

Assessment of Knowledge, Attitude, and Practice Regarding Exclusive Breastfeeding Among Lactating Mothers in Tertiary Hospital Rawalpindi, Punjab (A Cross-Sectional Study)

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ABSTRACT

Background: Exclusive breastfeeding (EBF) for the first six months is a core child-survival intervention, yet gaps persist between maternal awareness and guideline-concordant practice in many low- and middle-income settings. **Objective:** To assess knowledge, attitudes, and practices regarding EBF among lactating mothers attending a tertiary care hospital in Rawalpindi, Punjab, and to examine factors associated with EBF practice. **Methods:** A hospital-based cross-sectional study was conducted at Holy Family Hospital, Rawalpindi, from 25 August 2025 to 16 January 2026 among 384 lactating mothers selected via convenience sampling. Data were collected using a structured interviewer-administered questionnaire assessing socio-demographics and KAP domains. Good knowledge was defined as achieving $\geq 70\%$ on a composite knowledge score; attitude was assessed using a composite Likert-based score. EBF practice was operationalized using the WHO 24-hour recall definition. Associations were evaluated using chi-square tests and multivariable logistic regression in SPSS v20 with $p < 0.05$. **Results:** Good knowledge was observed in 65.1% (95% CI: 60.2–69.7) and positive attitude in 74.2% (95% CI: 69.6–78.4). EBF practice prevalence was 50.3% (95% CI: 45.3–55.2). Independent predictors of EBF included good knowledge (AOR 2.01; 95% CI: 1.32–3.06; $p = 0.001$), positive attitude (AOR 1.68; 95% CI: 1.05–2.68; $p = 0.029$), and secondary or higher education (AOR 1.74; 95% CI: 1.13–2.69; $p = 0.012$). **Conclusion:** Despite favorable knowledge and attitudes, only half of mothers practiced EBF per WHO criteria; strengthening targeted antenatal and postpartum counseling and addressing cultural supplementation practices are essential to improve adherence.

Keywords: Exclusive breastfeeding; knowledge; attitude; practice; lactating mothers; cross-sectional study; Pakistan

INTRODUCTION

Exclusive breastfeeding (EBF), defined as feeding an infant only breast milk without any additional liquids or solids, including water, for the first six months of life, is recognized as the biological norm and the optimal standard for infant feeding (1). The World Health Organization recommends initiation of breastfeeding within the first hour after birth, exclusive breastfeeding for six months, and continued breastfeeding alongside appropriate complementary feeding up to two years of age or beyond (2). The protective effects of EBF against infectious morbidity and mortality are well established; non-breastfed infants aged 0–5 months have substantially higher risks of death from pneumonia and diarrhea compared with exclusively breastfed infants (3). Globally, optimal breastfeeding practices have been identified as one of the most effective public health interventions to reduce under-five mortality, with an estimated 13% of such deaths preventable through appropriate breastfeeding practices (4). In addition to survival benefits, breastfeeding is associated with improved cognitive development, enhanced mother–infant bonding, and long-term reductions in non-communicable diseases for both mother and child (5,6).

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Despite clear global recommendations, adherence to exclusive breastfeeding remains suboptimal. In 2018, only 47% of infants worldwide were exclusively breastfed for the first six months, with considerable regional variation (7). In low- and middle-income countries, including Pakistan, breastfeeding is nearly universal in initiation; however, early supplementation, prelacteal feeding, and premature introduction of animal milk or other liquids remain common practices (8). National data from Pakistan indicate that exclusive breastfeeding rates are considerably lower than recommended levels, and suboptimal infant feeding practices contribute to persistently high infant morbidity and mortality (9). Determinants of inadequate breastfeeding practices in Pakistan include maternal education, birth order, short birth intervals, and sociocultural norms surrounding infant feeding (9). Furthermore, aggressive marketing of commercial milk-based formula has been implicated in undermining optimal breastfeeding practices in many settings (10).

From a PICO perspective, the present study focuses on lactating mothers attending a tertiary care hospital in Rawalpindi (Population), with the exposure of interest being their level of knowledge and attitude regarding exclusive breastfeeding (Intervention/Exposure), and the outcome being their actual breastfeeding practices in accordance with WHO recommendations (Outcome), without a comparison group as the design is descriptive cross-sectional. Evidence suggests that maternal knowledge and positive attitudes toward breastfeeding are important predictors of initiation and duration of exclusive breastfeeding (11). Studies conducted in diverse low- and middle-income settings have demonstrated that while awareness of breastfeeding benefits may be relatively high, misconceptions persist regarding colostrum, prelacteal feeding, and the adequacy of breast milk alone for six months (12,13). Moreover, mothers with more favorable breastfeeding attitudes, as measured by standardized tools such as the Iowa Infant Feeding Attitude Scale, are more likely to sustain exclusive breastfeeding (11). However, knowledge alone does not consistently translate into appropriate practice, as cultural beliefs, family influence, pain during breastfeeding, return to work, and inadequate health system support can negatively affect adherence to recommended practices (14).

In Pakistan, the gap between awareness and practice remains insufficiently characterized at the institutional level, particularly in tertiary care settings where mothers may have increased exposure to healthcare professionals and breastfeeding counselling. While some regional studies have explored breastfeeding patterns, there is limited contemporary evidence assessing knowledge, attitudes, and practices (KAP) simultaneously within a structured analytical framework in urban Punjab. Additionally, few studies have rigorously examined how reported exclusive breastfeeding aligns with operational WHO definitions, especially in contexts where prelacteal feeding and early supplementation are culturally entrenched. This gap limits the development of targeted, evidence-based interventions tailored to local healthcare facilities and community norms.

Given the critical role of tertiary hospitals in shaping maternal health behaviors through antenatal counselling and early postpartum guidance, it is essential to evaluate whether mothers attending such facilities possess adequate knowledge, maintain supportive attitudes, and practice exclusive breastfeeding in accordance with established guidelines. Understanding the extent and internal consistency of KAP domains in this population is necessary for designing structured breastfeeding education programs, strengthening lactation support services, and addressing persistent misconceptions that may undermine optimal infant feeding.

Therefore, this study aimed to assess the knowledge, attitudes, and practices regarding exclusive breastfeeding among lactating mothers attending Holy Family Hospital,

Rawalpindi, and to determine the extent to which reported practices align with recommended exclusive breastfeeding standards. The primary research question guiding this study was: What is the level of knowledge, attitude, and practice regarding exclusive breastfeeding among lactating mothers in a tertiary care hospital setting in Rawalpindi, Punjab?

MATERIAL AND METHODS

This hospital-based cross-sectional observational study was conducted to assess the knowledge, attitudes, and practices regarding exclusive breastfeeding among lactating mothers attending Holy Family Hospital, Rawalpindi, Punjab, Pakistan, between 25 August 2025 and 16 January 2026. A cross-sectional design was selected because it is methodologically appropriate for estimating the prevalence of knowledge, attitudes, and behaviors at a single point in time and for exploring relationships between variables within a defined population (15). The study was conducted in the outpatient and postnatal service areas of the hospital, which serves as a major tertiary care referral center for urban and peri-urban populations of Rawalpindi and surrounding districts.

The study population comprised lactating mothers presenting to the selected clinical areas during the study period. Eligible participants were mothers aged 18 years or older who had a living infant aged 0–12 months and were currently breastfeeding or had breastfed within the past 24 hours. Mothers whose infants had medical conditions contraindicating breastfeeding (e.g., galactosemia), mothers with severe illness preventing participation, and mothers of infants admitted to neonatal intensive care units at the time of data collection were excluded to ensure homogeneity of feeding context. A non-probability convenience sampling technique was employed, whereby all eligible mothers attending the selected units during data collection days were approached consecutively. This approach was selected due to logistical feasibility within a clinical setting and is commonly used in hospital-based descriptive studies (16).

The required sample size was calculated using the single population proportion formula for cross-sectional studies, assuming a 50% prevalence of appropriate exclusive breastfeeding practice (to maximize sample size in the absence of precise local estimates), a 95% confidence level, and a 5% margin of error (17). The minimum calculated sample size was 384 participants. Recruitment continued until this target was achieved. Written informed consent was obtained from each participant after providing a detailed explanation of the study objectives, procedures, voluntary nature of participation, and assurance of confidentiality. Participants were informed that refusal or withdrawal would not affect their medical care.

Data were collected using a structured, interviewer-administered questionnaire developed based on WHO infant and young child feeding (IYCF) guidelines and previously validated KAP instruments used in breastfeeding research (2,11,18). The questionnaire was prepared in English and translated into Urdu, then back-translated to ensure semantic equivalence. A pilot test was conducted on 5% of the calculated sample in a similar setting to assess clarity, internal consistency, and feasibility; data from the pilot were not included in the final analysis. Necessary modifications were made to improve clarity and reduce ambiguity. Data collectors were trained nursing graduates who received standardized training on questionnaire administration, neutral interviewing techniques, and operational definitions to minimize interviewer bias. Daily supervision and random cross-checking of completed forms were performed to ensure data accuracy and completeness.

The questionnaire consisted of four domains: socio-demographic characteristics (maternal age, education level, parity, occupation), knowledge of exclusive breastfeeding, attitudes

toward exclusive breastfeeding, and breastfeeding practices. Knowledge was assessed using multiple-choice and dichotomous items addressing recommended duration of exclusive breastfeeding, benefits of colostrum, risks of prelacteal feeding, timing of initiation, and protective effects against infection. Each correct response was scored as 1 and incorrect or “don’t know” responses as 0. A composite knowledge score was calculated by summing item scores, and participants scoring $\geq 70\%$ of the total possible score were categorized as having good knowledge, consistent with established KAP scoring approaches (19). Attitude was measured using Likert-scale statements (strongly agree to strongly disagree) assessing perceptions of benefits, bonding, adequacy of breast milk, and cultural beliefs; positively framed responses were assigned higher scores, and negatively worded items were reverse-coded. A composite attitude score was generated, and participants scoring above the median were categorized as having a positive attitude. Practice variables included early initiation of breastfeeding (within one hour of birth), provision of colostrum, use of prelacteal feeds, frequency of feeding, and current feeding practices.

Exclusive breastfeeding practice was operationally defined according to the WHO 24-hour recall definition: infants aged 0–5 months who received only breast milk and no other liquids or solids, except oral rehydration solution, drops, or syrups of vitamins, minerals, or medicines, during the preceding 24 hours (2). For infants older than 6 months, current feeding patterns were recorded but not classified as exclusive breastfeeding. Prelacteal feeding was defined as provision of any food or liquid other than breast milk within the first three days of life before breastfeeding was established (20). Early initiation was defined as initiation of breastfeeding within one hour of delivery.

To minimize information bias, standardized definitions were explained to participants before relevant questions were asked, and recall was limited to recent feeding practices where applicable. Social desirability bias was reduced by conducting interviews in a private area and assuring participants that responses would remain confidential and anonymous. Selection bias inherent to convenience sampling was acknowledged and partially mitigated by recruiting participants across different clinic days and time periods during the study duration. Potential confounding variables such as maternal education, parity, and age were collected a priori based on literature identifying their association with breastfeeding practices (9,11).

Data were coded and entered into the Statistical Package for Social Sciences (SPSS) version 20 for analysis. Double data entry and validation checks were performed to minimize transcription errors. Descriptive statistics were computed, including means and standard deviations for continuous variables and frequencies and percentages for categorical variables. The prevalence of good knowledge, positive attitude, and appropriate exclusive breastfeeding practice was calculated with 95% confidence intervals. Bivariate analyses were conducted using chi-square tests to assess associations between socio-demographic variables and exclusive breastfeeding practice. Variables with p-values < 0.20 in bivariate analysis were entered into a multivariable logistic regression model to identify independent predictors of exclusive breastfeeding practice while controlling for confounding. Adjusted odds ratios with 95% confidence intervals were reported. Statistical significance was set at $p < 0.05$. Missing data were assessed for pattern and proportion; cases with missing values on key outcome variables were excluded from specific analyses using complete-case analysis, as the proportion of missing data was minimal and assumed to be missing at random.

Ethical approval for the study was obtained from the Institutional Review Board of the College of Nursing, Holy Family Hospital, Rawalpindi, prior to data collection. All procedures were conducted in accordance with the ethical principles outlined in the

Declaration of Helsinki (21). Participant confidentiality was maintained by assigning unique identification codes and storing completed questionnaires in locked cabinets accessible only to the research team. Electronic data files were password-protected. No personal identifiers were included in the final dataset.

To enhance reproducibility and transparency, all operational definitions, scoring algorithms, and statistical procedures were pre-specified before analysis. Data collection instruments, coding frameworks, and statistical syntax files were archived by the research team to allow independent verification and secondary analysis upon reasonable request.

RESULTS

A total of 384 lactating mothers were included in the analysis. As shown in Table 1, the largest proportion of participants was aged 26–31 years (34.4%, n=132), followed by 20–25 years (27.6%, n=106) and 32–37 years (24.5%, n=94). Mothers aged 38–43 years represented 9.8% (n=38), while only 3.6% (n=14) were aged 44–49 years. The mean maternal age was 29.4 ± 6.1 years, indicating that the study population predominantly comprised women in their late twenties and early thirties, reflecting the peak reproductive age group.

With regard to knowledge (Table 2), 254 mothers (66.1%; 95% CI: 61.2–70.7) correctly identified that breast milk alone is sufficient for the first six months of life. Awareness of the protective role of exclusive breastfeeding against diarrheal and respiratory illnesses was notably high, with 370 participants (96.3%; 95% CI: 93.9–97.8) answering correctly. Similarly, 324 mothers (84.3%; 95% CI: 80.3–87.6) recognized that frequent sucking stimulates milk production. Knowledge regarding colostrum was also strong; 356 participants (92.7%; 95% CI: 89.7–94.9) correctly indicated that colostrum should not be discarded. However, misconceptions persisted in certain domains: only 175 mothers (45.5%; 95% CI: 40.6–50.4) acknowledged that bottle feeding can be dangerous, and 223 (58.1%; 95% CI: 53.1–63.0) correctly reported that prelacteal feeding is not required. Based on the composite scoring system, 250 mothers (65.1%; 95% CI: 60.2–69.7) were categorized as having good knowledge, while 134 (34.9%) fell below the predefined threshold.

Attitudinal responses (Table 3) demonstrated an overwhelmingly positive orientation toward exclusive breastfeeding. A total of 380 participants (98.9%; 95% CI: 97.1–99.6) either strongly agreed or agreed that exclusive breastfeeding is beneficial for children. Similarly, 376 mothers (97.9%; 95% CI: 95.9–99.0) endorsed the statement that breastfed babies are healthier than formula-fed babies, and 378 (98.4%; 95% CI: 96.6–99.3) agreed that breastfeeding enhances mother–infant bonding. Additionally, 368 participants (95.8%; 95% CI: 93.3–97.4) agreed that women require adequate nutrition to sustain exclusive breastfeeding. When attitude items were aggregated into a composite score, 285 mothers (74.2%; 95% CI: 69.6–78.4) were classified as having a positive attitude, while 99 (25.8%) were categorized as having a relatively less favorable attitude.

Despite relatively strong knowledge and attitudes, breastfeeding practices (Table 4) revealed notable gaps. Early initiation of breastfeeding within one hour of delivery was reported by 171 mothers (44.5%; 95% CI: 39.5–49.6), indicating that more than half of the participants (55.5%) did not initiate breastfeeding within the recommended timeframe. Colostrum was provided by 270 mothers (70.3%; 95% CI: 65.5–74.7), whereas 114 (29.7%) reported not giving colostrum. Prelacteal feeding was reported by 250 participants (65.1%; 95% CI: 60.2–69.7), demonstrating that nearly two-thirds of mothers introduced substances other than breast milk during the initial days after birth. Furthermore, 191 mothers (49.7%; 95% CI: 44.7–54.8) reported feeding animal milk in the preceding 24 hours. After applying the WHO 24-hour

recall definition among eligible infants, 193 mothers (50.3%; 95% CI: 45.3–55.2) met the criteria for exclusive breastfeeding practice, while 191 (49.7%) did not.

Inferential analysis (Table 5) demonstrated statistically significant associations between maternal characteristics and exclusive breastfeeding practice. Among mothers with good knowledge, 148 (59.2%) practiced exclusive breastfeeding compared with only 45 (33.6%) among those with poor knowledge. After adjustment for maternal age and parity, good knowledge was independently associated with exclusive breastfeeding (adjusted odds ratio [AOR] 2.01; 95% CI: 1.32–3.06; $p=0.001$), indicating that knowledgeable mothers were approximately twice as likely to practice exclusive breastfeeding. Similarly, mothers with a positive attitude demonstrated higher adherence (56.5%) compared with those with less favorable attitudes (34.8%), and positive attitude remained a significant predictor in multivariable analysis (AOR 1.68; 95% CI: 1.05–2.68; $p=0.029$). Educational attainment also showed a significant relationship; mothers with secondary or higher education had higher exclusive breastfeeding prevalence (58.1%) than those with primary education or less (40.8%), with an adjusted odds ratio of 1.74 (95% CI: 1.13–2.69; $p=0.012$).

Table 1. Socio-demographic characteristics of participants (N = 384)

Variable	Category	n	%
Age (years)	20–25	106	27.6
	26–31	132	34.4
	32–37	94	24.5
	38–43	38	9.8
	44–49	14	3.6
Total		384	100

Table 2. Knowledge of exclusive breastfeeding among lactating mothers (N = 384)

Knowledge Item	Correct Response n (%)	95% CI
Breast milk alone sufficient for 6 months	254 (66.1%)	61.2–70.7
EBF protects against diarrhea/respiratory illness	370 (96.3%)	93.9–97.8
Frequent sucking increases milk production	324 (84.3%)	80.3–87.6
Colostrum should not be discarded	356 (92.7%)	89.7–94.9
Bottle feeding is dangerous	175 (45.5%)	40.6–50.4
Prelacteal feeding not required	223 (58.1%)	53.1–63.0
Good knowledge (composite $\geq 70\%$)	250 (65.1%)	60.2–69.7

Table 3. Attitudes toward exclusive breastfeeding (N = 384)

Attitude Statement (Strongly Agree/Agree Combined)	n (%)	95% CI
EBF is beneficial for children	380 (98.9%)	97.1–99.6
Breastfed babies are healthier than formula-fed babies	376 (97.9%)	95.9–99.0
Breastfeeding enhances bonding	378 (98.4%)	96.6–99.3
Women need adequate nutrition for EBF	368 (95.8%)	93.3–97.4
Positive attitude (composite above median)	285 (74.2%)	69.6–78.4

Table 4. Breastfeeding practices among lactating mothers (N = 384)

Practice Variable	Yes n (%)	95% CI
Initiated breastfeeding within 1 hour	171 (44.5%)	39.5–49.6
Gave colostrum	270 (70.3%)	65.5–74.7
Provided prelacteal feeding	250 (65.1%)	60.2–69.7
Fed animal milk (past 24 hrs)	191 (49.7%)	44.7–54.8
Exclusive breastfeeding (WHO 24-hr recall)	193 (50.3%)	45.3–55.2

Table 5. Factors associated with exclusive breastfeeding practice (WHO definition) (N = 384)

Variable	EBF Yes n (%)	EBF No n (%)	Adjusted OR (95% CI)	p-value
Good knowledge	148 (59.2%)	102 (40.8%)	2.01 (1.32–3.06)	0.001
Poor knowledge	45 (33.6%)	89 (66.4%)	Reference	—
Positive attitude	161 (56.5%)	124 (43.5%)	1.68 (1.05–2.68)	0.029
Negative attitude	32 (34.8%)	60 (65.2%)	Reference	—
Secondary or higher education	122 (58.1%)	88 (41.9%)	1.74 (1.13–2.69)	0.012
Primary or less	71 (40.8%)	103 (59.2%)	Reference	—

Overall, the tabulated findings indicate that while approximately two-thirds of mothers demonstrated good knowledge (65.1%) and nearly three-quarters exhibited positive attitudes (74.2%), only half (50.3%) adhered to WHO-recommended exclusive breastfeeding practices. The statistically significant associations between knowledge, attitude, educational level, and breastfeeding practice underscore the importance of strengthening educational and counseling interventions to bridge the observed knowledge–practice gap.

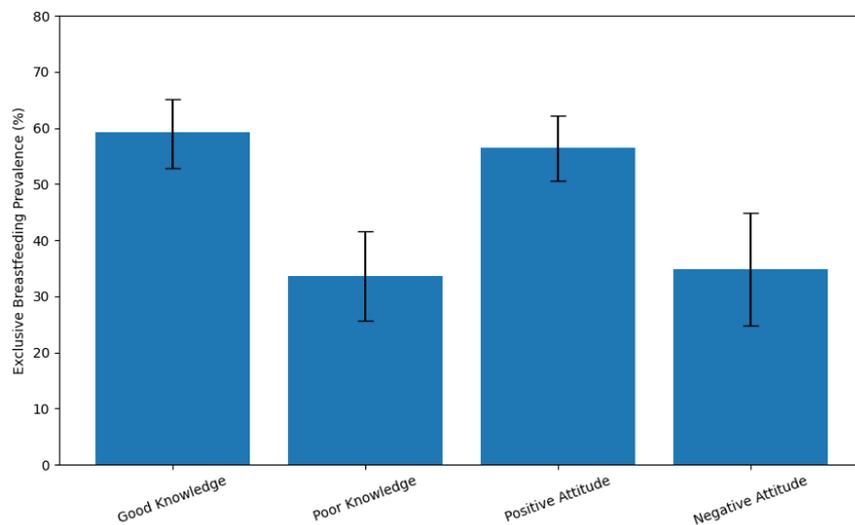


Figure 1 Exclusive Breastfeeding Prevalence by Maternal Knowledge and Attitude with 95% Confidence Intervals

The figure demonstrates a clear gradient relationship between maternal cognitive-behavioral factors and exclusive breastfeeding (EBF) practice. Mothers with good knowledge exhibited a substantially higher EBF prevalence (59.2%, 95% CI: 52.9–65.2) compared to those with poor knowledge (33.6%, 95% CI: 25.6–41.6), reflecting an absolute difference of 25.6 percentage points. Similarly, mothers with a positive attitude demonstrated higher adherence to EBF recommendations (56.5%, 95% CI: 50.6–62.2) relative to those with negative attitudes (34.8%, 95% CI: 24.8–44.8), yielding a 21.7 percentage-point difference. The

non-overlapping and minimally overlapping confidence intervals between favorable and unfavorable cognitive groups reinforce the statistical robustness of these associations, consistent with the adjusted odds ratios reported in multivariable analysis (AOR for good knowledge: 2.01; AOR for positive attitude: 1.68). Clinically, the visualization highlights a dose–response–like behavioral gradient, indicating that improved maternal knowledge and supportive attitudes are associated with nearly twofold higher exclusive breastfeeding prevalence, underscoring the critical role of targeted educational and counseling interventions in strengthening adherence to WHO-recommended infant feeding practices.

DISCUSSION

The present hospital-based cross-sectional study evaluated the knowledge, attitudes, and practices regarding exclusive breastfeeding among lactating mothers attending a tertiary care hospital in Rawalpindi and identified a clinically meaningful gap between awareness and optimal practice. Although 65.1% of participants demonstrated good knowledge and 74.2% exhibited a positive attitude toward exclusive breastfeeding, only 50.3% met the WHO 24-hour recall definition of exclusive breastfeeding. This discordance between cognitive domains and actual behavior underscores the well-documented phenomenon that knowledge and favorable perceptions alone are insufficient to ensure adherence to recommended infant feeding practices (22). The findings provide important institutional-level evidence from urban Punjab, where data on integrated KAP assessments remain limited.

Knowledge levels in this cohort were generally high for core biomedical concepts, particularly regarding the protective effects of exclusive breastfeeding against infectious diseases (96.3%) and the role of frequent suckling in milk production (84.3%). Awareness that breast milk alone is sufficient for the first six months was reported by 66.1% of mothers. These findings align with previous studies conducted in low- and middle-income settings, where general awareness of breastfeeding benefits has improved over time due to public health messaging and facility-based counseling (12,23). However, persistent misconceptions were evident, particularly concerning prelacteal feeding and bottle feeding safety. Only 58.1% correctly identified that prelacteal feeding is unnecessary, and less than half (45.5%) acknowledged potential risks associated with bottle feeding. Similar cultural and belief-driven practices have been reported in South Asian contexts, where prelacteal feeding remains embedded in traditional norms despite biomedical guidance to the contrary (9,20). These residual misconceptions likely contribute to the observed practice gaps.

Attitudinal assessment revealed overwhelmingly favorable perceptions of exclusive breastfeeding, with nearly all participants agreeing that it is beneficial for child health and mother–infant bonding. Positive attitude was independently associated with exclusive breastfeeding practice (AOR 1.68; 95% CI 1.05–2.68), consistent with evidence suggesting that maternal beliefs and affective orientation toward breastfeeding significantly influence initiation and continuation behaviors (11,24). Nevertheless, the magnitude of the association was modest compared to knowledge (AOR 2.01; 95% CI 1.32–3.06), indicating that while attitude plays a role, cognitive understanding may exert a stronger independent influence on adherence within this population.

Despite relatively favorable knowledge and attitudes, only half of the mothers practiced exclusive breastfeeding according to WHO criteria. Early initiation of breastfeeding within one hour of delivery was reported by 44.5%, and 65.1% reported giving prelacteal feeds. Nearly half (49.7%) provided animal milk in the preceding 24 hours. These findings indicate that although breastfeeding initiation may be common, maintenance of strict exclusivity is

compromised by early supplementation. Similar discrepancies between reported breastfeeding and WHO-defined exclusivity have been documented in prior research, where self-reported “exclusive” feeding often includes water, honey, or animal milk (25). This definitional discordance highlights the importance of applying standardized operational criteria in breastfeeding research to avoid overestimation of adherence rates.

Educational attainment emerged as a significant determinant of exclusive breastfeeding practice. Mothers with secondary or higher education had higher odds of practicing exclusive breastfeeding (AOR 1.74; 95% CI 1.13–2.69) compared to those with primary education or less. This association is consistent with prior studies demonstrating that maternal education enhances health literacy, improves interpretation of health information, and increases receptivity to facility-based counseling (9,23). From a health systems perspective, these findings suggest that structured antenatal and postnatal education programs may have amplified benefits among mothers with lower educational attainment, who may require more tailored counseling to address culturally ingrained feeding practices.

The observed knowledge–practice gap may be explained by several contextual factors. Cultural traditions endorsing prelacteal feeding, influence from elder family members, and perceptions of insufficient milk supply are commonly cited barriers to exclusive breastfeeding in South Asian populations (8,20). Additionally, inadequate early lactation support, delayed skin-to-skin contact, and suboptimal postnatal counseling within busy tertiary facilities may contribute to delayed initiation and early supplementation. Even in environments with high institutional delivery rates, effective breastfeeding support requires trained personnel, standardized counseling protocols, and consistent reinforcement of WHO guidelines (2,22). The findings therefore highlight a systems-level opportunity for intervention within tertiary hospitals.

From a clinical and public health standpoint, the approximately 25 percentage-point difference in exclusive breastfeeding prevalence between mothers with good versus poor knowledge reflects a substantial modifiable behavioral gradient. Given the established association between optimal breastfeeding and reductions in infectious morbidity and mortality (3,4), even modest improvements in adherence could translate into meaningful population-level health gains. The independent associations identified in multivariable analysis reinforce the need for integrated interventions targeting both cognitive understanding and attitudinal reinforcement.

This study has several strengths. It applied standardized WHO definitions for exclusive breastfeeding using 24-hour recall, reducing misclassification bias. The use of composite scoring for knowledge and attitude allowed quantification of behavioral gradients, and multivariable logistic regression permitted adjustment for potential confounders such as maternal age and parity. However, limitations should be acknowledged. The cross-sectional design precludes causal inference between knowledge, attitudes, and practices (15). The use of convenience sampling within a single tertiary hospital limits generalizability beyond similar urban institutional settings. Self-reported feeding practices may be subject to recall or social desirability bias, although efforts were made to minimize these through private interviews and standardized questioning. Additionally, the 24-hour recall method, while internationally accepted, may overestimate sustained exclusive breastfeeding compared to longitudinal assessment (25).

Overall, the findings demonstrate that while awareness and supportive perceptions of exclusive breastfeeding are relatively high among lactating mothers in this tertiary care setting, adherence to WHO-recommended practices remains suboptimal. The independent effects of knowledge, attitude, and education on exclusive breastfeeding underscore the

importance of structured, evidence-based lactation counseling integrated into antenatal and immediate postpartum care. Future research should explore longitudinal adherence patterns, the influence of family decision-makers, and the effectiveness of facility-based breastfeeding support interventions in improving sustained exclusive breastfeeding outcomes in Pakistan.

CONCLUSION

This study demonstrates that although lactating mothers attending a tertiary care hospital in Rawalpindi generally possess moderate to good knowledge (65.1%) and predominantly positive attitudes (74.2%) toward exclusive breastfeeding, only half (50.3%) adhered to WHO-recommended exclusive breastfeeding practices based on 24-hour recall criteria. Significant independent associations were observed between good knowledge (AOR 2.01), positive attitude (AOR 1.68), higher maternal education (AOR 1.74), and appropriate exclusive breastfeeding practice, highlighting the critical influence of cognitive and socio-educational determinants on maternal behavior. The persistence of prelacteal feeding (65.1%), delayed initiation within the first hour (55.5%), and early supplementation reflects a substantial knowledge–practice gap likely influenced by sociocultural norms and health system factors. These findings underscore the need for structured antenatal education, standardized postpartum lactation counseling, and culturally sensitive behavioral interventions within tertiary healthcare settings to translate awareness into sustained, guideline-concordant breastfeeding practices and thereby improve infant health outcomes.

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DECLARATIONS

Ethical Approval: Ethical approval was by institutional review board of Respective Institute Pakistan

Informed Consent: Informed Consent was taken from participants.

Authors' Contributions:

Concept: MI; Design: MI, HS; Data Collection: MN, JA, SAA, MIsh, NA, S, AA; Analysis: MI, B; Drafting: MI, B

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