

ARTICLE



Mental health in pregnancy complicated by fetal anomaly: depression screening and referrals in a single fetal care center

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OBJECTIVE: To quantify depression screening rates in a fetal care center, identify characteristics associated with screenings and identify mental health referral uptake rates

STUDY DESIGN: This retrospective cohort study of 166 patients in a single fetal care center investigated patients screened during pregnancy with the Edinburgh Postnatal Depression Scale

RESULTS: Patients screened positive for depression at a rate of 31.9% using 10 as the cut-off score at their first mental health consult following diagnosis. Patients with a prior mental health diagnosis and lacked insurance or had state insurance were more likely to screen positive. Additionally, patients were more likely to screen positive with a severe fetal diagnosis or uncertain fetal prognosis. Patients were likely to accept a referral for therapy; fewer accepted a referral for pharmacotherapy

CONCLUSION: Fetal care center patients are at risk of depressed mood and may be identified through universal screening. Particular attention should be provided to patients with an uncertain fetal prognosis and other identified characteristics.

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INTRODUCTION

Diagnosis of fetal anomaly during pregnancy is a significant and stressful life event that causes shock and emotional distress for pregnant patients [1–3]. Following fetal anomaly diagnosis, prenatal care fundamentally differs from that of uncomplicated pregnancy. These patients are often referred to specialized fetal care centers (FCCs), which differ from traditional prenatal care [4, 5]. Care in an FCC provides benefits to patients in the form of emotional support, coordination, delivery planning, multidisciplinary care and education which is thought to positively impact patient stress and mental health [6]. However, FCC care is also associated with additional secondary and unintended stressors including the need for patients to travel additional distance for their care in these specialized centers and the impact on employment, transportation, childcare and lodging, each of which has an influence on mental health [6, 7].

Leading healthcare organizations, including The American College of Obstetrics and Gynecology, the American Academy of Pediatrics, and Postpartum Support International, recommend universal prenatal and postpartum depression screening [8]. Nonetheless, depression screening is not universally implemented in obstetric care [9, 10]. Therefore, it is crucial for fetal care centers and healthcare professionals to screen pregnant individuals for depression following entry into a FCC and offer behavioral health services or referrals to patients during pregnancy with fetal anomaly, especially for patients who screen positive for depression. Patients with pregnancies complicated by fetal anomalies screen positive for depression more frequently than the general pregnant population, likely due to the detrimental effects of stress on perinatal mental health [3]. Evidence

suggests severity or uncertainty of fetal anomaly prognosis may impact mental health [11–13]. However, the impact of a fetal anomaly diagnosis on depression during pregnancy remains largely unknown. Mental health support is limited in many centers and communities, making it critical to identify variables associated with increased risk for depression in this population, as well as what mental health support is accepted by these patients [14, 15]. Though initial diagnosis of a fetal anomaly is emotionally traumatic, little is known about the impact of a fetal anomaly diagnosis on a pregnant person's mental health following transfer to an FCC. The potential role of an FCC in patient mental health, in addition to clinical care, warrants further exploration [16–18]. Furthermore, understanding the utilization of mental health referrals and care within this demographic is critical to gain insight into these patients' needs and preferences [19, 20].

We sought to identify the occurrence of depression screening rates in expectant patients at a FCC, where care is exclusively provided for pregnancies complicated by a fetal anomaly diagnosis. Improved understanding of how pregnant patients diagnosed with a fetal anomaly compare to general pregnant population for depression screening and risk factors/utilization patterns for available mental health services will support better care quality for these vulnerable patients.

MATERIALS AND METHODS

This manuscript presents a retrospective cohort study of routine perinatal depression screening for pregnant patients who received care at the Children's Mercy Kansas City Fetal Health Center between March 2019 and

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March 2020. The Fetal Health Center provides outpatient prenatal care, multidisciplinary fetal care, and postpartum care, and an inpatient labor and delivery unit connected to the Neonatal Intensive Care Unit.

Data

Depression screening tool. As part of a department decision to adhere to best practice guidelines for pregnancy, all Fetal Health Center patients seen during the study period of March 2019–March 2020 underwent standardized depression screening. Each screening was performed and scored by licensed social workers and utilized the Edinburgh Postnatal Depression Scale (EPDS) [21]. The EPDS is the most used depression and anxiety self-report measure in the perinatal period and has been validated for use in pregnancy as well as postpartum [22]. It includes 10 multiple choice questions, the last of which screens for suicidality. It has a total score possibility of 0–30, with responses on each individual question ranging from zero to three. Higher scores indicate greater presence of depression and anxiety symptoms in the past two weeks [21, 23].

Screenings occurred at or after the second appointment to the Fetal Health Center, after patients had transferred care. This screening timeframe was chosen because the first visit to the fetal care center is often hectic and overwhelming for new patients and includes confirmation of - or new information on - fetal diagnosis, which could also affect screening response [1, 24]. Efforts were made to screen all patients during the timeframe, inclusive of age and language. In rare cases, however, patients' first screening did not occur antenatally; these patients were excluded from this study. Additionally, in cases where patients had multiple prenatal screenings, only the initial screening value was used to minimize latent bias from patients where patients were rescreened due to elevated concern.

Response to positive screening: While all patients received a routine psychosocial assessment and verbal and written perinatal mental health education, those with an EPDS score of 10 or more (validated clinical cut-off for depression) then met with the social worker for further clinical assessment, recommendations and potential mental health referrals [25]. The social worker reviewed the screening findings with each patient, assessing further mental health needs, and offered referrals for mental health care. Mental health care options included referrals for therapy or pharmacotherapy referrals in the fetal care center or in the patient's local community, dependent upon clinical impression and patient preference.

Demographic and clinical data. Several demographic and clinical factors were extracted from patients' medical records. Linked to the screening data, data collected from the electronic medical record during depression screening included individual fetal diagnosis, gestational age at time of screening, number of pregnancies and living children, referral acceptance to mental health services, and pre-existing mental health diagnosis.

Next, a secondary set of patient-level data were extracted retrospectively from the medical record. These included demographic characteristics such as a patient's age, race, insurance status, marital status, and primary language. Elements of patient's clinical history including use of assisted reproductive technology as a proxy for infertility, and a set of social factors based on patient's geocoded home address using the DeGAUSS Geomarker tool, including drive-time to the fetal care center and a community deprivation index based on the 2018 American Community Survey [26].

Finally, a derived fetal prognosis score was computed for each patient. The prognostic stratification was developed by one of the study authors, a neonatologist, and utilized in previous studies of FCC counseling and outcomes [27, 28]. The score was assigned to each patient based on qualitative review of the medical record documentation for neonatal consultation in the fetal care center. Prognosis was stratified into the following categories: likely to survive (LS), uncertain but likely to survive (UL), uncertain with no qualifiers (UQ), uncertain and unlikely to survive (UU), and not survivable (NS).

Statistical analysis. In addition to descriptive assessments of depression rates and referral utilization in the fetal anomaly population, the magnitude and direction of associations between EPDS screening scores and patient characteristics were analyzed through a series of multiple logistic regressions. First, to robustly assess factors associated with a positive depression screening, two series of models were run classifying patients as depressed using two levels of EPDS screening scores. Initially utilizing the standard clinical EPDS screening score cutoff (≥ 10), and then

again at ≥ 13 , a secondary threshold commonly found in depression literature [29]. All models were adjusted for patient age, as it represents a known confounder for depression (inversely related to likelihood of depression). However, given total sample size, independent models were run for each additional covariate. In line with recent statistical literature advocating for the consideration of p -values as a continuous probability of true difference, we evaluate all associations at three levels of confidence (99%, 95%, and 90%, corresponding to $\alpha < 0.01$, $\alpha < 0.05$, $\alpha < 0.1$ respectively).

Second, in the subset of patients with positive screenings, the same procedure is used to study the association of patient characteristics and acceptance of social work referrals for (a) pharmacotherapy and (b) counseling. Acceptance of each referral type was modeled independently, and the analysis replicated to identify positive depression screening at both threshold levels. All data processing and analysis was performed utilizing SAS 9.4.

RESULTS

During the one-year study period, 190 patients diagnosed with a fetal anomaly underwent screening. However, 24 patients were not screened during the antepartum period and were subsequently excluded, resulting in an analysis cohort of 166 patients, constituting 87% of individuals screened. This cohort comprised patients predominantly of white ethnicity (76.33%), followed by Black (11.24%), Hispanic (7.69%), Multiracial (1.78%), American Indian (1.18%), Asian (1.18%) and other (.59%). The mean EPDS score in the cohort was 7.84, with notable variability among patients with a standard deviation of 4.99, and an interquartile range of 4–11. Four patients recorded a minimum score of 0, while three patients recorded scores exceeding 20, with the maximum EPDS score of 23 in the cohort. In total, 53 patients (31.9%) screened positive for depression prenatally using the EPDS cut-off of 10, while 29 patients screened positive using the more stringent cut-off of 13 (17.5%). An overview of demographics and clinical profiles for the cohort can be found in Table 1.

Results indicated a history of prior mental health diagnosis was positively associated with positive screening on the EPDS across both depression thresholds and at all confidence levels. Additionally, insurance was found to be associated with depression at the current clinical threshold (≥ 10). Post-hoc analysis for state vs. commercial and self-pay vs other insurance indicated both to have an association, with increased odds of depression for state insurance ($p = 0.017$), and decreased odds for self-pay patients ($p = 0.013$). While we find weak associations to pregnancy gravity, we do not find similar relationships to other factors often link to pregnancy anxiety such as a first pregnancy (Table 2).

Moving next to infant conditions, we note a strong and consistent association to prognostic score. First, patients screened positive (≥ 10) with a fetal prognosis coded as "unlikely to survive" more frequently, when compared to patients with a "likely to survive" prognosis ($p = 0.002$). Patients whose fetal prognosis was categorized as "uncertain with no qualifiers" were also more likely to screen positive for depression ($p = 0.006$); in contrast, patients with an "uncertain but unlikely" to survive fetal prognosis were not found to have increased chance of positive depression screening when compared to those with likely survival. Looking to diagnoses underlying this score, we are unfortunately unable to gain much insight into differences between conditions, finding extremely wide confidence intervals and general lack of association direction or magnitude, likely driven by the low sample sizes of any a given.

Finally, within the cohort of patients who screened positive for depression, individuals were likely to accept a counseling referral, with 74% ($n = 35$) of patients with a score ≥ 10 and 93% ($n = 27$) of patients with a score ≥ 13 accepting the referral. Patients were far less likely to accept a referral for pharmacotherapy, with 17% of patients with a score ≥ 10 and 24% of patients with a score ≥ 13 participating. Given the limited cohort size of accepted referrals,

Table 1. Cohort sociodemographic and clinical profile.

(n =)		EPDS ≥ 10	
		No (113)	Yes (53)
Patient socio-demographics	Age, mean (SD)	29.69 (6.63)	27.55 (7.33)
	Gestational Age, mean (SD)	30.30 (4.83)	29.11 (4.25)
	Race, n (%)		
	White	78 (69.03)	33 (62.26)
	Black	9 (7.96)	8 (15.09)
	Hispanic	6 (5.31)	7 (13.21)
	Other	7 (6.19)	1 (1.89)
	Unknown	13 (11.50)	4 (7.55)
	Insurance, n (%)		
	Commercial	77 (68.14)	25 (47.17)
	Self-pay	7 (6.19)	1 (1.89)
	State	27 (23.89)	26 (49.06)
	Unknown	2 (1.77)	1 (1.89)
	English primary language, n (%)	109 (96.46)	47 (88.68)
	Gravidity, mean (SD)	2.69 (2.01)	2.70 (1.88)
Fetal conditions	Prior mental health Dx, n (%)	20 (17.70)	26 (49.06)
	Drive time >1 hr, n (%)	57 (51.82)	30 (57.69)
	Deprivation Index, mean (SD)	0.32 (0.11)	0.37 (0.13)
	Fetal prognostic stratification, n (%)		
	↓ Severity		
	Likely survival	44 (38.94)	9 (16.98)
	Uncertain and likely	27 (23.89)	10 (18.87)
	Unknown/no qualifier	20 (17.70)	17 (32.08)
	Unknown and unlikely	15 (13.27)	6 (11.32)
	Not survivable	7 (6.19)	11 (20.75)
	Spina bifida, n (%)	3 (2.65)	2 (3.77)
	Heart, n (%)	45 (39.82)	21 (39.62)
	Genetic, n (%)	10 (8.85)	7 (13.21)
	Congenital diaphragmatic hernia, n (%)	3 (2.65)	2 (3.77)
	Lower urinary tract obstruction, n (%)	3 (2.65)	0 (0)
	Renal, n (%)	5 (4.42)	3 (5.66)
	Abdominal wall, n (%)	6 (5.31)	4 (7.55)
	Brain, n (%)	4 (3.54)	4 (7.55)
	Congenital pulmonary airway malformation, n (%)	8 (7.08)	2 (3.77)

Turning to the risk factor analysis, we note several clinical and social factors associated with an increased odds of positive depression screening (Table 2).

associations of various demographic, clinical and social factors to referral acceptance of counseling and medication tended to be less certain with large confidence bounds. We observed a weak association of patients who were more likely to accept a counseling referral when they were in their first pregnancy ($p = 0.055$) or had a history of infertility ($p = 0.055$).

DISCUSSION

In this study, we aimed to assess the influence of a fetal anomaly diagnosis on symptoms of depression during pregnancy following transfer to a fetal care center. Our findings indicate a substantial prevalence of positive depression screenings among pregnancies complicated by fetal anomaly, with 31.9% of patients in this cohort screening positive for depression. This rate is nearly twice as high as the prevalence noted across all pregnancies [30]. These findings add to the growing body of research demonstrating the

profound influence of a fetal anomaly diagnosis on the mental well-being of pregnant individuals [31, 32]. Our findings also identify patient characteristics associated with a positive depression screen including a history of mental health diagnosis in nearly 50% of patients, lack of insurance or state-based insurance, and severe or uncertain fetal prognosis. Patients in our cohort who screened positive for depression were likely to accept a referral for therapy, suggesting that therapy is a feasible and acceptable treatment option for patients in an FCC.

Studies on depression screening rates in pregnancy with fetal anomaly vary widely from 21% to 72%, with the highest rates associated with screening immediately following diagnosis [12, 32, 33]. The prevalence identified in this study is more consistent in studies with a similar screening timeframe to ours that also used the EPDS, with a range of 21% to 26% [1, 7]. Screening following patient entry into a fetal care center at the second visit or after may indicate a more accurate depiction of

Table 2. Factors associated with positive depression screening in FCC.

		EPDS ≥ 10			EPDS ≥ 13		
		OR	95% CI	p-value	OR	95% CI	p-value
<i>Patient socio-demographics</i>	Gestational age	0.96	0.89–1.03	0.244	0.88	0.80–0.96	0.006
	Race/Ethnicity			0.192			0.290
	Black vs White						
	Hispanic vs White						
	Other vs White						
	Insurance State vs. (Commercial + Self)	2.82	1.36–5.82	0.005	2.46	1.02–5.90	0.044
	English primary language	0.23	0.06–0.91	0.037	0.72	0.14–3.80	0.703
	Gravidity	1.09	0.91–1.31	0.365	1.21	0.97–1.51	0.095
	Prior mental health diagnosis	4.22	2.03–8.75	<0.001	5.88	2.47–13.99	<0.001
	Drive an hour or more	1.21	0.62–2.37	0.578	1.73	0.74–4.03	0.208
<i>Fetal conditions</i>	Deprivation index	19.43	1.10–341.91	0.043	23.31	0.77–705.32	0.070
	Prognostic stratification			0.007			0.091
	Likely survival	Reference					
	Uncertain and likely	1.85	0.66–5.18	0.241			
	Unknown/no qualifiers	4.23	1.60–11.21	0.004			
	Unknown and unlikely	1.88	0.57–6.24	0.301			
	Not survivable	7.10	2.14–23.53	0.001			

depression and anxiety symptoms, as patients are often in shock and at their highest level of distress immediately following diagnosis [13, 34]. Future research should investigate the benefits of standardization on timing of screening and screening tools for patients in FCCs [31].

Our findings identified patient characteristics during pregnancy with fetal anomaly that heighten risk for positive depression screening. We inferred that patients who were self-pay for insurance when they were screened early in their care were largely composed of patients who applied for but were not yet accepted for state-based insurance, or patients unable to access insurance due to their citizenship status. Prior mental health history and low socioeconomic status are known risk factors for perinatal mood and anxiety disorders [35], and the association in this study indicates that these are risk factors during pregnancy with fetal anomaly as well [7, 24, 36]. Similarly, the association with younger age and positive depression screening in our study is consistent with previous studies by Cole et al. [1] and Mehl et al. [36] and is corroborated in the general antenatal population [35].

Patients in our study with a fetal prognosis expected to be non-survivable were more likely to screen positive for depression, adding to the evidence on this finding [1]. Based on theoretical models of stress and coping, it is expected that patients will struggle more emotionally and experience greater distress with a poorer diagnosis [37, 38]. Patients with fetal prognostic uncertainty were as likely to screen positive for depression as patients with a prognosis that was non-survivable - and more likely to screen positive than patients with a poor prognosis for survival that carried more certainty. These were patients with fetal diagnoses that had little clarity on a wide spectrum of whether a baby would survive at birth, need aggressive medical management, or survive and have complex ongoing medical needs. This is a unique finding which indicates that uncertainty plays a substantial role in mental health during pregnancy with fetal anomaly; a previous study found that uncertain fetal prognosis was associated with elevated traumatic stress, but not depression [13]. This finding could help shape how fetal prognostic discussions are framed to support perinatal mental health, even amidst the real presence of uncertainty.

Uncertainty with fetal prognosis presents a broad spectrum of possible outcomes and limits control or anticipatory decision-making opportunities for neonatal delivery room management [13, 39]. More research to understand the impact of uncertainty perception on prenatal mental health and its continuation into parenting during the NICU admission is warranted, given the crucial role of perinatal mental health on maternal/child health outcomes [40, 41]. Coping is known to play a prominent role in managing the emotional distress of a fetal anomaly diagnosis [42, 43]; however, understanding how coping mechanisms are employed to navigate uncertainty in a manner that positively influences mental health remains unknown [44, 45]. Future research prioritizing the identification of effective coping strategies and other interventions aimed at alleviating the distress associated with prognostic uncertainty, as well as how clinicians can communicate uncertainty effectively and empathetically is greatly needed.

Limitations

Limitations included the small sample size over a defined time at one fetal care center, which limits generalizability. Patients receiving care in FCCs are a small portion of the prenatal population, however, and it is noteworthy that this sample size is considerable given the limited availability of this population at any one center. The retrospective design limits the information we can add to population characteristics to what is documented already in the electronic medical record only. Additionally, this study is limited to positive screening for depression, which indicates a threshold of symptoms, not a clinical diagnosis of depression.

CONCLUSION

Patients who experience a fetal anomaly diagnosis during pregnancy are at high risk for depressed mood. Associated risk factors for this population include patient mental health history, having state-based or no insurance, and having a severe or uncertain fetal prognosis. Patients who screen positive are likely to accept a counseling referral but are unlikely to accept a pharmacotherapy referral unless they have a mental health

history. Future research is needed with a larger sample size from multiple, diverse sites, and a prospective design. Future research should also consider the influence of integrated mental healthcare in FCCs, compared to FCCs that strictly refer patients to other centers for mental health support.

DATA AVAILABILITY

Given their sensitive nature, the data analyzed during the current study are not publicly available. The data may be shared on reasonable request to the corresponding author but note such requests may need separate approval by the Children's Mercy Kansas City Institutional Review Board.

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AUTHOR CONTRIBUTIONS

KH, KF and SK contributed to study conception. KH, KF, and SK designed the study and interpreted the data. KH, KF, and AS analyzed the data. KH, KF, and SK acquired the data and drafted the manuscript. KH, KF, AS, and SK interpreted the data. All authors revised the manuscript.

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COMPETING INTERESTS

The authors declare no competing interests.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by the CMKC Institutional Review Board (protocol #00002636) and determined to be exempt as it posed minimal risk; a waiver of consent was granted. This study was conducted in accordance with the Declaration of Helsinki.

ADDITIONAL INFORMATION

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