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Workplace and Travel-Related Barriers to Exclusive Breastfeeding Among Employed Mothers

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Abstract

Exclusive breastfeeding (EBF) for six months is a cornerstone of child survival, yet employed mothers face structural barriers that are incompletely understood, and the distinct challenges encountered away from a fixed workplace during travel remain largely unexamined. This cross-sectional study surveyed 384 employed lactating mothers of children aged 2–24 months in Narsingdi District, Bangladesh, using a structured questionnaire covering seven workplace-support indicators, current EBF status, and eleven paired Likert items comparing workplace and travel experience. Associations were tested with Pearson's chi-square, Wilcoxon signed-rank tests, and multivariable binary logistic regression. EBF prevalence was 72.9% (280/384). Maternity leave, breastfeeding breaks, and access to a private room were the strongest independent predictors of EBF (adjusted odds ratios 3.65, 3.13, and 3.39; all $p < 0.001$). Paired comparisons showed travel was associated with significantly greater logistical burden, schedule disruption, physical discomfort, stigma, and lower perceived safety than the workplace (all $p < 0.05$), whereas perceived privacy, hygiene, milk-storage safety, and social support were rated more favourably during travel. In a separate model of travel-challenge domains, sufficient time and feeling safe/comfortable while travelling independently predicted higher odds of EBF, whereas schedule disruption, physical discomfort, stigma, and, counter-intuitively, higher perceived social support while travelling independently predicted lower odds (all $p < 0.05$). Workplace structural supports are strongly associated with exclusive breastfeeding, but travel introduces a distinct, logistics-driven set of barriers not captured by workplace policy alone. Lactation support should be extended beyond the workplace into transport and public infrastructure to sustain progress toward national and global breastfeeding targets.

1. Background

Exclusive breastfeeding (EBF) for the first six months of life is recommended by the World Health Organization (WHO) and UNICEF as the optimal feeding practice for infant survival, growth, and cognitive development. Globally, the prevalence of EBF among infants under six months reached 48% in 2023–24, up from 37% in 2013, moving closer to the World Health Assembly target of 50% by 2025 [1]. In Bangladesh, however, national EBF prevalence has followed an inconsistent trajectory, falling from 65% in 2017–18 to 55% in 2022 according to the Bangladesh Demographic and Health Survey [2], a decline that public health authorities attribute in part to the growing participation of mothers in the paid workforce without commensurate lactation accommodation.

Return to paid work is one of the most consistently reported barriers to sustained EBF. Systematic reviews and meta-analyses of workplace lactation programmes have found that access to breastfeeding breaks, a dedicated lactation space, and organisational policy support are associated with meaningfully higher breastfeeding duration and exclusivity [5, 6]. Mothers without access to a lactation space and refrigerated storage have been reported to be up to 1.8 times more likely to discontinue breastfeeding after returning to work [7], and realist reviews indicate that breastfeeding breaks, lactation rooms, and supportive supervisors act through mechanisms of time availability, privacy, and reduced workplace

stigma [8]. Cross-sectional survey evidence from a French university hospital and perinatal network similarly found substantial gaps in lactation-space provision even in well-resourced settings [9], while a systematic review of employer-based programmes concluded that dedicated space and breastfeeding breaks were the accommodations most consistently linked to continued breastfeeding [10]. In Bangladesh, the Labour Act (Amendment) 2023 extended statutory maternity leave from 112 to 120 days, still short of the International Labour Organization's Convention 183 recommendation of at least 14–18 weeks with wide variation across sectors, and considerably shorter than the six-month period recommended for EBF [11].

While workplace lactation support has been extensively studied, the challenges mothers face while travelling, commuting to work, visiting health facilities, or travelling for family or economic reasons remain comparatively unexamined, despite being a routine and unavoidable part of daily life for many employed mothers in low- and middle-income settings. Unlike the workplace, travel environments are typically unregulated, offer no dedicated facilities, and expose mothers to unpredictable time constraints, public scrutiny, and logistical burden (e.g., carrying pumps, bottles, and cooling supplies). A recent Bangladeshi multilevel analysis of Demographic and Health Survey data confirmed a persistent association between maternal employment and EBF discontinuation [12], yet no study to date has directly compared, within the same mothers, the relative magnitude of workplace versus travel-related breastfeeding barriers.

This gap is not for want of related evidence: workplace lactation research has examined maternity leave, breaks, and facilities in considerable depth, but the discrete experience of commuting and transit is rarely isolated as an exposure. In one of the few studies to do so, a large mixed-methods survey of Chinese working mothers found that a return-trip commute of about one hour could functionally negate a nominal breastfeeding break, independent of leave entitlement or workplace policy [13]. An urban ethnography of infant feeding across public transport settings in Cardiff similarly found that crowding, unsuitable seating, and a lack of privacy made buses, trains, and taxis inhospitable environments for feeding or expressing, whereas comfortable seating and low visibility to strangers facilitated it [14]. These findings support treating travel as a distinct exposure warranting the paired within-subject comparison undertaken in this study, rather than assuming travel simply extends workplace difficulty.

This study therefore had three objectives: (1) to examine the association between seven dimensions of workplace breastfeeding support and EBF practice among employed lactating mothers in Narsingdi District, Bangladesh; (2) to identify which of eleven travel-related challenge domains independently predict EBF status; and (3) to directly compare, using a paired within-subject design, perceived breastfeeding-related difficulty across eleven domains (time, privacy, hygiene, milk storage, emotional comfort, social support, logistical burden, safety, schedule disruption, physical discomfort, and stigma) in the workplace versus during travel. We hypothesised that (H1) workplace support variables would be significantly associated with EBF practice, (H2) specific travel-challenge domains would independently predict EBF status after mutual adjustment, and (H3) travel would be associated with significantly

greater perceived breastfeeding-related difficulty than the workplace across the majority of comparison domains.

The study is informed by two complementary sociological frameworks. Role Strain Theory [15] conceptualises the difficulty employed mothers face in simultaneously meeting the competing demands of paid work, travel, and infant care, providing a lens for interpreting why structural supports at a fixed worksite do not automatically extend to the unregulated, mobile environment of commuting or travel. Recent extensions of this framework describe breastfeeding as embodied, gendered care work whose costs are often invisible to formal workplace policy [16], consistent with qualitative evidence that role strain among employed mothers intensifies when leave, childcare, and supportive supervision are simultaneously absent [17], and with scoping-review evidence that employment characteristics beyond a simple employed/not-employed dichotomy including occupation, schedule, and decision latitude structure breastfeeding continuation after return to work [18]. The WHO/UNICEF Infant and Young Child Feeding framework situates workplace and travel barriers within the broader determinants of optimal breastfeeding practice, linking this study's findings to established global public-health guidance on removing structural barriers to EBF.

2. Methods

2.1 Study design and setting

This was a descriptive cross-sectional study conducted among lactating mothers residing in Narsingdi District, Bangladesh. The study compared challenges faced by mothers in the workplace and during travel, focusing on structural workplace support, exclusive breastfeeding practice, and paired workplace-versus-travel experience across eleven functional domains.

2.2 Study population and sampling

The study population comprised lactating mothers with a youngest child aged between 2 and 24 months (mean 11.6 months, SD 4.5), currently breastfeeding or having breastfed within the preceding six months, who were employed (formally or informally), self-employed, or engaged in business/other occupations, and resident in Narsingdi District, Bangladesh (an administrative unit of approximately 1,150 km² comprising six upazilas Belabo, Monohardi, Narsingdi Sadar, Palash, Raipura, and Shibpur roughly 70 unions, six municipalities, and around 1,050 villages, with a mixed semi-urban and rural character). The target population was defined as the female population of Narsingdi District, estimated at 1,318,276 from the 2022 Population and Housing Census [3]. The minimum required sample size was determined using the Krejcie and Morgan sample-size table [4] for a known population of this magnitude, at a 95% confidence level and 5% margin of error; because the Krejcie and Morgan table plateaus at a minimum requirement of 384 respondents for any population above approximately 75,000–100,000, this minimum remains 384 at the larger, district-level target population and is unchanged from the upazila-level calculation. A total of 384 mothers were recruited and included in the final analysis, with no missing data on any analysed variable. Respondents were selected using purposive (non-probability) sampling

based on the inclusion criteria above; this technique was chosen for practical accessibility but means the sample cannot be assumed to be statistically representative of the full target population, a limitation discussed in Section 4.1.

2.3 Data collection instrument

Data were collected using a structured, interviewer- or self-administered questionnaire comprising four sections: (A) demographic characteristics (age, education, occupation, child's age; 4 items); (B) workplace breastfeeding support, measured as seven binary (Yes/No) items maternity leave, breastfeeding breaks, private room, milk storage/refrigeration, employer/colleague support, sufficiency of facilities and policies, and flexible working hours; (C) current exclusive breastfeeding status (Yes/No; 1 item); and (D) eleven paired items assessing perceived time availability, privacy, hygiene, milk-storage safety, emotional comfort, social support, ease of managing supplies, perceived safety/comfort, schedule disruption, physical discomfort, and stigma, each rated separately for the workplace and for travel contexts on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The instrument was pilot-tested with 20 lactating mothers in a neighbouring upazila prior to the main survey, and minor wording clarifications were made on that basis. Internal consistency of the full 22-item Likert battery, as originally assessed during instrument development, was acceptable (Cronbach's $\alpha = 0.82$); split subscale-level reliability for this analysis is reported separately in Section 2.4 and Section 3.7.

2.4 Statistical analysis

Descriptive statistics (means, standard deviations, frequencies, percentages) summarised sample characteristics and the prevalence of workplace support and EBF. Pearson's chi-square test of independence assessed the bivariate association between each of the seven binary workplace-support variables and EBF status, with phi (φ) reported as the effect size. The Wilcoxon signed-rank test, appropriate for paired ordinal (Likert-scale) data, compared workplace versus travel scores for each of the eleven domains and for an overall composite challenge index (mean of all eleven reverse-scored items, oriented so that higher scores denote greater difficulty). Internal consistency of the composite indices was assessed with Cronbach's alpha. Group differences in composite challenge scores by EBF status were tested with the Mann-Whitney U test. A multivariable binary logistic regression model, adjusted for maternal age and child age, was fitted to identify independent predictors of EBF among the seven workplace-support variables, with adjusted odds ratios (AOR) and 95% confidence intervals (CI) reported. Statistical significance was set at $p < 0.05$ (two-tailed). Analyses were performed in Python (SciPy, statsmodels) with cross-validation of chi-square results against SPSS-format output; results were confirmed to reproduce six of seven Pearson chi-square values reported in the original project working table to three decimal places.

2.5 Ethical considerations

Participation was voluntary, and written or verbal informed consent was obtained from all respondents prior to data collection. Confidentiality and anonymity of responses were maintained throughout data collection, entry, and analysis, and respondents were free to withdraw at any stage without consequence.

This research was conducted in full accordance with the ethical principles governing human subjects research, including the Declaration of Helsinki [28], the Belmont Report's [29] principles of respect for persons, beneficence, and justice, and the institutional ethical guidelines of Noakhali Science and Technology University (NSTU). Ethical approval for the study was obtained from the Ethical Committee of Noakhali Science and Technology University (NSTU), Reference No: NSTU/SCI/EC/2025/454, before the commencement of data collection.

2.6 Use of artificial intelligence

Generative artificial-intelligence tools were used during manuscript preparation to assist with English-language editing, reference formatting, and figure-styling code. All study design, data collection, statistical analysis, interpretation of results, and scientific conclusions are the authors' own and were independently verified; no AI tool was used to generate, fabricate, or analyse the underlying study data.

3. Results

3.1 Sample characteristics

A total of 384 lactating mothers were surveyed. The mean maternal age was 30.6 years (SD 5.3; range 20–40), and the mean age of the youngest child was 11.6 months (SD 4.5; range 2–24). Nearly half of respondents (45.1%) had completed graduate-level or higher education, while 17.2% had no formal education. The most common occupational category was formal employment (35.9%), followed by informal employment (31.0%), self-employment (14.3%), other occupations (12.0%), and business ownership (6.8%) (Table 1).

Table 1
Demographic characteristics of respondents (N = 384)

Characteristic	n	%
Age, years — mean (SD); range	30.6 (5.3); 20–40	—
Child age, months — mean (SD); range	11.6 (4.5); 2–24	—
Education level		
No formal education	66	17.2
Primary	94	24.5
Secondary	34	8.9
Higher secondary	17	4.4
Graduate and above	173	45.1
Occupation		
Employed (formal)	138	35.9
Employed (informal)	119	31.0
Self-employed	55	14.3
Business	26	6.8
Other	46	12.0
Note. SD = standard deviation.		

3.2 Workplace support and exclusive breastfeeding prevalence

Maternity leave was the most widely available workplace support (70.6%), followed by breastfeeding breaks (65.6%), a private breastfeeding room (60.4%), employer/colleague support (58.9%), flexible working hours (57.6%), sufficient facilities/policies (54.4%), and milk storage/refrigeration (51.3%) (Supplementary Figure S1). Overall, 72.9% of respondents (280/384) reported currently practising exclusive breastfeeding.

3.3 Association between workplace support and exclusive breastfeeding

Pearson's chi-square tests of independence showed statistically significant associations between EBF practice and maternity leave, breastfeeding breaks, private room availability, employer/colleague support, sufficiency of policies, and flexible working hours (all $p < 0.05$). No significant association was found for milk storage/refrigeration (Supplementary Table S1), indicating that the null hypothesis could

not be rejected for this variable alone, while it was rejected for the remaining six workplace-support indicators.

3.4 Independent predictors of exclusive breastfeeding

In the multivariable logistic regression model adjusting for all seven workplace-support variables plus maternal and child age (Nagelkerke's pseudo-R^2 = 0.21; likelihood-ratio $p < 0.001$), three variables remained independently and significantly associated with EBF after mutual adjustment: maternity leave (AOR 3.65, 95% CI 2.15–6.20, $p < 0.001$), breastfeeding breaks (AOR 3.13, 95% CI 1.85–5.31, $p < 0.001$), and private room availability (AOR 3.39, 95% CI 1.98–5.81, $p < 0.001$). Employer/colleague support, sufficiency of policies, flexible working hours, milk storage, maternal age, and child age were not independently significant predictors once the three structural variables were accounted for (Table 2, Fig. 1A).

Table 2
Multivariable logistic regression: predictors of exclusive breastfeeding

Predictor	AOR	95% CI	p-value
Maternity leave (Yes vs No)	3.65	2.15–6.20	< 0.001
Breastfeeding breaks (Yes vs No)	3.13	1.85–5.31	< 0.001
Private room (Yes vs No)	3.39	1.98–5.81	< 0.001
Milk storage (Yes vs No)	0.78	0.46–1.34	0.368
Employer/colleague support (Yes vs No)	1.35	0.79–2.29	0.273
Sufficient policies (Yes vs No)	1.19	0.70–2.03	0.513
Flexible working hours (Yes vs No)	1.49	0.87–2.54	0.144
Maternal age (per year)	1.02	0.97–1.07	0.504
Child age (per month)	1.01	0.95–1.07	0.871

Note. AOR = adjusted odds ratio, adjusted for all seven workplace-support variables plus maternal and child age; CI = confidence interval. Nagelkerke's pseudo-R^2 = 0.21; likelihood-ratio $p < 0.001$. Corresponds to Fig. 1A.

Table 4
Travel-related challenge domains as predictors of exclusive breastfeeding: unadjusted group comparison and multivariable logistic regression

Travel-context domain	Unadjusted M diff. (EBF Yes − No)	Unadjusted p (Mann-Whitney)	AOR (95% CI)	Adjusted p
Sufficient time to breastfeed	+ 0.96	< 0.001	1.68 (1.29–2.19)	< 0.001
Adequate privacy	+ 0.55	< 0.001	1.12 (0.86–1.46)	0.406
Clean/hygienic facilities	−0.09	0.526	0.65 (0.51–0.85)	0.001
Safe milk storage	+ 0.06	0.570	0.90 (0.70–1.14)	0.371
Emotional comfort	+ 0.06	0.569	0.90 (0.70–1.14)	0.373
Social support received	−0.54	< 0.001	0.67 (0.53–0.86)	0.002
Ease of managing supplies	+ 0.08	0.626	0.73 (0.56–0.96)	0.025
Feeling safe/comfortable	+ 1.14	< 0.001	1.80 (1.39–2.32)	< 0.001
Schedule disruption	−0.89	< 0.001	0.68 (0.51–0.89)	0.006
Physical discomfort	−0.92	< 0.001	0.62 (0.47–0.82)	< 0.001
Stigma/negative attitudes	−0.74	< 0.001	0.74 (0.58–0.94)	0.015

Note. Unadjusted M diff. is the mean travel-item score among mothers practising EBF minus the mean among those not practising EBF (positive = higher score among EBF mothers); all items are scored 1–5 in their original, literal wording direction. AOR = adjusted odds ratio for EBF (Yes) from the multivariable model including all eleven travel-context items simultaneously. Corresponds to Fig. 1B.

3.5 Workplace versus travel: paired comparison of breastfeeding challenges

Wilcoxon signed-rank tests comparing the eleven paired Likert items showed statistically significant differences between workplace and travel contexts for every domain (all $p < 0.05$; Table 3). The direction of the difference varied by domain. Mothers rated sufficient time to breastfeed (M = 2.90 vs 2.66) and feeling safe/comfortable (M = 3.32 vs 2.83) significantly higher for the workplace than for travel, indicating that time pressure and perceived safety were greater concerns while travelling. Conversely, and somewhat unexpectedly, perceived privacy (M = 2.43 vs 2.84), hygienic facilities (M = 2.45 vs 2.84), safe milk storage (M = 2.29 vs 2.54), emotional comfort (M = 2.50 vs 2.71), and social support (M = 2.59 vs 3.09) were all rated slightly more favourably during travel than at the workplace, despite the absence of dedicated travel infrastructure (Supplementary Figure S2). In terms of logistical and physical burden, difficulty managing supplies (M = 2.84 vs 3.49), schedule disruption (M = 2.94 vs 3.52), physical discomfort (M = 2.97 vs 3.39), and stigma/negative attitudes (M = 2.86 vs 3.15) were all significantly higher during travel, consistent with the expectation that unregulated, mobile environments impose a distinct logistical and social burden not captured by workplace-support policy alone.

Table 3
Paired comparison of workplace versus travel breastfeeding-related experience (Wilcoxon signed-rank test)

Domain	Workplace M (SD)	Travel M (SD)	W	p-value	Effect size (r)
Sufficient time to breastfeed/express	2.90 (1.26)	2.66 (1.28)	17964.5	0.004	0.147
Adequate privacy	2.43 (1.15)	2.84 (1.30)	15665.5	< 0.001	0.222
Clean/hygienic facilities	2.45 (1.10)	2.84 (1.23)	14446.0	< 0.001	0.225
Safe milk storage	2.29 (1.08)	2.54 (1.21)	15942.5	0.005	0.144
Emotional comfort	2.50 (1.14)	2.71 (1.22)	19644.0	0.024	0.116
Social support received	2.59 (1.14)	3.09 (1.28)	13689.5	< 0.001	0.285
Difficulty managing supplies	2.84 (1.27)	3.49 (1.23)	11174.5	< 0.001	0.356
Feeling safe/comfortable	3.32 (1.31)	2.83 (1.37)	15364.5	< 0.001	0.260
Schedule disruption	2.94 (1.34)	3.52 (1.28)	11684.0	< 0.001	0.327
Physical discomfort	2.97 (1.32)	3.39 (1.30)	17253.0	< 0.001	0.229
Stigma/negative attitudes	2.86 (1.32)	3.15 (1.33)	15261.0	0.001	0.164

Note. M = mean; SD = standard deviation; all items scored 1–5. See also Supplementary Figure S2.

3.6 Travel-related challenges as independent predictors of exclusive breastfeeding

To address the study's second objective, the eleven travel-context Likert items were entered simultaneously into a multivariable binary logistic regression predicting EBF status (Yes coded as the outcome of interest), replicating and extending the corresponding analysis in the source thesis. Variance inflation factors for all eleven predictors were low (1.06–1.37), indicating no material multicollinearity. The overall model was highly significant (McFadden's pseudo-R^2 = 0.338; likelihood-ratio $p < 0.001$). Two domains were robust, independent protective correlates of EBF in both unadjusted group comparisons and the adjusted model: sufficient time to breastfeed or express milk while travelling (AOR 1.68, 95% CI 1.29–2.19, $p < 0.001$) and feeling safe/comfortable while travelling (AOR 1.80, 95% CI 1.39–2.32, $p < 0.001$). Four domains were robust, independent risk correlates in both unadjusted and adjusted analyses: schedule disruption (AOR 0.68, 95% CI 0.51–0.89, $p = 0.006$), physical discomfort (AOR 0.62, 95% CI 0.47–0.82, $p < 0.001$), stigma or negative attitudes (AOR 0.74, 95% CI 0.58–0.94, $p = 0.015$), and counter-intuitively perceived social support while travelling (AOR 0.67, 95% CI 0.53–0.86, $p = 0.002$), such that mothers reporting higher social support during travel had lower, not higher, odds of EBF (Table 4, Fig. 1B). Clean/hygienic facilities (AOR 0.65, 95% CI 0.51–0.85, $p = 0.001$) and ease of managing supplies (AOR 0.73, 95% CI 0.56–0.96, $p = 0.025$) were significant risk correlates in the adjusted model only, with no significant association in unadjusted group comparisons (Mann-Whitney $p = 0.526$ and $p = 0.626$, respectively); given the absence of an unadjusted signal, these two associations are considered less stable and are interpreted cautiously as possible statistical suppression effects arising from shared variance among the eleven correlated challenge domains, rather than as firmly established independent risk factors.

The social-support finding merits particular caution in interpretation. One plausible explanation is that mothers who are not exclusively breastfeeding may require and therefore receive more visible practical assistance while travelling (for example, help with formula preparation or bottle-feeding logistics), inflating their reported social-support scores relative to exclusively breastfeeding mothers who feed directly and require comparatively less third-party assistance; this pattern would produce exactly the negative association observed here without implying that social support itself undermines EBF. This interpretation is offered as a hypothesis for future qualitative or longitudinal investigation rather than a causal claim.

3.7 Composite challenge index

An exploratory composite challenge index (mean of all eleven reverse-scored items, higher = greater difficulty) showed poor-to-questionable internal consistency (Cronbach's $\alpha = 0.26$ for the workplace index, 0.44 for the travel index) when the eleven domains were split into workplace and travel subscales for this purpose; this is lower than the $\alpha = 0.82$ reported for the full, undivided 22-item instrument during original instrument development (Section 2.3), and reflects the fact that splitting a validated instrument into direction-specific subscales, combined with reverse-scoring of several items to create a

unidimensional “difficulty” index, changes its internal-consistency properties; it does not indicate that the original instrument itself was unreliable. Composite results are therefore reported as supplementary to the primary item-level analyses in Sections 3.5 and 3.6. The mean travel-challenge score (M = 3.28, SD = 0.50) was modestly but significantly higher than the workplace-challenge score (M = 3.19, SD = 0.42; Wilcoxon W = 28067.0, p = 0.046; paired t(383) = 2.59, p = 0.010, Cohen’s d = 0.13). The travel-challenge score, but not the workplace-challenge score, differed significantly by EBF status: mothers who were not exclusively breastfeeding reported markedly higher travel-related challenge (M = 3.58, SD = 0.40) than those who were (M = 3.16, SD = 0.48; Mann-Whitney U = 6665.5, p < 0.001), whereas workplace-challenge scores did not differ significantly by EBF status (M = 3.22 vs 3.19; U = 13836.0, p = 0.453).

4. Discussion

This study found a relatively high overall EBF prevalence (72.9%) among surveyed mothers in Narsingdi District notably higher than the most recent national estimate of 55% from the 2022 Bangladesh Demographic and Health Survey [2]. This discrepancy should be interpreted cautiously: the present sample was drawn specifically from mothers engaged in employment or income-generating activity in a single district, used self-reported current status rather than 24-hour dietary recall, and may reflect local sampling characteristics rather than a genuine deviation from national trends. Nonetheless, the pattern of association between workplace support and EBF observed here is highly consistent with the broader international literature: maternity leave, breastfeeding breaks, and private lactation space emerged as the strongest and most consistent predictors, mirroring findings from systematic reviews showing that lactation breaks, dedicated space, and organisational policy rather than physical amenities such as refrigeration alone are the components most robustly linked to breastfeeding continuation [8, 19]. The comparatively weak, non-significant association between milk storage/refrigeration and EBF in both the bivariate and multivariable models is noteworthy: it suggests that in this setting, having somewhere and some time to feed or express matters more than having a place to store expressed milk, possibly because direct breastfeeding when reunited with the infant is more common than pumping-and-storing in this context.

These patterns broadly align with recent evidence from other employed populations in Bangladesh and comparable low- and middle-income settings. Among urban-poor garment workers in Dhaka, only 40% initiated breastfeeding within the first hour, a shortfall attributed less to individual knowledge gaps than to factory production schedules and limited organisational support for early initiation [20]. A scoping review of maternity-protection entitlements for non-standard workers across low- and middle-income countries similarly found that legal entitlements were frequently unenforced or inaccessible to informal and self-employed workers, and that distance between the worksite and home left some workers unable to feed for extended periods [21]. Conversely, a quasi-experimental evaluation of a baby-friendly workplace and community support intervention on a Kenyan agricultural estate found exclusive breastfeeding of 80.8% in the intervention group compared with 20.2% in the comparison group, underscoring that these structural barriers are modifiable when leave, facilities, education, and community support are combined [22].

The comparison between workplace and travel experiences is, to our knowledge, a novel contribution: rather than treating travel simply as an extension of workplace difficulty, our paired within-subject analysis revealed a more nuanced pattern. Consistent with our second hypothesis, travel was associated with significantly greater logistical burden (managing supplies), schedule disruption, physical discomfort, stigma, and lower perceived safety domains directly tied to the absence of fixed infrastructure and public visibility during transit. This is consistent with qualitative accounts of mothers reconciling breastfeeding with mobility and daily activities outside the home [23]. It is also consistent with a qualitative systematic review of breastfeeding in public across high-income settings, which found that legal protections were often poorly known or enforced and that surveillance, sexualisation of the breast, and fear of judgement disproportionately constrained younger, poorer, and otherwise marginalised mothers [24]; similar dynamics crowding, limited privacy, and exposure to bystander gaze have been documented specifically within transport settings [14], lending qualitative support to the elevated stigma and discomfort scores observed here during travel, although these OECD-based findings should be extended to the Bangladeshi context with caution. Counter to our initial expectation, however, perceived privacy, hygiene, milk-storage safety, comfort, and social support were rated somewhat more favourably during travel than at the workplace. A plausible explanation is that, at the workplace, structural provisions such as a private room exist for only 60% of mothers, and even where present may be perceived as formal, monitored, or professionally constrained spaces subject to supervisor or colleague scrutiny a pattern of incomplete or uneven provision also documented in a hospital-based workforce [9] whereas during travel, mothers may exercise greater personal discretion over where and how they feed, and may be accompanied by supportive family members. This finding cautions against assuming that formal workplace accommodation automatically translates into the psychologically supportive experience mothers require, and suggests that organisational culture and perceived autonomy may matter as much as the physical presence of a facility.

The significant association between higher travel-challenge scores and non-exclusive breastfeeding, in the absence of a corresponding association for workplace-challenge scores, suggests that travel-related barriers may represent an under-recognised and policy-neglected pathway to EBF discontinuation that operates independently of, and is not adequately captured by, standard workplace lactation accommodation frameworks. This is consistent with Role Strain Theory [15]: structural accommodations that reduce role strain at a fixed worksite do not automatically transfer to the unregulated, time-pressured environment of travel, where mothers must simultaneously manage transport logistics, infant care, and (for many) paid-work obligations without institutional support. Given that many employed mothers in Bangladesh rely on public or shared transport with limited privacy and unpredictable duration, extending lactation-friendly provisions such as designated feeding spaces at transport hubs, flexible travel scheduling, and public awareness campaigns to reduce stigma may be necessary complements to workplace-based interventions.

Complementary macro-level evidence supports this direction: a difference-in-differences analysis across 38 low- and middle-income countries found that each additional month of legislated paid maternity leave was associated with a 5.86-percentage-point increase in exclusive breastfeeding under six months (95%

CI 1.95–9.77) [25], while implementation research across Indonesia, Nigeria, the Philippines, and Vietnam cautions that legislative reform alone is insufficient without sustained coalition-building, financing, and enforcement [26]. At the facility level, a qualitative study of Brazilian workplace lactation rooms found that private, clean spaces with seating and refrigeration supported continued breastfeeding, but that a room located even a short walk from the worksite, or subject to restrictive access rules, could undermine practical use despite nominal provision [27], a design principle directly transferable to the transport-hub provisions recommended here.

The multivariable analysis of travel-challenge domains (Section 3.6) refined this picture by identifying which specific aspects of the travel experience were independently associated with EBF, rather than travel difficulty in the aggregate. Sufficient time and a subjective sense of safety/comfort while travelling emerged as the most robust protective correlates, mirroring the centrality of time and privacy/safety identified for the workplace domain in Section 3.4, and suggesting that time pressure and personal security are cross-context determinants of EBF that transcend the specific setting. Schedule disruption, physical discomfort, and stigma were robust risk correlates in both unadjusted and adjusted analyses, reinforcing the logistical and social-normative burden of breastfeeding while mobile. The unexpected inverse association between perceived social support during travel and EBF status warrants replication with qualitative methods before firm conclusions are drawn, but is plausible if non-exclusively breastfeeding mothers require and receive more visible third-party assistance (e.g., with formula preparation) while travelling than mothers who feed directly. The comparatively unstable associations for hygiene and supply-management (significant only after adjustment, not in unadjusted comparisons) should be treated as hypothesis-generating rather than confirmatory, given the possibility of suppression effects among the eleven inter-correlated challenge domains.

4.1 Strengths and limitations

This study has several notable strengths. Its paired within-subject design allowed direct comparison of workplace and travel experience for the same mothers across eleven parallel domains, controlling for individual-level confounding that would affect a between-group comparison. The sample size (n = 384) was determined a priori using the Krejcie and Morgan sample-size table [4] for the target population and was achieved with no missing data, supporting adequate statistical power for the reported associations.

Several limitations should nonetheless be noted. The cross-sectional design precludes causal inference, and reverse causality for example, mothers who successfully exclusively breastfeed rating their environment more favourably in retrospect cannot be excluded. Respondents were selected using purposive (non-probability) sampling rather than random sampling; although the achieved sample size matches the statistically derived minimum requirement, the non-random selection method means findings should be generalised to the broader population of employed lactating mothers in Bangladesh with caution, and replication with probability-based sampling is recommended. Data collection was confined to a single district (Narsingdi); findings may not generalise to other regions of Bangladesh or other occupational sectors. All measures were self-reported, introducing potential recall and social-

desirability bias, particularly for the EBF outcome, which was based on current status rather than the 24-hour recall used in Demographic and Health Survey methodology. Internal consistency of the eleven-item composite challenge indices, when split into workplace and travel subscales for the purpose of an exploratory composite index, was low to moderate (α = 0.26–0.44); this contrasts with the acceptable reliability (α = 0.82) reported for the full, undivided 22-item instrument during its original development, and indicates the composite subscales should be interpreted as exploratory and secondary to the item-level analyses in Sections 3.5 and 3.6. Item 19 (difficulty managing supplies) combined a positively worded stem ("is easy") with an explicit reverse-scoring instruction in the source questionnaire; it was scored as originally coded (higher = more difficulty) for consistency with the dataset, but the wording should be revised for clarity in future instrument versions. Finally, the multivariable logistic regression in Section 3.6 included all eleven travel-context items simultaneously; although variance inflation factors were low, two associations (hygiene, supply management) were significant only after mutual adjustment and not in unadjusted comparisons, and should be interpreted cautiously pending replication.

Taken together, these findings imply that lactation-support policy frameworks that focus exclusively on the physical workplace are likely to leave a substantial and identifiable set of travel-related barriers unaddressed.

5. Conclusions

Among employed lactating mothers in Narsingdi District, Bangladesh, maternity leave, breastfeeding breaks, and access to a private room were the strongest independent predictors of exclusive breastfeeding. Beyond the workplace, sufficient time and feeling safe/comfortable while travelling independently predicted higher odds of EBF, while schedule disruption, physical discomfort, stigma, and (counter-intuitively) higher perceived social support while travelling independently predicted lower odds of EBF. These findings indicate that policies focused solely on workplace accommodation, while necessary, are likely insufficient; complementary interventions addressing the specific, identifiable lactation-related needs of mobile and travelling mothers rather than travel difficulty in the aggregate are needed to sustain progress toward national and global exclusive breastfeeding targets.

5.1 Recommendations

Several recommendations follow from these findings. Employers should prioritise maternity leave duration, protected breastfeeding breaks, and private lactation space, as these showed the strongest independent associations with EBF in this study. Transport authorities and urban planning bodies should consider lactation-friendly provisions at major transit points, such as bus terminals and stations, that specifically protect mothers' time and sense of personal safety while travelling the two domains most robustly associated with EBF here drawing on facility-design principles, such as private, clean space with seating and refrigeration located close to where it is needed, that have proven effective within workplaces [27]. Community health programmes should extend breastfeeding-support messaging beyond the workplace to address schedule disruption, physical discomfort, and stigma encountered

specifically while travelling. Future research should employ longitudinal and qualitative designs to clarify the counter-intuitive finding that higher perceived social support during travel was associated with lower, not higher, odds of EBF, and to test whether this reflects compensatory assistance sought by non-exclusively breastfeeding mothers; such studies should also replicate the travel-challenge logistic regression model with probability-based sampling to confirm whether the hygiene and supply-management associations observed here, significant only after adjustment, are genuine or artefacts of shared variance among correlated predictors.

Declarations

Ethics approval and consent to participate

Ethical approval for this study was obtained from the Ethical Committee of Noakhali Science and Technology University (NSTU), Reference No: NSTU/SCI/EC/2025/454, prior to the commencement of data collection. The study was conducted in accordance with the Declaration of Helsinki [28] and the ethical principles of respect for persons, beneficence, and justice set out in the Belmont Report [29]. Participation was voluntary, and written or verbal informed consent was obtained from all respondents prior to data collection. Confidentiality and anonymity of responses were maintained throughout data collection, entry, and analysis, and respondents were free to withdraw at any stage without consequence.

Consent for publication

Not applicable. This manuscript reports aggregated survey findings and contains no identifiable individual data, images, or case details.

Availability of data and materials

The dataset(s) supporting the conclusions of this article is(are) included within the article (and its additional file(s)). Further enquiries can be directed to the corresponding author upon reasonable request.

Competing interests

The authors declare no conflict of interest.

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Authors' contributions

A.O. conceived the study, designed the questionnaire, and collected the data. M.A.M.R. analysed the data, interpreted the results, and prepared the manuscript. S.A. drafted and revised the manuscript. All authors read and approved the final manuscript.

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Figures

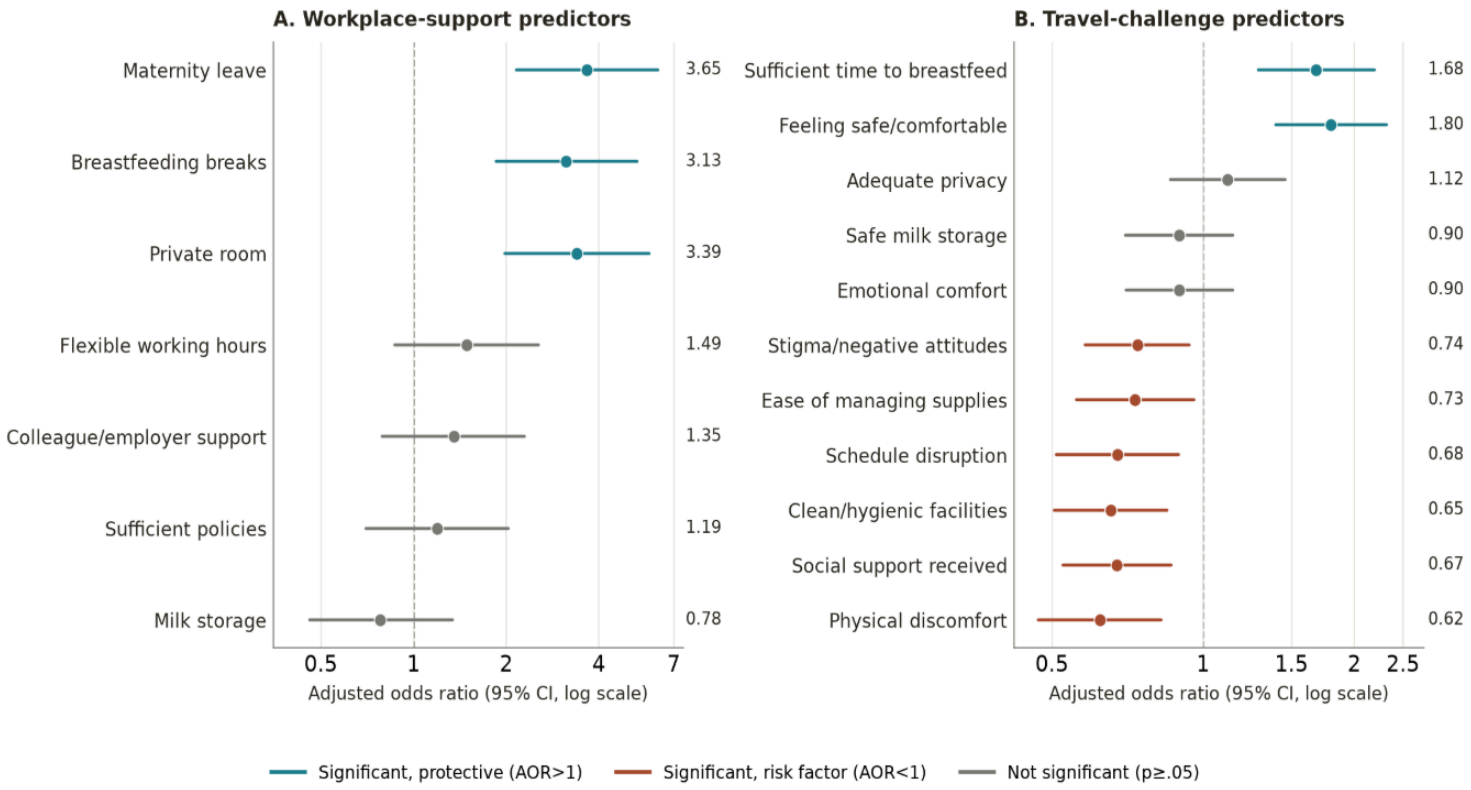


Figure 1

Adjusted odds ratios (95% CI, log scale) for exclusive breastfeeding from two multivariable logistic regression models (N = 384). Panel A: seven workplace-support predictors (model adjusted for maternal and child age; see Table 2). Panel B: eleven travel-challenge predictors (see Table 4). Teal markers indicate a statistically significant protective association (AOR>1); terra/rust markers indicate a statistically significant risk association (AOR<1); grey markers indicate no statistically significant association (p≥0.05).