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DOI: 10.21106/ijma.621**ORIGINAL ARTICLE | BIRTH INTERVAL****Interbirth Intervals of Immigrant and Refugee Women in the United States: A Cross-Sectional Study****Comfort Z. Olorunsaiye, PhD<sup>1✉</sup>; Larissa R. Brunner Huber, PhD<sup>2</sup>; Samira P. Ouedraogo, BSPH<sup>3</sup>**

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**ABSTRACT**

**Background and Objective:** Despite guidelines recommending an interval of at least 18–24 months between a live birth and the conception of the next pregnancy, nearly one-third of pregnancies in the United States are conceived within 18 months of a previous live birth. The purpose of this study was to examine the associations between multiple immigration-related variables and interbirth intervals among reproductive-aged immigrant and refugee women living in the United States.

**Methods:** This was a cross-sectional, quantitative study on the sexual and reproductive health (SRH) of reproductive-aged immigrant and refugee women in the United States. The data were collected via an online survey administered by Lucid LLC. We included data on women who had complete information on nativity and birth history in the descriptive analysis ( $n = 653$ ). The exposure variables were immigration pathway, length of time since immigration, and country/region of birth. The outcome variable was interbirth interval ( $\leq 18$ , 19–35, or  $\geq 36$  months). We used multivariable ordinal logistic regression, adjusted for confounders, to determine the factors associated with having a longer interbirth interval among women with second- or higher-order births ( $n = 245$ ).

**Results:** Approximately 37.4% of study participants had a short interbirth interval. Women who immigrated to the United States for educational (aOR = 4.57; 95% CI, 1.57–9.58) or employment opportunities (aOR = 2.27; 95% CI, 1.07–5.31) had higher odds of reporting a longer interbirth interval (19–35 or  $\geq 36$  months) than women born in the United States. Women born in an African country had 0.79 times the odds (aOR = 0.79; 95% CI, 0.02–0.98) of being in a higher category of interbirth interval.

**Conclusion and Global Health Implications:** Although all birthing women should be counseled on optimal birth spacing through the use of postpartum contraception, immigrant and refugee women would benefit from further research and policy and program interventions to help them in achieving optimal birth spacing. SRH research in African immigrant and refugee communities is especially important for identifying ameliorable factors for improving birth spacing.

**Keywords:** • African Immigrants • Birth Spacing • Immigrant Women • Interbirth Interval • Interpregnancy Interval • Maternal Health • Refugee Women

## I. Introduction

Current guidelines recommend an interval of at least 18–24 months between a live birth and the conception of the next pregnancy.<sup>1,2</sup> However, nearly one-third of pregnancies in the United States are conceived within 18 months of a previous birth.<sup>3</sup> Short interbirth interval is associated with adverse birth and infant outcomes and increased risks of maternal morbidity during pregnancy and at delivery.<sup>4–8</sup> Moreover, most of the adverse outcomes of short interval births are concentrated in marginalized populations, including immigrants.<sup>9,10</sup>

Factors associated with short interbirth interval include younger maternal age, marital status, and delayed initiation of childbearing.<sup>6,7</sup> Short duration of, or non-exclusive breastfeeding, and prior experience of infant death or pregnancy loss are also associated with short interpregnancy intervals.<sup>11–13</sup> Importantly, unintended pregnancies have significantly shorter birth intervals than planned pregnancies.<sup>6,14</sup> Other factors associated with short interbirth intervals include race and ethnicity and lower socioeconomic status.<sup>7,11,15</sup> Hispanic and Black individuals have comparatively higher risks of short interval births.<sup>6,11</sup>

Although health is a public good and health care should be universally available and accessible to individuals and communities, some groups of the population face significant barriers to accessing health care services.<sup>16–18</sup> For example, marginalized populations, such as immigrant and refugee communities, face barriers to health care, particularly sexual and reproductive health (SRH) care, due to language barriers, cultural norms, unfamiliarity with the US health care system, lower socioeconomic status, and a lack of culturally appropriate services.<sup>19–22</sup> In addition, due to the intersecting influences of immigration policies, language, and socioeconomic barriers, immigrant and refugee populations have even less access to health care services, including SRH and contraception.<sup>19–21,23</sup>

Federal immigration laws in the United States prevent undocumented immigrants and documented immigrants who have been in the country for less than 5 years from enrolling in publicly funded health insurance programs offered

through Medicaid.<sup>24,25</sup> Access to essential health education and services, such as SRH care, family planning services, and contraception for spacing or limiting births, is extremely limited for low-income immigrant and refugee women unless state exemptions are available.<sup>26</sup> Moreover, a lack of culturally competent health care providers and racism directed at immigrants constitute additional barriers to SRH care and optimal birth spacing in this population.<sup>26</sup> Consequently, individuals from immigrant and refugee populations are more likely to report using less effective contraception methods, which may increase their risk for short interval births.<sup>27</sup> Studies on interbirth intervals involving immigrant and refugee women have mostly relied on birth certificate data, which lack a number of key sociodemographic variables, thereby limiting the ability to adequately adjust the analyses for potential confounding factors.<sup>10,28,29</sup>

The purpose of this study, therefore, was to examine the associations between multiple immigration-related variables and interbirth interval among immigrant and refugee women living in the United States. The findings can contribute to filling some knowledge gaps about the factors associated with short interbirth intervals in immigrant and refugee women and identify groups at higher risk for short interbirth interval.

## 2. Methods

This was a cross-sectional, quantitative study on the sexual and reproductive health of immigrant women in the United States ( $n = 657$ ). The data were collected via an online survey administered by Lucid LLC, which supports the recruitment of samples for academic research through its academic marketplace, Theorem.<sup>30</sup> Lucid is able to reach and recruit diverse audiences through partnerships with multiple vendors. Eligibility for the online survey was based on self-identification as a woman, aged 18–44 years, English proficiency, and residency in the United States. We included data on 653 women who had complete information on nativity and birth history in the descriptive analysis ( $n = 653$ ). For the regression analysis, we excluded women with fewer than two births ( $n = 408$ ); hence, the final analytic

sample was 245 women with two or more births.

### 2.1. Study Variables

**Exposure:** The exposure variables were immigration-related factors, such as (1) length of time since immigration to the United States (US-born [unexposed]:  $\leq 5$ , 6–10, or  $> 10$  years); (2) immigration pathway (US-born [unexposed]: conflict/persecution, employment, education, or family reunification); and (3) place of birth (grouped into the following regions: US-born [unexposed], North America [non-US], Africa, Asia, other Western countries (i.e., Europe and Australia), South and Central America, or the Caribbean).

**Outcome:** We calculated the outcome variable, interbirth interval, using data from the most recent and previous births. The question on birth interval was adapted from the Pregnancy Risk Assessment Monitoring System (PRAMS) questionnaire<sup>31</sup> and was only applicable to participants who had more than one live birth. The adapted question was “when your youngest child was born, how old was the child born just before your youngest child?” Participants could select one of the following responses: 0–12 months, 13–18 months, 19–24 months, more than 2 years but less than 3 years, 3–5 years, or more than 5 years. Based on guidelines that recommend a minimum interval of 18 months between a live birth and a subsequent pregnancy,<sup>1</sup> we coded the outcome as an ordinal variable consisting of the following categories:  $\leq 18$  months (short interbirth interval), 19–35 months, and  $\geq 36$  months.

**Covariates:** Covariates were theoretically selected from existing studies.<sup>6,7,11,15,29</sup> Questions providing data on covariates were mostly adopted from the PRAMS and National Survey of Family Growth (NSFG).<sup>31,32</sup> Covariates included age, marital status (single or married), parity (none, 1, 2, or  $\geq 3$ ), ethnicity (Hispanic or non-Hispanic), and racial group (Black, Asian, White, or others [i.e., Middle Eastern, North African, or more than one race]). Prior research has shown that socially and structurally marginalized populations, such as people of color and immigrant groups, have a higher likelihood of having short interval births than White people.<sup>9,10,19</sup> Therefore, we conceptualized race and ethnicity as

separate variables to disentangle the structural (i.e., race) and social (i.e., ethnicity) relationships with the outcome and to avoid masking possible overlaps and heterogeneity in the study sample.<sup>33-36</sup>

Other covariates included insurance (none, public, or private), income ( $\leq \$20,000$ ,  $\$20,001–\$40,000$ ,  $\$40,001–\$75,000$ , or  $> \$75,000$ ), education (high school or less, some college or associate degree, bachelor’s degree, or graduate or professional degree), and language spoken predominantly at home (English, French, Spanish, and others [i.e., Arabic, Armenian, Chinese, Creole, Farsi, Hindi, Kirundi, Vietnamese, and Yoruba, based on participants’ self-report]).

### 2.2. Statistical Analysis

We computed frequency distributions of participants’ sociodemographic characteristics. Because the outcome variable was ordered, we used multivariable ordinal logistic regression to compare the odds of having a longer interbirth interval (i.e., 19–35 or  $\geq 36$ –months) versus  $\leq 18$  months (short), while adjusting for potential confounders. Results are expressed as odds ratios and 95% confidence intervals. The level of statistical significance was set at  $p < 0.05$ . We analyzed the data using Stata version 15 (College Station, Texas).

### 2.3. Ethical Approval

The institutional review board of Arcadia University approved the survey (21-06-01). All participants provided written informed consent prior to completing the survey.

## 3. Results

### 3.1. Social and Demographic Characteristics of the Study Participants

The descriptive analysis included 653 women. The mean age of women in the sample was 29.2 ( $\pm 7.4$ ) years (Table 1). Approximately 410 (62.9%) of the participants are classified as Black. Additionally, 506 women (77.5%) identified as non-Hispanic. Approximately 50.1% of the participants had public insurance, 135 (20.6%) had two children, and 110 (16.9%) had three or more children. Approximately 22.4% of the women had a bachelor’s

**Table 1: Social and demographic characteristics of study participants (n=653)**

Variable	N (%)
Reason for immigration	
US-born (non-immigrant)	398 (61.0)
Conflict/insecurity	50 (7.7)
Education	43 (6.6)
Employment	119 (18.3)
Family-based	43 (6.4)
Length of time since immigration	
US-born (non-immigrant)	398 (61.0)
≤5 years	72 (10.9)
6–10 years	54 (8.3)
>10 years	130 (19.91)
Birthplace	
US-born (non-immigrant)	398 (61.0)
North America (non-US)	9 (1.4)
Africa	66 (10.11)
Asia	27 (4.13)
Europe	43 (6.6)
South and Central America	68 (10.41)
Caribbean	42 (6.43)
Race	
Black/African American	410 (62.9)
Asian/Asian American	61 (9.4)
White	137 (21.01)
Other racial groups <sup>a</sup>	45 (6.8)
Ethnicity	
Hispanic	144 (22.1)
Non-Hispanic	506 (77.5)
Missing	3 (0.5)
Maternal age (years)	
Mean (standard deviation)	29.2 (7.4)
Parity	
None	269 (41.2)
One	139 (21.2)
Two	135 (20.7)
Three or more	110 (16.9)
Marital status	
Single	342 (52.4)
Married/Cohabiting	311 (47.63)
Insurance type	
None	67 (10.3)
Public	327 (50.08)
Private	256 (39.20)
Household income	
≤\$20,000	168 (25.73)
\$20,001–\$40,000	183 (28.02)
\$40,001–\$75,000	158 (24.6)
>\$75,000	72 (28.2)

(Contd...)

**Table 1: (Continued)**

Variable	N (%)
Highest educational level	
High school or less	187 (28.7)
Some college or associate	232 (35.6)
Bachelor's	146 (22.4)
Graduate or professional	87 (13.34)
Language spoken predominantly at home	
English	567 (86.83)
French	13 (2.0)
Spanish	62 (9.5)
Other languages <sup>b</sup>	11 (1.7)

<sup>a</sup>Other racial groups: Middle Eastern, North African, or two or more races.<sup>b</sup>Other languages: Arabic, Armenian, Chinese, Creole, Farsi, Hindi, Kirundi, Vietnamese, or Yoruba.

degree, and 28.0% reported an annual household income of \$20,001–\$40,000. Approximately 86.83% of the women spoke English, 9.5% spoke Spanish, and 2.0% spoke French, predominantly at home; “other” languages spoken predominantly at home by 1.7% of the women included Arabic, Armenian, Creole, Chinese, Farsi, Hindi, Kirundi, Vietnamese, and Yoruba. Furthermore, 398 (61%) were born in the United States, 68 (10.4%) in South and Central America, and 66 (10.1%) in Africa (Table 1). Approximately 18.3% of all women in the sample migrated to the United States for employment-based reasons, and 19.9% had been in the United States for more than 10 years.

### 3.2. Frequency Distribution of Interbirth Intervals of Women in the Study

Approximately 37.4% of the study participants had an interbirth interval of ≤18 months, 23.7% had interbirth intervals of 19–35 months, and 39.0% reported interbirth intervals of ≥36 months (Figure 1).

### 3.3. Unadjusted Analysis of Factors Associated With Interbirth Intervals

In the unadjusted multivariable ordered logistic regression, women who immigrated to the United States for educational (OR = 2.56; 95% CI, 1.02–6.41) and employment opportunities (OR = 1.95; 95% CI, 1.14–3.33) were more likely to report longer interbirth intervals (i.e., 19–35 or ≥36 months) than US-born women (unexposed, Table 2). Women who had lived in the United States for <5 years were less likely to have longer interbirth interval (OR = 0.33;

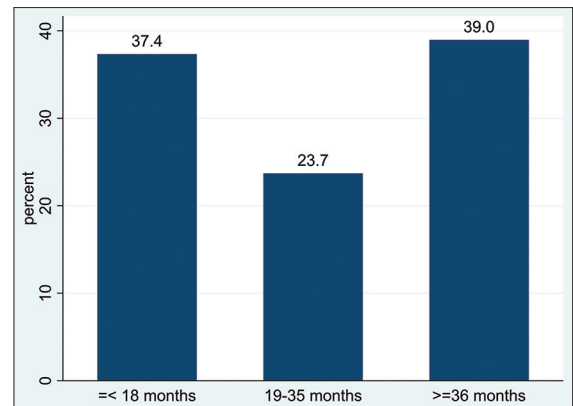
**Table 2: Unadjusted odds ratio and 95% confidence intervals of factors associated with interbirth intervals**

Variable	Unadjusted OR (95% CI)
Immigration pathway	
US-born	1.00 (Referent)
Conflict/insecurity	0.87 (0.40–1.90)
Education	2.56 (1.02–6.41)
Employment	1.95 (1.14–3.33)
Family-based	1.26 (0.54–2.94)
Length of time since immigration	
US-born	1.00 (Referent)
≤5 years	0.33 (0.26–1.00)
6–10 years	1.13 (0.53–2.42)
>10 years	1.92 (1.17–3.17)
Birthplace	
US-born	1.00 (Referent)
Africa	0.16 (0.04–0.49)
Asia	1.28 (0.51–3.21)
Other Western countries	2.78 (1.06–7.28)
South and Central America	1.56 (0.78–3.10)
Caribbean	1.05 (0.05–2.17)
Race	
Black/African American	1.00 (Referent)
Asian/Asian American	1.17 (1.02–15.48)
White	1.35 (1.09–6.22)
Other racial groups	1.58 (0.62–3.98)
Ethnicity	
Hispanic	1.00 (Referent)
Non-Hispanic	0.51 (0.25–1.03)
Maternal age (years)	1.08 (1.04–1.13)
Parity	
Two	1.00 (Referent)
Three or more	2.67 (1.57–4.52)
Marital status	
Single	1.00 (Referent)
Married/cohabiting	1.24 (0.80–1.91)
Insurance type	
None	1.00 (Referent)
Public	0.35 (0.14–0.87)
Private	0.40 (0.16–0.99)
Household income	
≤\$20,000	1.00 (Referent)
\$20,001–\$40,000	1.21 (0.67–2.19)
\$40,001–\$75,000	1.51 (0.92–1.09)
>\$75,000	1.25 (0.68–2.30)
Highest educational level	
High School or less	1.00 (Referent)
Some college or associate	2.09 (1.22–3.59)
Bachelor's	2.01 (1.09–3.69)
Graduate or professional	1.01 (0.53–1.94)

(Contd...)

**Table 2: (Continued)**

Variable	Unadjusted OR (95% CI)
Language spoken predominantly at home	1.00 (Referent)
English	0.25 (0.05–1.28)
French	2.22 (1.05–4.72)
Spanish	1.71 (0.27–10.94)
Other languages	

**Figure 1:** Frequency distribution of interbirth interval among women in the study (n = 245)

95% CI, 0.26–1.00), whereas women who had lived in the United States for >10 years had nearly twice the odds of reporting longer interbirth intervals (OR = 1.92; 95% CI, 1.17–2.94) than US-born women. African-born women had 84% lower odds of being in longer interbirth interval categories (OR = 0.16; 95% CI, 0.04–0.49) than US-born women, whereas women born in other Western countries had higher odds of being in the longer interbirth interval categories (OR = 2.78; 95% CI, 1.06–7.28).

### 3.4. Adjusted Analysis of Factors Associated With Interbirth Intervals

Women who migrated to the United States for educational reasons (aOR = 4.57; 95% CI, 1.57–9.58) and employment reasons (aOR = 2.27; 95% CI, 1.07–5.31) had statistically significant higher odds of being in longer interbirth interval categories than US-born women (unexposed) in the multivariable ordinal logistic regression model adjusted for potential confounders (Table 3). For African-born women, the odds of reporting longer

**Table 3: Adjusted odds ratio (OR) and 95% confidence intervals (CI) of the associations between immigration-related variables and interbirth intervals**

Exposure Variables <sup>a</sup>	Adjusted OR and 95% CI
Immigration pathway	
US-born	1.00 (Referent)
Conflict/insecurity	0.86 (0.23–3.20)
Education	4.57 (1.57–9.58)
Employment	2.27 (1.07–5.31)
Family-based	0.36 (0.03–3.74)
Length of time since immigration	
US-born	1.00 (Referent)
≤5 years	0.50 (0.23–1.01)
6–10 years	0.34 (0.03–3.77)
>10 years	0.41 (0.03–4.74)
Birthplace	
US-born	1.00 (Referent)
Africa	0.79 (0.02–0.98)
Asia	3.18 (0.27–37.73)
Other Western countries	2.72 (0.21–34.55)
South and Central America	3.40 (0.32–7.07)
Caribbean	1.52 (0.15–15.70)

<sup>a</sup>Model adjusted for ethnicity, race, maternal age, marital status, parity, insurance, income, education, and language spoken predominantly at home

interbirth intervals were markedly reduced but remained statistically significant (aOR = 0.79; 95% CI, 0.02–0.98); the association for other Western-born women was reduced but no longer statistically significant in the adjusted model. The association between length of time since immigration (<5 years) and interbirth interval was also reduced and lost statistical significance in the adjusted model; other categories of length of time since immigration were not associated with the outcome.

#### 4. Discussion

We examined the relationships between immigration-related factors and interbirth interval among women living in the United States. The results revealed that more than a third (37.4%) of births occurred within 18 months of a previous live birth. We also found significant relationships between immigration pathway and place of birth with interbirth intervals, but no relationship between the length of time since immigrating to the United States and outcome.

Our findings contribute to the literature on birth interval not only in the general US populations

but also in the country's immigrant and refugee populations. We found a slightly higher prevalence of short interval births (37%) than the national average of approximately 30%<sup>14</sup> and population-based studies that reported interbirth intervals ranging from 11% to 35%.<sup>6,14,29</sup> Studies have reported an above-average prevalence of short birth intervals in Black people, including Black immigrants.<sup>6,10,37</sup> Because Black women were overrepresented in our sample, this may have contributed to the higher prevalence of short interbirth intervals (≤18 months) observed in the results of the present study.

After adjusting for potential confounders, the association between shorter duration of time since immigration to the United States and interbirth interval lost significance. The length of time since immigration has been linked to health beliefs and behaviors, such as the use of disease management and preventative services for physical, mental, and sexual and reproductive health.<sup>23,38-40</sup> The length of stay in the receiving country has been used to assess acculturation and how immigrants change over time as a result of contact with other cultures after immigration.<sup>23,41</sup> It has also been linked to immigrants' initial health advantage, and health deterioration has been linked to longer duration of stay as a result of exposure to social and environmental determinants of health.<sup>42</sup> Simbiri et al.<sup>23</sup> argue in a study on care seeking that length of stay in the United States was not as important as language proficiency for immigrants accessing HIV prevention and care services. In the present study, nearly 87% of participants reported speaking English predominantly at home. Hence, adjusting the analysis for language spoken predominantly at home could have contributed to the null results we observed. We are not aware of any previous studies that examined associations between length of stay and interbirth interval in the United States. Nevertheless, this result warrants further investigation and confirmation using larger population-based data sets.

Our results revealed that a woman's place of birth was associated with interbirth interval. Women born in an African country had lower odds of reporting longer interbirth intervals (i.e., 19–35 or ≥36 months) than the unexposed group (i.e.,

US-born women). Our result indicating shorter interbirth interval among African-born women is consistent with the results of previous studies that reported shorter interpregnancy intervals among African-born women relative to women born in the United States and other parts of the world.<sup>10,28</sup> Specifically, Zhang et al.<sup>10</sup> found that African-born women had a mean birth-to-pregnancy interval that was about 6.5 and 15.4 months shorter than those of US-born White and Black women, respectively. Similarly, another study in Utah found that African-born women had higher parities and shorter intervals between pregnancies than White women born in the United States.<sup>43</sup> The authors suggested that their finding could be due to religious beliefs, cultural preferences for large families, and a lack of access to family planning methods, consistent with the existing literature.<sup>23,28,43-46</sup>

Women who immigrated to the United States for educational or employment opportunities had significantly longer interbirth intervals than women born in the United States. We are not aware of any previous studies that examined interbirth intervals in people who migrated to the United States for educational or employment opportunities. This result is plausible because student visa policies require good academic standing, which may be hampered by closely spaced pregnancies and the cost of childcare, which may be unaffordable to most international students.<sup>47,48</sup> The same argument may be true for women who immigrated for employment opportunities, in which case, closely spaced pregnancies may interfere with employment prospects. Taken together, voluntary immigrants, regardless of immigration pathway, may have greater motivation and self-efficacy to space childbearing in order to avoid jeopardizing their visa status due to the physical, financial, and social implications of pregnancy, birthing, and childcare.<sup>48,49</sup>

The results also indicated that women who migrated to the United States due to conflict or persecution had no significantly different odds of being in longer interbirth interval categories than women born in the United States. A recent study of Somali and Congolese refugee women found that the lasting influence of cultural identity and

birth spacing norms, post-resettlement, contribute to the use of less effective contraceptive methods (e.g., condoms, withdrawal, oral contraceptives, and fertility awareness methods) during the postpartum period.<sup>50</sup> Some of these methods, if not used correctly and consistently, may contribute to short interbirth intervals in immigrant and refugee women. However, our results do not support this explanation and warrants further investigation.

#### **4.1. Strengths and Limitations of the Study**

A key strength of this study is our ability to recruit foreign-born women from 40 states and the District of Columbia to participate in an online survey. Previous quantitative studies on immigrant and refugee women were typically limited to a single or few states. In addition, previous studies used birth certificate data, which may result in a larger sample size; however, such studies were limited in their ability to adjust for known confounders based on the variables available in the birth certificate data. The use of primary data collected in the present study allowed us to adjust the analysis for multiple factors that are not typically available in birth certificate records and examine the effects of multiple immigration-related exposure variables on interbirth interval. Notably, we were able to examine the association between immigration pathway and interbirth interval. This is a novel finding and contribution to research on birth spacing and pregnancy intervals in the United States.

Despite these strengths, this study has some limitations. Because we used a non-probability sampling method, our results are not generalizable to all immigrant and refugee women in the United States. The final analytic sample was small, limiting the generalizability of our findings. Nonetheless, we found statistically significant associations between the exposures and outcomes. Some of the associations observed may have been stronger in a larger sample of foreign-born women. The measures assessed were based on self-reported data, which may have been influenced by social desirability bias. However, the majority of the survey questions on the outcome and sociodemographic variables were adopted from the PRAMS and NSFG, which are validated and reliable national surveys.<sup>31,32</sup>

## 5. Conclusion and Global Health Implications

In this study, we examined the associations between immigration-related factors and interbirth intervals of immigrant and refugee women living in the United States. We found that the prevalence of short interval births was higher in this sample than the national average. The study's key findings revealed that women who immigrated for educational or employment opportunities had significantly higher odds of reporting longer interbirth intervals than women born in the United States. Our findings contribute to our understanding of the interbirth intervals of immigrant and refugee women in the United States. Because immigration is becoming an increasingly important health determinant,<sup>21</sup> the various immigration pathways should be considered when planning and delivering health services to foreign-born women in the United States. Our results also indicated that women born in Africa have shorter interbirth intervals than other women in the sample. Despite rapid growth in African immigration to the United States in recent years, the population has remained underrepresented in health research and services.<sup>51,52</sup> As immigration from sub-Saharan Africa to the United States continues, there is a need for more research to understand this population's SRH needs to provide responsive reproductive health care. While our study provides preliminary insights into immigration-related factors associated with interbirth interval among immigrant and refugee women in the United States, more research focusing on specific immigrant groups who may be at increased risk for short interbirth interval and its associated implications for pregnancy and birth outcomes is needed. Future research should prioritize African-born immigrant and refugee women, as well as recent immigrants.

### Compliance with Ethical Standards

**Conflicts of Interest:** The authors declare no competing interests. **Financial Disclosure:** Dr. Olorunsaiye has received research support from the Society of Family Planning Research Fund during the period of this study. **Funding/Support:** There was no funding for this study. **Ethics Approval:** The Institutional Review Board of Arcadia University approved the study (21-06-01). All participants provided written informed consent prior to

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### Key Messages

- ▶ In this study, nearly 4 in 10 (37.4%) women had interbirth intervals of  $\leq 18$  months; 23.7% had interbirth intervals of 19–35 months; and 39% had interbirth intervals of  $\geq 36$  months.
- ▶ Women born in Africa had significantly lower odds of reporting a longer interbirth interval (i.e., 19–35 or  $\geq 36$  months) than women born in the United States..
- ▶ Women who migrated to the United States for educational or employment reasons had increased odds of having longer interbirth intervals than women born in the United States.

### References

1. Bigelow CA, Bryant AS. Short interpregnancy intervals: an evidence-based guide for clinicians. *Obstetrical & Gynecological Survey*. 2015;70(7):458-464.
2. World Health Organization. *Report of a WHO technical consultation on birth spacing: Geneva, Switzerland 13-15 June 2005*. World Health Organization;2007.
3. Copen CE, Thoma ME, Kirmeyer S. Interpregnancy intervals in the United States: data from the birth certificate and the national survey of family growth. *National Vital Statistics Reports: From the Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System*. 2015;64(3):1-10.
4. Zhu BP, Rolfs RT, Nangle BE, Horan JM. Effect of the interval between pregnancies on perinatal outcomes. *N Engl J Med*. 1999; 340(8):589-94. doi: 10.1056/NEJM199902253400801
5. DeFranco EA, Seske LM, Greenberg JM, Muglia LJ. Influence of interpregnancy interval on neonatal morbidity. *Am J Obstet Gynecol*. 2015;212(3):386.e1-9. doi: 10.1016/j.ajog.2014.11.017
6. Gemmill A, Lindberg LD. Short interpregnancy intervals in the United States. *Obstet Gynecol*. 2013;122(1):64-71. doi: 10.1097/AOG.0b013e3182955e58
7. Haight SC, Hogue CJ, Raskind-Hood CL, Ahrens KA. Short interpregnancy intervals and adverse pregnancy outcomes by maternal age in the United States. *Ann Epidemiol*. 2019;31:38-44. doi: 10.1016/j.annepidem.2018.12.002



8. Conde-Agudelo A, Belizán JM. Maternal morbidity and mortality associated with interpregnancy interval: cross sectional study. *BMJ*. 2000;321(7271):1255-1259. doi: 10.1136/bmj.321.7271.1255
9. De Silva DA, Thoma ME. The association between interpregnancy interval and severe maternal morbidities using revised national birth certificate data: A probabilistic bias analysis. *Paediatr Perinat Epidemiol*. 2020;34(4):469-480. doi: 10.1111/ppe.12560
10. Zhang Y, Quist A, Enquobahrie D. Short birth-to-pregnancy intervals among African-born black women in Washington State. *J Matern Fetal Neonatal Med*. 2019;32(6):947-953. doi: 10.1080/14767058.2017.1395850
11. Cheslack Postava K, Winter AS. Short and long interpregnancy intervals: correlates and variations by pregnancy timing among US women. *Perspect Sex Reprod Health*. 2015;47(1):19-26. doi: 10.1363/47e2615
12. Miller JE. Birth intervals and perinatal health: an investigation of three hypotheses. *Fam Plann Perspect*. 1991:62-70.
13. Pimentel J, Ansari U, Omer K, et al. Factors associated with short birth interval in low- and middle-income countries: a systematic review. *BMC Pregnancy and Childbirth*. 2020;20(1):156. doi: 10.1186/s12884-020-2852-z
14. Huber LRB, Smith K, Sha W, Zhao L, Vick T. Factors associated with pregnancy intention among women who have experienced a short birth interval: findings from the 2009 to 2011 Mississippi and 2009 Tennessee Pregnancy Risk Assessment Monitoring System. *Ann Epidemiol*. 2018;28(6):372-376. doi: 10.1016/j.annepidem.2018.03.012
15. Masinter LM, Dina B, Kjerulf K, Feinglass J. Short interpregnancy intervals: results from the first baby study. *Women's Health Issues*. 2017;27(4):426-433. doi: 10.1016/j.whi.2017.02.011
16. Heimburg DV, Prilleltensky I, Ness O, Ytterhus B. From public health to public good: Toward universal wellbeing. *Scand J Public Health*. 2022;50(7):1062-1070. doi: 10.1177/14034948221124670
17. Woolf SH, Stange KC. A Sense of Priorities for the Healthcare Commons. *Am J Prev Med*. 2006;31(1):99-102. doi: 10.1016/j.amepre.2006.03.010
18. Yearby R. Racial inequities in mortality and access to health care. The untold peril of rationing health care in the United States. *J Leg Med*. 2011;32(1):77-91. doi: 10.1080/01947648.2011.550830
19. Derose KP, Escarce JJ, Lurie N. Immigrants and health care: sources of vulnerability. *Health Aff (Millwood)*. 2007;26(5):1258-68. doi: 10.1377/hlthaff.26.5.1258
20. Tapales A, Douglas-Hall A, Whitehead H. The sexual and reproductive health of foreign-born women in the United States. *Contraception*. 2018;98(1):47-51. doi: 10.1016/j.contraception.2018.02.003
21. Castañeda H, Holmes SM, Madrigal DS, Young M-ED, Beyeler N, Quesada J. Immigration as a social determinant of health. *Annu Rev Public Health*. 2015;36:375-92. doi: 10.1146/annurev-publhealth-032013-182419
22. Royer PA, Olson LM, Jackson B, et al. "In Africa, there was no family planning. Every year you just give birth": Family planning knowledge, attitudes, and practices among Somali and Congolese refugee women after resettlement to the United States. *Qual Health Res*. 2020;30(3):391-408. doi: 10.1177/1049732319861381
23. Simbiri KOA, Hausman A, Wadenya RO, Lidicker J. Access impediments to health care and social services between Anglophone and Francophone African immigrants living in Philadelphia with respect to HIV/AIDS. *J Immigr Minor Health*. 2010;12(4):569-79. doi: 10.1007/s10903-009-9229-8
24. Fuentes L, Desai S, Dawson R. New Analyses on US Immigrant Health Care Access Underscore the Need to Eliminate Discriminatory Policies; 2022. Accessed. December 1, 2022. <https://www.gutmacher.org/report/new-analyses-us-immigrant-health-care-access-underscore-need-eliminate-discriminatory>.
25. U.S. Centers for Medicare and Medicaid Services. Health Coverage For Lawfully Present Immigrants. Accessed November 3, 2022. <https://www.healthcare.gov/immigrants/lawfully-present-immigrants/>.
26. World Health Organization. *Ensuring Human Rights in the Provision of Contraceptive Information and Services: Guidance and Recommendations*; 2014.
27. White K, Teal SB, Potter JE. Contraception after delivery and short interpregnancy intervals among women in the United States. *Obstet Gynecol*. 2015;125(6):1471-1477. doi: 10.1097/AOG.0000000000000841
28. Araneta MRG, Baer RJ, Muglia LJ, et al. Health advantages and disparities in preterm birth among immigrants despite disparate sociodemographic, behavioral, and maternal risk factors in San Diego, California. *Matern Child Health J*. 2020;24(2):153-164. doi: 10.1007/s10995-019-02836-y
29. Teitler JO, Das D, Kruse L, Reichman NE. Prenatal care and subsequent birth intervals. *Perspect Sex Reprod Health*. 2012;44(1):13-21. doi: 10.1363/4401312
30. Coppock A, McClellan OA. Validating the demographic, political, psychological, and experimental results obtained from a new source of online survey respondents. *Research & Politics*. 2019;6(1):2053168018822174.
31. Shulman HB, D'Angelo DV, Harrison L, Smith RA, Warner L. The Pregnancy Risk Assessment Monitoring System (PRAMS): Overview of Design and Methodology. *Am J Public Health*. 2018;108(10):1305-1313. doi: 10.2105/AJPH.2018.304563
32. Centers for Disease Control and Prevention. National Survey of Family Growth 2017-2019. 2020. Accessed

- November 22, 2022. [https://www.cdc.gov/nchs/nsfg/nsfg\\_2017\\_2019\\_puf.htm](https://www.cdc.gov/nchs/nsfg/nsfg_2017_2019_puf.htm)
33. Bilheimer LT, Klein RJ. Data and measurement issues in the analysis of health disparities. *Health Serv Res.* 2010;45(5 Pt 2):1489-507. doi: 10.1111/j.1475-6773.2010.01143.x
  34. Kauh TJ, Read JnG, Scheitler A. The critical role of racial/ethnic data disaggregation for health equity. *Popul Res Policy Rev.* 2021;40(1):1-7. doi: 10.1007/s11113-020-09631-6
  35. Williams DT. A call to focus on racial domination and oppression: A response to "Racial and ethnic inequality in poverty and affluence, 1959–2015." *Popul Res Policy Rev.* 2019;38(5):615-654. doi: 10.1007/s11113-019-09512-7
  36. Valdez Z, Golash-Boza T. US racial and ethnic relations in the twenty-first century. *Ethn Racial Stud.* 2017;40(13):2181-2209.
  37. Zhu B-P, Le T. Effect of interpregnancy interval on infant low birth weight: a retrospective cohort study using the Michigan Maternally Linked Birth Database. *Matern Child Health J.* 2003;7(3):169-78. doi: 10.1023/a:1025184304391
  38. Johnson-Agbakwu CE, Flynn P, Asiedu GB, Hedberg E, Breitkopf CR. Adaptation of an acculturation scale for African refugee women. *Journal of Immigrant and Minority Health.* 2016;18(1):252-262.
  39. Agbemenu K. Acculturation and Health Behaviors of African Immigrants Living in the United States: An Integrative Review. *ABNF Journal.* 2016;27(3).
  40. Commodore-Mensah Y, Ukonu N, Cooper LA, Agyemang C, Himmelfarb CD. The association between acculturation and cardiovascular disease risk in Ghanaian and Nigerian-born African immigrants in the United States: the Afro-Cardiac Study. *J Immigr Minor Health.* 2016;18(1):252-62. doi: 10.1007/s10903-014-9998-6
  41. Berry JW. Acculturation: Living successfully in two cultures. *Int J Intercult Relat.* 2005;29(6):697-712. <https://doi.org/10.1016/j.ijintrel.2005.07.013>
  42. Uretsky MC, Mathiesen SG. The effects of years lived in the United States on the general health status of California's foreign-born populations. *J Immigr Minor Health.* 2007;9(2):125-36. doi: 10.1007/s10903-006-9017-7
  43. Dyer JM, Baksh L. *A Study of Pregnancy and Birth Outcomes among African-Born Women Living in Utah.* Migration Policy Institute; 2016.
  44. Agbemenu K, Auerbach S, Murshid NS, Shelton J, Amutah-Onukagha N. Reproductive health outcomes in African refugee women: a comparative study. *J Womens Health (Larchmt).* 2019;28(6):785-793. doi: 10.1089/jwh.2018.7314
  45. Agbemenu K, Volpe EM, Dyer E. Reproductive health decision-making among US-dwelling Somali Bantu refugee women: A qualitative study. *J Clin Nurs.* 2018;27(17-18):3355-3362. doi: 10.1111/jocn.14162
  46. Banke-Thomas A, Agbemenu K, Johnson-Agbakwu C. Factors associated with access to maternal and reproductive health care among Somali refugee women resettled in Ohio, United States: a cross-sectional survey. *J Immigr Minor Health.* 2019;21(5):946-953. doi: 10.1007/s10903-018-0824-4
  47. Lobnibe J-FY. Different Worlds, Mutual Expectations: African Graduate Student Mothers and the Burden of US Higher Education. *Journal of Education and Learning.* 2013;2(2):201-209. doi: 10.5539/jel.v2n2p201
  48. Zhang K. "Finally, I told my professor I was pregnant." Becoming new mothers as international graduate students. *Linguistics and Education.* 2021;63:100922.
  49. Kulp AM. Parenting on the path to the professoriate: A focus on graduate student mothers. *Research in Higher Education.* 2020;61(3):408-429.
  50. Royer PA, Olson LM, Jackson B, et al. "In Africa, there was no family planning. Every year you just give birth": family planning knowledge, attitudes, and practices among Somali and Congolese refugee women after resettlement to the United States. *Qual Health Res.* 2020;30(3):391-408. doi: 10.1177/1049732319861381
  51. Tamir C. *The Growing Diversity of Black America.* Pew Research Center; 2021
  52. Agbemenu K, Mencia JJ, de Rosa C, Aidoo-Frimpong G, Ely G. Family planning research in African immigrant and refugee women: a scoping review. *J Transcult Nurs.* 2022;33(3):416-426. doi: 10.1177/10436596211072891

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