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ORIGINAL PAPER

Pregnancy Complications Among Resettled Refugees in Illinois

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Abstract
Newly resettled refugee populations often have significant health care needs including pregnancy complications; yet research is lacking on pregnancy complications among refugees in Illinois. This was a retrospective analysis of the 2016–2017 hospital discharge data of refugee women of childbearing age (15–44 years) in Illinois. There were 3,355 hospital encounters by refugee women in our analysis, and 19.1% (n = 640) were associated with complications mainly related to pregnancy. The majority of hospital encounters associated with complications mainly related to pregnancy occurred after the first 8 months of US arrival (85.2%) and were among women who had Medicaid insurance (90.3%), ≥ 5 hospital encounters (60.2%), and who were most commonly from Iraq (23.3%) or Burma (19.4%). Refugee women may benefit from increased awareness and education about prenatal care, support in access, and prompt referrals.

Keywords Refugee · Pregnancy · Pregnancy complications · Maternal morbidity

Introduction

Newly resettled refugee populations often have significant health care needs due to many years spent in refugee camps and other settings where limited health services were available [1]. After US arrival, refugees are eligible for resettlement and health care benefits, which include a short-term health insurance that can help cover the cost of some health care services [2]. In Illinois, most refugees are eligible for Medicaid soon after arrival. Refugees are able to maintain Medicaid coverage until they no longer meet financial and nonfinancial eligibility criteria [2]. For newly-arrived refugees Refugee Medical Assistance, which is a short-term medical assistance that is available for up to eight months from the date of arrival in the United States is available [3]. Other potential sources of health coverage include employer-sponsored health insurance plans or medical plans purchased via the Health Insurance Marketplace. Between January 2016 and December 2017, the demographics of refugees arriving to Illinois were 48% female and 42% were children aged zero to seventeen [4]. The newcomers came from over 40 different countries with the top five being Syria, Burma, Iraq, Congo (Democratic Republic) and Afghanistan. Over 50% were resettled in the city of Chicago with other top cities of settlement occurring in Rockford, Skokie, Moline, and Aurora [4].

A few studies have reported that refugees identify a greater need for health care services after resettlement than other non-refugee and immigrant populations [5–7]. Reduced access to health care services after resettlement have contributed to worse health outcomes among refugee populations, including pregnancy complications. Pregnancy complications are health problems that occur during pregnancy and after birth and can involve the health of the mother, the baby, or both. Some women develop health problems during pregnancy, while others have pre-existing health conditions that may lead to complications throughout

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pregnancy [8]. Some of the most common complications in pregnancy include anemia, hypertension, and diabetes [8]. Since the majority of complications are preventable and/or treatable, it is important for pregnant women to receive recommended prenatal care to prevent and/or monitor complications during pregnancy [9, 10].

Describing hospital encounters related to pregnancy complications may help inform interventions and programs to prevent and treat these complications among resettled refugees in the United States. This analysis describes the characteristics of hospital encounters related to complications mainly related to pregnancy among refugee women in Illinois.

Materials and Methods

Data Source and Participants

We analyzed 2016–2017 data from a dataset created by merging the Illinois hospital discharge dataset with Illinois's Refugee Health Assessment Program in Illinois (ReHAPI) data. ReHAPI is a web-based application that collects data on sociodemographic information of refugee populations in Illinois and the results of their domestic medical examination. These examinations are conducted by US clinicians within 90 days of arrival into the United States. The data were merged by conducting deterministic matching on date of birth, last name, and first name of each individual. ReHAPI data provided information about the sociodemographic characteristics including visa status at US arrival and country of origin, and the Illinois hospital discharge data included information on characteristics of hospital encounters and the primary medical diagnoses recorded as *International Classification of Diseases, Tenth Revision* (ICD-10) codes. The dataset, which included data from all years available in ReHAPI was merged with the 2016-17 Illinois discharge dataset and deidentified after matching. Analysis was conducted with the deidentified dataset.

Refugee populations include all refugees and other newcomer populations that are eligible for United States Refugee Assistance Program (USRAP) benefits. These populations include refugees, asylees, and Special Immigrants Visa holders (SIVH). We will refer to all these populations as refugees or refugee populations hereafter. Individuals were included in the analysis if they had at least one hospital encounter during the investigation period. The Illinois Department of Public Health Institutional Review Board and a Centers for Disease Control and Prevention (CDC) Human Subjects Advisor determined the analysis to be non-research and therefore, ethics review by an institutional review board was not required.

Measures

The primary outcome variable in the analysis was hospital encounters (including inpatient admissions and emergency department encounters) due to complications mainly related to pregnancy (yes/no). The Clinical Classifications Software (CCS) for ICD-10, developed by the Healthcare Cost and Utilization Project, was used to analyze primary medical diagnoses [11]. The CCS provides an organized categorization scheme that collapses ICD-10-CM diagnosis codes into a smaller number of clinically meaningful categories [11]. In this analysis, we described primary medical diagnoses of hospital encounters for all resettled refugee populations using CCS level 1 category. CCS level 2 category of 11.3 was used to define hospital encounters related to complications mainly related to pregnancy. CCS level 2 category of 11.3 was also the only category for which data for CCS level 3 category was available, which enabled further characterization of ICD-10 codes. Additional variables included in the analysis included age in years, length of stay (LOS) in days, time from US arrival and hospital encounter, visa status at US arrival, country of origin, payer, number of hospital encounters, visit type, and admission type. We dichotomized time from US arrival and hospital encounter as <8 months and ≥ 8 months, given that 8 months from US arrival is the time when all potential sources of healthcare coverage are available for all newly arrived refugees, including Refugee Medical Assistance.

Statistical Analysis

We described frequency and proportions of hospital encounters overall and demographic and visit characteristics of hospital encounters due to complications mainly related to pregnancy. Analyses were performed using SAS, version 9.4 (SAS Institute).

Results

There were 9,308 hospital encounters from January 2016 to December 2017 among resettled refugees in Illinois. The average number of encounters per refugee was 4.1 encounters (range: 1–27 encounters). The average age of individuals at hospital encounters was 35.9 (SD = 19.1) years, and approximately 60% were female. There were 67 nationalities represented by individuals that had hospital encounters, with the individuals most commonly from Iraq (36%).

For our analysis of hospital encounters related to complications mainly related to pregnancy, we restricted the analysis to refugee women of childbearing age (between 15 and 44 years) per the Illinois Department of Public Health

[12]. This resulted in a final sample size of 3,355 hospital encounters (based on 985 refugee women). The characteristics of hospital encounters among refugee women aged 15–44 years are summarized in Table 1. Of the 3,355 hospital encounters among 985 women, 640 (19.1%) encounters were related to complications mainly related to pregnancy. Overall, the mean age of women at hospital encounters related to complications mainly related to pregnancy was 30.3 ± 5.9 years, the average number of hospital encounters per woman was 4.5 ± 3.6, and the average LOS of the hospital encounters was 2.6 ± 5.0 days. The majority of hospital encounters related to complications mainly related to pregnancy occurred ≥ 8 months after time of US arrival (85.2%) and were among women with refugee visa status (85.2%), from Iraq (23.3%) or Burma (19.4%), who had Medicaid insurance (90.3%), and had ≥ 5 hospital encounters (60.2%). Most of the hospital encounters occurred in the emergency department (85.2%).

Among the 9,308 hospital encounters from January 2016 to December 2017 involving resettled refugees in Illinois, the most common primary medical diagnoses based on CCS level 1 at hospital encounter are presented in Fig. 1. As shown, ill-defined conditions (15%) were the leading primary medical diagnoses followed by complications of pregnancy and childbirth (13%), musculoskeletal system and connective tissue diseases (12%), respiratory system diseases (9%), injury and poisoning (9%), and genitourinary system diseases (8%). For the 3,355 hospital encounters among 985 women aged between 15 and 44 years; among the 165 primary medical diagnoses associated with hospital encounters related to pregnancy complications, the leading complications included threatened abortion (6.4%), post-term pregnancy (4.7%), gestational diabetes (3.9%), and maternal hypertension (3.9%; Table 1). Other medical diagnoses based on CCS level 2 among refugee women aged 15–44 were spondylosis, respiratory infections, diseases of female genital organs, diseases of the urinary system, and non-traumatic joint disorders (data not shown).

Discussion

This analysis examined characteristics of hospital encounters related to complications mainly related to pregnancy of resettled refugee women in Illinois. In this analysis, we found that among refugee women aged 15–44 years, the proportion of hospital encounters associated with complications mainly related to pregnancy was approximately 19%. The majority of the hospital encounters occurred ≥ 8 months after time of US arrival, among refugees who had Medicaid insurance, and the most common nationalities were Iraqi and Burmese. Over three-quarters of the hospital encounters occurred at emergency departments. Apart from complications related to pregnancy, refugee women seek medical care for these diagnoses: respiratory infections, diseases of the urinary system, diseases of the heart, diseases of female genital organs, and non-traumatic joint disorders.

The finding that nearly one in five hospital encounters involved complications mainly related to pregnancy is consistent with previous studies, albeit few, that examined common reasons for utilizing hospital services among resettled refugees [13–16]. A study in Nebraska reported that the most common reason for utilization of emergency departments (9%) and inpatient services (62%) were complications due to pregnancy [13]. Of note, complications related to pregnancy and childbirth were the most common reasons for hospitalization among women 18 to 44 years of age in 2017 in the United States [17]. The data reported for US populations does not report percentage of hospitalizations due to complications related to pregnancy and childbirth, but only provides a rate of inpatient stays (624 per 100,000), thus we are unable to directly compare with the proportions from our data. Even though we were unable to compare our sample population to non-refugee populations with our dataset, one study in the literature reported a higher proportion of poorer maternal health outcomes among some refugee populations (i.e., women from Iraq, Burma, and Afghanistan) compared to non-refugee populations [13].

Plausible explanations for complications related to pregnancy among refugee women include lack of access to or insufficient use of primary care or antenatal care services prior to hospital encounter(s). It is also possible that some encounters to the emergency department may not be necessarily urgent but as a means to access antenatal care for pregnancy, although we are unable to assess the reasons for seeking care. Other studies report delayed initiation of obstetric care and lower numbers of prenatal care visits among pregnant refugee and immigrant women compared to US-born counterparts [18]. Reasons for inadequate access to antenatal services may be multiple and include challenges navigating the health care system, cultural and language barriers, limited information about how to access care, and lower prioritization of health care due to competing priorities such as childcare [19]. Refugees may be reluctant to seek needed obstetric services due to fear of obstetrical interventions, perceived lack of choice in care processes and privacy, and feeling of judgment by service providers [20, 21].

Of note, nearly 98% of hospital encounters were among women who had Medicaid or some form of health insurance coverage. The high percentage of encounters covered by health insurance is due in part to expanded insurance options available for recently arrived refugee populations in Illinois. Illinois expanded Medicaid in 2014, which might

Table 1 Demographic and visit characteristics of hospital encounters made by Illinois refugee women aged 15–44, 2016–2017 (n = 3,355)

	Frequency (%) or Mean ± SD	
	Overall	Complications mainly related to pregnancy
Complications mainly related to pregnancy (CCS Level 3 = 11.3)		
Yes	640 (19.1)	--
No	2715 (80.9)	--
Age (in years)	30.5 ± 7.1	30.3 ± 5.9
Length of stay	1.7 ± 3.3	2.6 ± 5.0
Time from US arrival and hospital encounter		
< 8 months	617 (18.4)	95 (14.8)
≥ 8 months	2738 (81.6)	545 (85.2)
Visa Status		
Refugee	2999 (89.4)	545 (85.2)
Special Immigrant Visa	237 (7.1)	70 (10.9)
Asylee	90 (2.7)	12 (1.9)
Others	29 (0.8)	13 (2.0)
Country of Origin		
Iraq	958 (28.6)	149 (23.3)
Burma	483 (14.4)	124 (19.4)
Democratic Republic of Congo	348 (10.4)	78 (12.2)
Syria	244 (7.3)	33 (5.2)
Bhutan	215 (6.4)	49 (7.7)
Afghanistan	283 (8.4)	46 (7.2)
Iran	143 (4.3)	28 (4.4)
Others	681 (20.3)	133 (20.8)
Payer		
Medicaid	3007 (89.6)	578 (90.3)
Private	220 (6.6)	48 (7.5)
Medicare	2 (0.1)	1 (0.2)
Other	126 (3.7)	13 (2.0)
Number of hospital encounters		
1–4	2120 (63.2)	255 (39.8)
5–10	1017 (30.3)	297 (46.4)
11+	218 (6.5)	88 (13.8)
Visit type[$]		
Emergency Department	2974 (88.6)	545 (85.2)
Hospital Admission	381 (11.4)	95 (14.8)
Admit type[#]		
Elective	1800 (53.6)	350 (54.7)
Emergency or urgent	1332 (39.7)	195 (30.5)
Others	223 (6.7)	95 (14.8)
Primary medical diagnoses		
Threatened abortion	--	41 (6.4%)
Post-term pregnancy	--	30 (4.7%)
Gestational diabetes	--	25 (3.9%)
Maternal hypertension	--	25 (3.9%)
Others	--	519 (81%)

[$]Visit Type: Visit Type differentiates whether an encounter was an inpatient or outpatient encounter. Outpatient encounters also include emergency department encounters.

[#]Admit Type: There are two types of hospital admissions - elective or emergency/urgent. Elective hospital admissions occur when a provider arranges a hospital bed in advance for a patient on specific day. Emergency/urgent admissions occur when a patient is directly admitted to the hospital after being seen in the emergency department or urgent care.

explain why this analysis found that the majority of hospital encounters were covered by Medicaid. If refugees meet and maintain certain income eligibility criteria, they will be eligible for Medicaid [2]. Otherwise, Refugee Medical Assistance is available for refugees; however, this is only available for 8 months after arrival, after which refugees would have to find other health insurance coverage. Additionally, the Illinois State Plan, under federal Title XXI, allows health care coverage for children from conception to birth, regardless of the mother's citizenship status [22]. Therefore, all pregnant women in Illinois are eligible for prenatal care via the Moms and Babies Program, assuming

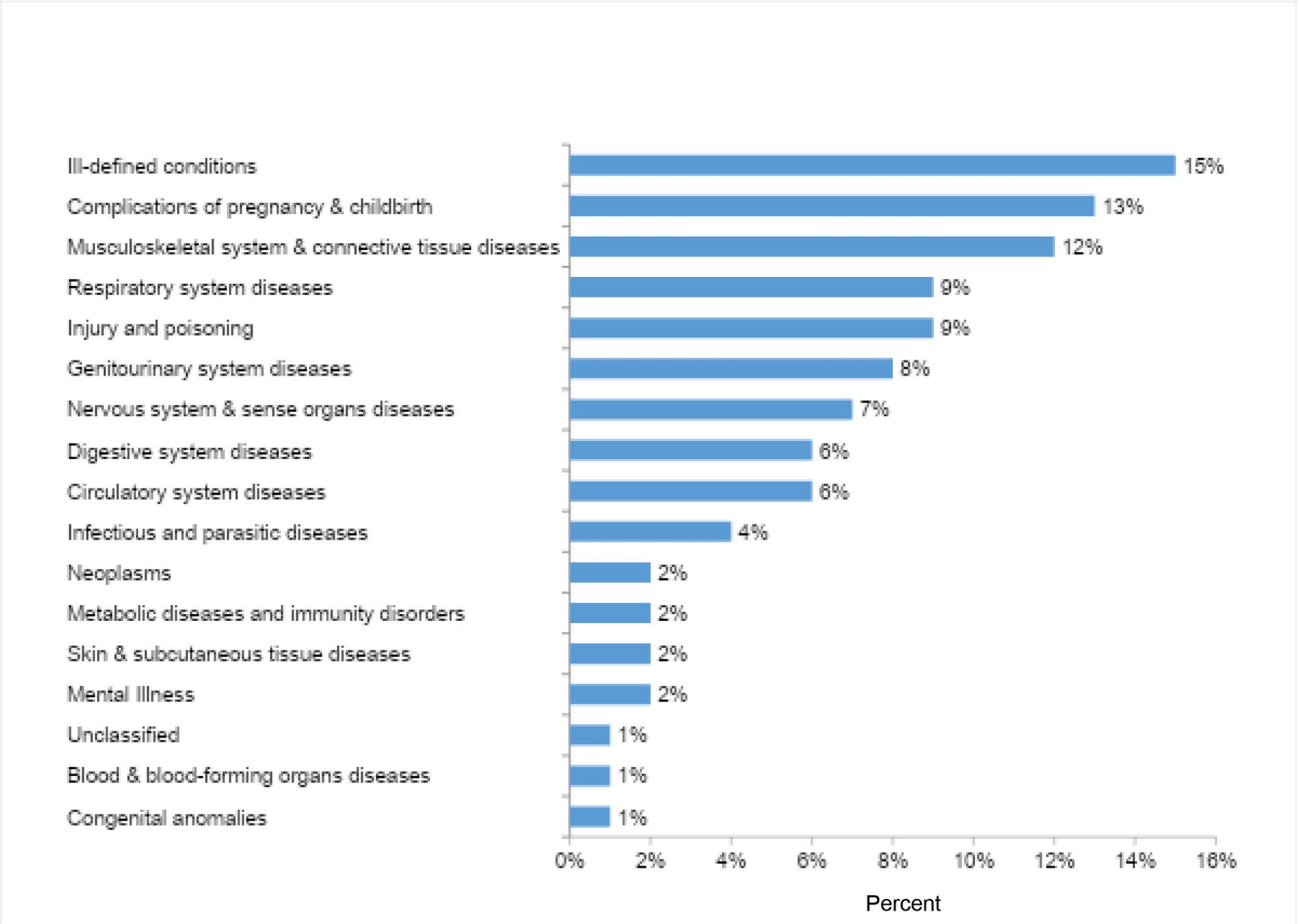

Fig. 1 Primary medical diagnoses of Illinois refugee populations at hospital encounters based on Clinical Classifications Software for ICD-10 (CCS Level 1 Category), 2016–2017 (n = 9,308).

other eligibility criteria are met. Another reason why most women had Medicaid is that women without insurance might not have seek care at all.

Further work to identify factors contributing to complications mainly related to pregnancy needs to be conducted. Additional efforts should focus keenly on identifying barriers that create disparity in the receipt of routine health care to pregnant refugee women to reduce the quantity of hospital encounters due to pregnancy related complications. Programs to improve awareness and access to prenatal care, along with health education regarding preventable pregnancy-related conditions (e.g., gestational diabetes and maternal hypertension) and/or treatable could be considered. Other programs can help identify and resolve barriers to accessing these services among refugee women in Illinois. Examples of successful interventions that have helped resolve barriers to care access include having adequate social or community support and using trusted members of the community, such as community health workers or 'cultural ambassadors', to support a range of services including providing prenatal health education, helping complete health insurance and other paperwork, and connecting women with prenatal care [23]. When possible, health care providers should use primary care encounters as an opportunity to discuss routine prenatal care, signs and symptoms of complications related to pregnancy, when and how to contact their health care provider, and any identified conditions associated with their pregnancy, such as gestational diabetes.

Limitations and Strengths

Our investigation had some limitations. First, the investigation was conducted among refugee women in Illinois and therefore may not be generalizable to all refugee populations in the United States. Further, the ReHAPI dataset only includes those individuals who attended the domestic medical examination, and not all refugees who have arrived in Illinois. Second, since the data were based on hospital discharge data, there could be errors with the quality of

diagnostic coding and decisions of health care providers inputting the data. Third, analyses were at the encounter level, rather than the individual level, thus it is possible for individuals to have multiple encounters; this complicates the interpretation of results. Fourth, we were unable to stratify data by delivery status since the dataset only included the primary medical diagnosis for the encounter; therefore, we were unable to determine whether the complications related to pregnancy were due to delivery. Fifth, we did not have access to ICD-10 codes (CCS level 3 categories) for most CCS level 2 categories under CCS level 1 category of 11 in our dataset, which would have helped determine appropriateness for inclusion as complications related to pregnancy and childbirth; therefore, it is possible the proportion of hospital encounters associated with complications related to pregnancy is underestimated. Sixth, data on all pregnancy-related hospital encounters (with or without complications) for non-refugee populations were unavailable; therefore, relevant comparisons were unable to be made.

Conclusions

This analysis found that from 2016 to 2017, a fifth of hospital encounters among refugee women in Illinois were primarily associated with complications mainly related to pregnancy. While studies have documented poorer maternal health outcomes in resettled refugee populations, our analysis is one of the first to use a statewide hospital discharge dataset to provide a more detailed analysis of hospital encounters associated with complications mainly related to pregnancy among resettled refugee populations. After US arrival, refugee women need to be linked to primary care and barriers to accessing care should be resolved in a timely manner. Refugee women of childbearing age who are pregnant or planning for pregnancy should be educated on the importance of prenatal care and be given prompt referrals to prenatal care and assistance with accessing care, when needed.

Author Contributions Eric Adjei Boakye: Conceptualization, Methodology, Data curation, Formal analysis, Writing - original draft, Writing - review & editing, Supervision, Final approval. Anh-Thu Runez: Conceptualization, Data curation, Writing - review & editing, Final approval. Chantel C. Hoskin Snelling: Methodology, Writing - original draft, Writing - review & editing, Final approval. Jessica R. Lamberson: Methodology, Writing - original draft, Writing - review & editing, Final approval. Veronica Halloway: Writing - review & editing, Final approval. Ngozi Ezike: Writing - review & editing, Final approval. Gayathri S. Kumar: Conceptualization, Methodology, Data curation, Writing - original draft, Writing - review & editing, Supervision, Final approval.

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Declarations

Conflict of interest The authors have no conflicts of interest to disclose.

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