.76) was the highest mean score observed whereas social domain (mean \pm SD=36.69 \pm 7.62) was the least.

Another study assessed the QOL of breast cancer patients based on fact g/fact b standard tool. In this tool QOL ranges from zero to 144. The total score of the five domains were 144 with a mean of 74.59 \pm 17.72 whereas breast cancer specific symptoms were 36 with a mean of 21.10 \pm 8.93.

The study which assessed QOL based on FACT-B standard tool showed that the physical domain (mean \pm SD=2.22 \pm 1.1) was the most affected QOL in breast cancer patients whereas functional domain was the least.

Meta regression

To detect the source of heterogeneity Meta regression analysis was conducted. Patients mean age wasn't significant coefficients =-2.008 (95% CI: -5.120 to 1.103; P value =0.206. Sample size was also insignificant coefficients =-0.006 (95% CI: -0.065 to 0.053; P value = 0.840. This indicated mean age and sample size did not contribute for heterogeneity.

Determinants of HRQOL of breast cancer patients in Africa

There are different factors that are associated with HRQOL in breast cancer patients (Table 6)

Discussion

The basic goal of healthcare is to improve the patients' quality of life and it is specifically important in the case of breast cancer because the disease is more likely diagnosed at late stage than other forms [23]. The aim of this systematic review and meta-analysis is to investigate health related quality of life of breast cancer patients in the African countries. This review and meta-analysis analyzed 10 studies that reported QOL in breast cancer patients in Africa. About 2,190 breast cancer patients were involved for the analysis of the pooled estimation of QOL.

Standard tools introduced to quantify health related QOL in breast cancer patients had frequently developed for the last decade. All studies were used standardized data collection instrument and the most frequently used standard tool to measure the QOL in this review were EORTC QLQ-C30 and EORTC QLQ-BR23 which is similar to a review done in Spain [24]. But this finding was slightly different from the review of the review conducted [25] which stated that frequently used specific QOL instrument in breast cancer patients were FACT-B and EORTC QOL-BR23.

In systematic review and meta-analysis, data collection instrument showed that the scores of QOL of African breast cancer patients differ from country to country. Therefore, the mean score of QOL varies from 28.38 to 65.48. Good scores were recorded at Kenya, Ethiopia and Nigeria and the lowest mean score was recorded among Egyptian breast cancer patients (28.38). Differences observed in HRQOL scores among these African breast cancer patients may be related differences in the time since diagnosis, disease stage, treatments they received and variation in socio-demographic characteristics of participants.

Based on EORTC QLQ-C30, the pooled mean score of GQOL in this review was 52.772 (95% CI: 42.199 to 63.345). This finding was lower than a systematic review and meta-analysis done in Eastern Mediterranean region in which the mean overall QOL was 60.5 [26]. This difference may be due to the total sample size included in the study which was 6,034, better quality of care provided during the course of the disease and differences in socio-demographic characteristics between African and Eastern Mediterranean region participants.

In this review and meta-analysis from functional scores based on EORTC QLQ-C30, social domains (mean score = 72.91; 95% CI: 62.14, 83.68) and physical domains (mean score = 72.69; 95% CI: 63.37, 82.01) scored highest. This quality score is lower than EORTC reference value for social and physical functioning scores for breast cancer patients (mean score = 61.8). It is also lower than a meta-analysis done in Eastern Mediterranean region where cognitive (mean score = 74.3; 95% CI: 70.4, 78.2) and social functioning (mean score = 72.5; 95% CI: 66.2, 78.9) [26].

In our review role domain scored lowest with a mean of 56.64 (95%CI: 36.42, 76.86). In one study, QOL was dichotomized into poor and good QOL. This study showed that majority of breast cancer patients had poor emotional functioning (mean score = 47.61 \pm 25.83) whereas cognitive functioning was good (mean score = 80.06 \pm 22.89). Individual studies conducted in Germany also should that patients with breast cancer also had poor emotional functioning (mean score = 68.3 (\pm 26.9)) and good cognitive functioning (mean score = 80.1 (\pm 24.9)) [27].

Based on EORTC QLQ-C30, financial difficulties (mean = 68.86 with 95% CI: 56.51, 81.21) and fatigue (mean = 44.33 with 95% CI: 32.75, 55.91) were the most reported cancer specific symptoms. This analysis is consistent with a review and analysis done in Eastern Mediterranean region in which fatigue and financial

problems were the most common cancer specific symptoms [26]. These may be because of majority of African populations including Ethiopia belonged to lower-middle class families which may pose additional financial burden for the cost of the disease management. Diarrhea (mean 14.75 with 95% CI: 6.55, 22.96) and nausea/vomiting (mean 18.81 with 95% CI: (9.83, 27.79) were the least breast cancer specific symptoms consistent with finding of meta-analysis conducted in Eastern Mediterranean region in which diarrhea was the least frequent cancer specific symptom (mean score of 16.7). The reason for nausea/vomiting and diarrhea were the least breast cancer specific symptom may be the symptoms are experienced within a week period of taking chemotherapy.

According to the study conducted by han *et al.*, 2010 stated that a woman who has good body image and better conceptualization of it can cope up the cancer better [28]. But woman with poorer body image in the breast cancer disease had greater psychological distress and greatly associated with depression and poorer QOL [29]. In our systematic review and meta-analysis, based on EORTC QLQ-BR23 questioner, body image (mean = 62.47; 95% CI = 46.33, 78.62) and future perspective (mean = 53.12; 95% CI = 31.75, 74.49) were the highest functional and breast cancer symptom whereas, breast symptom and arm symptom were the lowest with pooled mean estimate of 26.56; CI = 16.07, 37.05 and 26.7; CI = 20.41, 32.98 respectively. This was consistent with individual study conducted by sun *et al.*, 2014 that body image was the highest breast cancer symptoms with mean score of 80.6 and breast symptom and arm symptom were the lowest with mean score of 9.4 and 14.9 respectively. This study (sun *et al.*, 2014) states that superiority body image is the greatest strength of breast cancer patients [30]. In addition to this, body image is closely linked to identify, self-esteem, attractiveness, sexual functioning and social relationships [31].

In this systematic review and meta-analysis, one study which was done by koboto *et al.*, 2020 was used WHOQOL-BR23 data collection tool to assess health related QOL of breast cancer patients. In this study, environmental domain (mean \pm SD = 93.31 \pm 19.76) followed by physical health domain (mean \pm SD = 88.26 \pm 21.61) were the highest mean score [11]. Whereas, psychological and social domain (mean \pm SD = 68.20 \pm 19.07 and 36.69 \pm 7.62) respectively were the lowest [32]. These differences may due to cancer stigma and cultural view of the community. Findings of this study is slightly different from the study done in Srilankan in which environmental and social domains were higher in their mean score than physical and psychological domains [33]. This may be one indication of differences in culture, religion and social value among different countries.

Based on the findings of this systematic review and meta-analysis, several factors were associated with HRQOL in breast cancer patients. Regarding to socio-demographic characteristics, there was no consistencies between studies in case of age. Three studies [17, 19, and 21] suggest that, cancer patients' HRQOL was negatively affected in older patients; this may be due to inability to tolerate adverse effects of chemotherapy and inability to perform their daily activity. While two other studies [8, 22] found that younger patients' QOL were more affected than older patients and the reason behind to this suggest that inability to fulfill themselves as wives and they need better physical appearance than older patients. The finding of these studies was supported by other systematic review conducted in Middle East of breast cancer patients which states that there was inconsistency between studies regarding the effect of age on HRQOL [34]. The review also identified that patients with higher level of education has better QOL than illiterate; this is due to those who are educated may have better access to salaried and employment and get better economic resource that brings good sense of control. This result is also supported by the study conducted in Korean breast cancer patients [35] and other studies done about education and QOL [36]. Studies conducted in Kenya stated that married participants had better QOL than unmarried and divorced participants. The possible explanation for this was, married ones may get financial support from families and married by itself is a form of social support that led to positive influence on QOL.

This review tried to address all relevant information regarding HRQOL among breast cancer patients in African countries. However, it has limitations. Considerable heterogeneity was existed in the included studies. The observed heterogeneity can be described by differences in quality of the study, the study design used and sensitivity. Subgroup analysis was performed based on country only because of variation of variables from study to study. This was also another limitation of our study.

Conclusion

General QOL of breast cancer patients in Africa is below EORTC reference values. So, more attention must be paid to quality of life of patients with breast cancer along with proper access to treatment and control of different risk factors. Continuous implementation of multidimensional educational program in order to provide necessary information and resource for the patient and thus improving their quality-of-life is recommended. It is also very important to give great emphasis to the role of families for the quality of breast cancer patients. Different factors have been identified that greatly affect the health-related quality of life of breast cancer patients.

List Of Abbreviations

EORTC QLQ-BR23: European Organization for Research and Treatment of Cancer Quality of Life Questioner-Breast Cancer Module 23; EORTC QLQ-C30: European Organization for Research and Treatment of Cancer Quality of Life Questioner Core-30; FACT-B: Functional Assessment of Cancer Therapy- Breast specific; FACT-G: Functional Assessment of Cancer Therapy-General; HRQOL: Health Related Quality Of Life; IARC: International Agency for Research on Cancer; ORR: Overall Radiographic Response; OS: Overall Survival; PFS: Progression Free Survival; PRISMA: Preferred Reporting Items for Systematic Review and Meta-Analysis; QOL: Quality of Life; SSA: Sub-Saharan Africa; WHOQOL-BREF: World Health Organization Quality Of Life Brief

Declarations

Ethical approval and consent to participate

This is a systematic review and meta-analysis and didn't need an ethical approval

Consent for publication

Not applicable

Availability of data and materials

Data sets are available at the hands of the corresponding author and given upon rescannable request

Competing interests

The authors declared that they have no competing interests

Funding

This review hadn't receive any fund from a funding agency

Authors' contribution

TB selected the title of the study. Three authors (TB, WA and TB) screened the title and abstracts of the studies based on the inclusion and exclusion criteria. TB, WA and TB also collected the full texts, evaluated the eligibility of the studies for final inclusion and assessed the quality of the study. TB and WA analyzed the data. EE solved the disagreement between the authors and gives general advice and corrections to this review and meta-analysis.

Acknowledgments

We would like to thank Dr Eskinder Eshetu who helped us in every aspect of this systematic review and meta-analysis.

References

1. World health organization. International agency for research on cancer. Latest global cancer data. Geneva, switzerland. 2018
2. Brinton L, Figueroa J, Adjei E, Ansong D, Biritwum R, Edusei L, Nyarko K, & Wiafe S. Factors contributing to delays in diagnosis of breast cancers in Ghana, West Africa. *Curatiois*. 2016; 38(1). <https://doi.org/10.1007/s10549-016-4088-1>
3. Montazeri A. Health-related quality of life in breast cancer patients: a bibliographic review of the literature from 1974 to 2007. *Journal of experimental and clinical cancer research*. 2008; 27(1): 1-31. <https://doi.org/10.1186/1756-9966-27-32>
4. Verhaak E, Gehring K, Hanssens P, Aaronson N, Sitskoom M. Health-related quality of life in adult patients with brain metastases after stereotactic radiosurgery: a systematic, narrative review. *Supportive care in cancer*. 2020; 28(2): 473-484. <https://doi.org/10.1007/s00520-019-05136-x>
5. Wen P, Macdonald D, Reardon D, Cloughesy T, Sorensen A, Galanis E, Degroot J, Wick W, Gilbert M, Lassman A, Tsien C, Mikkelsen T, Wong E, Chamberlain M, Stupp R, Lamborn K, Vogelbaum M, Van Den Bent M, Chang S. Updated response assessment criteria for high-grade gliomas: response assessment in neuro-oncology working group. *Journal of clinical oncology*. 2010; 28(11): 1963-1972. <https://doi.org/10.1200/jco.2009.26.3541>
6. Donovan K, Sanson-Fisher R, Redman S. Measuring quality of life in cancer patients. *Journal of clinical oncology*. 1989; 7(7): 959-968. <https://doi.org/10.1200/jco.1989.7.7.959>
7. Stanton A, Revenson T, Tennen H. Health psychology: psychological adjustment to chronic disease. *Annual review of psychology*. 2007. 58: 565-592.
8. Okoli C, Anyanwu S, Ochomma A, Emegoakor C, Chianakwana G, Nzeako H, Ihekwoaba E. Assessing the quality of life of patients with breast cancer treated in a tertiary hospital in a resource-poor country. *World journal of surgery*. 2018; 43(1): 44-51.
9. Hassen A, Taye G, Gizaw M, Hussien M. Quality of life and associated factors among patients with breast cancer under chemotherapy at Tikur Anbessa Specialized. *PLoS One*. 2019; 14(9):1-13. <https://doi.org/10.1371/journal.pone.0222629>
10. Sibhat S, Fenta T, Sander B, Gebretekle G. Health-related quality of life and its predictors among patients with breast cancer at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. *Health and quality of life outcomes*. 2019; 17(1):1-10
11. Koboto D, Deribe B, Gebretsadik A, Ababi B, Bogale N, Geleta D, Gemechu L, Mengistu K. Quality of life among breast cancer patients attending Hawassa University Comprehensive Specialized Hospital cancer treatment center. *Breast cancer: targets and therapy*. 2020; 12: 87-95. <https://doi.org/10.2147/bctt.s252030>
12. Yusuf A, Hadi I, Mahamood Z, Ahmad Z, Keng S. Quality of life in malay and chinese women newly diagnosed with breast cancer in Kelantan, Malaysia. *Asian pacific journal of cancer prevention*. 2013; 14(1): 435-440. <https://doi.org/10.7314/apjcp.2013.14.1.435>
13. Liberati A, Altman D, Tetzlaff J, Mulrow C, Gøtzsche P, Ioannidis J, Clarke M, Devereaux P, Kleijnen J, Moher D. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. *BMJ*. 2009; 339. <https://doi.org/10.1136/bmj.b2700>
14. Mols F, Vingerhoets A, Coebergh J, Van De Poll-Franse L. Quality of life among long-term breast cancer survivors: a systematic review. *European journal of cancer*. 2005; 41(17): 2613-2619. <https://doi.org/10.1016/j.ejca.2005.05.017>
15. Dersimonian R, Laird N. Meta-analysis in clinical trials. *Control Clin Trials*. 1986; 7:177-188
16. Higgins J, Thompson S. Quantifying heterogeneity in a meta-analysis. *Statistics in medicine*. 2002; 21(11): 1539-1558. <https://doi.org/10.1002/sim.1186>
17. Meron B. Assessing the quality of life among patients with breast cancer at Tikur Anbessa Specialized Hospital, Addis Ababa. 2016.
18. Jaiyesimi A, Sofela E, Rufai A. Health related quality of life and its determinants in nigerian breast cancer patients. *African Journal of Medicine and Medical Sciences*. 2007; 36(3): 259-265

19. Rahou B, Rhazi K, Hanchi Z, Ouasmani F, Benazzouz B, Ahid S. Quality of life among Moroccan women undergoing treatment of breast cancer. 2017; 21: 1-11
20. Sybil K. Health related quality of life of breast cancer patients at Kenyatta National Hospital. Univeristy of Nairobi. 2017
21. Enien M, Ibrahim N, Makar W, Darwish D, Gaber M. Health-related quality of life: impact of surgery and treatment modality in breast cancer. *Journal of cancer research and therapeutics*. 2018; 14(5): 957-963. <https://doi.org/10.4103/0973-1482.183214>
22. Shouman A, Abou El Ezz N, Nivine G, Amal M. Quality of life in breast cancer sufferers. *International Journal of Health Care Quality Assurance*. 2016;29(7): 721-732
23. Abdulrahman G, Rahman G. Epidemiology of breast cancer in Europe and Africa. *Journal of cancer epidemiology*. 2012; 1-6. <https://doi.org/10.1155/2012/915610>
24. Delgado-Sanz M, García-Mendizábal M, Pollán M, Forjaz M, López-Abente G, Aragonés N, Pérez-Gómez B. Heath-related quality of life in Spanish breast cancer patients: a systematic review. *Health and quality of life outcomes*. 2011; 9(1): 3
25. Mokhatri-hesari P, Montazeri A. Health-related quality of life in breast cancer patients: review of reviews from 2008 to 2018. *Health and quality of life outcomes*. 2020; 18(1): 1-25
26. Hashemi S, Balouchi A, Al-Mawali A, Rafiemanesh H, Rezaie-Keikhaie K, Bouya S, Dehghan B, Farahani M. Health-related quality of life of breast cancer patients in the Eastern Mediterranean region: a systematic review and meta-analysis. *Breast Cancer Research and Treatment*. 2019; 174(3): 585-596
27. Engel J, Schlesinger-Raab A, Emeny R, Hölzel D, Schubert-Fritschle G. Quality of life in women with localized breast cancer or malignant melanoma 2 years after initial treatment: a comparison. *International journal of behavioral medicine*. 2014; 21(3): 478-486
28. Han J, Grothuesmann D, Neises M, Hille U, Hillemanns P. Quality of life and satisfaction after breast cancer operation. *Archives of gynecology and obstetrics*. 2010; 282(1): 75-82
29. Begovic-Juhant A, Chmielewski A, Iwuagwu S, Chapman L. Impact of body image on depression and quality of life among women with breast cancer. *Journal of psychosocial oncology*. 2012; 30(4): 446-460. <https://doi.org/10.1080/07347332.2012.684856>
30. Sun Y, Kim S, Heo C, Kim D, Hwang Y, Yom C, Kang E. Comparison of quality of life based on surgical technique in patients with breast cancer. *Japanese journal of clinical oncology*. 2014; 44(1): 22-27. <https://doi.org/10.1093/jjco/hyt176>
31. Dahl C, Reinertsen K, Nesvold I, Fossa S, Dahl A. A study of body image in long-term breast cancer survivors. *Cancer*. 2010; 116(15): 3549-3557. <https://doi.org/10.1002/cncr.25251>
32. World health organization. Guide to cancer - guide to cancer early diagnosis. In world health organization. 2017. <https://apps.who.int/iris/bitstream/handle/10665/254500/9789241511940-eng.pdf;jsessionid=2646a3e30075db0fca4a703a481a5494?sequence=1>
33. Wasanaharshani M. Quality of life and satisfaction with care among breast cancer survivors receiving different treatments strategies in Sri Lanka. *Cancer therapy & oncology international journal*. 2016; 2(1): 1-5. <https://doi.org/10.19080/ctoj.2016.01.555578>
34. Haidari R, Abbas L, Nerich V, Anot A. Factors associated with health-related quality of life in women with breast cancer in the Middle East: a systematic review. *Cancers*. 2020, 12(3): 1-19
35. Chae Y, Seo K. Health-related quality of life in women with breast cancer in Korea: do sociodemographic characteristics and time since diagnosis make a difference? *Oncology nursing forum*. 2010; 37(4). <https://doi.org/10.1188/10.onf.e295-e303>
36. Land K, Michalos A, Sirgy M. Handbook of social indicators and quality of life research. In handbook of social indicators and quality of life research 2012. <https://doi.org/10.1007/978-94-007-2421-1>

Tables

Table 1: General characteristics of included studies

Author and publication year	Country	Study design	Data collection method	Questionnaire	Study setting	Sample size	Mean age with SD	Mean score for GQOL with SD
Sibhat <i>et al.</i> , 2019 [10]	Ethiopia	Cs	Interview	EORTC QLQ-C30 EORTC QLQ-BR23	Hospital	404	43.94 ±11.72	59.32±22.94
Meron amare, 2016 [17]	Ethiopia	Cs	Interview	EORTC QLQ-C30 EORTC QLQ-BR23	Hospital	250	45.51±11.18	52.5±26.0
Koboto <i>et al.</i> , 2020 [11]	Ethiopia	Cs	Structured questionnaire	WHOQOL-BREF BREAST CANCER-SPECIFIC-BR23	Hospital	259	44.89±12.56	75.3±17.1
Jaiyesimi <i>et al.</i> , 2007 [18]	Nigeria	Prospective study	Interview	EORTC QLQ-C30 EORTC QLQ-BR23	Hospital	35	44.3±11.9	58.10±30.68
Okoli <i>et al.</i> , 2018 [8]	Southern Nigeria	Prospective study	Face-to-face interview	FACT-B	Hospital	60	48.5 ±21.5	53.49 ±12.56
Rahou <i>et al.</i> , 2017 [19]	Morocco	Cs	Face to face interview	EORTC QLQ-C30 EORTC QLQ-BR23	Hospital	400	48.2±10.3	53.4±17.71
sybil, 2011 [20]	Kenya	Cs	Interview	EORTC QLQ-C30 EORTC QLQ-BR23	Hospital	142	49.4±10.2	65.48±19.885
hassen <i>et al.</i> , 2019 [9]	Ethiopia	Cs	Face to face interview	EORTC QLQ-C30 EORTC QLQ-BR23	Hospital	404	44±11.78	52.98± 25.61
enien <i>et al.</i> , 2018 [21]	Egypt	Cs	Structured questionnaire oral interview	EORTC QLQ-C30 EORTC QLQ-BR23	Hospital	172	50.32±8.54	28.38±11.7
shouman <i>et al.</i> , 2016 [22]	Egypt	Cs	Interview	FACT-G FACT-B	Hospital	64	51.05±9.25	2.51±0.72

Footnote: - **SD:** standard deviation; **CS:** cross sectional; **GQOL:** general quality of life; **EORTC QLQ-C30:** European organization for research and treatment of cancer quality -of- life questioner core 30; **EORTC QLQ-BR23:** European organization for research and treatment of cancer quality-of- life questioner-breast cancer module 23; **WHOQOL-BREF:** world health organization quality of life; **FACT-B:** functional assessment of cancer therapy- breast; **FACT-G:** functional assessment of cancer therapy-general.

Table 2: Methodological quality of included studies

Author and publication year	Total	Quality
Sibhat <i>et al.</i> , 2019 [10]	11	High
Meron amare, 2016 [17]	12	High
Koboto <i>et al.</i> , 2020 [11]	10	High
Jaiyesimi <i>et al.</i> , 2007 [18]	9	Moderate
Okoli <i>et al.</i> , 2018 [8]	11	High
Rahou <i>et al.</i> , 2017 [19]	11	High
Sybil, 2011 [20]	12	High
Hassen <i>et al.</i> , 2019 [9]	12	High
Enien <i>et al.</i> , 2018 [21]	12	High
Shouman <i>et al.</i> , 2016 [22]	9	Moderate

Table 3: The pooled estimate of functional score in breast cancer patients based on EORTC QLQ-C30 standard tool in Africa

Author and publication year	Cognitive domain with SD	Emotional domain with SD	Role domain with SD	Physical domain with SD	Social domain with SD
Sibhat et al., 2019 [10]	78.55±26.23	71.51±29.74	73.18±36.19	67.97±25.15	80.07±30.08
Meron amare, 2016 [17]	61.8±33.2	56.2±30.9	52.6±42.6	62.3±34.2	74.1±28.5
Jaiyesimi <i>et al.</i> , 2007 [18]	60.0±32.13	61.9±30.34	46.2 ±36.62	76.9 ±20.59	40.9 ±42.84
Rahou <i>et al.</i> , 2017 [19]	64.6±18.52	53.83±31.94	25.5±23.50	61.15±20.75	58.33±30.79
Sybil, 2011 [20]	83.6±23.1	86.4±17.0	79.5±27.3	84.5±14.2	89.0±19.1
Enien <i>et al.</i> , 2018 [21]	65.56±22.05	59.61±24.96	62.45±21.16	83.37±12.54	87.91±17.92
Pooled estimate score (95%ci)	69.41(62.11,76.71)	64.99(53.53,76.45)	56.64(36.42,76.86)	72.69(63.37, 82.01)	72.91(62.14,83.68)

Table 4: The pooled estimate of breast cancer-specific symptom score patients based on EORTC QLQ-C30 in Africa

Author and publication year	Fatigue with SD	Nausea/vomiting with SD	Pain with SD	Dyspnea with SD	Insomnia with SD	Appetite loss with SD	Constipation with SD
Sibhat et al., 2019 [10]	42.38±33.35	14.48±24.96	36.46±32.91	18.65±30.69	33.16±39.85	36.47±40.69	24.83±35.11
Meron amare, 2016 [17]	50.0±27.6	55.7±38.3	46±31.9	57.1±41.5	53.5±42.1	17.9±30.3	62.5±35.11
Jaiyesimi <i>et al.</i> , 2007 [18]	52.7 ±32.82	14.76±20.52	59.1 ±34.38	23.81±37.55	35.24±32.28	35.24± 39.56	19.61 ±32.82
Rahou <i>et al.</i> , 2017 [19]	60.22±21.76	19.66±26.02	36.83±21.21	21.33±19.18	53.33±25.52	47.66±22.01	3.50±11.11
Sybil, 2011 [20]	22.1±21.2	3.6±2.01	19.4±25.3	4.7±2.6	9.5±5.4	0	3.3±2.3
Enien <i>et al.</i> , 2018 [21]	39.43±17.70	5.86±10.93	36.44±18.07	17.58±24.006	21.24±26.53	13.18±22.15	21.24±22.15
Pooled estimate score (95% ci)	44.33(32.75,55.91)	18.81(9.83,27.79)	37.88(31.51,44.24)	23.71(11.92,35.50)	34.63(14.13,55.13)	29.99(13.94,46.03)	22.32(13.94,30.70)

Table 5: The pooled estimate of cancer-specific functional and symptom score in breast cancer patients in Africa

EORTC QLQ-BR23 functional and symptom scores							
	Sexual functioning with SD	Future perspective with SD	Body image with SD	Sexual enjoyment with SD	Systemic therapy side effects with SD	Breast symptoms with SD	Arm symp with SD
Sibhat <i>et al</i> , 2019 [10]	17.78±28.09	52.47±43.13	77.21±32.09	63.51±30.98	34.11±22.59	18.39±22.71	24.92±22.71
Meron amare, 2016 [17]	29.0±26.2	82.1±30.3	45.3±34.2	51.3±26.4	34.6±29.7	59.2±29.4	33.6±28.4
Rahou <i>et al</i> , 2017 [19]	4.37±1.05	22.58±29.06	38.37±36.05	20.33±16.39	24.46±18.93	27.33±18.80	26.33±18.80
Sybil, 2011 [20]	19.4±25.9	66.9±34.2	77.1 ±38.4	47.7±24.01	15.9±7.9	16.9±6.58	16.9±7.2
Enien, <i>et al</i> , 2018 [21]	74.45±14.89	41.75±20.088	74.51±13.21	32.23±19.53	28.41±14.76	11.53±14.36	32.35±20.4
Pooled estimate score(95% ci)	29.00(-0.03,58.33)	53.12(31.75,74.49)	62.47(46.33,78.62)	42.99(25.57,60.41)	27.42(19.92,34.93)	26.56(16.07,37.05)	26.7(20.4,33.0)

Table 6: Determinants of QOL of breast cancer patients in Africa

Author and publication years	Global HRQOL mean (SD)	Determinants of HRQOL	Sign of association
Sibhat et al., 2019 [10]	59.32 (22.94)	Higher stage of breast cancer	-
		Problem in cognitive functioning	-
		Pain	-
		Financial difficulties	-
		Future perspective	+
Hassen et al., 2019 [9]	52.98 (25.61)	Educational status of college and above	+
		Being divorced	+
		Higher score of household income, social and physical function	+
		Lower score of insomnia, fatigue, financial difficulties and systemic therapy side effects	+
		Patients receiving ≥2 cycle chemotherapy	-
Koboto et al., 2020 [11]	75.3 (17.1)	Diagnosis at stage iii and iv	-
		Low level of income	-
Meron amare, 2016 [17]	52.5 (26.0)	Older age	-
		Higher income	+
		Higher level of education	+
		Duration of the disease/time since diagnosis	+
Jaiyesimi et al., 2007 [18]	58.10 (30.70)	Financial difficulties	-
		Pain	-
		Fatigue	-
		nausea/ vomiting	-
		Difficulties in physical, cognitive and social functioning	-
Okoli et al., 2018 [8]	53.49 (12.56)	Older age	+
		Post mastectomy	-
		Pre-menopausal	-
Rahou et al., 2017 [19]	53.4 (17.70)	Being young	+
		Being single	+
		Receiving radiation	+
		Taking chemotherapy	-
		Undertaking surgical procedure	-
Sybil, 2011 [20]	65.5 (19.9)	Being married	+
		Good social support	+
		Higher level of education	+
		Systemic chemotherapy	-
		Higher stage of disease	-
		Poor functional scale	-
		Frequent symptom	□
Enien et al., 2018 [21]	28.38 (11.70)	Older age	-
		Illiterate	-
		Advanced disease stage	-
		Lymphedema	-
Shouman et al, 2016 [22]	2.51 (0.72)	Older age	+
		Being educated	+

Having children	+
Sufficient family income	+
Presence of care giver	+
Post-operative chemotherapy	-
Difficulties in obtaining medication	-

Figures

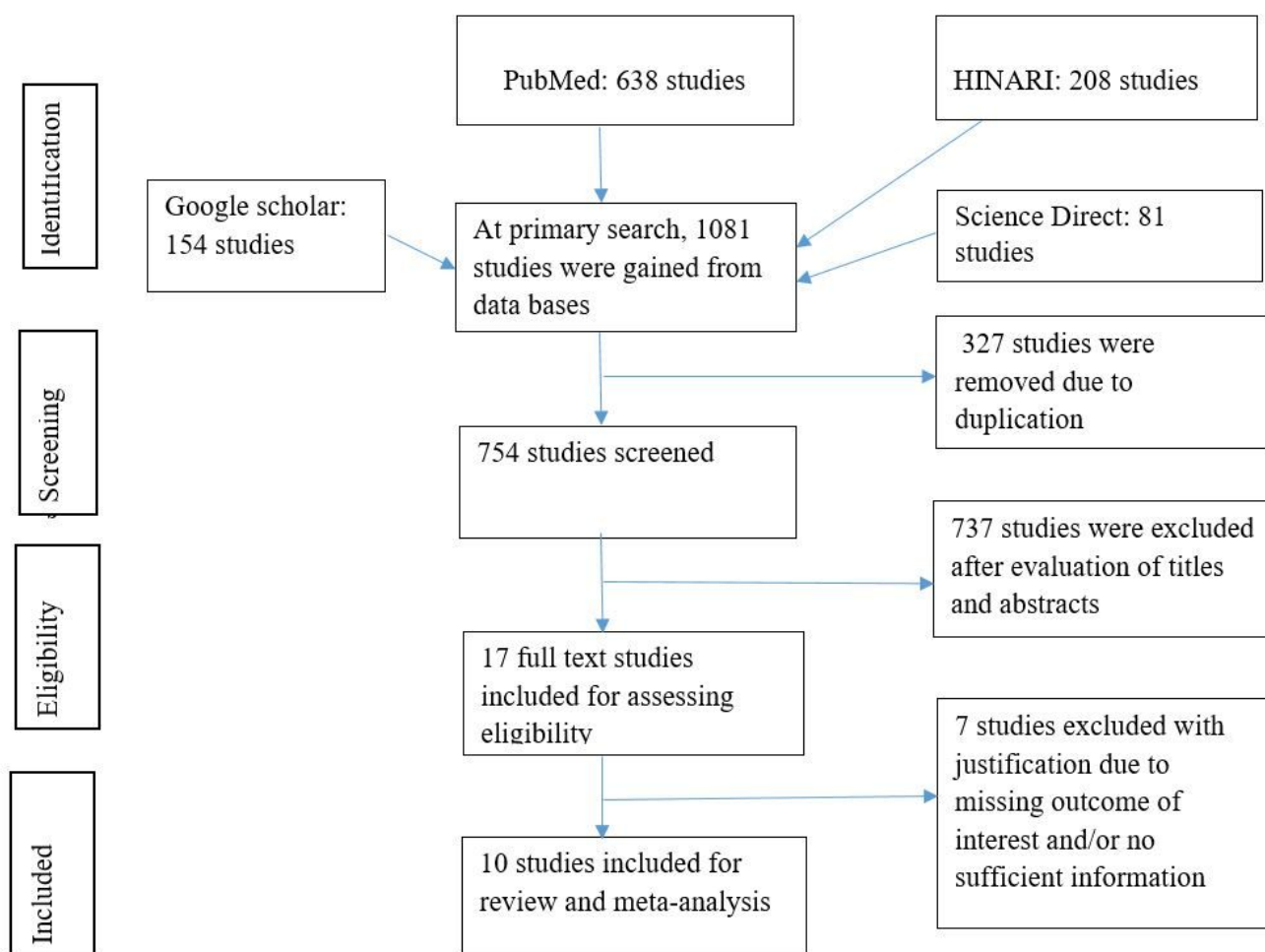


Figure 1

Flow diagram of the selection process

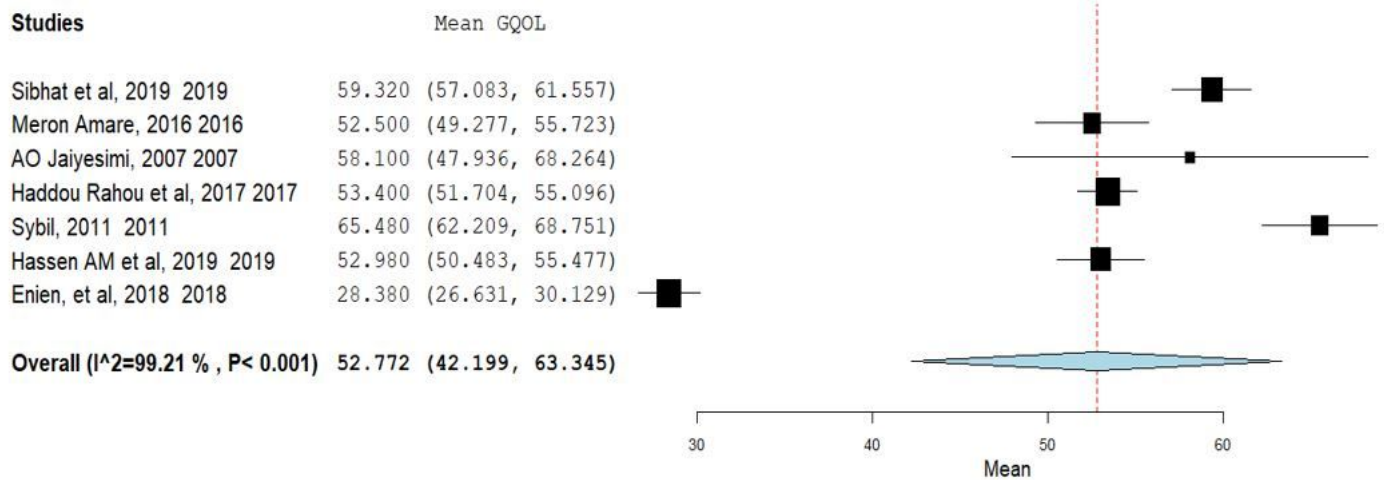


Figure 2

Pooled estimate of the mean score of GQOL based on EORTC QLQ-C30 standard tool

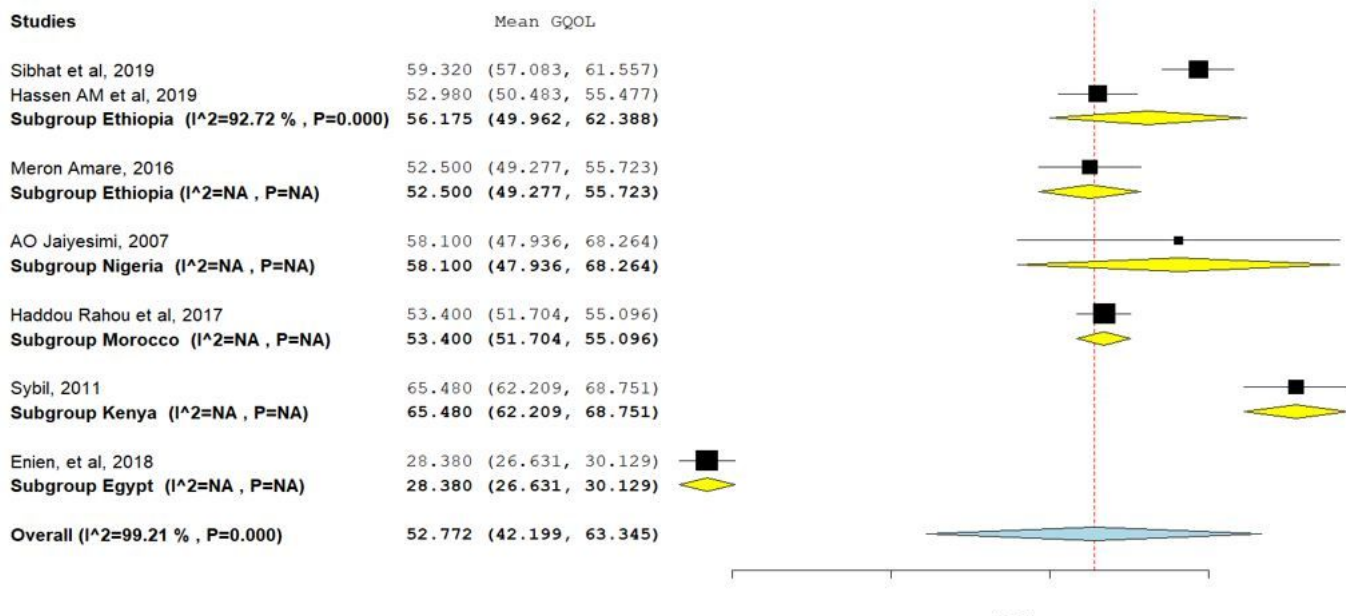


Figure 3

Subgroup analysis based on country in breast cancer patients in Africa

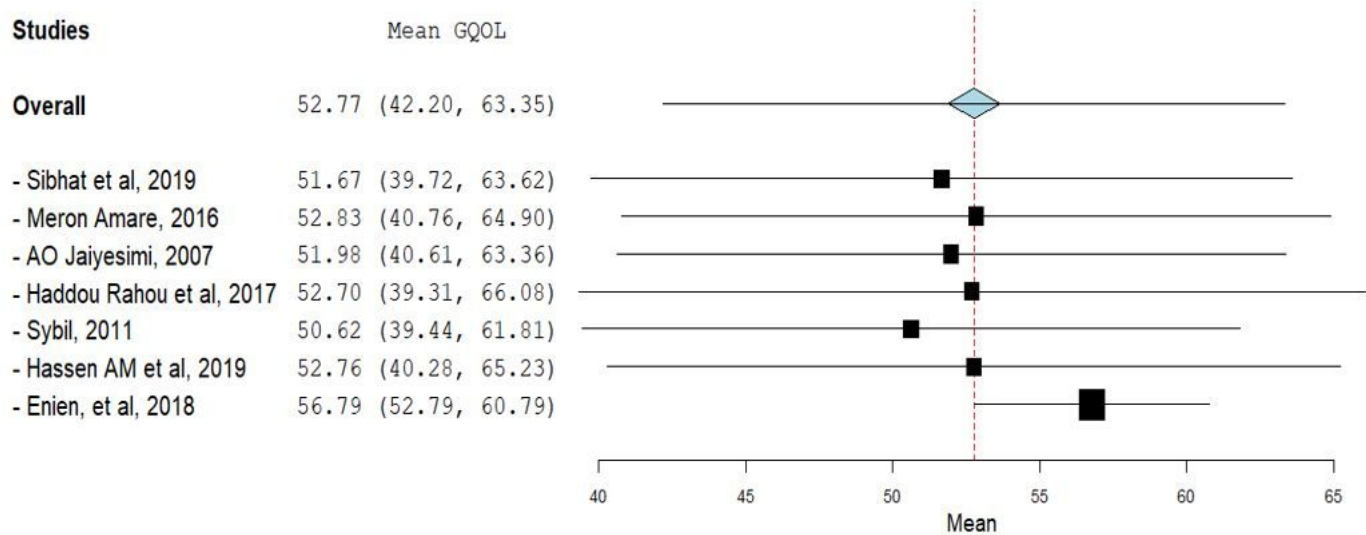


Figure 4

A leave- one-out meta-analysis of breast cancer patients in Africa

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [PRISMAchecklist.docx](#)