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Is breastfeeding duration related to the health of migrant mother–child dyads experiencing homelessness? The ENFAMS cross-sectional survey

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Background: Literature from the general population shows a consensus about the health benefits associated with breastfeeding for both mothers and children. However, studies investigating these issues in the context of homelessness and migration are rare. This research aimed to examine the relations of any breastfeeding duration with health outcomes among migrant mother–child dyads experiencing homelessness. **Methods:** Data were collected among sheltered and mainly foreign-born mothers experiencing homelessness, and their children aged 6 months to 5 years, from the ENFAMS cross-sectional survey ($n = 481$, 2013—Great Paris area). Any breastfeeding duration, along with various health outcomes of both the mother and her child, was ascertained by face-to-face questionnaires administered by trained interviewers to mothers (perceived physical and emotional health and maternal depression) or by trained psychologists to children (adaptive behaviours). Nurses measured weight and height [thus allowing them to calculate body mass index (BMI)] and haemoglobin concentration (mother–child dyad) and maternal blood pressure. Multivariable linear and modified Poisson regression analyses were performed to examine outcome-wide associations between any breastfeeding duration ≥6 months and the various mother–child outcomes. **Results:** Any breastfeeding ≥6 months was associated with lower systolic blood pressure in mothers ($B = -0.40$, 95% confidence interval = −0.68 to −0.12). No association was observed with the other outcomes. **Conclusions:** The relevance of supporting breastfeeding to improve mothers' physical health holds true in the context of migration and homelessness. It is therefore important to support breastfeeding in these settings. Moreover, given the documented social complexity of breastfeeding practices, interventions should take mothers' socio-cultural heritage and the structural barriers they face into account.

Introduction

Breastfeeding is a compelling public health goal and an important strategy to improve infant mortality and morbidity.[1] Compared with many low- and middle-income countries, the duration of breastfeeding in most high-income countries is shorter, with fewer than one in five children still breastfed by the age of 12 months.[1] Benefits for child morbidity include not only lower risks of otitis media, gastroenteritis, respiratory infections, overweight/obesity, type 2 diabetes and some cancers, but also higher cognitive performance scores.[1–3] Breastfeeding can also benefit mothers by not only reducing their risks of breast and ovarian cancer, type 2 diabetes and high blood pressure[1] but also reinforcing the bonding between the mother and her child.[4] Nonetheless, its effects on maternal health have received far less attention than those on child health.[1] Based on empirical evidence about the dose-dependent benefits of breastfeeding, the World Health Organization (WHO) recommends that children be exclusively breastfed for their first 6 months of life and that breastfeeding continues to the age of 2 years or older, along with adequate complementary feeding starting at 6 months.[5] Gaps nonetheless remain between recommended and actual breastfeeding practices worldwide.[6]

A wide range of factors may hamper or favour the lactation journey. Infant-feeding decisions are deeply embedded within women's social norms and representations, and structural factors can also play a crucial role.[7] Moving to a new (high-income) country often increases women's vulnerability, which may disrupt their decision about and establishment of breastfeeding.[8] Socio-cultural uprooting can pose specific challenges to mothers about breastfeeding their newborns; among these is a lack of access to meaningful breastfeeding education and early culturally appropriate professional and peer support.[8] Despite reports that migrants tend to retain breastfeeding practices similar to those of their home country, including longer durations of breastfeeding than host-country natives,[9] migration is

also considered a structural risk factor for homelessness,[10] along with its related food insecurity and suboptimal living conditions. The intersection of these social determinants may further hamper breastfeeding. In France, previous findings from the ENFAMS (a French acronym for 'ENfants et FAMilles Sans logement'—'children and families without housing') study stressed that most (86%) mothers experiencing homelessness, more than 90% born abroad, had breastfed their child.[11] These durations varied greatly, by region of birth and migration trajectory.[11]

The potential benefits of the WHO-recommended breastfeeding practices among migrant women without housing might be substantial because their health—and their children's—is known to be suboptimal for most conditions for which breastfeeding is known to be protective.[12] Critical knowledge gaps exist however about the relationship between breastfeeding and its health benefits for migrant mother–child dyads without housing. We cannot rule out the possibility that unsuccessful breastfeeding experiences could aggravate health outcomes, for example by impairing self-esteem and triggering maternal postpartum depressive symptoms.[13]

The purpose of this research within the ENFAMS study[11] was to explore the associations of any breastfeeding duration with child and maternal health outcomes among migrant mother–child dyads without housing.

Methods

Study population

The Observatoire du Samu Social (Observatory of the Social Emergency Service, a non-governmental organization providing accommodations to persons without homes in the greater Paris area) conducted the ENFAMS survey (further details provided elsewhere[14]) from January to May 2013.[14] Its overarching aim was to analyze health according to living conditions among a representative sample of families experiencing homelessness in the greater Paris area (the population size was estimated at 10 280 families). Women eligible for inclusion: belonged to a family composed of at least one adult, as well as one child younger than 13 years; spoke 1 of the 17 survey languages; and was currently lodged in emergency shelters that were generally short-term and provided only basic services (e.g. breakfast), in social hotels, in long-term rehabilitation centres that provided a larger number of services (e.g. access to a kitchen), and in reception centres for asylum-seekers. Families were offered vouchers to participate. First, 251 of the 796 accommodations for homeless persons in the region at the time of the survey were randomly selected, stratified by facility type (82% participation rate). Second, families with at least one child younger than 13 years were randomly selected: 801 (65% participation) took part in the study. In the third and final stage, one child was randomly chosen from each family. For the present study, we excluded families in which the sampled child was younger than 6 months ($n = 60$) or older than 6 years ($n = 235$), as breastfeeding duration was not ascertained in children aged >6 years, or where the father was the respondent ($n = 25$). This produced a sample of 481 mother–child dyads.

Measurements

Exposure

The primary predictor variable in this analysis was a maternal report of any period of breastfeeding. As previously described in ENFAMS,[11] two mutually exclusive groups (<6 months, ≥6 months) were formed based on mothers' responses to the following question: 'For how many months was your child breastfed or provided breast milk?'. Children were considered breastfed if they had ever received breast milk, regardless of the type of breastfeeding (exclusive or partial) and of the introduction of complementary foods or non-milk beverages (if any). For those children still receiving breast milk at the time of the interview, duration was censored at the child's age at that moment ($n = 59$, 12%).

Outcomes

Child physical health. Nurses assessed children's haemoglobin concentration (g/dl) from a capillary blood sample with a portable haemoglobinometer. They also weighed the children with a calibrated SECA balance scale, measured their height by a sliding foot scale or a wall-mounted stadiometer (depending on age) with a precision of 0.1 kg and 0.1 cm, respectively. Height and weight were measured while participants were dressed in light indoor clothing without footwear. Values were converted into age- and sex-specific BMI *z*-scores with the WHO standards.[15]

Child development. Using the Vineland Adaptive Behaviour Scale, second edition (VABS-II),[16] a psychologist assessed children's adaptive behaviours, defined as practical everyday skills needed to function and meet the demands of one's environment, including the skills necessary to care for oneself effectively and independently and to interact with others.[17] Mothers were asked about the children's everyday activities across four domains (and subdomains): communication (receptive, expressive and written), daily living skills (personal, domestic and community), socialization (interpersonal relationships, play and leisure time, and coping skills) and motor skills (gross and fine). For each domain, the sum of the raw scores of the corresponding subdomains was converted into an age-based standard score. The higher the score, the more 'adapted' the child.[18]

Maternal physical health. As they had for the children, nurses measured maternal haemoglobin concentration (g/dl) and weight and height to compute BMI in kg/m^2. Nurses also measured maternal blood pressure by standardized methods. The systolic and diastolic blood pressure (SBP and DBP, respectively) were measured three times: first at the right and then the left brachial artery, and finally at the brachial artery where either SBP or DBP was the highest among the first two measurements. Values were collected by an electronic sphygmomanometer after a 5-min rest in a seated position before each measurement. According to the 2017 American College of Cardiology/American Heart Association Guideline, BP should be measured in both arms at the initial assessment, and if there is a difference, the arm with the higher BP should be used again to diagnose hypertension.[19] Thus, we discarded the first two measurements and used the third measure in the analysis. SBP and DBP were considered separately. Note that SBP has been shown to be more responsive than DBP to changes in modifiable risk factors.[20] Mothers' perceptions of their physical health were ascertained by the following semi-quantitative adapted *Minimum European Health Module* variable: 'How would you currently describe your physical health? Is it … 1. Very good; 2. Good; 3. Fair; 4. Poor; 5. Very Poor'?[21] Responses were grouped into one 'negative' ('very bad', 'bad' or 'fair') and one 'positive' ('good' or 'very good') modality.

Maternal mental health. Mothers' perceptions of their emotional health were ascertained with the following ordinal adapted *Minimum European Health Module* variable: 'How would you currently describe your emotional health? Is it … 1. Very good; 2. Good; 3. Fair; 4. Poor; 5. Very Poor'.[21] Responses were grouped into the same modalities: negative or positive. Mothers were classified as depressed or not with the WHO short form of the Composite International Diagnostic Interview (CIDI).[22]

Covariates

This study incorporated a set of variables considered sufficient to adjust for confounding factors [11,18,23]:

- Maternal social, economic and demographic factors: maternal age (in years), parity at the child's birth (multiparity: yes, no), employment/student status (yes, no), educational level (<high-school degree: yes, no), monthly income [>€59.20/consumption unit (first

tertile): yes, no], health insurance [(in)complete, none], mother's region of birth (North Africa, sub-Saharan Africa, and the rest of the world, including Europe and France).
- Mother's living conditions: the reason for departure from native country (to escape violence: yes, no), residential instability (i.e. number of moves in the last 12 months >2: yes, no), household food insecurity in the preceding 12 months (assessed using the French version of the US Household Food Security Module[24,25]: yes, no), proficiency in French (yes, no), region of residence at the child's birth (in France, abroad).
- Mother's social and familial support: father has ever lived with the child (yes, no), friends' social support, ascertained by one item investigating whether mothers had been invited to visit friends more than once in the past year (yes, no).
- Child's characteristics: age (years), sex, birth weight (kg) and gestational age at birth (weeks of amenorrhoea).

Statistical analysis

We adopted an outcome-wide approach that enables a comprehensive holistic assessment of the association of one given exposure with a wide range of outcomes; its methodological advantages include less susceptibility to P-hacking and publication bias.[26] We used linear (or modified Poisson[27] for the dichotomized outcomes, i.e. maternal depression, perceived physical and emotional health) regression models to regress each standardized outcome on any breastfeeding duration ≥6 months. All models were controlled for the covariates mentioned above (see 'Covariates' section). We performed multiple imputations by chained equations to impute missing data for all variables, with 20 imputed datasets created. More information is available in Supplementary material S1.

To evaluate the robustness of the estimated associations with unmeasured confounding, we calculated *E-values* for each exposure-outcome association.[26] We also reran all the analyses with each dichotomized outcome according to well-defined cut-offs (refer to Supplementary table S4 footnotes). Finally, we considered any breastfeeding duration in months as a continuous variable.

Using R software (version 4.0.4), we took the complex multistage sampling design of the ENFAMS survey into account by weighting all our analyses.

Results

Sample characteristics

The children's mean age was 2.8 years [95% confidence interval (CI) 2.5 to 3.0]. The proportion of food insecurity was 84.6% (95% CI 79.1 to 90.0). More specifically, 34.4% (95% CI 27.5 to 41.4) had moderate food security, 41.0% (95% CI 34.0 to 48.0) had low food security and 9.2% (95% CI 6.2 to 12.4) had very low food security. In terms of socio-economic position, 30.4% (95%CI 24.3 to 36.6) of mothers had at least a high-school diploma, while only 15.6% (95% CI 10.3 to 21.0) worked. Overall, 61.6% (95% CI 54.7 to 68.4) of the children had been (or were being) breastfed for at least 6 months. Sub-Saharan Africa was the region of birth for 34.3% (95% CI 27.9 to 40.6) of mothers, North Africa for 29.6% (95% CI 22.7 to 36.4) and outside Africa for 36.2% (95% CI 29.4 to 42.9). Table 1 reports other characteristics of the study sample.

Analyses

Any breastfeeding ≥6 months was associated with lower maternal SBP ($B = -0.40$, 95% CI −0.68 to −0.12), but not with DBP (Table 2). No associations were observed with any of the children's outcomes studied.

E-values suggested that associations of any breastfeeding ≥6 months with the various outcomes were at least moderately (mostly from 1.20 to 2.65) robust to potential unmeasured confounding (Supplementary table S2). Reanalyzing the primary models using dichotomized outcomes yielded consistent results (Supplementary table S3—distributions of dichotomized outcomes are provided in Supplementary table S4), as did the analyses with any breastfeeding duration as a continuous variable in months (Supplementary table S5).

Discussion

Despite extremely deprived living conditions, mothers undergoing homelessness after migrating to France had lower SBP when they had fed their children with any amount of breast milk for at least 6 months, compared with similarly situated mothers who had not. To our knowledge, no other epidemiological study has examined whether breastfeeding might potentially protect children and mothers from the increased health risks inherent in these living conditions.

Stressors related to migration, on top of various insecurities (e.g. residential, food), may directly contribute to high blood pressure.[28] High-stress levels can 'get under the skin' and have a lasting impact on developing physiological regulatory systems such as immunological/inflammatory and neurological functioning. In turn, these disruptions place individuals at risk for a myriad of health problems throughout their lifespan, such as chronic infections and hypertension.[29] Consistent with our results, emerging evidence from multiple individual studies suggests that breastfeeding could be associated with reduced cardiovascular risk, that is, may reduce hypertension later on in these mothers' lives.[30] Several mechanisms have been proposed to explain this relation.[31] First, maternal metabolism may be 'reset' by breastfeeding after pregnancy, which in turn may decrease blood pressure; the longer a woman lactates, the more completely she off-loads the energy stored accumulated during pregnancy in anticipation of lactation. Second, oxytocin release stimulated by breastfeeding is reported to reduce blood pressure directly. Evidence also supports the hypothesis that this neuropeptide's release during suction plays a crucial role in controlling stress and anxiety through social bonding.[4] Further investigation is needed about the foundations for these relations. Notably, we identified an inverse dose–response association between breastfeeding duration in months and maternal SBP (Supplementary table S5). We further explored the potential cumulative nature of this relation to see whether multiparous women accumulate longer lifetime breastfeeding durations, as reported elsewhere.[32] Our results indeed suggested a stronger association for multiparous women who breastfed their children more than 6 months than for nulliparous women ($B = -0.61$, 95% CI −0.96 to −0.25 and $B = -0.39$, 95% CI −0.76 to −0.02, respectively). Associations between breastfeeding and BMI remain uncertain. Factors not taken into account in this analysis, such as gestational weight gain and pre-pregnancy weight, may confound the relations we investigated.[33] Similarly, one explanation might be that low maternal self-efficacy in breastfeeding, but also physical challenges with it (including latching problems, nipple pain, negative emotions during infant feeding, breast infection, and lack of milk supply), could weaken or counteract breastfeeding's potential physical but also mental benefits.[34] Alternatively, a lack of statistical power might have produced the borderline associations seen here between longer breastfeeding durations and some aspects of suboptimal maternal health (i.e. with diastolic blood pressure and depression).

A recent meta-analysis by Horta et al. concluded that the risk of being overweight or obese was moderately lower in children who were breastfed.[35] The null finding regarding this outcome in our study may be partly explained by residual confounding. In fact, Horta et al. suggested that variables such as children's birth conditions should be systematically taken into account in investigating such relations.[35] The finding that breastfeeding was not associated with children's adaptive behaviours is consistent with observational studies and randomized controlled trials from other resource-limited populations that also found no association with cognitive

Table 1 Characteristics of our sample (weighted)[a]: the ENFAMS survey

	***n* = 481** **Mean or % (95% CI)**
Exposure	
Any breastfeeding duration ≥6 months	61.6 (54.7 to 68.4)
Outcomes	
Children	
Physical health	
BMI *z*-scores (WHO references)	0.60 (0.39 to 0.80)
Haemoglobin concentration (mg/L)	11.2 (11.0 to 11.4)
Development (adaptive behaviours, VABS-II—scores standardised by age)	
Socialization[b]	77.8 (76.5 to 79.1)
Communication[b]	73.3 (71.0 to 75.5)
Motor skills[b]	68.2 (66.8 to 69.6)
Daily living skills[b]	89.7 (87.6 to 91.7)
Mothers	
Physical health	
BMI (kg/m^2)	26.9 (26.2 to 27.7)
Haemoglobin concentration (mg/l)	11.2 (11.0 to 11.4)
Diastolic blood pressure (mmHg)	78.1 (76.3 to 79.9)
Systolic blood pressure (mmHg)	120.3 (117.9 to 122.7)
Perceived physical health (MEHM—positive)[c]	49.8 (42.7 to 56.9)
Mental health	
Perceived emotional health (MEHM—positive)[c]	39.8 (32.8 to 46.8)
Depression (CIDI—yes)	27.3 (21.1 to 33.6)
Covariates	
Mother's socio-demographic factors	
Employment status (yes)	15.6 (10.3 to 21.0)
Educational level (>high-school diploma)	30.5 (24.4 to 36.7)
Monthly income (>59.5€/CU)[d]	24.9 (19.2 to 30.6)
Mother's region of birth (Africa)	63.8 (57.0 to 70.6)
Multiparity (yes)	31.5 (25.6 to 37.4)
Mother's living conditions	
Food security (yes)	15.3 (9.9 to 20.7)
Proficiency in French (yes)	42.3 (35.4 to 49.2)
Region of residence at child birth (France)	49.8 (42.8 to 56.8)
Reason for departure of country of origin (to escape from violence)	25.7 (20.5 to 31.0)
Mother's social and familial support	
Father's presence (ever lived with the child—yes)	75.1 (69.7 to 80.6)
Friends' social support (invited more than once within the last year)	55.7 (48.7 to 62.7)
Child characteristics	
Sex (boy)	55.7 (48.7 to 62.7)

CU, consumption unit; MEHM, Minimum European Health Module.

a: When variables are binary, only distribution for (one modality) is displayed.

b: For each domain, the sum of the raw scores of the corresponding subdomains was converted into an age-based standard score. Higher scores indicate a higher level of adaptive behaviours. Standard scores (mean = 100; SD = 15) were established for the general population in the United States.

c: Positive: 'very good' or 'good' perception.

d: First tertile <59.5€/CU/month.

outcomes.[36] Adaptive behaviour describes the typical performance of daily activities and represents in part the ability to translate cognitive potential (e.g. executive function, a higher-order cognitive function) into real-world skills. Reported associations between breastfeeding and children's cognitive abilities in high-income settings could be due in part to maternal cognitive and socio-economic characteristics. A recent study in the UK supports this hypothesis, at least in the short term.[37] In low-income settings, high rates of some degree of breastfeeding exist but comparisons between breastfed and non-breastfed populations may have examined more homogeneous groups.[38] Moreover, other sources of confounding cannot entirely be ruled out.

Breastfeeding duration data were self-reported retrospectively for most of the sample (as few mothers—12%—were still breastfeeding the child at the time of the survey), thus impairing precision and accuracy. Nonetheless, previous studies suggest that maternal recall is a valid and reliable measure of breastfeeding practices.[39] Additionally, we had no information about the type of breastfeeding; in particular, we cannot rule out the possibility that findings for exclusive breastfeeding might be different. Partial breastfeeding is a common practice in France among mothers of sub-Saharan African origin.[8,40] Furthermore, data on breastfeeding over the last decade shows changing trends in some but not all breastfeeding indicators. For example, exclusive breastfeeding has increased in west and central Africa since 2015.[6] Because information on parental smoking habits in the perinatal period was missing, residual confounding cannot entirely be ruled out: especially, smoking mothers were reported to have shorter breastfeeding duration; which would in turn result on their newborns running greater health risks.[41,42] However, we believe this bias is limited because migrants tend to smoke less than those born in France.[43] Our study has several strengths, however, including its representative sample of families experiencing homelessness in the greater Paris area, its comprehensive examination of a wide range of health and well-being outcomes, in children, but also and more originally in their mothers. Our study is also novel in its focus on mother–child dyads experiencing homelessness after migration, an under-researched and underserved population. It interviewed women in 17 different languages. To optimize precision and accuracy, it measured several objective variables, namely, the height, weight, and haemoglobin concentrations of

Table 2 Associations between any breastfeeding duration ≥6 months and standardized mother–child physical and mental health outcomes: unadjusted and adjusted models: the ENFAMS survey

	n = 481	
	Unadjusted ***B*** **or PR (95% CI)[b]**	**Adjusted[a]** ***B*** **or PR (95% CI)[b]**
Children		
Physical health		
BMI *z*-scores (WHO references)	0.12 (−0.27 to 0.51)	0.06 (−0.29 to 0.41)
Haemoglobin concentration (HemoCue® Hb201+ system)	0.05 (−0.26 to 0.36)	0.02 (−0.29 to 0.32)
Development (adaptive behaviours)		
Socialization (VABS-II)[c]	−0.07 (−0.28 to 0.14)	0.01 (−0.17 to 0.19)
Communication (VABS-II)[c]	−0.15 (−0.46 to 0.16)	−0.07 (−0.31 to 0.17)
Motor skills (VABS-II)[c]	−0.21 (−0.42 to 0.00)	−0.09 (−0.28 to 0.09)
Daily living skills (VABS-II)[c]	−0.04 (−0.3 to 0.23)	0.04 (−0.19 to 0.26)
Mothers		
Physical health		
BMI	0.18 (−0.13 to 0.48)	0.02 (−0.27 to 0.3)
Haemoglobin concentration (HemoCue® Hb201+ System)	0.12 (−0.17 to 0.41)	0.12 (−0.16 to 0.39)
Diastolic blood pressure	−0.14 (−0.44 to 0.17)	−0.26 (−0.53 to 0.01)
Systolic blood pressure	−0.29 (−0.59 to 0.01)	−0.40 (−0.68 to −0.12)
Perceived physical health (MEHM—positive vs. negative)	1.11 (0.82 to 1.49)	1.12 (0.86 to 1.46)
Mental health		
Perceived emotional health (MEHM—positive vs. negative)	1.21 (0.84 to 1.75)	1.19 (0.87 to 1.64)
Depression (CIDI—yes vs. no)	0.75 (0.47 to 1.18)	0.73 (0.49 to 1.10)

PR, prevalence ratio.

a: Adjusted for: mother's socio-economic and socio-demographic factors: maternal age, parity at childbirth, employment/schooling status, educational level, region of birth, monthly income, health insurance, mother's living conditions: the reason for departure from the country of origin, residential instability, food insecurity in the preceding 12 months, proficiency in French, region of residence at child's birth, mother's social and familial support: father ever lived with the child, friends' social support, child's characteristics: age, sex, birth weight, gestational age.

b: Mainly standardized betas are presented except for the 'depression (CIDI)' and 'perceived physical and emotional health (MEHM)' variables where prevalence ratios are reported.

c: Higher values are positive.

mothers and children and maternal blood pressure. It also measured self-rated (perceived) health, associated with various dimensions: physical, social, and emotional function, and biomedical signs and symptoms.[44] This combination of both subjective and objective measurements was an additional strength.

Although the benefits of breastfeeding for children are widely established, our study did not confirm them. Our findings do not, however, necessarily imply that there are no relations between breastfeeding and children's health; the influence of breastfeeding on child health might emerge later on.[37] Alternatively, as stressed above, observational studies are also subject to residual confounding. While it is possible to control for some socio-economic and socio-demographic factors, it is not possible to control, for instance, the exhaustive list of social, behavioural and attitudinal factors intrinsic to the desire to breastfeed.[45] Hence, the jury remains out regarding the associations between breastfeeding duration and measures of child health and development in this population; further research is recommended. Breastfeeding should continue to be encouraged, as any short-term improvements in children's adaptive behaviours and BMI are only two aspects of the benefits it can provide. The positive associations of any breastfeeding duration on maternal health, though less studied, are also worth mentioning. Besides the improved systolic blood pressure emphasized in our study, breastfeeding has also been robustly associated with reduced risks for maternal type 2 diabetes, ovarian cancer, and breast cancer.[1] A few articles stressed the role of self-efficacy, or confidence in one's ability to breastfeed, in mediating the relation between infant feeding method and maternal mental health outcomes.[34] Consequently, there is room for improvement in raising awareness of breastfeeding recommendations and communicating the positive effects of lactation in mothers experiencing homelessness for themselves too. While any breastfeeding duration ≥6 months seems to yield positive health benefits for mothers, we should underscore the importance of exclusive breastfeeding as another important recommended practice for optimal health benefits.[1,6] Research suggests that the duration of breastfeeding (particularly when longer than 3 or 4 months) is more important than the breastfeeding pattern (exclusive or not), at least, in the association with child behaviours.[46] Either way, duration and exclusivity are practices that depend upon not just maternal willingness, awareness and education, but also on early social support,[45] the working environment, and more generally the broader social environment.[7] A fundamental challenge is thus to implement strategies with sustained and community-wide support and guidance, proven to be effective for women encountering structural, cultural and social difficulties.[47] Any discussion about infant feeding should incorporate all aspects of the mother's life, including the level of familial and social support,[45] exposure to systemic racism, and other structural stressors, work situation and financial status.[34] Ultimately, maternal mental health could also be of importance to help our understanding of breastfeeding practices in these settings.[48] Women who do present with significant perinatal mental health issues should be supported to make whatever decision is best for themselves and their families. Professionals should refrain from presenting all-or-nothing scenarios, given that many women combine breast and formula feeding in ways that allow them to enjoy successfully—and if they choose—long-lasting breastfeeding relationships with their children.[34] Especially important is the training of health professionals and social workers with reinforcement of knowledge as well as creation of role models.[45,49]

Conclusion

Breastfeeding according to WHO recommendations to improve mothers' health remains relevant in the intersecting and challenging life circumstances of migration and homelessness. It is therefore important to inform women so they can make a free and informed

choice about the breastfeeding practices they wish to adopt. Given the documented social complexity of breastfeeding practices, any interventions to support breastfeeding in these disadvantaged living conditions should be proportional to maternal vulnerabilities, i.e. should consider the mothers' socio-cultural heritage and structural barriers they face, including food and residential insecurity.

Supplementary data

Supplementary data are available at *EURPUB* online.

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Conflicts of interest: None declared.

Ethics

The study protocol was approved by the national authority for the protection of personal data collected on individuals (CNIL, nDR-2013-147) and by two Ethics Committees (CPP, Ref 22,20120206 August 2012, and CCTIRS, n12.471, 17 September 2012).

Data availability

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Key points

- Experiencing homelessness has short- and long-term negative consequences on the health of mothers and children.
- Studies investigating the benefits of breastfeeding on the health of mothers and children experiencing homelessness in the context of migration are sparse.
- In mother–child dyads experiencing homelessness in the greater Paris area after their migration to France, any breastfeeding $\geq$6 months was associated with lower maternal systolic blood pressure.
- The relevance of supporting breastfeeding to improve mothers' physical health holds true in the combined situation of migration and homelessness.

References

1 Victora CG, Bahl R, Barros AJD, et al.; Lancet Breastfeeding Series Group. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *Lancet* 2016;387:475–90.

2 Su Q, Sun X, Zhu L, et al. Breastfeeding and the risk of childhood cancer: a systematic review and dose-response meta-analysis. *BMC Med* 2021;19:90.

3 Videholm S, Wallby T, Silfverdal S-A. Breastfeeding practice, breastfeeding policy and hospitalisations for infectious diseases in early and later childhood: a register-based study in Uppsala County, Sweden. *BMJ Open* 2021;11:e046583.

4 Peñacoba C, Catala P. Associations between breastfeeding and mother–infant relationships: a systematic review. *Breastfeed Med* 2019;14:616–29.

5 World Health Organization. *Infant and Young Child Nutrition—Global Strategy on Infant and Young Child Feeding*. Geneva: World Health Organization, 2002.

6 Neves PAR, Vaz JS, Maia FS, et al. Rates and time trends in the consumption of breastmilk, formula, and animal milk by children younger than 2 years from 2000 to 2019: analysis of 113 countries. *Lancet Child Adolesc Health* 2021;5:619–30.

7 Snyder K, Hulse E, Dingman H, et al. Examining supports and barriers to breastfeeding through a socio-ecological lens: a qualitative study. *Int Breastfeed J* 2021;16:52.

8 Odeniyi AO, Embleton N, Ngongalah L, et al. Breastfeeding beliefs and experiences of African immigrant mothers in high-income countries: a systematic review. *Matern Child Nutr* 2020;16:e12970.

9 Dennis C, Shiri R, Brown HK, et al. Breastfeeding rates in immigrant and non-immigrant women: a systematic review and meta-analysis. *Matern Child Nutr* 2019;15:e12809.

10 Hermans K, Dyb E, Knutagård M, et al. Migration and homelessness: measuring the intersections. *Eur J Homelessness* 2020;14:22.

11 Frenoy P, Vandentorren S, Arnaud A, et al. Demographic, socioeconomic, and sociocultural factors associated with any breastfeeding in homeless mothers. *Matern Child Nutr* 2021;17:e13167.

12 Jones KM, Power ML, Queenan JT, Schulkin J. Racial and ethnic disparities in breastfeeding. *Breastfeed Med* 2015;10:186–96.

13 Watkins S, Meltzer-Brody S, Zolnoun D, Stuebe A. Early breastfeeding experiences and postpartum depression. *Obstet Gynecol* 2011;118:214–21.

14 Vandentorren S, Le Méner E, Oppenchaim N, et al. Characteristics and health of homeless families: the ENFAMS survey in the Paris region, France 2013. *Eur J Public Health* 2016;26:71–6.

15 de Onis M, Onyango AW, Borghi E, et al. Development of a WHO growth reference for school-aged children and adolescents. *Bull World Health Organ* 2007;85:660–7.

16 Sparrow SS, Cicchetti DV, Balla A. The Vineland Adaptive Behavior Scales. 2nd ed. Circle Pines, MN: American Guidance Service, 2005: 199–231.

17 Klin A, Saulnier CA, Sparrow SS, et al. Social and communication abilities and disabilities in higher functioning individuals with autism spectrum disorders: the Vineland and the ADOS. *J Autism Dev Disord* 2007;37:748–59.

18 Darbeda S, Falissard B, Orri M, et al. Adaptive behavior of sheltered homeless children in the French ENFAMS survey. *Am J Public Health* 2018;108:503–10.

19 Whelton PK, Carey RM, Aronow WS, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: a Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation* 2018;138:e484–594.

20 Brummett BH, Babyak MA, Siegler IC, et al. Systolic blood pressure, socioeconomic status, and biobehavioral risk factors in a nationally representative US young adult sample. *Hypertension* 2011;58:161–6.

21 Cox B, Oyen HV, Cambois E, et al. The reliability of the Minimum European Health Module. *Int J Public Health* 2009;54:55–60.

22 Kessler RC, Üstün TB. The World Mental Health (WMH) Survey Initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res* 2004;13:93–121.

23 Arnaud A, Lioret S, Vandentorren S, Le Strat Y. Anaemia and associated factors in homeless children in the Paris region: the ENFAMS survey. *Eur J Public Health* 2018;28:616–24.

24 Radimer KL. Measurement of household food security in the USA and other industrialised countries. *Public Health Nutr* 2002;5:859–64.

25 Health Canada. Canadian Community Health Survey. Cycle 2.2, Nutrition (2004): Income-Related Household Food Security in Canada. Office of Nutrition Policy and Promotion, Health Canada: Ottawa, ON, Canada. 2006, p. 110.

26 VanderWeele TJ, Mathur MB, Chen Y. Outcome-wide longitudinal designs for causal inference: a new template for empirical studies. *Statist Sci* 2020;35:437–66.

27 Zou G. A modified Poisson regression approach to prospective studies with binary data. *Am J Epidemiol* 2004;159:702–6.

28 Gasperin D, Netuveli G, Dias-da-Costa JS, Pattussi MP. Effect of psychological stress on blood pressure increase: a meta-analysis of cohort studies. *Cad Saude Publica* 2009;25: 715–26.

29 Cutuli JJ, Ahumada SM, Herbers JE, et al. Adversity and children experiencing family homelessness: implications for health. *J Child Poverty* 2017;23:41–55.

30 Tschiderer L, Seekircher L, Kunutsor SK, et al. Breastfeeding is associated with a reduced maternal cardiovascular risk: systematic review and meta-analysis involving data from 8 studies and 1 192 700 Parous Women. *J Am Heart Assoc* 2022;11:e022746.

31 Park S, Choi N-K. Breastfeeding and maternal hypertension. *Am J Hypertens* 2018; 31:615–21.

32 Lupton SJ, Chiu CL, Lujic S, et al. Association between parity and breastfeeding with maternal high blood pressure. *Am J Obstet Gynecol* 2013;208:454.e1–454.e7.

33 Chowdhury R, Sinha B, Sankar MJ, et al. Breastfeeding and maternal health outcomes: a systematic review and meta-analysis. *Acta Paediatr* 2015;104:96–113.

34 Yuen M, Hall OJ, Masters GA, et al. The effects of breastfeeding on maternal mental health: a systematic review. *J Womens Health (Larchmt)* 2022;31:787–807.

35 Horta BL, Rollins N, Dias MS, et al. Systematic review and meta-analysis of breastfeeding and later overweight or obesity expands on previous study for World Health Organization. *Acta Paediatrica* 2023;112:34–41.

36 Mohammed S, Oakley LL, Marston M, et al. The association of breastfeeding with cognitive development and educational achievement in sub-Saharan Africa: a systematic review. *J Glob Health* 2022;12:04071.

37 Pereyra-Elías R, Quigley MA, Carson C. To what extent does confounding explain the association between breastfeeding duration and cognitive development up to age 14? Findings from the UK Millennium Cohort Study. *PLoS One* 2022; 17:e0267326.

38 Walfisch A, Sermer C, Cressman A, Koren G. Breast milk and cognitive development—the role of confounders: a systematic review. *BMJ Open* 2013;3:e003259.

39 Li R, Scanlon KS, Serdula MK. The validity and reliability of maternal recall of breastfeeding practice. *Nutr Rev* 2005;63:103–10.

40 Kersuzan C, Tichit C, Thierry X. Les pratiques d'allaitement des immigrées et des natives en France, à partir de la cohorte Elfe. *Population* 2018;73:571–92.

41 References 41–49 are available in the Supplementary data..