



The EPDS and Australian Indigenous women: A systematic review of the literature



Jayne Kotz^{a,*}, Rhonda Marriott^a, Corinne Reid^b

^a Murdoch University Research Centre for Aboriginal Health and Social Equity, Murdoch University, Australia

^b Deputy Vice-Chancellor, Research, Victoria University, Melbourne, Australia

ARTICLE INFO

Article history:

Received 14 April 2019

Received in revised form 20 December 2019

Accepted 4 February 2020

Keywords:

EPDS

Australian Aboriginal

Indigenous

Perinatal

Mental health

Screening

ABSTRACT

Problem: The Edinburgh Postnatal Depression Scale (EPDS) is considered the gold standard in perinatal mental health screening and the Australian Clinical Practice Guidelines recommend universal use. However, screening rates are four times lower with Indigenous Australian women compared to non-Indigenous women. Difficulties have been reported using the EPDS in this context.

Background: Evidence demonstrates the link between perinatal mental health and maternal and child outcomes. Indigenous Australian maternal and child health and wellbeing outcomes remain unacceptably poor across all measured parameters and reported psychological distress and child removal rates are increasing.

Methods: A systematic literature review was conducted to assess the effectiveness, validity, reliability, and cultural safety of the EPDS in the Indigenous Australian context and identify the availability and suitability of any adaptations.

Findings: The EPDS has not been validated for use with Indigenous Australian women.

Discussion: The findings and limitations identified in this review are consistent with concerns in other countries about the cross-cultural use of the EPDS and its sensitivity in predicting risk for postnatal depression amongst Indigenous women. Where adaptations of the EPDS have been used there has been no psychometric and cultural validation beyond the remote communities in which they were developed.

Conclusions: There is no evidence to demonstrate that the EPDS in its current form and application is suitable for screening with Indigenous Australian women. Urgent work is required to evaluate and/or develop culturally meaningful screening tools that are predictive of risk for social and emotional wellbeing and perinatal mental distress in this context.

© 2020 Australian College of Midwives. Published by Elsevier Ltd. All rights reserved.

Statement of significance

Problem or issue?

Perinatal mental-health screening among Indigenous Australian women is poor.

What is already known?

The EPDS is considered the gold standard for perinatal mental health screening. Whilst it has been translated into a number of languages, there are concerns about its

cross-cultural suitability, especially in Indigenous cultures. Reports suggest a bias in responding to the EPDS among Indigenous Australian women because of perceived consequences of mental health screening [1].

What will this research add?

A systematic review of the validity, reliability, and cultural safety of the EPDS and culturally driven adaptations used in an Indigenous Australian context. Evidence from the literature to guide the development of culturally safe and clinically effective perinatal screening practice.

Background

Perinatal mental health is a public health concern. Indigenous women in Australia have additional risk factors compared with non-Indigenous peers. A recent Western Australian study [2] found

Abbreviations: EPDS, The Edinburgh Postnatal Depression Scale (Cox, Holden, Sagovsky, 1987).

* Corresponding author at: Building 190, Ngangk Yira Murdoch University, 90 South Street Murdoch, WA, 6150, Australia.

E-mail address: jayne.kotz@murdoch.edu.au (J. Kotz).

that between 1997 and 2013, over 34% of 43,383 (or 1 in three) Aboriginal babies were born to mothers who had a hospital contact for mental illness in the five years prior, or the first-year post, birth, with the most common contacts being for substance related disorders, mood disorders and anxiety. The incidence of mental health contacts rose distinctly during this time period.

The immediate effects of sustained high levels of maternal cortisol (a feature of both antenatal depression and anxiety) include preterm birth [3], and small birth size [4] with attendant risks for infant development [5,6]. Furthermore, women who experience antenatal anxiety are far more likely to experience severe postnatal depression compared to those without anxiety [7,8]. When postnatal depression and anxiety are poorly managed there is a cumulative effect on other members of the family [9,10]. Early-life effects of postnatal depression and anxiety for the infant may include poor attachment and neglect [11] while subsequent effects can include cognitive, emotional, social and behavioural developmental impairments [12–14], and later susceptibility to adolescent psychopathology with potentially lifelong consequences [15–17]. There is also a high likelihood that parents self-regulate their distress through engaging in high-risk behaviours including alcohol or drug use (AOD) [16]. Combined, it is of utmost importance to both identify maternal perinatal distress in the form of depression or anxiety; and provide early interventions to assist women during the significant life events of pregnancy, childbirth and early parenting.

For Indigenous Australian parents, there are a number of risk factors for perinatal distress. These include concerns relating to poorer pregnancy outcomes including low gestational age with five times the rate of premature birth, and more than twice the rate of stillbirth [18]. The risk of perinatal depression and / or anxiety further increases with the presence of significant complex, contextual factors such as historical trauma related to the stolen generations¹, as well as current trauma associated with continuing high rates of infant mortality, family violence and child removal [19,20]. A recent study by O'Donnell et al. [21] showed that Aboriginal infants had almost 9 times the risk of infant removal compared to non-Aboriginal children. This risk decreased but remained at twice the risk, once other infant and parent factors were considered. When Aboriginal infants who entered out-of-home care (OOHC) were compared to Aboriginal infants who had not, the highest risk factor for entering OOHC was maternal substance use which has seven times the risk, followed by maternal mental-health hospital contact. In this context, the risk of child removal is likely to be particularly salient for women during pregnancy, and especially when being asked about their mental health status – this constitutes a potentially powerful situational influence or 'demand characteristic'² that may prevent women from feeling safe to access perinatal screening or may influence their responding during screening.

Cumulatively these effects constitute a considerable risk for perinatal mental health problems for Indigenous adults (Australian Bureau of Statistics and Australian Institute of Health and Welfare

[22]). Indeed, a South Australian study [23] reported that almost one in four Indigenous women reported 'high' to 'very high' levels of psychological distress using the Kessler-5 tool, in the first 12 months postpartum.

Despite these high risks for perinatal distress, and the knowledge that suicide rates amongst Indigenous Australian people are double that of non-Indigenous people [24], Indigenous women are four times less likely than non-Indigenous women to be screened using the EPDS [25,26]. Failing to address the social complexities and root causes of poor engagement with mental health screening means that outcomes are likely to continue to remain compromised. It is imperative that culturally sensitive and effective screening for Indigenous women becomes a public health priority.

The EPDS is widely used to screen for perinatal depression. It has been translated into more than sixty languages and is recommended as best practice in Australia [1]. However Cox [27], one of the original authors of the EPDS, recently highlighted some of the limitations of the use of the instrument, and noted that "any screening scale must be acceptable to the mothers themselves and to the health professionals who administer it", that we must "Be careful to check the validity of the scale for the population of mothers completing the EPDS" [emphasis added] and "Establish its sensitivity, specificity, positive predictive value and optimal cut off points for the purpose of your clinical or research work" (p.789). He continues "sometimes the use of the EPDS . . . can be suboptimal—and occasionally dangerously misleading" (p.789). This systematic review aims to contribute to evidence-informed practice by reviewing the effectiveness, validity, reliability, and cultural safety of the EPDS in the Indigenous Australian context including identifying the availability and suitability of any adaptations.

Materials and method

Methodology rationale

The PICO (Population, Intervention, Comparison, Outcome) model was used as a framework for the systematic literature review search strategy [28,29]. PICO is deemed the most reliable basis for formulating a focused question to facilitate a literature search and has been adopted by the Cochrane Collaboration [30].

Scope and terminology

Defining the scope of this review required theoretical consideration of contextualised perinatal screening needs, then deciding on language that was both constraining and inclusive enough to ensure the sensitivity and specificity of the search strategy.

Protocol

Methods of analysis and inclusion criteria were specified in advance and documented in a protocol which adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) [31].

Specific eligibility criteria

Empirical studies specifically pertaining to perinatal mental health screening of Indigenous Australian women from peer-reviewed journals and grey literature from 1990 (EPDS uptake across Australia commenced early in the 1990s) through to January 2019. Studies where the EPDS had been modified in an Indigenous Australian context were included in the study.

¹ "The Stolen Generations refer to the Aboriginal and Torres Strait Islander children who were removed from their families by Australian Federal and State government agencies and church missions between 1910 and 1970 through a policy of assimilation. Under this policy, the forcible removal of First Australian children was made legal. Assimilation was based on a belief of white superiority and black inferiority and presumed that "full-blood" Aboriginal and Torres Strait Islander peoples would naturally die out." "The Stolen Generations" Available online at: <https://www.commonground.org.au/learn/the-stolen-generations>. Downloaded 6th December 2019

² In Psychology, 'demand characteristics' are considered to be artefactual and often unconscious influences on actions. Responding to a survey according to social norms, is a form of demand characteristic.

Exclusion criteria

Cohort, population based, prevalence and longitudinal studies, program evaluations studies, needs analyses and other studies where perinatal mental health screening was a secondary focus e.g. where the study focus was on diabetes, obesity, infant health and wellbeing, models of care.

Information sources

Eight data bases were electronically searched: Scopus, BioMed Central, EBSCOhost- CINAHL, ProQuest, PubMed, OVID and PsychINFO. Grey literature was sourced from the International Marcé Society Conference proceedings, Indigenous Health InfoNet, Australian Institute of Health and Welfare (AIHW) and the Telethon Kids Institute (TKI).

Search

The following search terms: (aborig* OR indigenous) AND (epds OR Edinburgh postnatal depression scale) OR (screen* AND mental

health) AND (matern* OR antenatal OR postnatal OR perinatal) NOT cancer NOT hepatitis NOT infect* NOT cardi* NOT heart NOTeducat* NOT audi* NOT infant OR paed* OR child* NOT diabet* NOT immigrant* AND lo.Exact ("Australia") AND peer reviewed journals.

Results

One hundred and fifty-eight (158) results were extracted. Reviewing titles, electronic exclusion was employed to remove (where possible) further studies focusing on diabetes, cardiovascular health, obesity, infant health, program evaluations and locations external to Australia. This excluded 81 studies. Of the remaining 77 papers, duplications were removed resulting in 39 remaining studies. Bases on the same criteria, abstracts were read excluding a further 35 studies. Four studies remained. See Fig. 1.

This systematic review shows there is very limited evidence associated with the effectiveness of use of the EPDS with Indigenous Australian women. In fact, while the EPDS is considered best practice in Australia [1], no studies in our search strategy included psychometric or qualitative validation of the standard EPDS for Indigenouswomen (Table 1).

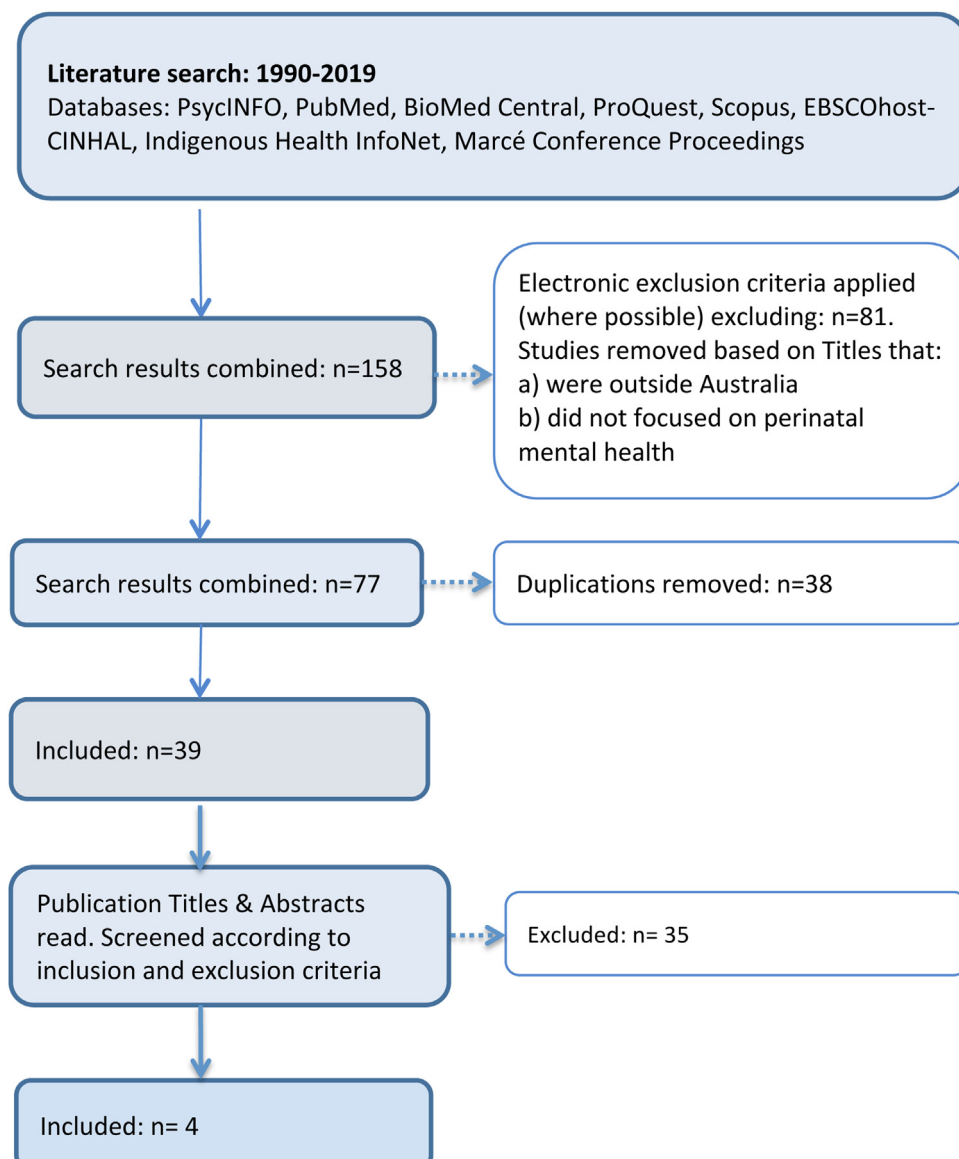


Fig. 1. Inclusion Exclusion Flow Diagram adapted from PRISMA [31].

Table 1
The PICO Model Approach to Systematic Review.

PICO Model approach to finding clinically relevant evidence in the literature.	
P Patient population	Perinatal mental health and wellbeing of Indigenous Australian women.
I Intervention	Culturally relevant, safe and effective mental health screening and assessment tools for Indigenous Australian women within child bearing age group (aged approximately 13–50 years)
C Comparison	PRISMA reporting for systematic reviews. Evaluation of EPDS against psychometric test parameters drawn from Groth-Marnat [50]: what constructs the test measures; standardisation; reliability; validity criteria; accuracy; replicability?
O Outcome	Study quality: Assessed against identified theoretical frameworks and practical considerations e.g.: relevance of study question, explicit addressing of cultural considerations and ethical considerations, consideration of the impact of self-administration of the EPDS given demand characteristics and literacy challenges. Despite the uptake of use of the EPDS in Australia since late 1980s and widespread usage since the late 1990s, there is inadequate evidence of psychometric soundness of the EPDS when used in the Indigenous Australian context.
Question: What evidence exists to support the routine use of the EPDS for perinatal mental health screening with Indigenous and Torres Strait Islander mothers?	

Source: Schardt et al., [29].

Four papers (two studies) reported on modified versions of the EPDS for use with Indigenous Australian women (See Table 2). The Townsville Indigenous Islander Health Service, located in regional north-eastern Queensland, adapted the EPDS for local use by translating each question into Indigenous English [32]. A convenience sample of Aboriginal and Torres Strait Islander patients participated in this study in Townsville (n = 181) and Mount Isa (n = 25) comparing the adapted tool with the EPDS. Each participant received the adapted version first and then the EPDS was administered as a gold standard comparison. No difference was found between the scores. While there is no evidence supporting the use of the EPDS as a reliable comparative measure, there was a reported preference for the adapted version and suggestion from some mothers and healthcare professionals, of difficulties in understanding some of the language in the standard EPDS [32] and of biases in responding [33].

Two papers reported on the Kimberley Mums Mood Scale (KMMS) developed for use in the Kimberley region of Western Australia (WA). The first was a report on its development involving close community collaboration [37]. The second was a validation study with a small convenience sample (n = 97) [36]. The KMMS included the addition of guidelines for psychosocial inquiry related to six specified domains (supports, stressors, anxiety, relationships, adverse childhood experiences and wellbeing/substance use). Question 10 of the EPDS which asks about 'harm to self' was also adapted in the KMMS to include an inquiry about 'harm to others'. Externalising expressions of anger by 'lashing out' was suggested as an additional sign of depression among Indigenous women [33]. This study compared KMMS results with a blinded mental health assessment by an Indigenous general practitioner as the gold standard. The KMMS alone had 87% sensitivity³ and 75% specificity⁴ with a positive predictive value of 54.1% and a negative predictive value of 94.4%. Sensitivity and specificity were defined as: high >0.90; moderate 0.70–0.90 and low <0.70. With the added inclusion of psychosocial inquiry, results appeared promising within this specified remote area context. Visual prompts were used to replace Likert numerical scales. Here the use of colour, weather and faces specific to the Kimberley were locally understood and intended to convey increased meaning. Unfortunately, given the small sized convenience samples, the results did not adequately meet evaluation criteria that would support generalised use. Further, in terms of generalisability, both the

KMMS and the north Queensland EPDS adaptations contain the use of regionally localised words which may be a cultural limitation in translating those adaptations for other language groups or areas.

A third study emerged from the grey literature search. An abstract from the MARCE Conference proceedings (2011) identified a further translation of the EPDS into two Indigenous languages from East Arnhem Land and Central Australia [34]. These translations (Yolgnu Martha and Walpiri), used an approach described as 'OneTalk' technology which was developed in conjunction with Traditional Owners and elders in the Northern Territory in response to the need to communicate effectively. A 'talking' book includes the translated EPDS screens and information to support understanding and awareness of perinatal depression and screening. After contacting the author by phone, Chapple reported that anecdotally this adaptation was well received in a small pilot of uncertain numbers. Insufficient funding prevented the project from continuing.

Discussion

Despite the well-established high risk of mental health challenges for Aboriginal and Torres Strait Islander mothers, there is an absence of research investigating the psychometric properties of, or indeed qualitative experiences of, the standard EPDS when used in this context. The three adaptations identified in this systematic review search had all been developed for use in remote Australian community settings.

These three adaptations highlight some potentially important differences in the symptom profile of depression in the perinatal period (specifically, the importance of anger as a core symptom) and the importance of considering contextual factors in making sense of symptomatology. The fourth study that was undertaken in Yolgnu, Martha and Walpiri languages highlighted the usefulness of images and audio to support mental health literacy within a cultural context, through fostering understanding and engagement. Whilst these are valuable insights, the four studies are very preliminary and do not provide a credible evidence-base to guide broader practice in perinatal mental health screening for Indigenous and Torres Strait Islander women.

Increasingly questions are being raised around deficiencies in the use of EPDS translations in different cultural contexts, cultural adaptations and validation processes. This is particularly evident among peoples from culturally diverse and low/lower- middle income countries [38,39]. Many of these communities share similar features and health statistics with Indigenous Australian communities. Despite the original intent of the EPDS authors [27], surprisingly, there is no reliable evidence base on the sensitivity or validity of the EPDS as a screening tool for risk of postnatal depression in cross-cultural contexts.

³ Sensitivity - the proportion of people with the condition who have a positive result, true positive rate.

⁴ Specificity- the proportion of people without the condition who have a negative result, true negative rate.

Table 2
Key Feature Summary.

Author and Year	Location	Tool	Research Aim and Design	Sample	Data Analysis	Results
Campbell, Hayes, Buckby, 2008.	Queensland, Townsville Aboriginal and Islander Health Service (TAIHS) and the Mt. Isa Aboriginal Health Service (MTI)	Adaptations of the EPDS: 1. Townsville Aboriginal and Islander Health Service (TAIHS) 2. Mt Isa (MTI)	Aim: Evaluate reliability of the TAIHS and the MTI adaptations compared with standard EPDS version. Design: Descriptive and comparative analysis using Cronbach's alpha. Standard EPDS compared with (i) TAIHS (ii) MTI. Participants completed either of the adaptations and the standard EPDS both antenatally and postnatally (test/retest).	Aboriginal and Torres Strait Islander women from the TAIHS (N = 181) and Mt. Isa (N = 25) Inadequate sample size for reliability analysis i.e. test/retest N = 45	Reliability of TAIHS and MTI compared to the standard EPDS was calculated using Cronbach's alpha. Rates of case detection used cut off score of 12 or above. Percentage of people identified as being at risk.	Both adaptations demonstrated robust internal consistency (inter-item correlation). Large dropout rates of antenatal and postnatal completion rates weakened reliability (test / retest consistency across time). Sample size completing both the EPDS and the TAIHS adaptation: a) antenatally N=24 b) postnatally N=9. Some suggestion of difficulties understanding the language used in the EPDS. Limitations: Cut-off scores were assumed as no validation was undertaken. No comparative evaluation (with the EPDS) for the MTI adaptation was reported.
Chapple, 2011	Northern Territory (NT). East Arnhem Land and Central Australia ^a	Audio-visual translations of the EPDS into Yolgnu Martha and Walpiri languages.	Aim: To develop a new culturally considered approach to perinatal mental health screening. Develop 'talking' posters and screening tool (EPDS translated into language). Design: Community participatory action (CPAR) approach. An operational response to identified perinatal mental health barriers	Consultation with experts: Aboriginal women and NT Perinatal mental health reference group	Consultation with the Community and NT Perinatal Mental Health reference group.	Developed over 3 years with local women using OneTalk technology. Anecdotal evidence reported the project was well accepted as a screening and a mental health literacy tool. The program was heading towards a pilot in East Arnhem Land and Central Australia. Limitation: No formal evaluation. Discontinued funding prevented project continuation.
Kotz et al. (2017) ¹	Western Australia (WA) Kimberley Region.	Kimberley Mums mood Scale (KMMS)	Aim: To develop a new culturally considered adaptation of the standard EPDS - (KMMS). Design: CPAR using yarning as a methodology to gather data and thematic analysis.	Workshops and focus groups with midwives CHNs and AHWs (n = 72). Initial community focus groups (n = 48). Further iterative process (n = 52). Total Kimberley women from 8 language groups: n = 100.	Thematic analysis of the qualitative data collection. The systematic, repetitive, and recursive iterative process in adapting the tool increased reliability of the development process.	Key themes and barriers to perinatal mental health and screening were identified. The KMMS may provide a culturally safe means for perinatal mental health screening. Some suggestion of difficulties understanding the language used in the EPDS and of biases in responding through fear of consequences. Limitation: Lack of validity evidence weakens this conclusion.
Marley et al., 2017 ^b	Kimberley, WA.	KMMS - modified EPDS with visual Likert scale (Part 1) and psychosocial inquiry (Part 2).	Aim: To determine reliability validity and acceptability of the KMMS when compared to assessment from a blinded clinical expert. Design: Cross-sectional approach (ie: looks at prevailing features in a given population at a single point in time, without manipulating variables).	Consenting Aboriginal women (n=91) from 15 Kimberley sites providing perinatal care.	Mixed-methods approach. Internal consistency of KMMS (Part 1) measured with Cronbach's alpha. Identified risk using i) Part 1 alone and ii) overall KMMS risk (Part 1 and 2 combined) was compared to blinded reference standard GP assessment. This was determined from receiver operating characteristics (ROC) curves. Acceptability of KMMS used frequency of responses on questionnaire and interview.	KMMS may be an effective tool for identifying Kimberley Aboriginal perinatal women at risk of anxiety and depression. It appears more accepted by clinicians compared with the EPDS. KMMS seems to be a culturally safe tool. It shows internal consistency, reliability, and detected women with moderate to high risk of anxiety or depression. Some suggestion of difficulties understanding the language used in the EPDS. Limitation: Women were selected and invited to participate which may have biased results.

^a Kotz and Marriott are authors of the current paper.

^b Kotz is first author of the current paper.

Concerns have been raised about using a one-dimensional risk screening tool for Indigenous clients during the perinatal period and the missed opportunities to engage with and inform the contextual needs of Indigenous pregnant women in a family centered and culturally secure way. Cox [27] himself emphasises that “When used to assess a mother in the community, the practitioner should discuss the responses with her, listen to her story, ascertain whether clinical depression or another mental disorder is present—and consider referral and/or further listening visits” (p.789). Despite this and the recommendations of the Australian Government Department of Health Clinical Practice Guidelines Pregnancy Care [40], many antenatal guidelines recommend the use of the EPDS as a singular risk screen [41,42]. Deeper psychosocial inquiry may easily be overlooked in time and resource-poor settings.

There are strong assumptions made about screening instruments and their capacity to identify vulnerable individuals. These have far-reaching implications for clinical practice, public policy and research particularly in relation to Indigenous Australian parents. Due to these potentially significant impacts, the NHMRC GRADE guidelines emphasise that poor evidence should not be elevated to the status of best practice [35]. Instead other factors should drive policy and clinical decision making whilst the necessary validation studies are undertaken as a matter of priority.

There is a challenge for health care providers to use a culturally competent assessment process that includes (a) training on the relevance and need for culturally safe assessments (b) not relying on a single measure (c) using contextualising, reflective documentation based on interview and observation; and (d) reporting results using cultural explanations that avoid mental health labelling [51].

Where to from here? Should we pursue an agenda of psychometric and cultural validation of the EPDS? Should new measures be commissioned? When it comes to using standardised or adaptations of standardised tools such as questionnaires and rating scales with Indigenous people, the evidence and opinions are mixed. On the one hand, some have pointed out that the validity of instruments designed for non-Indigenous people may not carry across to Indigenous people. Indeed, the thoughtless use of conventional methods may be harmful. Hunter [43] has warned that ‘well-intentioned actions based on simplistic understandings of Indigenous perspectives continue to compound, rather than alleviate, the ongoing suffering and injustices experienced by Indigenous Australian people’ ([43], p578). Additionally, psychometric properties whilst important are only valuable if the consequences of the results serve the purpose for which they were intended [44]; in this case improving outcomes for vulnerable Indigenous mothers, children and families. Positive outcomes (such as improved rates of mental health) have not been evidenced since the introduction of routine antenatal screening using the EPDS in the mid-1990s and postnatal screening in 1997 throughout WA [19,45]. Minimally, the International Test Commission (ITC) guidelines for test adaptation, state that (i) it should not be assumed that tests used out of context are effective, rather it must be established that it is so; and further (ii) that a systematic approach to adaptations or translations should be followed to maximise the prospects of the test maintaining its effectiveness [46]. Pragmatically, developing new tests is challenging in relation to time, cost and resource-commitment. In the context of a mental health crisis in Indigenous Australian communities and poor maternal and child health outcomes among this population, an interim position may be to evaluate the psychometric properties of the EPDS when used in this context, or of other existing mental health scales, such as Strong Souls [47] or the Here and Now Aboriginal Assessment (HANAA) [48], which have been developed

for Indigenous adults but have not been applied to the perinatal context.

In summary, there is no doubt that the EPDS is the most commonly used screening tool in the perinatal period [49]. However, there is currently no evidence to support its use with Indigenous Australian women. Given the presence of complex and intergenerational risk factors, an *effective* perinatal mental health screening process is a public health priority that will save lives and families.

Conclusion

A premium should be placed on addressing this evidence-gap. It seems that a tripartite approach is warranted that focuses on: (i) evaluating the EPDS in context (ii) evaluating other Indigenous mental health screeners when applied to the perinatal period and (iii) beginning the longer-term task of designing a more suitable instrument in collaboration with Indigenous communities themselves. This process should be informed by a co-design with Indigenous women and midwives and reflective of the importance of a contextualised, culturally safe instrument to support women in distress at this most vulnerable of times.

Funding

None declared.

Ethical statement

Ethics Committee Approval not required. No humans or animals were directly involved in this research.

Conflict of interest

None declared.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.wombi.2020.02.007>.

References

- [1] Austin M-P, Highet N, the Expert Working Group, Mental Health Care in the Perinatal Period: Australian Clinical Practice Guideline, Centre of Perinatal Excellence, Melbourne, 2017.
- [2] F. Lima, C. Shepherd, J. Wong, M. O'Donnell, R. Marriott, Trends in mental health related contacts among mothers of Aboriginal children in Western Australia (1990–2013): a linked data population-based cohort study of over 40,000 children, *BMJ Open* 9 (7) (2019) e027733, doi:<http://dx.doi.org/10.1136/bmjopen-2018-027733>.
- [3] A.R. Duffy, D.L. Schminkey, M.W. Groer, M. Shelton, S. Dutra, Comparison of hair cortisol levels and perceived stress in mothers who deliver at preterm and term, *Biol. Res. Nurs.* 20 (3) (2018) 292–299, doi:<http://dx.doi.org/10.1177/1099800418758952>.
- [4] S.J. Cherak, G.F. Giesbrecht, A. Metcalfe, P.E. Ronksley, M.E. Malebranche, The effect of gestational period on the association between maternal prenatal salivary cortisol and birth weight: a systematic review and meta-analysis, *Psychoneuroendocrinology* 94 (2018) 49–62, doi:<http://dx.doi.org/10.1016/j.psyneuen.2018.04.023>.
- [5] H.A. Frey, M.A. Klebanoff, The epidemiology, etiology, and costs of preterm birth, *Seminars in Fetal and Neonatal Medicine*, 21(2015; 2016), pp. 68–73, doi:<http://dx.doi.org/10.1016/j.siny.2015.12.011>.
- [6] A. Lundequist, B. Bohm, H. Lagercrantz, H. Forsberg, A. Smedler, Cognitive outcome varies in adolescents born preterm, depending on gestational age, intrauterine growth and neonatal complications, *Acta Paediatr.* 104 (3) (2015) 292 (Oslo, Norway : 1992).
- [7] D. Barthel, L. Kriston, D. Fordjour, Y. Mohammed, E.D. Kra-Yao, C.E. Bony Kotchi, on behalf of the International CDS Study Group, Trajectories of maternal ante- and postpartum depressive symptoms and their association with child- and mother-related characteristics in a west african birth cohort study, *PLoS One* 12 (11) (2017) e0187267, doi:<http://dx.doi.org/10.1371/journal.pone.0187267>.

- [8] M. Austin, L. Tully, G. Parker, Examining the relationship between antenatal anxiety and postnatal depression, *J. Affect. Disord.* 101 (1) (2007) 169–174, doi: <http://dx.doi.org/10.1016/j.jad.2006.11.015>.
- [9] S. Myers, S.E. Johns, Postnatal depression is associated with detrimental life-long and multi-generational impacts on relationship quality, *PeerJ* 6 (2018) e4305, doi: <http://dx.doi.org/10.7717/peerj.4305>.
- [10] L. Beestin, S. Hugh-Jones, B. Gough, The impact of maternal postnatal depression on men and their ways of fathering: an interpretative phenomenological analysis, *Psychol. Health* 29 (6) (2014) 717–735, doi: <http://dx.doi.org/10.1080/08870446.2014.885523>.
- [11] K. Parsons, S. Young, J. Tamsen, T. Rochat, M. Kringelbach, A. Stein, Postnatal depression and its effects on child development: a review of evidence from low- and middle-income countries, *Br. Med. Bull.* 101 (1) (2012) 57–79 1 March 2012.
- [12] C. Thompson, Examining the impact of anxiety on preterm birth, *Ky. Nurse* 62 (4) (2014) 6. Retrieved on 2nd May 2015 from <https://search-proquest-com.libproxy.murdoch.edu.au/docview/1615294521?pq-origsite=summon&accountid=12629&selectids=10000039100698510000155>.
- [13] J. Posner, J. Cha, A.K. Roy, B.S. Peterson, R. Bansal, H.C. Gustafsson, C. Monk, Alterations in amygdala–prefrontal circuits in infants exposed to prenatal maternal depression, *Transl. Psychiatry* 6 (11) (2016) e935, doi: <http://dx.doi.org/10.1038/tp.2016.146>.
- [14] N.A. Strobel, A. Richardson, C.C.J. Shepherd, K.E. McAuley, R. Marriott, K.M. Edmond, D.R. McAullay, Modelling factors for aboriginal and torres strait islander child neurodevelopment outcomes: a latent class analysis, *Paediatr. Perinat. Epidemiol.* (2019), doi: <http://dx.doi.org/10.1111/ppe.12616>.
- [15] D. Hay, C. Waters, O. Perra, N. Swift, V. Kairis, R. Phillips, S. Goosen, Precursors to aggression are evident by 6 months of age, *Dev. Sci.* 17 (3) (2014) 471–480, doi: <http://dx.doi.org/10.1111/desc.12133>.
- [16] R.N. Davis, M.M. Davis, G.L. Freed, S.J. Clark, Fathers' depression related to positive and negative parenting behaviors with 1-year-old children, *Pediatrics* 127 (4) (2011) 612.
- [17] T. Verbeek, C. Bockting, M. van Pampus, J. Ormel, J. Meijer, C. Hartmen, H. Burger, Postpartum depression predicts offspring mental health problems in adolescence independently of parental lifetime psychopathology, *J. Affect. Disord.* 136 (3) (2012) 948±54.
- [18] Australian Bureau of Statistics, Deaths, Australia, 2013 Cat. No. 3302.0, (2014).
- [19] Australian Institute of Health and Welfare, Australia's Welfare 2017 Australia's welfare series no. 13. AUS 214, AIHW, Canberra, 2017.
- [20] P. Surkan, S. Patel, Preventing infant and child morbidity and mortality due to maternal depression, *Best Pract. Res. Clin. Obstet. Gynaecol.* 33 (2016) 156–168, doi: <http://dx.doi.org/10.1016/j.bpobgyn.2016.05.007>.
- [21] M. O'Donnell, S. Taplin, R. Marriott, F. Stanley, Infant removals: the need to address the over-representation of Aboriginal infants and community concerns of another 'stolen generation', *Child Abuse Negl.* 90 (2019) 88–98, doi: <http://dx.doi.org/10.1016/j.chiabu.2019.01.017>.
- [22] Australian Bureau of Statistics & Australian Institute of Health and Welfare, The Health and Welfare of Australia's Aboriginal and Torres Strait Islander Peoples 2008, AIHW, Canberra, 2008 2008. Report No.: IHW 21. <http://www.aihw.gov.au/publication-detail/?id=6442468085> (Accessed 25 May 2012).
- [23] D. Weetra, K. Glover, M. Buckskin, J.A. Kit, C. Leane, A. Mitchell, S.J. Brown, Stressful events, social health issues and psychological distress in aboriginal women having a baby in South Australia: implications for antenatal care, *BMC Pregnancy Childbirth* 16 (89) (2016) 88, doi: <http://dx.doi.org/10.1186/s12884-016-0867-2>.
- [24] Australian Indigenous HealthInfoNet, Summary of Aboriginal and Torres Strait Islander Health Status 2018, Australian Indigenous HealthInfoNet, Perth, WA, 2019.
- [25] K. Gausia, S. Thompson, T. Nagel, A. Rumbold, C. Connors, V. Matthews, R. Bailie, Antenatal emotional wellbeing screening in Aboriginal and Torres Strait Islander primary health care services in Australia, *Contemp. Nurse* 46 (1) (2013) 73–82, doi: <http://dx.doi.org/10.5172/conu.2013.46.1.73>.
- [26] Porter San Martin, A. Macarena, K. Betts, S. Kisely, G. Pecoraro, R. Alati, Screening for perinatal depression and predictors of underscreening: findings of the born in queensland study, *Med. J. Aust.* 210 (1) (2019) 32–37, doi: <http://dx.doi.org/10.5694/mja2.12030>.
- [27] J. Cox, Use and misuse of the edinburgh postnatal depression scale (EPDS): a ten point 'survival analysis', *Arch. Womens Ment. Health* 20 (6) (2017) 789–790, doi: <http://dx.doi.org/10.1007/s00737-017-0789-7>.
- [28] A. Cooke, D. Smith, A. Booth, Beyond PICO: the SPIDER tool for qualitative evidence synthesis, *Qual. Health Res.* 22 (10) (2012) 1435–1443, doi: <http://dx.doi.org/10.1177/1049732312452938>.
- [29] C. Schardt, M.B. Adams, T. Owens, S. Keitz, P. Fontelo, Utilization of the PICO framework to improve searching PubMed for clinical questions, *BMC Med. Inform. Decis. Mak.* 7 (1) (2007) 16, doi: <http://dx.doi.org/10.1186/1472-6947-7-16>.
- [30] D. O'Connor, S. Green, J.P.T. Higgins, Defining the review question and developing criteria for including studies, in: J.P.T. Higgins, S. Green (Eds.), *Cochrane Handbook for Systematic Reviews of Interventions*, 2008. Retrieved from www.cochrane-handbook.org.
- [31] A. Liberati, D. Altman, J. Tetzlaff, C. Mulrow, P. Gøtzsche, J. Ioannidis, D. Moher, The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration, *BMJ* (2009), doi: <http://dx.doi.org/10.1136/bmj.b2700> (Clinical Research Ed.), 339(2009), b2700–b2700.
- [32] A. Campbell, B. Hayes, B. Buckby, Aboriginal and torres strait islander women's experience when interacting with the edinburgh postnatal depression scale: a brief note, *Aust. J. Rural Health* 16 (3) (2008) 124–131, doi: <http://dx.doi.org/10.1111/j.1440-1584.2007.00930.x>.
- [33] J. Kotz, A. Munns, R. Marriott, J.V. Marley, Perinatal depression and screening among Aboriginal Australians in the Kimberley, *Contemp. Nurse* 52 (1) (2016) 42–58, doi: <http://dx.doi.org/10.1080/10376178.2016.1198710>.
- [34] C. Chapple, Translating the Edinburgh postnatal depression scale into language: improving perinatal mental health literacy in remote aboriginal communities in the NT, 2011 marcé Conference, Perth: perinatal mental health across the spectrum, MARCE Conference Proceedings: Perinatal Mental Health Across the Spectrum: Causes, Consequences, Context and Care, Fremantle, WA, 2011, pp. 16.
- [35] J.C. Andrews, H.J. Schünemann, A.D. Oxman, K. Pottie, J.J. Meerpohl, P.A. Coello, G. Guyatt, GRADE guidelines: 15. going from evidence to recommendation—determinants of a recommendation's direction and strength, *J. Clin. Epidemiol.* 66 (7) (2013) 726–735, doi: <http://dx.doi.org/10.1016/j.jclinepi.2013.02.003>.
- [36] J. Marley, J. Kotz, C. Engelke, M. Williams, D. Stephen, S. Coutinho, S. Trust, Validity and acceptability of Kimberley mum's mood scale to screen for perinatal anxiety and depression in remote Aboriginal health care settings, *PLoS One* 12 (1) (2017) e0168969, doi: <http://dx.doi.org/10.1371/journal.pone.0168969>.
- [37] J. Kotz, A. Pratt, M. Williams, Developing a kimberley version of the edinburgh postnatal depression scale for aboriginal women in the kimberley, MARCE Conference Proceedings: Perinatal Mental Health Across the Spectrum: Causes, Consequences, Context and Care, Fremantle, WA, 2011, pp. 27.
- [38] B.D. Thombs, A. Benedetti, L.A. Kloda, B. Levis, K.E. Riehm, M. Azar, S. Vigod, Diagnostic accuracy of the edinburgh postnatal depression scale (EPDS) for detecting major depression in pregnant and postnatal women: protocol for a systematic review and individual patient data meta-analyses, *BMJ Open* 5 (10) (2015) e009742, doi: <http://dx.doi.org/10.1136/bmjopen-2015-009742>.
- [39] S.D. Shrestha, R. Pradhan, T.D. Tran, R.C. Gualano, J.R.W. Fisher, Reliability and validity of the Edinburgh postnatal depression scale (EPDS) for detecting perinatal common mental disorders (PCMDs) among women in low- and lower-middle-income countries: a systematic review, *BMC Pregnancy Childbirth* 16 (72) (2016) 72, doi: <http://dx.doi.org/10.1186/s12884-016-0859-2>.
- [40] Department of Health, Clinical Practice Guidelines: Pregnancy Care, Australian Government Department of Health, Canberra, 2018.
- [41] FSH Obstetrics and Gynaecology and Women, Children and Newborn Services, Antenatal Shared Care Guidelines for General Practitioners, Obstetrics and Gynaecology and Women, Children and Newborn Services, Fiona Stanley Hospital, Murdoch, WA, 2016.
- [42] Department of Health Western Australia, Clinical Practice Guidelines, Antenatal Care Schedule. Women and Newborn Health Service, King Edward Memorial Hospital Obstetrics & Gynaecology North Metroprolitan Health Service, (2016) , pp. 8.
- [43] E. Hunter, 'best intentions' lives on: untoward health outcomes of some contemporary initiatives in indigenous affairs, *Aust. N. Z. J. Psychiatry* 36 (5) (2002) 575–584, doi: <http://dx.doi.org/10.1046/j.1440-1614.2001.01040.x>.
- [44] S. Messick, Foundations of validity: meaning and consequences in psychological assessment, *Ets Res. Rep. Ser.* 1993 (2) (1993), doi: <http://dx.doi.org/10.1002/j.2333-8504.1993.tb01562.x> i-18.
- [45] M. Hutchinson, A. Joyce, Western Australia's Mothers and Babies, 2013: 31st Annual Report of the Western Australian Midwives' Notification System, Department of Health, Western Australia, 2016.
- [46] F.M. Cheung, ITC test adaptation guidelines, *Int. J. Psychol.* 51 (2016) 937.
- [47] A. Thomas, S. Cairney, W. Gunthorpe, Y. Paradies, S. Sayers, Strong souls: development and validation of a culturally appropriate tool for assessment of social and emotional well-being in indigenous youth, *Aust. N. Z. J. Psychiatry* 44 (1) (2010) 40–48, doi: <http://dx.doi.org/10.3109/00048670903393589>.
- [48] A. Janca, Z. Lyons, S. Balaratnasingam, D. Parfitt, S. Davison, J. Laugharne, Here and now Aboriginal assessment: background, development and preliminary evaluation of a culturally appropriate screening tool, *Australas. Psychiatry* 23 (3) (2015) 287–292, doi: <http://dx.doi.org/10.1177/1039856215584514>.
- [49] J. Cox, J. Holden, R. Sagovsky, Detection of postnatal depression. Development of the 10-item edinburgh post-natal depression scale, *Br. J. Psychiatry* 150 (1987) 782–786 1987.
- [50] G. Groth-Marnat, *Handbook of Psychological Assessment*, fifth ed., John Wiley & Sons Inc., Hoboken New Jersey, United State, 2009 ISBN: 978-0-4-70-08358-1.
- [51] E. Langham, J. McCalman, V. Matthews, R.G. Bainbridge, B. Nattabi, I. Kinchin, R. Bailie, Social and emotional wellbeing screening for aboriginal and torres strait islanders within primary health care: a series of missed opportunities? *Front. Public Health* 5 (2017) 159, doi: <http://dx.doi.org/10.3389/fpubh.2017.00159>.