What factors influence the knowledge and attitudes of UK university students towards breastfeeding?

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ABSTRACT

Background Breastfeeding provides substantial benefits for individuals, families, and society, yet rates in the UK remain lower than in comparable countries. Early knowledge and attitudes, formed before pregnancy and breastfeeding experiences, strongly influence future feeding practices. As future parents and societal influencers, university students are a key population for fostering informed attitudes and understanding of breastfeeding.

Aim This study assessed breastfeeding knowledge and attitudes among university students, comparing health and non-health disciplines, and exploring associated factors.

Methods A cross-sectional survey of 114 students at a UK university was conducted using an online self-administered questionnaire. Convenience sampling recruited participants across health and non-health disciplines. Data were analysed descriptively and inferentially, with regression analyses identifying predictors of knowledge and attitudes.

Results Intention to breastfeed was high in both groups. However, students overall had neutral attitudes, and knowledge was at the threshold between low and high. Health students showed significantly greater knowledge and more positive attitudes than non-health students ($p < 0.001$). Regression analyses indicated that prior breastfeeding education and field of study were the strongest predictors of knowledge and attitudes, while male gender and urban residence were linked to slightly lower knowledge.

Discussion Despite high intentions, overall knowledge and attitudes were limited. Findings suggest targeted interventions emphasising breastfeeding education and exposure could improve knowledge and attitudes, supporting informed and confident breastfeeding practices.

Conclusion Universities are strategic settings for interventions to enhance breastfeeding knowledge and attitudes in advance of personal experience. Public health strategies should also address social, cultural, and community factors to foster supportive breastfeeding environments.

Statement of significance

Problem or issue

Breastfeeding offers significant benefits for individuals, families, and society, and is a core component of high-quality maternity care, yet rates in the UK remain lower than in comparable countries.

What is already known

Early knowledge and attitudes, formed before pregnancy and breastfeeding, strongly influence future infant feeding practices, but university students prior to pregnancy have received limited research attention despite their role as future parents and societal influencers.

What this paper adds

This study shows limited breastfeeding knowledge and largely neutral attitudes among students, identifies modifiable influences, and supports early, inclusive initiatives across disciplines and genders to enhance knowledge, foster positive breastfeeding attitudes and strengthen future breastfeeding support.

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Introduction

Breastfeeding is a natural, nutritious, and sustainable practice essential to global public health, widely advocated by leading organisations such as the World Health Organisation and UNICEF (WHO, 2024; Peregrino et al., 2018; Azad et al., 2021). It supports infant survival and development by providing bioactive compounds, immune cells, and molecules that protect against various illnesses, including infections, asthma, diabetes, and heart disease (Masi and Stewart, 2024; Muro-Valdez et al., 2023). Breastfeeding also promotes brain development and enhances cognitive functioning and mental health in children (Roghair, 2024; Purkiewicz et al., 2025). For mothers, it reduces the risks of risk of breast and ovarian cancers, cardiovascular disease, diabetes, and postpartum complications while fostering the mother–infant bond and supporting emotional development through hormonal mechanisms (Purkiewicz et al., 2025; Roghair, 2024; Azad et al., 2021; Victora et al., 2016). Beyond individual benefits, breastfeeding plays a critical role in public health by lowering the preventable disease burden, healthcare costs, and mortality rates globally, aligning with the Sustainable Development Goals outlined in the 2030 Agenda (WHO, 2024; Peregrino et al., 2018; Victora et al., 2016; World Alliance for Breastfeeding Action, 2016).

In the global context, breastfeeding remains the norm in many countries; however, in the United Kingdom formula feeding is more culturally prevalent (Jamie et al., 2020; Brown et al., 2011). Initiatives like the NHS 'Start for Life' programme and the UNICEF Baby Friendly Initiative (BFI) have been introduced to promote breastfeeding (UNICEF UK, 2016). However, the UK continues to report low breastfeeding rates, particularly for exclusive breastfeeding, which remains significantly below international recommendations (National Institute for Health and Care Research, 2024; Peregrino et al., 2018; UNICEF UK, n.d.). Eight in ten UK mothers stop breastfeeding earlier than intended, and only around 1 % exclusively breastfeed to six months (UNICEF UK, n.d.). Despite a recent increase in breastfeeding at six to eight weeks in England, the UK still ranks poorly among high-income countries, and even modest increases could yield major economic and health benefits, with the NHS potentially saving around £48 million annually through reduced breast cancer and common infant illnesses (Peregrino et al., 2018).

To understand why breastfeeding rates remain suboptimal in the UK, it is important to consider what shapes breastfeeding behaviours and when feeding decisions are made. Breastfeeding behaviour is influenced by a complex mix of individual, psychological, social, and cultural factors (Peregrino et al., 2018). Prior research consistently shows that knowledge and attitudes toward breastfeeding are among the strongest predictors of future feeding behaviour (Abebe et al., 2022; Malekian et al., 2025; Naja et al., 2022). Importantly, many feeding decisions are made prior to pregnancy, with knowledge and attitude playing key roles (Sayed et al., 2023; Yahya and Abdul Hamid, 2018). Thurgood et al. (2022) reported that most mothers (57 %) decided on their infant feeding method before becoming pregnant. This is notably higher than those deciding during pregnancy (34 %). Therefore, understanding young adults' breastfeeding knowledge, attitudes, prior exposures, and future intent may reveal critical gaps that could lead to targeted interventions.

There is a clear opportunity to shape breastfeeding attitudes and knowledge before the experience of pregnancy and breastfeeding, particularly among university students, who represent future parents, professionals, and societal influencers. Few studies have examined breastfeeding knowledge and attitudes among this specific population. There is a lack of parity-specific demographic data, and limited attention has been given to the views of those who have not yet experienced pregnancy or breastfeeding (Malekian et al., 2025). Most UK-based research focuses on mothers during pregnancy or in the postpartum period, or on healthcare professionals, particularly midwives, nurses, and general practitioners (McGuinness et al., 2025; Spencer et al., 2022;

Wilkins et al., 2012). Jackson et al. (2023) examined UK university staff and students but did not explore parity or demographic subgroups in depth.

Previous studies have identified education and exposure as the most frequently associated factors with breastfeeding knowledge and attitudes (Malekian et al., 2025). Comparing students in health and non-health disciplines enables investigation into the role of formal breastfeeding education and exposure and helps identify key educational influences. It also supports the design of targeted interventions at both professional training and community levels. This study aimed to assess baseline breastfeeding attitudes and knowledge among a diverse student population at a UK university, to compare these outcomes between health and non-health students, and to explore factors associated with students' attitudes and knowledge. This study addresses a clear gap in the UK evidence base regarding pre-pregnancy breastfeeding knowledge and attitudes among university students.

Methods

Design, setting and participants

A quantitative, cross-sectional design was employed to assess breastfeeding knowledge and attitudes among university students at a university in the United Kingdom. This approach was chosen because it allows data to be captured at a single point in time, providing baseline information on patterns and subgroup differences in a time-efficient way (Wang and Cheng, 2020).

Eligible participants included current Bournemouth University students of all genders and academic levels, and academic disciplines who had never been pregnant nor had a partner who had experienced pregnancy. For further comparisons in line with the study aims, academic disciplines were categorised as "health" if the course was listed under the Health or Medical Science titles on the university course list, all other participants were classified as "non-health. Research highlights the critical role of partner and social support in breastfeeding outcomes, with male knowledge and attitudes increasingly recognised as key contributors to breastfeeding success. (Crippa et al., 2021; Srinivasiah et al., 2019; Grabowski et al., 2024; Yahya and Abdul Hamid, 2018). Thus, it was essential to include both male and female students in efforts to explore breastfeeding-related beliefs. Eligibility was confirmed through a screening question about the participant's or their partner's history of pregnancy or breastfeeding.

An a priori power analysis was conducted using GPower 3.1 to estimate the required sample size for an independent samples *t*-test. Both knowledge and attitudes toward breastfeeding were key outcomes, but the analysis was based on attitudes, as differences between health and non-health students were expected to be smaller. Assuming a medium effect size (Cohen's $d = 0.5$), a significance level of 0.05, and a power of 0.80, the minimum required sample size was 128 participants. Participants were recruited using a non-probability sampling strategy, including convenience, self-selection, and snowball sampling, because it was not possible to obtain a complete list of students across all programmes, making probability sampling impractical.

Ethical approval for the study was obtained prior to data collection, and all participants were provided with an information sheet and gave informed consent before taking part.

Data collection and instruments

Data were collected using a self-administered online questionnaire hosted on JISC Online Surveys. Data collection was conducted over a three-month period, from March to June 2025.

Utilising the most commonly used and suitable instruments for similar populations and contexts in a recent scoping review (Malekian et al., 2025), the questionnaire consisted of three sections:

Attitudes toward breastfeeding

Measured using the Iowa Infant Feeding Attitude Scale (IIFAS), a validated 17-item instrument rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) (De La Mora and Russell, 1999). Total scores ranged from 17 to 85, with higher scores indicating more favourable attitudes toward breastfeeding. IIFAS total scores were classified into three categories: positive attitude toward breastfeeding (scores 70–85), neutral attitude (scores 49–69), and negative attitude toward breastfeeding (scores 17–48). Items on the IIFAS that favour formula feeding were reverse scored prior to calculating the total score, in accordance with the instrument's standard scoring procedure. The psychometric data from reliability studies indicate that the IIFAS has high internal consistency (α = 0.86) with a broad sample of randomly selected women. The scale has shown strong internal reliability, with Cronbach's alpha values generally between 0.85 and 0.86, and slightly lower but acceptable reliability (α = 0.72–0.76) reported in studies with similar populations. Its consistent use across diverse countries and demographics supports its cross-cultural validity and robustness (De La Mora and Russell, 1999; Jefferson, 2015; Bień et al. 2021).

Breastfeeding knowledge

Assessed using the Infant Feeding Knowledge Test Form A (AFORM), which includes 10 multiple-choice and 10 true/false items. Total scores ranged from 0 to 20, with scores above 13 indicating a high level of knowledge. The AFORM measure has demonstrated adequate reliability in previous studies, with internal consistency estimates (Cronbach's α) ranging from 0.54 to 0.64 (Grossman et al., 1990; Yahya and Abdul Hamid, 2018).

Demographic and contextual variables

This section collected information on participants' demographic characteristics, breastfeeding education, exposure, and future parenting intentions, informed by a scoping review of relevant literature (Malekian et al., 2025).

Data analysis

Data were analysed using IBM SPSS Statistics version 28. Descriptive statistics, including means, ranges, standard deviations, and frequency distributions, were used to summarise participant demographics, breastfeeding exposure, education, and intentions. Frequencies and percentages of item responses were reported separately for the total sample, health students, and non-health students as well as overall attitude and knowledge scores. A chi-square test was conducted to compare the proportion of participants who received breastfeeding education between health and non-health students, as this test is appropriate for examining differences between independent groups when both the predictor (field status) and the outcome (receipt of breastfeeding education) are categorical (Franke et al., 2012).

Assumption checks were conducted to ensure the suitability of parametric analyses. Shapiro–Wilk tests and visual inspection of histograms and Q–Q plots showed no significant deviations from normality in attitude or knowledge scores, supporting the use of parametric tests. Levene's test confirmed homogeneity of variance for attitude scores ($F = 0.45$, $p = 0.504$) and for knowledge scores ($F = 2.79$, $p = 0.098$), supporting equal variances in both cases. No extreme outliers were identified, and no data transformations were required. T-tests are appropriate for evaluating mean differences between two independent groups and provide robust statistical power when their underlying assumptions are met (Schober and Vetter, 2019); therefore, independent samples *t*-tests were conducted to compare attitude and knowledge scores between health and non-health students. For all analyses, an alpha ≤ 0.05 was used to indicate statistical significance. Missing responses were handled using listwise deletion, the default procedure in SPSS.

To explore factors associated with students' breastfeeding knowledge and attitudes, forward stepwise multiple regression analyses were conducted separately for each dependent variable. This approach was used because it enables the systematic identification of variables that significantly contribute to prediction while minimising model complexity and controlling for redundancy among correlated predictors (Tabachnick and Fidell, 2000). Based on theoretical considerations and prior literature (Malekian et al., 2025b), nine candidate predictors were included: demographic variables (excluding those with limited interpretability or small subsamples), field status, prior breastfeeding exposure, and breastfeeding education. Of the 114 participants, listwise deletion resulted in 97 complete cases for the knowledge model and 104 for the attitude model. These sample sizes meet the commonly cited guideline of at least 10 participants per predictor, supporting stability of the regression estimates. Post hoc power analyses using G*Power indicated high achieved power for both models (0.99 for knowledge; 0.92 for attitude), given an alpha of 0.05, nine predictors, and observed effect sizes of $f^2 = 0.583$ and $f^2 = 0.225$, respectively. All models met the assumptions of normality, linearity, homoscedasticity, and independence of residuals (Durbin-Watson: 1.76–1.91). Collinearity diagnostics indicated no multicollinearity issues (VIF ≤ 1.25), and no extreme outliers were detected (|ZRESID| > 3).

Ethical considerations

Ethical approval for this study (Project ID 62875) was granted by the Bournemouth University Research Ethics Committee on 20 March 2025, prior to data collection. The study adhered to institutional and national data protection standards. Participation was voluntary and anonymous. Before accessing the questionnaire, participants reviewed a summary of the study and its aims, were fully informed of their rights, and provided electronic consent prior to participation. No personally identifying information was collected.

Results

A total of 130 individuals completed the survey. The eligibility check question indicated that 16 participants had personal experience with breastfeeding so they were excluded from the analysis. The final sample comprised 114 eligible participants. Where field of study was reported ($n = 106$), participants were nearly evenly distributed between health students ($n = 54$, 49.1 %) and non-health students ($n = 52$, 50.9 %). A post hoc power analysis based on the group sizes indicated an achieved power of approximately 0.77 to detect a medium effect size (Cohen's $d = 0.5$) for attitudes at an alpha level of 0.05.

The mean age of participants was 25.4 years (SD = 4.7), with a range of 19–38 years. The majority of the sample was female (75.9 %), with a higher proportion of male participants in the non-health group (32.7 %). More than half of the participants were postgraduate students (57.5 %). Within the health-related group, the distribution between undergraduate and postgraduate students was nearly equal, whereas postgraduates were more prevalent among non-health students (63.5 %). Most participants were unmarried (85.1 %), unemployed (77 %), and resided in urban areas (61.1 %). Additional socio-demographic characteristics by group, including household income, parental education, and only-child status, are detailed in Table 1.

Breastfeeding exposure, education, and intentions

Breastfeeding exposure, education, and intentions among students, by group, are summarised in Table 2. Breastfeeding exposure was assessed through three questions: whether participants knew someone who had breastfed, whether they had ever witnessed breastfeeding, and whether they had been breastfed themselves as an infant. Participants also reported whether they had received any formal or informal breastfeeding education, along with their intention to breastfeed and the intended duration.

The majority of the sample (62.3 %) reported being breastfed as an infant. Nearly all participants (93.9 %) knew someone who had breastfed, with little variation between the health and non-health

Table 1
Demographic information of students.

Variable	Health N (%)	Non-health N (%)	Unknown N (%)	Total N (%)
Age (Max *n* = 110)				
N	52	51	7	110
Min-Max	20–38	19–38	25–36	19–36
Mean (SD)	25.9 (5.2)	24.5 (4.1)	29.23 (3.7)	25.5 (4.7)
Gender (Max *n* = 111)				
Male	5 (9.3 %)	17 (34 %)	4 (57.1 %)	26 (23.2 %)
Female	49 (90.7 %)	33 (66 %)	3 (42.9 %)	85 (75.9 %)
Level of study (Max *n* = 113)				
Undergraduate	27 (50.9 %)	19 (36.5 %)	2 (25 %)	48 (42.5 %)
Postgraduate	26 (49.1 %)	33 (63.5 %)	6 (75 %)	65 (57.5 %)
Ethnicity (Max *n* = 111)				
Mixed/Multiple ethnic groups	1 (1.9 %)	4 (8 %)	1 (14.3 %)	6 (5.4 %)
White (British, Irish, European)	34 (63 %)	16 (32 %)	2 (28.6 %)	52 (46.8 %)
South Asian (Indian, Pakistani, Bangladeshi, Sri Lankan)	4 (7.4 %)	5 (10 %)	3 (42.9 %)	12 (10.8 %)
East Asian/Southeast Asian (Chinese, Japanese, Korean, etc.)	3 (5.6 %)	10 (20 %)	—	13 (11.7 %)
Middle Eastern/North African (MENA)	5 (9.3 %)	13 (26 %)	1 (14.3 %)	19 (17.1 %)
Black/African/Caribbean/Black British	7 (13 %)	2 (4 %)	—	9 (8.1 %)
Marital status (Max *n* = 114)				
Unmarried	45 (83.3 %)	44 (84.6 %)	8 (100 %)	97 (85.1 %)
Married	9 (16.7 %)	8 (15.4 %)	—	17 (14.9 %)
Employment status (Max *n* = 113)				
Employed	12 (22.6 %)	12 (23.1 %)	2 (25 %)	26 (23 %)
Student/unemployed	41 (77.4 %)	40 (76.9 %)	6 (75 %)	87 (77 %)
Household's annual income (Max *n* = 112)				
Less than £23,000	18 (33.3 %)	28 (54.9 %)	4 (57.1 %)	50 (44.6 %)
£23,000 to £50,270	27 (50 %)	18 (35.3 %)	3 (42.9 %)	48 (42.9 %)
Over £50,270	9 (16.7 %)	5 (9.8 %)	—	14 (12.5 %)
Location (Max *n* = 113)				
Non-urban	24 (45.3 %)	18 (34.6 %)	2 (25 %)	44 (38.9 %)
Urban	29 (54.7 %)	34 (65.4 %)	6 (75 %)	69 (61.1 %)
Parents' Education Level (Max *n* = 113)				
No qualifications	3 (5.6 %)	4 (7.7 %)	—	7 (6.2 %)
GCSE or equivalent	12 (22.2 %)	8 (15.4 %)	1 (14.3 %)	21 (18.6 %)
A-level or equivalent	16 (29.6 %)	8 (15.4 %)	4 (57.1 %)	26 (23 %)

Table 1 (*continued*)

Variable	Health N (%)	Non-health N (%)	Unknown N (%)	Total N (%)
Higher education	23 (42.6 %)	32 (61.5 %)		59 (52.2 %)
Only child status (Max *n* = 114)				
Yes	3 (5.6 %)	6 (11.5 %)	1 (12.5 %)	10 (8.8 %)
No	51 (94.4 %)	46 (88.5 %)	7 (87.5 %)	104 (91.2 %)

Table 2
Breastfeeding exposure, education, and intentions among students.

Breastfeeding Exposure	Health N (%)	Non-health N (%)	Unknown N (%)	Total N (%)
Breastfed as an infant (Max *n* = 114)				
Yes	35 (64.8 %)	30 (57.7 %)	5 (75 %)	71 (62.3 %)
No	14 (25.9 %)	15 (28.8 %)	2 (25 %)	31 (27.2 %)
Not sure	5 (9.3 %)	7 (13.5 %)	—	12 (10.2 %)
Know someone who has breastfed (Max *n* = 114)				
Yes	51 (94.4 %)	48 (92.3 %)	8 (100 %)	107 (93.9 %)
No	3 (5.6 %)	4 (7.7 %)	—	7 (6.1 %)
Witnessed breastfeeding (Max *n* = 114)				
Yes	54 (100 %)	49 (94.2 %)	6 (75 %)	109 (95.6 %)
No	—	3 (5.8 %)	2 (25 %)	5 (4.4 %)
Received Formal or Informal Breastfeeding Education (Max *n* = 113)				
Yes	31 (57.4 %)	12 (23.1 %)	1 (14.3 %)	44 (38.9 %)
No	23 (42.6 %)	40 (76.9 %)	6 (85.7 %)	69 (61.1 %)
Breastfeeding Intention (Max *n* = 114)				
Yes	52 (96.3 %)	51 (98.1 %)	8 (100 %)	111 (97.4 %)
No	2 (3.7 %)	1 (1.9 %)	—	3 (2.6 %)
Duration of Breastfeeding Intention (Max *n* = 110)				
Only after birth	1 (2 %)	1 (2 %)	—	2 (1.8 %)
<3 months	2 (3.9 %)	1 (2 %)	—	3 (2.7 %)
<6 months	13 (25.5 %)	9 (17.6 %)	1 (12.5 %)	23 (20.9 %)
6 months or more	24 (47.1 %)	28 (54.9 %)	3 (37.5 %)	55 (50 %)
12 months or more	11 (21.6 %)	12 (22.5 %)	4 (50 %)	27 (24.5 %)

groups. Similarly, most had witnessed breastfeeding (95.6 %), with all participants in the health group (100 %) and 94.2 % in the non-health group responding yes.

Regarding breastfeeding education, 38.9 % of participants reported receiving either formal or informal instruction, with a significantly higher proportion among health students (57.4 %) than non-health students (23.1 %), $\chi^2(1, N = 106) = 12.95$, $p < 0.001$. Participants described a range of sources from which they had gained breastfeeding-related knowledge. Most respondents to this question ($n = 21$) described learning through higher education. All those who reported that the

university was their source of breastfeeding education belonged to the health group. This education included lectures, clinical modules such as paediatrics, and training aligned with initiatives like the UNICEF Baby Friendly Initiative. A smaller group ($n = 5$) recalled learning about breastfeeding through earlier educational experiences, such as high school health classes, GCSE coursework, or military training. Others ($n = 5$) mentioned learning from family members, most frequently mothers, as well as grandmothers or aunts. For example, one participant noted, "*Learned when my aunt had her first baby and I was interested, so I attended class with her,*" while another shared, "*From my mother—we were four children and I am the oldest.*" Some participants ($n = 5$) also reported learning about breastfeeding through media and online platforms, including general media, parenting content on Instagram, and social media discussions. Comments included, "*On social media, a lot of people have opinions on it,*" and "*From Instagram parenting*". In a separate question, respondents reflected on the influence of media or social media on their infant feeding decisions, with 10 % ($n = 13$) reporting being strongly influenced, 28 % ($n = 36$) somewhat influenced, 38 % ($n = 50$) not influenced, and 24 % ($n = 31$) stating that they did not engage with media or social media on this topic.

Baseline Attitudes Toward and Knowledge of Breastfeeding

Baseline attitudes and knowledge of breastfeeding, with item-level frequencies and percentages, are presented in

Table 3 and Table 4, respectively. The overall mean attitude score among participants ($N = 112$) was 60.1 ± 6.6, with the vast majority of participants (90.2 %) demonstrating a neutral attitude, while 8 % showed a positive attitude and 1.8 % a negative attitude (Table 3).

Among the participants, 48.1 % of health students disagreed with the statement that formula-feeding is more convenient than breastfeeding, compared to 19.2 % of non-health students. In contrast, 46.2 % of non-

health students agreed with this statement, whereas only 13 % of health students did, indicating differing perceptions of convenience between the groups.

Health students were also more likely to agree that *breast milk is more easily digested than formula* (83.3 % vs. 55.8 %), whereas non-health students showed greater uncertainty, with 32.7 % responding neutrally compared to 14.8 % of health students.

The overall mean knowledge score was 13.0 ± 2.9 (Table 4). Among health students, 70 % demonstrated high knowledge. In contrast, 64 % of non-health students categorised as having low knowledge. Only 39.2 % of non-health students correctly identified the indicator of sufficient breast milk intake (≥ 6 wet diapers per day), compared to 74.1 % of health students. These findings reflect a generally more informed perspective among health students across both attitudinal and knowledge dimensions.

Total knowledge score	Frequency (%)		Total score (Min–Max)	Mean ±SD (95 % CI)
	Low	High		
Health (Valid N = 50)	15 (30 %)	35 (70 %)	7–19	14.2 ± 2.8
Non-health (Valid N = 50)	32 (64 %)	18 (36 %)	6–18	11.7 ± 2.5
Total (Valid N = 107)	50 (46.7 %)	57 (53.3 %)	6–19	13.0 ± 2.9

Comparison of Knowledge and Attitude Scores Between Health and Non-Health Students.

There was a significant difference in attitude scores, t(102) = 3.74, $p < 0.001$, with health students ($M = 62.3$, SD = 6.7) scoring higher than non-health students ($M = 57.6$, SD = 6.0), resulting in a mean difference

Table 3
Attitude of students towards breastfeeding.

Attitude questions	Disagree		Neutral		Agree	
	Health N (%)	Non-health N (%)	Health N (%)	Non-health N (%)	Health N (%)	Non-health N (%)
*The nutritional benefits of breast milk lasts only until the baby is weaned from breast milk.	45 (83.3 %)	35 (67.3 %)	4 (7.4 %)	6 (11.5 %)	5 (9.3 %)	11 (21.2 %)
*Formula-feeding is more convenient than breastfeeding.	26 (48.1 %)	10 (19.2 %)	21 (38.9 %)	18 (34.6 %)	7 (13 %)	24 (46.2 %)
Breastfeeding increases mother-infant bonding.	3 (5.6 %)	2 (3.8 %)	—	6 (11.5 %)	51 (94.4 %)	44 (84.6 %)
*Breast milk is lacking in iron.	31 (58.5 %)	30 (58.8 %)	20 (37.7 %)	17 (33.3 %)	2 (3.8 %)	4 (7.8 %)
Formula-fed babies are more likely to be overfed than are breast-fed babies.	12 (22.2 %)	16 (30.8 %)	14 (25.9 %)	16 (30.8 %)	28 (51.9 %)	20 (38.5 %)
*Formula-feeding is the better choice if a mother plans to work outside the home.	26 (48.1 %)	19 (36.5 %)	19 (35.2 %)	11 (21.2 %)	9 (16.7 %)	22 (42.3 %)
Mothers who formula-feed miss one of the great joys of motherhood.	33 (61.1 %)	26 (50 %)	10 (18.5 %)	15 (28.8 %)	11 (20.4 %)	11 (21.2 %)
*Women should not breastfeed in public places such as restaurants.	44 (81.5 %)	42 (80.8 %)	5 (9.3 %)	5 (9.6 %)	5 (9.3 %)	5 (9.6 %)
Babies fed breast milk are healthier than babies who are fed formula.	13 (24.1 %)	16 (30.8 %)	13 (24.1 %)	9 (17.3 %)	28 (51.9 %)	27 (51.9 %)
*Breast-fed babies are more likely to be overfed than formula-fed babies.	40 (74.1 %)	28 (53.8 %)	13 (24.1 %)	19 (36.5 %)	1 (1.9 %)	5 (9.6 %)
*Fathers feel left out if a mother breast-feeds.	33 (61.1 %)	35 (67.3 %)	9 (16.7 %)	8 (15.4 %)	12 (22.2 %)	9 (17.3 %)
Breast milk is the ideal food for babies.	1 (1.9 %)	4 (7.7 %)	8 (14.8 %)	7 (13.5 %)	45 (83.3 %)	41 (78.8 %)
Breast milk is more easily digested than formula.	1 (1.9 %)	6 (11.5 %)	8 (14.8 %)	17 (32.7 %)	45 (83.3 %)	29 (55.8 %)
*Formula is as healthy for an infant as breast milk.	26 (48.1 %)	21 (40.4 %)	19 (35.2 %)	17 (32.7 %)	9 (16.7 %)	14 (26.9 %)
Breast-feeding is more convenient than formula feeding.	8 (14.8 %)	17 (32.7 %)	25 (46.3 %)	22 (42.3 %)	21 (38.9 %)	13 (25 %)
Breast milk is less expensive than formula.	1 (1.9 %)	6 (11.5 %)	2 (3.7 %)	5 (9.6 %)	51 (94.4 %)	41 (78.8 %)
*A mother who occasionally drinks alcohol should not breast-feed her baby.	26 (48.1 %)	7 (13.5 %)	7 (13.5 %)	12 (23.1 %)	21 (38.9 %)	33 (63.5 %)

Total attitude score	Frequency (%)			Total score (Min–Max)	Mean ±SD (95 % CI)	
	Negative	Neutral	Positive			
Health (N = 53)	1 (1.9 %)	45 (84.9 %)	7 (13.2 %)	48–78	62.3 ± 6.7	
Non-health (N = 51)	2 (3.8 %)	48 (92.3 %)	1 (1.9 %)	48–75	57.6 ± 6.0	
Total (N = 112)	2 (1.8 %)	101 (90.2 %)	9 (8 %)	48–78	60.1 ± 6.6	

For reverse-coded items (*), disagreement indicates a favorable attitude. Reported Ns and percentages include only valid (non-missing) responses.

Table 4
Knowledge of students towards breastfeeding.

Knowledge questions	Correct responses			
	Health N (%)	N	Non-health N (%)	N
1. Breastfeeding cuts down on the mother's bleeding after delivery.	28 (51.9 %)	54	17 (32.7 %)	52
2. Breast milk makes up a complete diet for baby. No extras (foods, vitamins etc.) are needed until the baby is close to six months of age.	43 (79.6 %)	54	40 (76.9 %)	52
3. If breasts are small, the mother might not have enough milk to feed the baby.	49 (90.7 %)	54	44 (84.6 %)	52
4. When a mother is sick with the flu or a bad cold, she can usually continue to breastfeed her baby.	34 (63 %)	54	29 (55.8 %)	52
5. Babies who are breastfed tend to get fewer allergies than babies who get formula.	50 (92.6 %)	54	36 (69.2 %)	52
6. The pill is the best way to keep from getting pregnant while breastfeeding.	44 (83 %)	53	42 (80.8 %)	52
7. A mother shouldn't try to breastfeed if she is planning to go back to work or school since she won't be able to be with her baby for feedings.	53 (98.1 %)	54	45 (86.5 %)	52
8. The more often a mother breastfeeds, the more milk she will have for her baby.	42 (77.8 %)	54	38 (74.5 %)	51
9. Babies who are breastfed tend to get fewer infections than babies who get formula.	50 (94.3 %)	53	36 (69.2 %)	52
10. Many women are not able to make enough milk to feed their baby.	33 (61.1 %)	54	17 (32.7 %)	52
11. The best food for a newborn (Breast milk)	52 (96.3 %)	54	50 (96.2 %)	52
12. Because babies may get a bad reaction to certain foods, breastfeeding mothers should never eat (None)	41 (75.9 %)	54	21 (40.4 %)	52
13. After the baby loses weight following birth, they will probably gain it back faster if (He is breastfed)	21 (38.9 %)	54	27 (51.9 %)	52
14. A mother shouldn't try to breastfeed if she (Drink a lot of alcoholic beverages)	53 (100 %)	53	49 (94.2 %)	52
15. Breastfeeding mothers' nipples get sore if (The baby's feeding position is not right)	42 (77.8 %)	54	30 (57.7 %)	52
16. When a mother breastfeeds, the best way to tell if the baby is getting enough milk is (The baby has 6/more wet diapers in 24 h)	40 (74.1 %)	54	20 (39.2 %)	51
17. When a mother breastfeed (She may get her figure back easier)	30 (55.6 %)	54	12 (23.1 %)	52
18. If a mother breastfeeds (None)	40 (74.1 %)		25 (48.1 %)	52
19. Breastfeeding will probably make (No difference in the size *or* shape of the breasts)	29 (54.7 %)	53	26 (50 %)	52
20. Breastfed babies need (Only breast milk)	49 (90.7 %)	54	45 (86.5 %)	52

of 4.7 (95 % CI [2.2, 7.2]) (Table 5).

Similarly, for knowledge scores, health students ($n = 50$) demonstrated significantly greater knowledge ($M = 14.2$, SD $= 2.8$) than non-health students ($n = 50$; $M = 11.7$, SD $= 2.5$), t(98) $= 4.74$, $p < 0.001$, with a mean difference of 2.5 (95 % CI [1.4, 3.6]).

Exploratory analysis of Factors Associated with Attitude and Knowledge

Scores

Stepwise regression analysis indicated that field of study and prior breastfeeding education were significant predictors of attitude scores, together explaining 20.1 % of the variance ($R^2 = 0.201$, Adjusted $R^2 = 0.184$, F(2, 94) $= 11.81$, $p < 0.001$; see Table 6). Health students scored 4.05 points higher than non-health students ($B = 4.05$, $p < 0.001$), and participants with prior breastfeeding education scored 3.60 points higher than those without ($B = 3.60$, $p = 0.011$). Other variables, including age, gender, location, employment status, marital status, parents' education, and prior breastfeeding exposure, did not significantly contribute to the model.

Knowledge scores were predicted by prior breastfeeding education, field of study, location, and gender, collectively explaining 36.8 % of the variance ($R^2 = 0.368$, Adjusted $R^2 = 0.339$, F(4, 88) $= 12.81$, $p < 0.001$; see Table 6). Prior breastfeeding education was the strongest predictor ($B = 2.250$, $p < 0.001$), followed by field of study ($B = 1.202$, $p = 0.032$). Participants from urban areas scored slightly lower than rural participants ($B = -1.296$, $p = 0.013$), and males scored slightly lower than females ($B = -1.287$, $p = 0.045$). Other demographic and experiential variables did not significantly contribute.

Discussion

This study explored breastfeeding knowledge, attitudes, exposure, and intentions among university students without personal or partner experience of pregnancy or breastfeeding. Focusing on this group allows for early evaluation and more targeted intervention, which is particularly important as informed decision-making is more effective before the physical, emotional, and lifestyle barriers of pregnancy and postpartum emerge (Malekian et al., 2025; Padmanabhan et al., 2016).

Nearly all participants (97.4 %) expressed an intention to breastfeed. While the majority intended to do so for more than six months, only 24.5 % planned to breastfeed for >12 months, which falls below the WHO recommendation to continue breastfeeding up to 2 years and beyond, following the introduction of solid foods at 6 months (WHO, 2023). Nonetheless, these high levels of intention are notable given that formula feeding remains the predominant norm in the UK (Newman and Williamson, 2018; Royal College of Paediatrics and Child Health, 2021). The ethnic diversity of the sample may help explain this pattern, as less than half of participants identified as White British, and international students or those from more breastfeeding-supportive cultures may have influenced the overall findings. Yet despite these strong intentions and widespread exposure to breastfeeding within families and social networks, overall knowledge was modest and attitudes were largely neutral. This disconnect between intention and attitudes has been observed in other student populations internationally (Jefferson, 2015; Lou et al., 2014), reflecting the complexity of how infant feeding decisions are shaped.

Differences between health and non-health students were evident. Health students, demonstrated higher knowledge and more positive attitudes, reflecting structured breastfeeding education and clinical exposure in their curricula, as well as the university's Baby Friendly Initiative (BFI) accreditation. These findings align with previous research identifying education and professional training as key drivers of breastfeeding knowledge and awareness among students (Sandhi et al., 2023; Malekian et al., 2025). Knowledge levels among non-health

Table 5
Comparison of Attitude and Knowledge Scores Between Health and Non-Health Students.

Variable	Group	N	Mean	SD	Shapiro-Wilk (W, p)	Levene's Test (F, p)	t (df)	p-value	Mean Difference (95 % CI)	Effect Size (Cohen's d)
Attitude Score	Health	53	62.3	6.7	0.982, 0.621	0.449, 0.504	3.74 (102)	<0.001	4.7 (2.2,7.2)	0.73
	Non-Health	51	57.6	6.0	0.957, 0.065					
Knowledge Score	Health	50	14.2	2.8	0.940, 0.014*	2.79, 0.098	4.74 (98)	<0.001	2.5 (1.4,3.6)	0.95
	Non-Health	50	11.7	2.5	0.975, 0.364					

Table 6

Stepwise Regression Predicting Attitude and Knowledge Scores.

Predictor	Attitude					Knowledge				
	B	SE	β	t	p	B	SE	β	t	p
Field status	4.05	1.34	0.30	3.01	0.003	1.20	0.55	0.21	2.18	0.032
breastfeeding education	3.60	1.39	0.25	2.59	0.011	2.25	0.54	0.38	4.21	<0.001
Location	—	—	—	—	—	−1.30	0.51	−0.22	−2.53	0.013
Gender	—	—	—	—	—	−1.29	0.63	−0.18	−2.03	0.045

Model fit: Attitude: $R^2 = 0.201$, Adjusted $R^2 = 0.184$, $F_{(2, 94)} = 11.81$, $p < 0.001$, Knowledge: $R^2 = 0.368$, Adjusted $R^2 = 0.339$, $F_{(4, 88)} = 12.81$, $p < 0.001$.

students were low, and this difference highlights the need to extend breastfeeding education beyond health curricula. Equipping all students with accurate information is important, as infant feeding decisions are influenced not only by health professionals and future parents, but also by partners, peers, and the wider community, which these students will help shape in the future.

Exploratory analyses confirmed that prior breastfeeding education and field of study were the strongest predictors of both knowledge and attitudes. Gender and location had smaller but statistically significant effects, with male students and those from urban areas scoring slightly lower. The finding regarding gender is consistent with a study among UK students, and aligns with international research showing that male students generally score lower than female students in breastfeeding attitudes and knowledge (Jackson et al., 2023; Grabowski et al., 2024). Male students also appeared less likely to view breastfeeding as relevant to them, with some declining to participate in this study on that basis. This reflects persistent perceptions of breastfeeding as a gendered issue, despite its relevance for everyone. Including all genders in breastfeeding education is therefore essential, both to promote informed personal decision-making and to foster supportive environments where partners, family, peers, and communities provide support and social acceptance, and workplaces or study settings accommodate breastfeeding needs. Slightly lower knowledge and attitude scores among urban residents in this sample contrast with trends reported in high-income countries, including the UK (Gallegos et al., 2020; Wood et al., 2023; Peregrino et al., 2018). This suggests that local context and factors, such as neighbourhood socioeconomic status, cultural influences and education, may play a more significant role in shaping attitudes and practices than a simple urban rural divide (Isherwood et al., 2019; Kera et al., 2023; Abebe et al., 2019). Moreover, in some urban areas, modern lifestyles and work-focused cultures may prioritise formula feeding, and there are studies indicate that formula feeding has become standard in many urban settings (Paramashanti et al., 2023).

It should be noted that the models explained only 20.1 % of the variance in attitude scores and 36.8 % of the variance in knowledge, reflecting the complex mixture of factors that influence these variables. Knowledge and attitudes are influenced partly by educational exposure and professional background, but much is left to unmeasured factors e. g., cultural norms, social influences, perceived barriers. Differences related to culture or ethnicity could not be explored in the analyses due to small sample sizes for the various ethnic groups and the absence of data on participants' nationalities. Ethnicity alone does not fully capture cultural influences, as individuals from different ethnic groups may have been raised within similar cultural contexts. Nevertheless, the importance of culture in shaping breastfeeding practices is supported by research showing that some migrant women, while aware of the UK's formula-feeding norms, continue to breastfeed due to cultural beliefs about the psychological benefits of breast milk, using formula primarily in response to child demands or family-related conflicts (Choudhry and Wallace, 2012).

Certain aspects of the study should be considered when interpreting these findings. Conducting the research within a single UK university limits the generalisability of findings, and male participation was notably lower than female participation for the reasons discussed above. The use of non-probability sampling further limits representativeness, as

the sample may not fully reflect the wider student population. A further limitation is that self-report tools that assess attitudes to infant feeding are susceptible to social desirability bias (Mazhar et al., 2025), particularly in a setting with strong BFI affiliation, which may have encouraged students to align their responses with pro-breastfeeding norms. Although anonymity likely reduced this effect, response bias cannot be excluded. Although the tools used are common in this context, no instrument is without limitations, and some items may oversimplify complex concepts or unintentionally reinforce misconceptions. For instance, the item on assessing whether a baby is getting enough milk based on six or more wet nappies in 24 h did not reflect that babies naturally have fewer wet nappies in the first 48 h, with six or more expected only from day five onwards (NHS, 2022), which may have led knowledgeable students to question its accuracy. Likewise, the item suggesting that women with small breasts 'might not have enough milk to feed the baby' can be misleading, as breast size does not determine milk production. Women with small breasts can produce adequate milk, though infants may feed more frequently due to smaller storage capacity (Pollard, 2023).

Despite these limitations, the study provides valuable insight into the baseline breastfeeding knowledge, attitudes, and intentions of young adults before they encounter infant feeding decisions personally. The finding that intention was high, but knowledge and attitudes remained limited, suggests that early intervention is crucial for translating willingness into informed and confident choices. Extending structured education beyond health disciplines, and ensuring that both men and women are included, could help strengthen public health efforts to normalise breastfeeding and create more supportive environments.

Conclusion

The findings of this study highlight the need for early, inclusive breastfeeding education that engages all genders and disciplines. Universities offer a convenient setting for such interventions, allowing students to develop knowledge and supportive attitudes before they encounter personal infant feeding decisions. However, public health strategies must also extend beyond the university environment to address broader community, cultural, and social influences that shape infant feeding practices. Investigating these factors could identify effective approaches for promoting supportive breastfeeding environments, informing policy, and reducing disparities in knowledge and attitudes. Additionally, longitudinal studies tracking the translation of intentions into actual breastfeeding behavior would provide valuable evidence to guide public health initiatives and ensure interventions effectively support future parents and communities.

Funding

CRediT authorship contribution statement

Maryam Malekian: Writing – original draft, Visualization, Validation, Methodology, Investigation, Formal analysis, Data curation,

Conceptualization. **Michelle Irving:** Writing – review & editing, Validation, Supervision, Resources, Methodology. **Vanora A. Hundley:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Methodology.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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