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Is there an optimal screening tool for identifying perinatal depression within clinical settings of sub-Saharan Africa?

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ABSTRACT

Depression is a leading cause of maternal morbidity and mortality worldwide and the most common complication of the perinatal period. Women in sub-Saharan Africa (SSA) are disproportionately impacted by perinatal depression. Maternal and child health (MCH) clinics are widely attended in SSA, offering a potential access point for depression screening. Yet, selection of optimal depression screening instruments for use within MCH clinics in SSA remains unclear. We synthesized evidence depicting relative strength of perinatal depression screening scales for use among African perinatal women within four evaluation domains: 1) diagnostic performance, 2) cultural adaptation, 3) feasibility and ease of implementation, 4) experience using the tool in SSA perinatal populations. The Edinburgh Postnatal Depression Scale (EPDS) and Patient Health Questionnaire-9 (PHQ-9) had the most evidence among peripartum women in SSA, and a balance of feasibility, diagnostic performance metrics, and cultural adaptations. Other depressive screening instruments developed for general populations show strengths for application in African perinatal populations in at least one evaluation domain. Building health services capacity to integrate depression screening within routine MCH visits is an important next step to address perinatal depression in SSA.

1. Introduction

Depression is a leading cause of disability worldwide, affecting women twice as frequently as men (Abate et al., 2017; Kessler, 2003). Depression during pregnancy and the first year postpartum is the most common complication of the perinatal period (Stein et al., 2014; Woody, Ferrari, Siskind, Whiteford, & Harris, 2017), and disproportionately affects women in low- and middle-income countries (LMICs) (Fisher et al., 2012; Woody et al., 2017). A wide spectrum of adverse outcomes may follow maternal depression (Stein et al., 2014), including maternal suicide, adverse perinatal outcomes, difficulties in bonding, and infant-child-adolescent developmental problems.

There is growing advocacy for integrating depression screening into Maternal Child Health (MCH) services (Rahman et al., 2013a) especially in sub-Saharan Africa (SSA) where MCH services are widely attended and offer a high-impact access point for other health domains (Atif, Lovell, & Rahman, 2015; Rahman et al., 2013a). While there are multiple depression screening tools available, it is unclear which are optimal for wide-scale implementation in SSA MCH clinics. We summarized findings from the literature to date, highlighting aspects relevant for prioritizing tool selection for this population. We focused on the following characteristics of screening tools used to detect perinatal depression in SSA: diagnostic performance of screening instruments, cultural adaptation, feasibility of implementation within real-world MCH services (Kagee, Tsai, Lund, & Tomlinson, 2013), and experience using the tool in SSA perinatal populations. We summarized our findings across these four evaluation domains per screening tool and overall to depict relative strength of screening tools in each domain. This is the first evaluation to

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extend assessment of perinatal depression tools beyond diagnostic validity to include important characteristics for programmatic implementation in SSA settings.

2. Considerations for perinatal depression screening in sub-Saharan Africa

2.1. General considerations for disease screening

In approaching population-level disease screening, it is important to consider clinical, ethical, financial, logistical, and human resource issues. Foremost, health services should be available to manage the disorder if widespread screening is recommended. In clinical settings with inadequate resources for mental health services, screening for depressive symptoms during antenatal and postpartum care may be considered unethical if next steps for adequately managing clinically significant symptoms are difficult to access. Mental health treatment options such as lay counselor-delivered psychosocial interventions are increasingly available in SSA settings, further encouraging the identification of optimal screening tools (Ola & Atilola, 2019). A suitable screening tool should be low cost to the health system, feasible to administer, acceptable to the population being screened, valid, and reliable in its measurement (Chorwe-Sungani & Chipps, 2017).

2.2. Screening for depression among perinatal women

During the perinatal period, the health of mothers and infants is intrinsically linked. Poor maternal mental health adversely affects the dyad (Stein et al., 2014), making identification of perinatal depression crucial for both mother and infant health. Women interface with the health system and community-based care more frequently during the perinatal period than other life periods, presenting a unique opportunity for widespread symptom ascertainment (Rahman et al., 2013b).

Some expert groups such as the US Preventive Services Task Force and American College of Obstetricians and Gynecologists recommend universal depression screening at least once during the perinatal period (O'Connor, Rossom, Henninger, Groom, & Burda, 2016; The American College of O, 2015). They base this guidance on the frequency of depression among perinatal populations and cite evidence of moderate direct or indirect mental health benefits among populations undergoing screening (O'Connor et al., 2016; The American College of O, 2015). Experts in Canada and United Kingdom assert that there is insufficient high-quality data to support population-level resource allocation toward perinatal depression screening. They suggest that widespread perinatal depression screening may cause more harm than benefit through overtreatment of those receiving falsely positive screening results (Antenatal and postnatal m, 2014; Joffres et al., 2013; Thombs & Ziegelstein, 2013). Experts in the US and elsewhere counter that providing mental health services to those screening positive for perinatal depression (even false positives) may incite more benefit than harm, particularly in settings offering psychosocial support or other non-pharmaceutical treatment options (O'Connor et al., 2016; The American College of O, 2015).

In parallel to this debate, depression is gaining attention as an urgent global public health issue in expert-led clinical intervention programs, global development agendas, and donor-led initiatives for research priorities such as the World Health Organization Mental Health Gap Action Programme (WHO mhGAP) (World Health Organization, 2016), the United Nations Sustainable Development Goals (United Nations, 2030), and the Grand Challenges in Global Mental Health, respectively (Collins et al., 2011). These initiatives call for worldwide prioritization of case identification for mental disorders within routine primary and community care settings (Collins et al., 2011; Rahman et al., 2013a).

As more settings adopt policies promoting maternal mental health, it is important to understand which screening instruments appropriately identify individuals for monitoring and intervention within specific populations (Akena et al., 2012; Chorwe-Sungani & Chipps, 2017; Gelaye, Rondon, Araya, & Williams, 2016; Shrestha, Pradhan, Tran, Gualano, & Fisher, 2016; Tsai et al., 2013). A few screening tools are tailored to assess depressive symptoms during the perinatal period, including the Edinburgh Postnatal Depression Scale (EPDS) (Cox, Holden, & Sagovsky, 1987), which is also validated for use during pregnancy (Bergink et al., 2011). General depression screening tools are also applied within perinatal populations (Tsai et al., 2013), including those in SSA, though evidence for their utility during these periods has not been extensively evaluated (Akena et al., 2012; Chorwe-Sungani & Chipps, 2017; Gelaye et al., 2016; Shrestha et al., 2016; Tsai et al., 2013) (Table 1, Fig. 1).

2.3. Screening for depression among perinatal women in sub-Saharan Africa

Some SSA countries maintain specific guidelines for mental health screening, such as South Africa's *National Mental Health Policy Framework and Strategic Plan: 2013–2020* (South African Government, 2013) which recommends routine screening for mental illness during pregnancy, and the *Kenya Mental Health Policy: 2015–2030* (Republic of Kenya Ministry of Health, 2015) which recommends increased mental health screening generally. However, mental health screening is not routinely integrated in MCH clinics in SSA and depression screening for perinatal populations remains controversial (The Lancet, 2016). In SSA, most health system contacts made during the perinatal period occur within outpatient settings, including MCH clinics (e.g., well-child visits, infant immunization visits). Guidelines for operationalizing programmatic depression screening, care, and referral within MCH are lacking.

3. Considerations for prioritizing a perinatal depression screening tool in sub-Saharan Africa

Depression screening tools have been assessed using systematic reviews, comparative studies, and meta-analyses, predominantly comparing scales for diagnostic performance metrics (e.g., sensitivity, specificity) (Chorwe-Sungani & Chipps, 2017; O'Connor et al., 2016; Tsai et al., 2013; Akena et al., 2012; Gelaye et al., 2016; Shrestha et al., 2016). In a purposive literature search using PubMed and snowball searching (Lecy & Beatty, 2012), we identified five systematic reviews synthesizing data on performance of screening tools among perinatal populations across LMICs (Chorwe-Sungani & Chipps, 2017; Gelaye et al., 2016; Shrestha et al., 2016; Sweetland, Belkin, & Verdeli, 2014); one specifically in SSA (Tsai et al., 2013). The most recent systematic review (Chorwe-Sungani et al., 2017) (Chorwe-Sungani & Chipps, 2017) included studies published through 2015. We conducted a PubMed search (Appendix 1. PubMed Search Terms) to identify studies on this topic published from January 2015 through July 2021. From 57 results returned, we identified 11 additional articles relevant to developing or assessing performance of depression screening tools among perinatal populations in SSA (Abrahams, Schneider, Field, & Honikman, 2019; Barthel et al., 2015; Chorwe-Sungani & Chipps, 2018; Davies, Garman, Lund, & Schneider, 2020; Green et al., 2018; Khalifa, Glavin, Bjertness, & Lien, 2015; Marsay, Manderson, & Subramaney, 2017; Mashegoane & Bambo, 2021; Molenaar et al., 2020; Velloza et al., 2020; Woldetensay et al., 2018). Systematic reviews and articles were included in our narrative review if they reported characteristics of depression screening tool validity (either construct, content, face, or criterion validity) among perinatal populations in SSA. Studies and reviews evaluating diagnostic performance (criterion validity) compared depressive screening tools against clinical diagnostic interview as the reference standard. These studies and reviews discuss the importance of linguistic and cultural adaptation for accurate measurement (Chorwe-Sungani & Chipps, 2017; Sweetland et al., 2014). Unfortunately, there is no standardized approach for evaluating a tool for these characteristics, thus our narrative synthesis discusses findings from heterogeneous studies.

Challenges for perinatal depression screening in resource-limited

Table 1
Assessment of depression screening instruments for application among perinatal populations in sub-Saharan Africa.

		Diagnostic performance	Cultural adaptations	Feasibility and ease of implementation	Frequency of use in SSA
1	Edinburgh Postnatal Depression Scale (EPDS)	14 studies in SSA with cutoff score ≥9 (Tsai et al., 2013): Pooled sensitivity: 94%, pooled specificity: 77%	Multiple versions culturally adapted for SSA (Abrahams et al., 2019; Khalifa et al., 2015; Kumar et al., 2015; Shrestha et al., 2016): Igbo Yoruba Amharic Twi Shona Chichewa Kiswahili	10-items Likert scale responses Bidirectional questions Recall period: "In the past 7 days"	>20 studies among perinatal populations in SSA
2	Patient Health Questionnaire (PHQ)	From one study in Ghana with PHQ-9 cutoff score ≥9 (Sweetland et al., 2014; Tsai et al., 2013): Sensitivity: 94%, Specificity: 75%	Multiple versions culturally adapted for perinatal populations in SSA (Chorwe-Sungani & Chipps, 2017; Tsai et al., 2013; Velloza et al., 2020; Woldetensay et al., 2018): Afaan Oromo Kiswahili Kikuyu	10-item, 2-item versions Likert scale responses Unidirectional questions Recall period "Over the past 2 weeks"	>5 studies among perinatal populations in SSA
3	General Health Questionnaire (GHQ)	From one study from Nigeria (GHQ-28) (Chorwe-Sungani & Chipps, 2017; Tsai et al., 2013): Sensitivity: 82% Specificity: 85%	At least one version culturally adapted for Botswana (not for perinatal populations) (MT, MM, IE, N, & A, 2009; Sweetland et al., 2014): Setswana	60-item, 30-item, 28-item, 12-item versions Likert scale responses Bidirectional questions Recall period: "In the past few weeks"	>5 studies among perinatal populations in SSA
4	Shona Symptom Questionnaire (SSQ)	From one study within Zimbabwean pregnant women (Chorwe-Sungani & Chipps, 2017; Tsai et al., 2013): Sensitivity: 82% Specificity: 66%	First indigenous measure of mental disorder from SSA; validated among perinatal women in Zimbabwe (Nhiwatiwa et al., 1998; Patel et al., 1997): Shona	14-items Yes/No responses Unidirectional questions Recall period: "During the course of the past week"	>1 study among perinatal populations in SSA
5	Self-Regulation Questionnaire (SRQ)	From one study within Ethiopian pregnant women with SRQ-20 cutoff ≥6 (Chorwe-Sungani & Chipps, 2017; Tsai et al., 2013): Sensitivity: 68% Specificity: 62%	At least one version culturally adapted for Malawian perinatal women (Hanlon et al., 2008; Molenaar et al., 2020; Stewart et al., 2009): Chichewa, Chiyao Also translated to: Amharic	20-item scale Yes/No responses Unidirectional questions Recall period: "In the last month"	>1 study among perinatal populations in SSA
6	Center for Epidemiological Studies Depression Scale (CES-D)	From one study in Uganda (CESD-20) (Chorwe-Sungani & Chipps, 2017): Sensitivity: 73% Specificity:79%	At least one version translated and validated among pregnant women in Uganda (BK et al., 2014; Chorwe-Sungani & Chipps, 2017): Acholi, Langi	20-item, 10-item versions Likert scale responses Bidirectional questions Recall period: "Over the past week"	>1 study among perinatal populations in SSA
7	Hopkins Symptom Checklist (HSCL)	From one study in Tanzania with cutoff (Chorwe-Sungani & Chipps, 2017; Tsai et al., 2013): Sensitivity: 89% Specificity: 80%	At least one version translated and validated among pregnant women in Tanzania (Chorwe-Sungani & Chipps, 2017; SF et al., 2002): Kiswahili	25-item, 10-item versions Likert scale responses Unidirectional questions Recall period: "In the last 7 days"	>1 study among perinatal populations in SSA
8	Hospital Anxiety and Depression Scale (HADS)	From one study within Nigerian pregnant women (Sweetland et al., 2014; Tsai et al., 2013): Sensitivity: 93% Specificity: 91%	At least one version translated and validated among pregnant women in Nigeria (Abiodun, 1994; Chorwe-Sungani & Chipps, 2017): *Language not indicated*	14-items (7-items for anxiety subscale, 7 items for depression subscale) Likert scale responses Bidirectional questions Recall period: questions written in present tense (e.g., "I feel miserable and sad")	>1 study among perinatal populations in SSA
9	Kessler Psychological Distress Scale (K-10/K-6)	From one study within South African pregnant women (K-10) (Chorwe-Sungani & Chipps, 2017; Sweetland et al., 2014; Tsai et al., 2013): Sensitivity: 73% Specificity: 54%	Multiple versions translated and validated for perinatal populations in SSA (Chorwe-Sungani & Chipps, 2017; Sweetland et al., 2014; Tsai et al., 2013): Moore, Dioula, French Afrikaans	10-item, 6-item versions Likert scale responses Unidirectional questions Recall period: "In the past 4 weeks"	>1 study among perinatal populations in SSA

Evidence synthesized from results of systematic reviews: Chorwe-Sungani et al., 2017, Gelaye et al., 2016, Shrestha et al., 2016, Sweetland et al., 2014, Tsai et al., 2013. Evidence supplemented by PubMed review. **Diagnostic performance:** High = Sensitivity and/or Specificity >90%; Medium = Sensitivity and/or Specificity ≥75%; Low = Sensitivity and/or Specificity <75% **Cultural adaptation:** High = Multiple culturally adapted versions available or tool was developed specifically for the population; Medium = One culturally adapted tool identified; Low = Adaptation of tool is limited to language translation without further cultural adaptation or evaluation **Feasibility and ease of implementation:** High = Binary response types, Unidirectional questions, tense of question corresponds to recall period; Medium: Likert scale responses included, bidirectional questions may be included, tense of question corresponds to recall period; Low: Liker scale responses, bidirectional questions, tense of questions does not correspond to recall period (e.g., question phrased in present tense while asking about past experience) **Frequency of use in SSA:** High = >20 studies; Medium = 5–20 studies; Low = 1–5 studies.

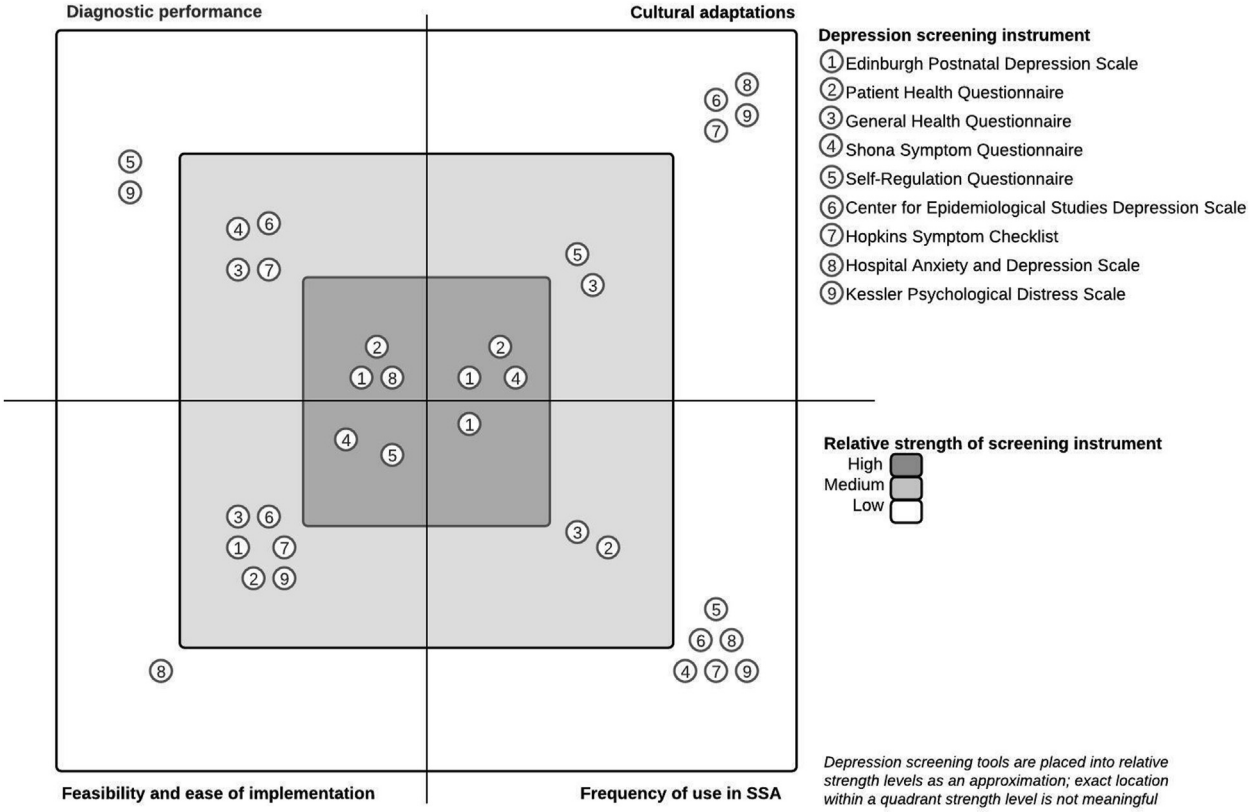

Fig. 1. Relative strengths of depression screening instruments for application among perinatal populations in sub-Saharan Africa.
Diagnostic performance: High = Sensitivity and/or Specificity >90%; Medium = Sensitivity and/or Specificity ≥75%; Low = Sensitivity and/or Specificity <75% **Cultural adaptation:** High = Multiple culturally adapted versions available or tool was developed specifically for the population; Medium = One culturally adapted tool identified; Low = Adaptation of tool is limited to language translation without further cultural adaptation or evaluation **Feasibility and ease of implementation:** High = Binary response types, Unidirectional questions, tense of question corresponds to recall period; Medium: Likert scale responses included, bidirectional questions may be included, tense of question corresponds to recall period; Low: Liker scale responses, bidirectional questions, tense of questions does not correspond to recall period (e.g., question phrased in present tense while asking about past experience) **Frequency of use in SSA:** High = >20 studies; Medium = 5–20 studies; Low = 1–5 studies.

clinical settings include high patient volumes and busy healthcare workers who cannot dedicate more than a few minutes to each patient (Atif et al., 2015; Rahman et al., 2013a). Task-shifting models where non-specialized healthcare workers and lay counselors perform perinatal depression screening have been recommended and tested in these settings (Gajaria & Ravindran, 2018; Rahman et al., 2013b). These studies found adequate performance by non-specialized counselors in delivering mental health screening and services, offering a scalable solution (Gajaria & Ravindran, 2018; Rahman et al., 2013b). Further, the rich diversity of ethnic groups and languages in SSA necessitates multiple linguistically-tailored screening tools with associated provider training (Sweetland et al., 2014). Acceptability for publicly discussing mental health varies, and MCH clinics may not have available private rooms for confidential interviews, causing discomfort to patients (Sweetland et al., 2014). Comorbidities such as HIV infection may increase the complexity of depression screening (Sweetland et al., 2014).

Despite these barriers, perinatal depression screening may be particularly impactful in SSA where the prevalence of depression is high, where MCH services are the most well-attended health services in the region, and where affordable, sustainable interventions for depression are effective (Chibanda et al., 2016; Ola & Atilola, 2019). Attention to multiple factors is needed when selecting a screening tool for perinatal populations in resource-limited settings.

We focus on diagnostic performance, cultural adaptations, feasibility, and use in MCH clinics in SSA to evaluate perinatal depression screening tools. We summarized our findings across these four evaluation domains per screening tool (Table 1) and overall to depict relative strength (high, medium, low) of screening tools in each domain (Fig. 1). Categorization of strength level per evaluation domain was determined by the authors according to agreed-upon criteria (Table 1). We placed each depression screening tool into quadrants defined by the evaluation domains according to strength level to visually synthesize results (Fig. 1).

3.1. Screening instrument diagnostic performance

A screening tool's diagnostic performance to balance accurate identification of cases (sensitivity) with valid identification of non-cases (specificity) when compared against a clinical diagnosis is a key feature to consider in selecting a screening instrument. High sensitivity ensures those with depression who would benefit from referral to additional mental health services are not missed due to a false negative result. Concurrently, specificity should be optimized to reduce misallocation of provider time to those with a false positive screening result. In high-resource settings where screening tests are the initial step in directing patients toward further diagnostics by a specialist (O'Connor et al., 2016) tools that cast a wider net (more sensitive, less specific) are permissible since resources exist over multiple care stages to distinguish cases from false positives. In clinical settings worldwide which rely on task-shifting for mental health screening and service provision, the ideal balance between sensitivity and specificity for these settings may be influenced by the referral process, costs, and accessibility. Higher specificity may be useful for resource allocation at the cost of sensitivity loss in such settings.

Tsai and colleagues demonstrated that using the same cut-off,

sensitivity and specificity of the EPDS differed between perinatal women in SSA and those in the United States/Europe. In their pooled estimates of sensitivity and specificity of the EPDS compared to diagnostic interview in 14 studies among African perinatal populations, the cut-point score of ≥12 (applied in Western settings as the level optimizing sensitivity and specificity) was associated with higher specificity and lower sensitivity among African perinatal women (68% sensitivity, 93% specificity) (Tsai et al., 2013). A lower cut-point of ≥10 produced equivalent diagnostic performance metrics (>80% sensitivity/specificity) to the standard higher cut-points of ≥12 or ≥13 among Western groups (O'Connor et al., 2016; Tsai et al., 2013). Programmatic considerations could be incorporated to choose relevant cut-points for use in the diverse communities and contexts of SSA MCH. If programs desire higher specificity and lower sensitivity to decrease unnecessary referrals, the higher cut-point may be useful.

From their systematic review of 26 studies evaluating various depressive screening tools among African perinatal populations, Tsai and colleagues noted that the EPDS was the only scale assessed for all of the following metrics: criterion-related validity (14 studies), reliability (12 studies), construct validity (6 studies), and content validity (5 studies) (Tsai et al., 2013). These researchers concluded that the EPDS is acceptably valid for use in SSA (Tsai et al., 2013).

This review identified other scales far less frequently applied among perinatal populations with insufficient data for pooled diagnostic performance metrics (Beck Depression Index [BDI], Kessler Psychological Distress Scale-10/-16 [K-10/K-16], Hopkins Symptoms Checklist 25 [HSCL], General Health Questionnaire [GHQ]) (Tsai et al., 2013). Chorwe-Sungani et al. synthesized diagnostic performance metrics for tools used across LMICs for perinatal depression, similarly finding the EPDS had high sensitivity and specificity (>85%) (Chorwe-Sungani & Chipps, 2017). Other screening tools assessed by Chorwe-Sungani et al. were used far less frequently (if at all) in African settings, and had lower accuracy than the EPDS (Chorwe-Sungani & Chipps, 2017). These reviews highlight the importance of evaluating diagnostic performance of a screening tool in the relevant context to ensure appropriate cut-points and understand the tool's performance (Akena et al., 2012; Chorwe--Sungani & Chipps, 2017; Gelaye et al., 2016; Shrestha et al., 2016; Tsai et al., 2013).

Results from individual diagnostic performance studies included in these reviews offer preliminary support for the criterion validity of the Patient Health Questionnaire (PHQ-9) (cutoff ≥9: 94% sensitivity, 75% specificity) (Weobong et al., 2009), Hospital Anxiety and Depression Scale (93% sensitivity, 91% specificity) (Abiodun, 1994), and potentially the GHC, CES-D, HSCL which showed lower but acceptable sensitivity and specificity in a few studies among African perinatal women (Chorwe-Sungani and Chipps, 2017, 2018; Sweetland et al., 2014; Tsai et al., 2013) (Table 1, Fig. 1).

Future analyses of depression scale validity among perinatal populations of SSA should evaluate psychometrics beyond sensitivity/specificity such as reliability, content, and construct validity to inform tool prioritization across numerous scales.

3.2. *Cultural appropriateness, acceptability, and adaptation of tools*

Relevance of a screening tool for identifying depression within cultural constructs of mental health in a specific region is important. Incorrect interpretation of a question or its answer leads to inaccurate endorsement of items which could eventually produce an incorrect screening result. In the context of pregnancy and postpartum, specific cultural expectations of symptoms such as fatigue or appetite may influence assessment of depressive symptoms (Angelotta & Wisner, 2017; Sweetland et al., 2014). Sweetland and colleagues examined the consequences of inappropriate adaptation of depressive symptom screening tools in their systematic review of qualitative interviews from diverse settings in 16 SSA countries where participants were asked to "think aloud" as they responded during screening assessments (Sweetland et al., 2014). These authors summarize findings about appropriateness of depression screening tools for African populations (including perinatal women) into thematic areas of "linguistic", "conceptual", and "content/factorial validity" (Sweetland et al., 2014).

Misunderstandings often stemmed from linguistically inappropriate portrayals of "depression" within different cultural contexts. For instance respondents in Eritrea and South Africa reported depression using idioms such as "thinking too much", "sighing", or "the heart is sore", among others (Sweetland et al., 2014). A study specifically examining local idioms of perinatal depression in South Africa additionally found common phrases of "stress", "being sad or unhappy", or "being scared" as common symptoms-based descriptions of depression (Davies, Schneider, Nyatsanza, & Lund, 2016). Others used metaphors evoking a depressed state such as "you feel the sun has set even though it's morning", "you don't feel like yourself even when you are walking", and "you are like the weather" (Davies et al., 2016). These authors concluded that it was important to elicit locally-relevant descriptions of perinatal depression. Further, symptoms identified via local idioms aligned well with international diagnostic criteria from the DSM-5 and ICD-10 when accurate translations were used and interviews were conducted by trained individuals (Davies et al., 2016).

Specific screening scale items may cause confusion as highlighted by Sweetland et al. For instance, questions about changes in appetite within the PHQ-9 were perceived in African settings to be asking about food insecurity (Sweetland et al., 2014). Discussions across the literature challenge the appropriateness of using screening instruments that rely on somatic symptoms within perinatal populations since changes in appetite, weight, sleep, and fatigue are natural components of the perinatal period – they may not indicate depression (Cox et al., 1987; Yawn et al., 2009). This inspired the original development of the EPDS and continues to motivate its use (Cox et al., 1987; Yawn et al., 2009).

In a recent publication detailing the process of translating the EPDS questionnaire for Kiswahili-speaking communities, Kumar and colleagues implement four criteria for achieving linguistic equivalence (Kumar, Ongeri, Mathai, & Mbwayo, 2015). These are: informativeness, source language transparency, security, and practicality – steps which allow multiple researchers to collaboratively adapt the tool for context-specific appropriateness (Kumar et al., 2015). Those aiming to apply a perinatal depression screening instrument to a setting which lacks an adapted version should engage in similar procedures to enhance scale performance. Conducting cognitive interviews can illuminate how respondents understand and interpret survey questions developed within a different population, highlighting areas for adaptation (Scott et al., 2020, 2021; Velloza et al., 2020). Velloza and colleagues performed cognitive interviews among perinatal women in Kenya to evaluate comprehension of the PHQ-9, finding that respondents had difficulty answering double-barreled questions and items concerning circumstances not relevant to their lives (e.g., "watching television") (Velloza et al., 2020). Further, a multi-stage process involving mixed methods to comprehensively adapt a depression screening tool for use in a new setting may be necessary, such as the development and evaluation process used for the novel Shona Symptom Questionnaire in Zimbabwe (Patel, Simunyu, Gwanzura, Lewis, & Mann, 1997). More recent efforts follow similar multi-stage processes to adapt depression scales for use among specific perinatal populations in SSA (Abrahams et al., 2019; Mashegoane & Bambo, 2021; Molenaar et al., 2020; Schneider, Baron, Davies, Bass, & Lund, 2015; Woldetensay et al., 2018), including Davies and colleagues' development of a version of the Hamilton Depression Rating Scale for use by non-clinicians in South African perinatal populations (Davies et al., 2020), and the Green et al. process to develop and validate a perinatal depression screening tool involving local idioms in Kenya (Green et al., 2018).

When selecting a screening tool for detecting perinatal depression in SSA clinical settings, culturally adapted scales that have been modified to achieve linguistic-conceptual equivalence should be prioritized. The EPDS and PHQ-9 have been culturally adapted for perinatal populations

in multiple African countries. The Shona Symptom questionnaire (SSQ) is the first published indigenous mental health screening scale developed for groups in SSA using ethnographic, qualitative input and was validated in perinatal women (Table 1, Fig. 1) (Nhiwatiwa, Patel, & Acuda, 1998).

If adapted versions of scales are not publicly available for use in a specific setting or population, efforts to adapt the scale for language, context, and conceptual relevance should be initiated. At a minimum, findings from non-adapted scales applied to perinatal depression screening should be interpreted cautiously with ample discussion of limitations.

3.3. Feasibility and ease of implementation

In the context of busy clinics with high patient-to-provider ratios and few-to-no mental health specialists, ease of implementation is an essential factor when selecting a screening tool for perinatal depression (Chorwe-Sungani & Chipps, 2017). In their review of tools used in LMICs which included long-form and brief formats, Akena and colleagues found short scales were as effective as longer ones in identifying perinatal depression (Akena et al., 2012). Cultural and linguistic appropriateness facilitates implementation since confusing language hinders efficient administration. For example, qualitative interviews in Ethiopia revealed that use of the phrase "for no good reason" in the EPDS impeded ease of use (Sweetland et al., 2014).

Question structure negatively affected accuracy of responses in Sweetland's assessment; specifically double-barreled and long-winded questions performed poorly (e.g., "do you ever hear voices without knowing where they are coming from or which other people cannot hear?" from the Self-Reporting Questionnaire) (Sweetland et al., 2014). Instruments using bidirectional questioning with some questions phrased positively and others negatively also caused confusion (e.g., EPDS, PHQ-9, GHQ, and others) (Sweetland et al., 2014). These authors highlight findings from two Kenyan studies where application of Likert scale items (e.g., "a little" vs "quite a bit") and the two-week reference period for PHQ-9 responses as a proportion of days (e.g., "more than half the days") adversely affected accuracy of responses (Sweetland et al., 2014).

In their assessment of eight common depression screening tools for perinatal depression among South African women, van Heyningen and colleagues suggest that short (4-item), binary-scoring tools such as Whooley questions may be easier to implement in busy, resource-limited health settings than longer, Likert scale instruments (Van Heyningen, Honikman, Tomlinson, Field, & Myer, 2018). A recent evaluation of the Whooley questions compared to the EPDS among South African perinatal women found that the Whooley questions had the advantage of brevity and simplicity, while maintaining high diagnostic performance (Marsay et al., 2017). Akena et al. agree that, "brief scales may have an edge over the longer instruments" (Akena et al., 2012). Depressive symptom scales applied to African perinatal populations to date ranged from two items (PHQ-2) to 60 items (GHQ-60), nearly all use Likert-style response options, and most use bidirectional questioning (Table 1, Fig. 1). The Shona Symptom Questionnaire and Self-Regulation Questionnaire have high ease of implementation as brief instruments (<25-items) with binary responses and unidirectional question format (Table 1).

Other considerations for feasibility include self-administration versus clinician-administration of tools (Sweetland et al., 2014; Tsai et al., 2013). To date, the global dialogue surrounding expanded screening for perinatal depression in LMICs focuses on task-shifting depression screening from specialized mental health providers to non-specialized clinicians and community health workers to improve access (Atif et al., 2015; Kagee et al., 2013; Rahman et al., 2013a). The relative complexity of depression screening instruments should be considered in task-shifting and self-administration scenarios to optimize accuracy of results.

3.4. Experience with use among African perinatal populations

Experience using a screening tool within clinical settings may offer advantages, when combined with adequate diagnostic performance, cultural adaptation, and implementation feasibility (Kroenke, 2018). In selecting a depression screening instrument, the "degree of uptake by other practitioners and healthcare systems" should be considered in concert with performance characteristics, as widespread understanding of questions and scoring across clinical settings facilitates consistent administration and interpretation (Kroenke, 2018; K, PO, & J, 2015). From the ten different perinatal depression screening tools identified by Tsai and colleagues as being applied within perinatal populations in their systematic review of screening in Africa, the EPDS surfaced as the most frequently used instrument which is consistent with utilization in settings globally (Tsai et al., 2013). They state that, "while other standard instruments could, with limitations, be employed to screen for perinatal depression, …the weak evidence base is a major barrier to sound programming" (Tsai et al., 2013). Frequency of use strengthens support for utilizing the EPDS in African clinical settings. The PHQ-9 and GHQ are the next most frequently used depressive screening tools among African perinatal populations within the literature to date (Table 1, Fig. 1). The PHQ-9 has been integrated into HIV care settings in multiple countries of SSA (Kulisewa et al., 2019) including programs involving perinatal women, potentially strengthening the case for wider-scale use of the PHQ-9 for perinatal depression screening in SSA.

While the EPDS had the highest relative frequency of use, it is worth noting that depressive symptom screening is generally *infrequent* across community, public, and private sector health facilities in sub-Saharan Africa. Familiarity with screening tools among healthcare workers and patients is relatively low and may not have reached a threshold to prioritize any specific screening tool over another based-on commonality of use. Existing evidence of depression screening tool use in perinatal populations in SSA is from research, as opposed to routine clinical settings.

4. Implications for widespread perinatal depression screening in SSA

The specific challenges and opportunities for perinatal depression screening in African MCH clinics make it critical to select the most appropriate screening tool carefully. Busy and resource-limited clinical settings require a screening instrument that is easy to implement, well-understood by the population, and accurate in classification. Simple, short instruments which maintain accurate identification of cases may be more appropriate in contexts of task-shifting or self-administration within MCH clinical settings of sub-Saharan Africa.

Overall, the EPDS and PHQ-9 tools have higher performance characteristics and frequency of use among SSA perinatal populations that support implementation in MCH settings compared to other instruments. Other tools are less well-studied but show strengths in at least one evaluation domain for application in African perinatal populations, inspiring further investigation. All tools evaluated (including the EPDS and PHQ-9) have shortcomings necessitating careful adaptation for specific perinatal populations and thoughtful interpretation of results. Future research should focus on comprehensively adapting existing tools to ensure high performance across the four evaluation domains. A similar evaluation of existing screening tools for other prevalent perinatal mental disorders such as, anxiety and post-traumatic stress, is also urgently needed. Implementation science strategies will help evaluate approaches to integrating depression screening within MCH visit schedules and assess appropriate timing, potential on-site depression interventions, and referral strategies. Given the high prevalence of depression among peripartum mothers, it remains critical to scale up depression screening in MCH services in SSA to improve maternal and child health and well-being.

Authorship

AL-conceptualized the idea for the commentary, reviewed articles for

the commentary, wrote the first draft, conducted the edits for the drafts, drafted the figure, reviewed and approved final draft, JP-reviewed the data in the figure, reviewed drafts and provided substantial edits and contributed towards final draft, reviewed and approved final draft, AB-reviewed drafts and provided substantial edits and contributed towards final draft, reviewed and approved final draft, MK- reviewed drafts and provided substantial edits and contributed towards final draft, reviewed and approved final draft, JK- reviewed drafts and provided substantial edits and contributed towards final draft, reviewed and approved final draft, PYC- reviewed drafts and provided substantial edits and contributed towards final draft, reviewed and approved final draft, GJS-conceptualized the idea for the commentary, reviewed the data in the figure, reviewed all drafts and provided substantial edits and contributed towards final draft, reviewed and approved final draft.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

APPENDIX 1. PUBMED SEARCH TERMS

(Validation OR validity OR validating) AND (“Pregnancy"[Mesh] OR “Pregnant Women"[Mesh] OR pregnan*[tiab] OR pregnan*[ot])) AND (Depression[tiab] OR Depressive[tiab]) AND (“Africa South of the Sahara"[Mesh] OR “Sub-Saharan Africa"[tiab] OR “SubSaharan Africa"[tiab] OR “sub-Sahara Africa"[tiab] OR “subSahara Africa"[tiab] OR “Sub-Saharan African"[tiab] OR “SubSaharan African"[tiab] OR “sub-Sahara African"[tiab] OR “Africa South of the Sahara"[tiab] OR Angola*[tiab] OR Benin*[tiab] OR Botswana[tiab] OR Burkina Faso[tiab] OR Burkinabe[tiab] OR Burundi[tiab] OR Cameroon*[tiab] OR Cape Verde[tiab] OR “Central Africa"[tiab] OR “Central African"[tiab] OR “Central African Republic"[tiab] OR Chad*[tiab] OR Comoros[tiab] OR Congo*[tiab] OR DRC[tiab] OR Côte d'Ivoire[tiab] OR Ivorian[tiab] OR Djibouti[tiab] OR “East Africa"[tiab] OR “East African"[tiab] OR “Eastern Africa"[tiab] OR “Eastern African"[tiab] OR Equatorial Guinea[tiab] OR Eritrea*[tiab] OR Eswatini[tiab] OR Ethiopia*[tiab] OR Gabon*[tiab] OR Gambia*[tiab] OR Ghana*[tiab] OR Guinea*[tiab] OR Guinea-Bissau[tiab] OR Kenya*[tiab] OR Lesotho[tiab] OR Liberia[tiab] OR Madagascar[tiab] OR Malagasy[tiab] OR Malawi*[tiab] OR Mali[tiab] OR Malian[tiab] OR Mauritania[tiab] OR Mauritius[tiab] OR Mauritian[tiab] OR Mozambique[tiab] OR Mozambican[tiab] OR Namibia*[tiab] OR Niger[tiab] OR Nigeria*[tiab] OR Réunion[tiab] OR Rwanda*[tiab] OR Sao Tome and Principe[tiab] OR Senegal*[tiab] OR Seychelles[tiab] OR Sierra Leone*[tiab] OR Somali*[tiab] OR “South Africa"[tiab] OR “South African"[tiab] OR “Southern Africa"[tiab] OR Sudan[tiab] OR Swaziland[tiab] OR Tanzania*[tiab] OR Togo[tiab] OR Togolese[tiab] OR Uganda*[tiab] OR “West Africa"[tiab] OR “West African"[tiab] OR “Western Africa"[tiab] OR “Western African"[tiab] OR “Western Sahara"[tiab] OR Zambia*[tiab] OR Zimbabwe*[tiab] OR “Sub-Saharan Africa"[ot] OR “SubSaharan Africa"[ot] OR “sub-Sahara Africa"[ot] OR “subSahara Africa"[ot] OR “Sub-Saharan African"[ot] OR “SubSaharan African"[ot] OR “sub-Sahara African"[ot] OR “Africa South of the Sahara"[ot] OR Angola*[ot] OR Benin*[ot] OR Botswana[ot] OR Burkina Faso[ot] OR Burkinabe[ot] OR Burundi[ot] OR Cameroon*[ot] OR Cape Verde[ot] OR “Central Africa"[ot] OR “Central African"[ot] OR “Central African Republic"[ot] OR Chad*[ot] OR Comoros[ot] OR Congo*[ot] OR DRC[ot] OR Côte d'Ivoire[ot] OR Ivorian[ot] OR Djibouti[ot] OR “East Africa"[ot] OR “East African"[ot] OR “Eastern Africa"[ot] OR “Eastern African"[ot] OR Equatorial Guinea[ot] OR Eritrea*[ot] OR Eswatini[ot] OR Ethiopia*[ot] OR Gabon*[ot] OR Gambia*[ot] OR Ghana*[ot] OR Guinea*[ot] OR Guinea-Bissau[ot] OR Kenya*[ot] OR Lesotho[ot] OR Liberia[ot] OR Madagascar[ot] OR Malagasy[ot] OR Malawi*[ot] OR Mali[ot] OR Malian[ot] OR Mauritania[ot] OR Mauritius[ot] OR Mauritian[ot] OR Mozambique[ot] OR Mozambican[ot] OR Namibia*[ot] OR Niger[ot] OR Nigeria*[ot] OR Réunion[ot] OR Rwanda*[ot] OR Sao Tome and Principe[ot] OR Senegal*[ot] OR Seychelles[ot] OR Sierra Leone*[ot] OR Somali*[ot] OR “South Africa"[ot] OR “South African"[ot] OR “Southern Africa"[ot] OR Sudan[ot] OR Swaziland[ot] OR Tanzania*[ot] OR Togo[ot] OR Togolese[ot] OR Uganda*[ot] OR “West Africa"[ot] OR “West African"[ot] OR “Western Africa"[ot] OR “Western African"[ot] OR “Western Sahara"[ot] OR Zambia*[ot] OR Zimbabwe*[ot])

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