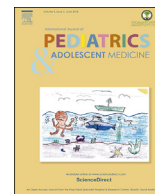


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Original research article

## The impact of maternal socio-demographic characteristics on breastfeeding knowledge and practices: An experience from Casablanca, Morocco

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### ABSTRACT

**Background:** Breastfeeding is universally recognized by the World Health Organization as the best way of feeding infants. Therefore, several countries have initiated health promotion interventions to support successful breastfeeding based on the factors influencing breastfeeding outcomes.

**Objective:** To examine the association between the knowledge of breastfeeding and maternal socio-economic and demographic characteristics, and to determine any impact on child nutritional status.

**Methods:** A cross-sectional study using both qualitative and quantitative methods was conducted with mothers of infants aged six- to twenty-four months. Data was collected by a semi-structured questionnaire and face-to-face, in-depth interviews with mothers to get an insight into their breastfeeding perceptions and experiences. Educational achievement and occupational class were used as indicators of socio-demographic status. Nutritional status was assessed by anthropometric measurements.

**Results:** A significant relationship between exclusive breastfeeding and the mother's education ( $P < .001$ ) and socio-economic status ( $P < .001$ ) has been highlighted. A significant link was pointed out between breastfeeding and length-for-age Z score (LAZ) ( $P < .001$ ), and weight-for-age Z score (WAZ) ( $P = .005$ ). Moreover, a strong association was found between maternal employment and exclusive breastfeeding ( $P < .001$ ).

**Conclusions:** Our findings shed some light on challenges faced by mothers, as well as an association between socio-demographic characteristics and practices for facilitating exclusive breastfeeding to guide the mothers in breastfeeding management.

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### 1. Introduction

The health benefits of breastfeeding are unquestionably admitted throughout the world.

Trials theorized that almost 39% of the world's child population

do not reach optimal growth. The prenatal and postnatal diets are the major causes of stunted children [1].

According to the World Health Organization (WHO), breast milk is the best nutrition reinforcing optimal growth in early infancy [2,3]. However, the establishment of exclusive breastfeeding (EB)

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until six months of age is still commonly affected by the misconception of the breastfeeding process [4].

From the age of six months, children require a food diversification to prevent growth retardation. Impaired feeding in the first years of life might induce malnutrition, which has shown correlation to short-term injurious repercussions — essentially retarded growth and increased child morbidity and mortality [2,5].

The priority of fighting childhood malnutrition and mortality has been enshrined in the United Nations' Millennium Development Goals (MDGs). Therefore, dealing with neonatal mortality, which is to a large extent recognized to be related to delayed breastfeeding initiation, is fundamental to reach the MDG 4 targeting the reduction of child mortality in developing countries [6,7].

In Africa, enhanced performance monitoring in Morocco regarding the MDGs, notably MDG 4, over the past 15 years, has been substantially efficacious, as the child mortality rate of children under the age of five decreased by more than 60%, while the neonatal mortality goal remains out of reach [8].

Currently, Morocco's engagement to development aims to attain the new global Sustainable Development Goals (SDGs) to eradicate extreme poverty, realign nutrition as crucial to evolution and raise communal welfare by 2030. Indeed in 2016, the world formally established the 2030 agenda for SDGs to confront challenges over the next 15 years. Goal 2, above all, aims to end hunger and all types of malnutrition and to carry out continual food production by 2030 [9,10].

It is with these issues in mind that we aspired to evaluate breastfeeding practices of nursing mothers and their knowledge of existing breastfeeding recommendations. Additionally, we sought to address the motives and compulsions that drive women to wean prior to the accepted scheduled time. Furthermore, we assessed whether the type of breastfeeding influences child nutritional status.

## 2. Methodology

### 2.1. Study area

This study was conducted in Ain Chock, which is a locality in the city of Casablanca, Morocco. According to data from the Moroccan General Census of Population and Housing of 2014, the Ain Chock District includes 89,013 households out of a population of nearly 377,744 [11,12].

### 2.2. Research design

This was a cross-sectional study, undertaken from January to December 2016, on healthy urban children seen for routine primary healthcare at the twelve public health centers in Ain Chock district, Casablanca.

### 2.3. Source and study population

The sourced population consisted solely of mothers with infants whose age was between six and twenty-four months, who were requesting vaccination or vitamin A/D supplementation for their children at the Ain Chock health facilities. Those having any congenital or metabolic diseases influencing growth, history of acute infection or diarrhea 15 days or less prior to the survey were excluded. This selected population ensured the completion of the optimal duration of exclusive breastfeeding, thus having better remembrance with regards their breastfeeding practices.

### 2.4. Eligibility criteria

**Inclusion Criteria:** In this study, we selected all nursing mothers of children aged 6–24 months.

**Exclusion Criteria:** Children having any congenital or metabolic diseases capable of influencing growth, history of acute infection or diarrhea 15 days or less before the survey were excluded.

### 2.5. Sample size and sampling procedure

Based on Lorenz's [13] formula for calculating sample size, and assuming a P (national prevalence of exclusive breastfeeding of a newborn at term at the age of 6 months in Morocco) of 27%, an  $\alpha$  of 0.05 and a  $Z\alpha$  of 1.96, a minimum sample size of 250 nursing mothers was required.

All in all, 297 questionnaires were completed, with a valid response rate of 90%. Twenty-six mothers refused to participate because they claimed that the interview will take too much time.

### 2.6. Data collection

Data was collected through an individual, face-to-face, in-depth interview with the selected mother, using a pre-tested and structured questionnaire guided by previous literature. The questionnaire focused on identifying factors that may influence breastfeeding choices and outcomes to explore the breastfeeding experiences [14,15], practices and perceptions on breastfeeding constraints.

Two pediatricians assessed the validity of the questionnaire. Pre-testing was completed on 5% of the total respondents to determine whether the questionnaire was understandable, and corrections were made progressively. The face-to-face interviews required almost 40 min.

The questionnaire had three parts. First, we gathered information on age, baby gender, education level, marital status, mode of delivery, parental occupation, living environment, number of children, rank among siblings, and health insurance coverage. Besides, information on monthly income for household was used for the determination of the lower, middle and wealthy social classes in Morocco using a broad definition of the middle class, adopted by the High Commission for Planning surveys based on a lower limit of 2800 Moroccan dirham (MAD) per month and an upper limit of 6736 MAD per month [16].

The second questionnaire section contained questions specific to breastfeeding. Questions covered the following topics: maternal knowledge and attitudes towards breastfeeding versus formula feeding, antenatal intent to breastfeed, knowledge and factors that encourage or discourage mothers from the practice of exclusive breastfeeding, exposure to media sources concerning breastfeeding, support networks including healthcare professionals and friends/family, current infant feeding practices, and influential family members' knowledge and practices regarding exclusive breastfeeding.

Twelve questions assessed the mother's knowledge of the benefits of exclusive breastfeeding [17,18]. These questions covered the entire process of exclusive breastfeeding and its well-documented benefits for the mother-infant dyad. Questions were posed as agree or disagree.

Moreover, 12 questions focused on the breastfeeding behaviors of mothers in the postpartum period and the principal challenges subsequently encountered [19].

Eight breastfeeding features were submitted to mothers who completed our survey:

1) Mastitis/Breast abscess; 2) Full breasts/breast engorgement/sore or fissured nipple; 3) Perceived insufficiency and low breast-

milk production; 4) Inverted, flat, large and long nipples; 5) Low breast-milk intake; 6) Being depressed, lacking in confidence, worried, or stressed; 7) Short-term separation due to employment outside the home; and 8) Health facility environment and family members were not supportive.

### 2.7. Assessment of nutritional status in children

Anthropometry is universally used as the gold standard measure for acute malnutrition in children beyond six months of age and has proven value [20].

The World Health Organization Infant Growth Standards were utilized to evaluate the Z-scores [21]. In Our study, we examined data for children with Z-scores less than minus two standard deviations ( $-2$  SD).

Stunting was diagnosed on the basis of an international consensus which says that children are stunted if their length-for-age Z-score (LAZ) is less than  $-2$  SDs and severely stunted if their length is under  $-3$  SDs in comparison with the WHO Child Growth Standards median for similar age and gender [22,23].

Children were characterized as wasted children (weight-for-length Z-score (WLZ)  $< -2$ ) and severely wasted children (WLZ  $< -3$ ), using the WHO's Child Growth Standards [20,24].

Furthermore, based on the growth standards of the WHO, severe underweight children were represented by having weight-for-age Z scores (WAZ) less than  $-3.0$  SDs and were free from any congenital diseases [20,25].

Data collectors were trained to use a data collection tool and corresponding procedures for four days. Five final-year medical students with practical experience in research studies collected data. Public health nurses also helped investigators during fieldwork.

### 2.8. Data analysis

Statistical Package for Social Sciences (SPSS) was utilized to analyze data. We applied a mixed-methods approach using both qualitative and quantitative methods.

The statistical assessment of the quantitative variables was performed by calculating the average  $\pm$  standard deviation, or median and interquartile range (IQR).

The normality of the distribution was evaluated using the Kolmogorov-Smirnov (KS) test [26], but rejected at a  $P$  value  $< .05$ . The comparison of quantitative variables with normal distribution was carried out by the student t-test; when the parametric hypotheses were not satisfied, the Kruskal-Wallis test and the Mann-Whitney test were performed [27].

Qualitative variables were expressed in numbers and percentages and their associations were assessed using the Chi-square test or Fisher's exact test. A value of  $P < .05$  was considered significant for all statistical analyzes.

### 2.9. Ethical consideration

This research received prior approval from the Institutional Ethics Committee of the Faculty of Medicine in Rabat, Mohamed V University, Morocco. The interview content was explained in detail to respondents. Free and informed verbal consent was obtained at the beginning of each investigation from all participants. Data collection and handling were done with strict confidentiality. Furthermore, all the women interviewed were free to withdraw from the study at all stages.

## 3. Results

### 3.1. Study participant demographics

The overall analysis of the children recruited revealed that the median age was 12 months with extremes of 6 and 24 months. The 12–24 months age group was the most predominant, with a sex ratio of 1.34.

All infants included in the study were full-term and eutrophic. The mean birth weight was 3 Kg  $\pm$  200 g and the gestational age was 38 weeks  $\pm$  1.5.

For the surveyed mothers, 87.2% were housewives, with more than half having attained a secondary education level (59.6%).

Moreover, the economic level of the household was average for the majority of our participants (72.1%). The main characteristics of our population are presented in Table 1.

### 3.2. Assessing malnutrition in infants

The analysis in Table 2 revealed a statistically significant difference between the two genders for median LAZ ( $P < .001$ ) and WAZ ( $P = .019$ ) below  $-2$  SD. However, the distribution of the two sexes according to nutritional status was statistically similar. Table 2 shows the overall distribution of nutrition indicators less than  $-2$  Z-scores by gender at all ages.

### 3.3. Knowledge of the benefits of exclusive breastfeeding

In order to meet the objective of our study, we performed a descriptive analysis of mothers' knowledge of the benefits of

**Table 1**  
Socio-demographic characteristics of infants and families.

Characteristics	Overall population (N = 297)
<b>Infant characteristics</b>	
Child's age (months) <sup>a</sup>	12 [9–18]
<b>Child's age ranges<sup>b</sup></b>	
6–8 months	58 (19.5)
9–11 months	83 (28)
12–24 months	156 (52.5)
<b>Gender of the child<sup>b</sup></b>	
Female	127 (42.8)
Male	170 (57.2)
<b>Mother characteristics</b>	
Mother's age <sup>c</sup>	29.72 (6.05)
<b>Mother's age groups<sup>b</sup></b>	
Less than 20 Years	11 (3.7)
20–29 Years	146 (49.2)
30–39 Years	117 (39.4)
40–49 Years	23 (7.7)
<b>Literacy<sup>b</sup></b>	
Illiterate	27 (9.1)
Primary school	56 (18.9)
Secondary school	177 (59.6)
Higher education	37 (12.5)
<b>Mother's professional activity<sup>b</sup></b>	
Housewife	259 (87.2)
Paid worker	38 (12.8)
<b>Household characteristics</b>	
Monthly income (MAD) <sup>d</sup>	5000 (2700–6500)
<b>Household economic level<sup>b</sup></b>	
Low	83 (27.9)
Medium	214 (72.1)

Note

<sup>a</sup> Values are expressed as median and interquartile.

<sup>b</sup> Values are expressed as count and percentage.

<sup>c</sup> Values are expressed as mean  $\pm$  standard deviation.

<sup>d</sup> MAD=Moroccan Dirhams.

**Table 2**  
Distribution of low nutrition indicators by gender, in child's population.

Nutritional status (Classification Based on growth indicators < -2 Z-scores)		Child's population (N = 297)		p value
		Boys n = 170	Girls n = 127	
<b>LAZ &lt; -2 Z-scores</b>		-2.5 [-4; -2]	-2.5 [-4; -2]	<.001*
<b>Stunting</b> (LAZ < -2 Z-scores)	Severely Stunted	27 (15.9)	9 (7.1)	.400**
	Stunted	31 (18.2)	16 (12.6)	
	Combined	58 (19.5)	25 (8.4)	
<b>WAZ &lt; -2 Z-scores</b>		-2 [-2.5; -2]	-2 [-3; -2]	.019*
<b>Underweight</b> (WAZ < -2 Z-scores)	Severely underweight	3 (1.8)	2 (1.6)	.809**
	Underweight	16 (9.4)	4 (3.1)	
	Combined	58 (19.5)	25 (8.4)	
<b>WLZ &lt; -2 Z-scores</b>		-2.5 [-3; -2]	-2.25 [-3.6; -2]	.653*
<b>Wasting</b> (WLZ < -2 Z-scores)	Severely Wasted	3 (1.8)	1 (0.8)	.711**
	Wasted	7 (4.1)	3 (2.4)	
	Combined	10 (3.4)	4 (1.4)	

Note: Values are expressed as count and percentage; IQR: Interquartile range.

LAZ = Length-for-age z-score; WAZ = Weight-for-age z-score; WLZ = Weight-for-length Z-Score. \* Mann-Whitney; \*\*Chi-Square test.

In relation to the newer WHO standards, Moderate wasting (weight-for-length Z score, WLZ, < -2), severe wasting (WLZ < -3); underweight (WAZ < -2); severely underweight (WAZ < -3.0); LAZ-scores generated using the 2006 World Health Organization (WHO) Growth Reference, were used to define stunting (LAZ < -2SD) and severe stunting (LAZ < -3SD).

exclusive breastfeeding.

The overall analysis revealed that several mothers were conscious of breastfeeding benefits. Analysis by educational attainment and socio-economic status revealed that the percentage of women with information on the benefits of the EB was significantly high among mothers with high and/or secondary education and mothers with medium socio-economic status (Table 3).

### 3.4. Sources of knowledge

According to the interviews, 56.6% gained knowledge about breastfeeding through their immediate family environment. Additionally, 41.1% of the participants were provided with information on exclusive breastfeeding and useful steps for its successful management from health professionals. Mothers have clearly emphasized the relevance of informed counseling regarding breastfeeding received from health professionals. However, 22.2% of mothers reported receiving information from television programs, radio and social networks.

### 3.5. Promoting breastfeeding among lactating mothers

Many mothers reported that perceiving unconcerned behavior from health professionals and family members was linked breastfeeding for a length of time far away from optimal guidelines.

Grandmothers also provided assistance by way of babysitting to help mothers return to work outside the home.

However, the ability of fathers to help their wives was limited by men's professional responsibilities.

### 3.6. Practices of breastfeeding during the first hour following birth

The majority of mothers gave breast milk to their infants during the first hour following birth. A calculated 90.23% of mothers breastfed their infants while 4.37% administered breast milk in a bottle. The delayed onset of breastfeeding, ranging from a few hours to several days, has been associated with various issues, including maternal or infant health problems.

The study of this association between the different modalities of breast-feeding (breastfeeding, bottle-feeding and the use of infant formulas) and the socio-demographic characteristics of the mother and the anthropometric parameters of infants highlighted a

statistically significant increase in breastfeeding among infants during the first hour following birth and maternal education ( $P < .001$ ), as well as the economic level of the household ( $P < .001$ ) (Table 4).

Compared with the anthropometric indices of infants, our results revealed a significant link between breastfeeding during the first hour following birth and the LAZ at the time of recruitment ( $P < .001$ ).

### 3.7. Child feeding patterns

At initial recruitment, 227 (76.4%) of infants were still being breastfed, while 113 (38%) were bottle-fed. Breastfeeding was common in the first six months (94.7%), with a significant proportion of women breastfeeding on demand (72.7%). The median number of feedings was four times daily. However, breastfeeding did not last until the second half of childhood. Regarding the early introduction of food, we found that water was the most frequently introduced element before the age of six months.

The proportion of infants who started mixed feeding at birth was 39.4%. The median age of onset of artificial feeding was two months. 127 (42.8%) of the children were fed a formula for infants, 64 (21.5%) of the infants were fed with cow's milk, 90 (30.3%) were fed with first-age infant formula and 52 (17.5%) were fed with second-age infant formula. On the other hand, about two-thirds of mothers ( $n = 197$ ) reported that a dummy had been given to their baby in the first year to comfort the sick and crying child, while other mothers reported the desire to satisfy the suckling reflex of babies, and also as a mean of delaying the meals of infants.

### 3.8. Exclusive breastfeeding practices and their correlation with the socio-demographic characteristics of mothers and the nutritional status of infants

In our study, more than half of the mothers (57.23%) exclusively breastfed their babies. The analysis, depicted in Table 5, exposed a greater percentage of exclusive breastfeeding among women with secondary or high education attainment in relation to illiterate mothers and/or with a primary level of education, respectively (75.7% and/or 78.7% versus 3.7% and/or 3.6%;  $p < .001$ ). On the other hand, for mothers with an average economic level compared to mothers with low household economic status, respectively with

**Table 3**

Mothers' knowledge of the benefits of breastfeeding: A comprehensive analysis and analysis by level of education and socio-economic status.

Breastfeeding Benefits	Mother's Educational Status				<i>P</i> value	Mother's Economic Status		<i>P</i> value	Overall Analysis n = 297
	Illiterate n = 27	Primary n = 56	Secondary n = 177	High n = 37		Low n = 83	Medium n = 214		
<b>EB for about 6 months is the optimal feeding of infants</b>					<b>.033***</b>			<b>.013***</b>	
Yes	24 (8.4)	52 (18.2)	173 (60.5)	37 (12.9)		76 (26.6)	210 (73.4)		286 (96.7)
No	3 (27.3)	4 (36.4)	4 (36.4)	0 (0)		7 (63.6)	4 (36.4)		11 (3.7)
<b>EB protects against diseases, such as otitis media, acute diarrheal disease, lower respiratory illnesses</b>					<b>.044***</b>			<b>.429**</b>	
Yes	23 (8.3)	53 (19.1)	165 (59.4)	37 (13.3)		76 (27.3)	202 (72.7)		278 (93.6)
No	4 (21.1)	3 (15.8)	12 (63.2)	0 (0)		7 (36.8)	12 (63.2)		19 (6.4)
<b>BF prevented a major portion of illness before the immunization against infectious diseases</b>					<b>&lt;.001***</b>			<b>&lt;.001**</b>	
Yes	11 (4.8)	24 (10.6)	157 (69.2)	35 (15.4)		35 (15.4)	192 (84.6)		227 (76.4)
No	16 (22.9)	32 (45.7)	20 (28.6)	2 (2.9)		48 (68.6)	22 (31.4)		70 (23.6)
<b>BF has been associated with a decrease in the risk for both breast and ovarian cancers</b>					<b>&lt;.001***</b>			<b>&lt;.001**</b>	
Yes	12 (5.1)	33 (14.1)	156 (66.7)	33 (14.1)		45 (19.2)	189 (80.8)		234 (78.8)
No	15 (23.8)	23 (36.5)	21 (33.3)	4 (6.3)		38 (60.3)	25 (39.7)		63 (21.2)
<b>BF mothers have decreased postpartum blood loss and more rapid involution of the uterus</b>					<b>&lt;.001**</b>			<b>&lt;.001**</b>	
Yes	11 (6.1)	23 (12.7)	120 (66.3)	27 (14.9)		34 (18.8)	147 (81.2)		181 (60.9)
No	16 (13.8)	33 (28.4)	57 (49.1)	10 (8.6)		49 (42.2)	67 (57.8)		116 (39.1)
<b>Maternal-infant bonding is enhanced during BF</b>					<b>.491***</b>			<b>.522**</b>	
Yes	22 (8.2)	51 (19.1)	160 (59.9)	34 (12.7)		73 (27.3)	194 (72.7)		267 (89.9)
No	5 (16.7)	5 (16.7)	17 (56.7)	3 (10)		10 (33.3)	20 (66.7)		30 (10.1)
<b>BF results in reduced household expenditure for formula, as well as reductions in health care expenditures</b>					<b>.784***</b>			<b>.520***</b>	
Yes	26 (9.1)	55 (19.3)	169 (59.3)	35 (12.3)		81 (28.4)	204 (71.6)		285 (96)
No	1 (8.3)	1 (8.3)	8 (66.7)	2 (16.7)		2 (16.7)	10 (83.3)		12 (4)
<b>Breast milk promotes long-term cognitive development</b>					<b>&lt;.001***</b>			<b>&lt;.001***</b>	
Yes	9 (4.2)	21 (9.8)	153 (71.5)	31 (14.5)		30 (14)	184 (86)		214 (72.1)
No	18 (21.7)	35 (42.2)	24 (28.9)	6 (7.2)		53 (63.9)	30 (36.1)		83 (27.9)
<b>The variable composition of human milk provides nutrients specifically adapted to the changing needs of the infant</b>					<b>.002**</b>			<b>.001**</b>	
Yes	14 (6.1)	39 (17)	145 (63.3)	31 (13.5)		53 (23.1)	176 (76.9)		229 (77.1)
No	13 (19.1)	17 (25)	32 (47.1)	6 (8.8)		30 (44.1)	38 (55.9)		68 (22.9)
<b>Breast milk features are not found in infant formula</b>					<b>&lt;.001***</b>			<b>&lt;.001**</b>	
Yes	3 (1.4)	9 (4.2)	167 (78.4)	34 (16)		12 (5.6)	201 (94.4)		213 (71.7)
No	24 (28.6)	47 (56)	10 (11.9)	3 (3.6)		71 (84.5)	13 (15.5)		84 (28.3)
<b>Postpartum weight loss may be facilitated in BF women</b>					<b>&lt;.001***</b>			<b>&lt;.001***</b>	
Yes	0 (0)	3 (2.1)	111 (77.6)	29 (20.3)		3 (2.1)	140 (97.9)		143 (48.1)
No	27 (17.5)	53 (34.4)	66 (42.9)	8 (5.2)		80 (51.9)	74 (48.1)		154 (51.9)

Note: Values are expressed as count and percentage; BF = breastfeeding; EB = exclusive breastfeeding.

\*\*Chi-Square test; \*\*\* Fisher's test.  $p < .05$  is considered to be significant.

78% versus 3.6%,  $P < .001$ . In contrast, breastfeeding and artificial breastfeeding were more prevalent among mothers with lower levels of education and/or economic status.

Compared to the nutritional status of children based on growth indicators (weight, height and age), our results revealed a statistically significant difference between the type of child feeding and the LAZ scores ( $P < .001$ ), as well as with WAZ scores at recruitment ( $P = .005$ ). Indeed, the LAZ and WAZ scores were normal among the majority of children who were exclusively breastfed. In addition, no relationship was found between mothers age and the method of infant feeding ( $P = .340$ ).

### 3.9. Correlation of the breastfeeding length with the characteristics of mothers and infants

#### 3.9.1. Characteristics of mothers

The median length of breastfeeding was 5 months (IQR = 0–5), with extremes ranging from 0 to 7 months.

The nonparametric Kruskal-Wallis test revealed a significant relationship between the length of breastfeeding and education levels, as well as the socio-economic status of mothers. Indeed, the length of exclusive breastfeeding was higher among mothers better educated ( $P < .001$ ). A significant difference was found between the

illiterate-secondary ( $P < .001$ ), illiterate-high ( $P < .001$ ), primary-secondary ( $P < .001$ ) and primary-high ( $P < .001$ ) education level.

However, no difference was assumed between the length of breastfeeding and the illiteracy-secondary ( $P = .964$ ) and secondary-higher level ( $P = .385$ ) groups. Meanwhile, the length of exclusive breastfeeding was higher among mothers from an average socio-economic class ( $P < .001$ ). In contrast, the duration of EB was statistically similar between the different age groups of nursing mothers ( $P = .303$ ).

#### 3.9.2. Characteristics of infants

The non-parametric Kruskal-Wallis test, showed a statistically significant relationship between the exclusive breastfeeding duration and LAZ scores ( $P < .001$ ), along with WAZ scores ( $P = .003$ ).

Analysis by age group of infants revealed a significant link between exclusive breastfeeding and the WLZ scores for children aged 6–8 months ( $P = .005$ ), and between breastfeeding and WAZ among children aged 9–11 months ( $P = .018$ ). On the other hand, no statistically significant relation was found with the WLZ scores for the children aged 9–11 months ( $P = .303$ ) and among the 12–24 months group, along with the WAZ scores for the children aged 6–8 months ( $P = .297$ ) and 12–24 months ( $P = .052$ ). For the LAZ, a statistically significant difference was found across all age groups ( $P < .001$ ).

**Table 4**  
Association between initiation of the newborn feeding within the first hour of birth with the mother's socio-demographic characteristics and the infant's anthropometric parameters at the time of recruitment.

Variables	Starting Newborn Feeding Within the First Hour of Birth (n = 297)			P value
	Exclusive Breastfeeding (n = 268)	Putting Breast Milk in a Bottle (n = 13)	Infant Formula Milk (n = 16)	
<b>Mother's Age Groups</b>				<b>.475***</b>
Less than 20 years	10 (90.9)	1 (9.1)	0 (0)	
20 to 29 years	134 (91.8)	7 (4.8)	5 (3.4)	
30 to 39 years	103 (88)	5 (4.3)	9 (7.7)	
40 years and over	21 (91.3)	0 (0)	2 (8.7)	
<b>Mother's Education</b>				<b>&lt;.001***</b>
Illiterate	20 (74.1)	3 (11.1)	4 (14.8)	
Primary school	38 (67.9)	7 (12.5)	11 (19.6)	
Secondary school	175 (98.9)	2 (1.1)	0 (0)	
Higher education	35 (94.6)	1 (2.7)	1 (2.7)	
<b>Household Economic Level</b>				<b>&lt;.001***</b>
Low	58 (69.9)	10 (12)	15 (18.1)	
Medium	210 (98.1)	3 (1.4)	1 (0.5)	
<b>Nutritional Status: Classification Based on Growth Indicators (Z-Scores)</b>				
<b>WLZ</b>				<b>.128***</b>
Normal range	146 (93)	4 (2.5)	7 (4.5)	
Overweight	55 (84.6)	7 (10.8)	3 (4.6)	
Risk overweight	55 (90.2)	1 (1.6)	5 (8.2)	
Severely wasted	4 (100)	0 (0)	0 (0)	
Wasted	8 (80)	1 (10)	1 (10)	
<b>LAZ</b>				<b>&lt;.001***</b>
Normal range	210 (98.1)	3 (1.4)	1 (0.5)	
Severely Stunted	26 (72.2)	7 (19.4)	3 (8.3)	
Stunted	32 (68.1)	3 (6.4)	12 (25.5)	
<b>WAZ</b>				<b>.108***</b>
Normal range	248 (91.2)	10 (3.7)	14 (5.1)	
Severely underweight	4 (80)	1 (20)	0 (0)	
Underweight	16 (80)	2 (10)	2 (10)	

Note: Values are expressed as count and percentage. LAZ = Length-for-age z-score; WAZ = Weight-for-age z-score; WLZ = Weight-for-length z-score.

\*\*\*Fisher's test.  $p < .05$  is considered to be significant.

Referring to the WHO standards: Moderate wasting (weight-for-length Z score, WLZ,  $< -2$ ), severe wasting (WLZ  $< -3$ ); underweight (WAZ  $< -2$ ); severely underweight (WAZ  $< -3.0$ ); Length-for-age Z-scores (LAZ), generated using the 2006 World Health Organization (WHO) Growth Reference, were used to define stunting (LAZ  $< -2$  SD) and severe stunting (LAZ  $< -3$  SD).

### 3.10. Obstacles to exclusive breastfeeding

During the interviews, 227 of the mothers (76.43%) reported that they planned to breastfeed their infants exclusively until the age of 12 months. Among these women, 66% of mothers did not reach their intended breastfeeding duration for numerous reasons, including difficulties related to maternal health problems and the widespread belief among mothers that food and other liquids were more nutritious than exclusive breast milk. Additionally, many mothers stated that they frequently suffered negative reactions to breastfeeding in public places due to the increased social tendency to breast sexualization, which limited their breastfeeding ability.

Table 6 summarizes the main constraints affecting the implementation of good breastfeeding practices. The overall analysis revealed that the majority of mothers did not report having difficulties breastfeeding their child. Analysis comparing the level of education and socioeconomic status of mothers revealed a statistically significant difference between the education level and socioeconomic categories concerning the short-term separation between the woman and her infant ( $P < .001$ ).

Furthermore, many women expressed feelings of guilt and anxiety about failure to meet their hypothetical expectations of maternity due to the inability to overcome the challenges of breastfeeding, particularly when there is pressure from their family environment.

## 4. Discussion

A multitude of social, psychological, emotional, and

environmental factors define whether an infant is breastfed or formula-fed [28]. Human milk for human babies is unquestionably the biological standard [2–4]. Studies in both industrialized and developing countries have assessed the short-term and long-term outcomes on infant and maternal health with respect to breastfeeding initiation [29].

The World Health Organization (WHO) recommends exclusive breastfeeding without any additional food or water till 6 months of age. Subsequently, it is recommended to introduce complementary foods at six months and sustain breastfeeding until the age of 24 months [30].

The threats of not breastfeeding are well established and encompass infections, malnutrition, deficiencies, and underdevelopment [31].

In Morocco, the practice of breastfeeding remains deficient and unsatisfactory with regards to the goals recommended by the WHO. Indeed, in the national surveys, the rate of exclusive breastfeeding of newborns at term at the age of six months was estimated at 27.8% in 2011 [13]. In premature children, this rate was evaluated at 57.9% at the age of three months [32].

Most of the available Moroccan studies have, in recent years, expressed alarm at the observed decline in the practice and length of exclusive breastfeeding. Indeed, there is currently a tendency to regress this practice in relation to progress in the marketing of industrial milks and the lack of information and awareness of mothers [33].

In the present study, almost 58.2% of infants (n = 173) had been exclusively breastfed, which is well above the national average. The median duration of exclusive breastfeeding for mothers was five

**Table 5**

Association between the type of breastfeeding with mother's socio-demographic and infant's anthropometric parameters.

Variables	Feeding Type (Since Birth) (n = 297)			P value
	Exclusive Breastfeeding (n = 170)	Artificial Feeding (n = 8)	Mixed Feeding (n = 119)	
<b>Mother's Age Group</b>				<b>.340***</b>
Less than 20years	9 (81.8)	0 (0)	2 (18.2)	
20 to 29years	81 (55.5)	2 (1.4)	63 (43.2)	
30 to 39 years	65 (55.5)	5 (4.3)	47 (40.2)	
40 years and over	15 (65.2)	1 (4.3)	7 (30.4)	
<b>Mother's Education</b>				<b>&lt;.001***</b>
Illiterate	1 (3.7)	1 (3.7)	25 (92.6)	
Primary school	2 (3.6)	7 (12.5)	47 (83.9)	
Secondary school	139 (78.7)	0 (0)	38 (21.5)	
Higher education	28 (75.7)	0 (0)	9 (24.3)	
<b>Household Economic Level</b>				<b>&lt;.001***</b>
Low	3 (3.6)	8 (9.6)	72 (86.7)	
Medium	167 (78)	0 (0)	47 (22)	
<b>Mother's Professional Activity</b>				<b>.102***</b>
Housewife	151 (58.3)	5 (1.9)	103 (39.8)	
Paid worker	19 (50)	3 (7.9)	16 (42.1)	
<b>Nutritional Status Classification Based on Growth Indicators (Z-scores)</b>				
<b>WLZ</b>				<b>.288***</b>
Normal range	98 (62.4)	4 (2.5)	55 (35.0)	
Overweight	28 (43.1)	3 (4.6)	34 (52.3)	
Risk overweight	37 (60.7)	1 (1.6)	23 (37.7)	
Severely wasted	2 (50)	0 (0)	2 (50)	
Wasted	5 (50)	0 (0)	5 (50)	
<b>LAZ</b>				<b>&lt;.001***</b>
Normal range	167 (78)	0 (0)	47 (42)	
Severely Stunted	0 (0)	2 (5.6)	34 (94.4)	
Stunted	3 (6.4)	6 (12.8)	38 (80.9)	
<b>WAZ</b>				<b>.005***</b>
Normal range	164 (60.3)	8 (2.9)	100 (36.8)	
Severely underweight	1 (20)	0 (0)	4 (80)	
Underweight	5 (25)	0 (0)	15 (75)	

Note: Values are expressed as count and percentage. LAZ = Length-for-age z-score; WAZ = Weight-for-age z-score; WLZ = Weight-for-length z-score.

\*\*\*Fisher's test.  $p < .05$  is considered to be significant.**Table 6**

Correlation between reported barriers to exclusive breastfeeding with mothers' educational attainment and economic status.

Constraints	Mother's Educational Status				P value	Mother's Economic Status		P value	Overall Analysis n = 297
	Illiterate n = 27	Primary n = 56	Secondary n = 177	High n = 37		Low n = 83	Medium n = 214		
<b>Mastitis/Breast Abscess</b>					<b>.361***</b>			<b>.340***</b>	
Yes	3 (7.7)	5 (12.8)	23 (59)	8 (20.5)		8 (20.5)	31 (79.5)		39 (13.1)
No	24 (9.3)	51 (19.8)	154 (59.7)	29 (11.2)		75 (29.1)	183 (70.9)		258 (86.9)
<b>Full Breasts/Breast Engorgement/Sore or Fissured Nipple</b>					<b>.371***</b>			<b>.534**</b>	
Yes	2 (6.5)	5 (16.1)	17 (54.8)	7 (22.6)		7 (22.6)	24 (77.4)		31 (10.4)
No	25 (9.4)	51 (19.2)	160 (60.2)	30 (11.3)		76 (28.6)	190 (71.4)		266 (89; 6)
<b>Perceived Insufficiency and Low Breast-Milk Production</b>					<b>.199**</b>			<b>.181**</b>	
Yes	10 (9.1)	26 (23.6)	65 (59.1)	9 (8.2)		36 (32.7)	74 (67.3)		110 (37)
No	17 (9.1)	30 (16)	112 (59.9)	28 (15)		47 (25.1)	140 (74.9)		187 (63)
<b>Inverted, Flat, Large and Long Nipples</b>					<b>.149***</b>			<b>.336***</b>	
Yes	2 (9.1)	2 (9.1)	12 (54.5)	6 (27.3)		4 (18.2)	18 (81.8)		22 (7.4)
No	25 (9.1)	54 (19.6)	165 (60)	31 (11.3)		79 (28.7)	196 (71.3)		275 (92.6)
<b>Low Breast-Milk Intake</b>					<b>.097***</b>			<b>.520***</b>	
Yes	2 (16.7)	0 (0)	7 (58.3)	3 (25)		2 (16.7)	10 (83.3)		12 (4)
No	25 (8.8)	56 (19.6)	170 (59.6)	34 (11.9)		81 (28.4)	204 (71.6)		285 (96)
<b>Being Depressed, Lacking in Confidence, Worried, or Stressed</b>					<b>.491***</b>			<b>.357**</b>	
Yes	2 (8)	7 (28)	12 (48)	4 (16)		9 (36)	16 (64)		25 (8.4)
No	25 (9.2)	49 (18)	165 (60.7)	33 (12.1)		74 (27.2)	198 (72.8)		272 (91.6)
<b>Short-Term Separation Due to Employment Outside the Home</b>					<b>&lt;.001***</b>			<b>.001***</b>	
Yes	1 (12.5)	6 (75)	0 (0)	1 (12.5)		7 (87.5)	1 (12.5)		8 (2.7)
No	26 (9)	50 (17.3)	177 (61.2)	36 (12.5)		76 (26.3)	213 (73.7)		289 (97.3)
<b>Health Facility Environment and Family Members Were Not Supportive</b>					<b>.210***</b>			<b>.527***</b>	
Yes	0 (0)	2 (15.4)	7 (53.8)	4 (30.8)		2 (15.4)	11 (84.6)		13 (4.4)
No	27 (9.5)	54 (19)	170 (59.9)	33 (11.6)		81 (28.5)	203 (71.5)		284 (95.6)

Note: Values are expressed as count and percentage. \*\* Chi-Square test; \*\*\* Fisher's test.  $p < .05$  is considered to be significant.

months (IQR: 5–6).

Nevertheless, as stated formerly in literature [34], our study brings out that early complementary feeding is a widespread misconception in the Moroccan population as a method for dealing with supposed maternal milk insufficiency. From the time that public, social and cultural opinions alter women's decision, educating and engaging the community as a whole is fundamental to improve the duration of breastfeeding.

Water was the elementary substance most often introduced before the age of six months. Many mothers ( $n = 162$ ) commonly introduced a first combination of both vegetables and breast milk during complementary feeding (54.5%). In other cases ( $n = 73$ ), commercial milk formula and dairy products had been supplied to the children (24.6%). Additionally, 17.5% of the mothers had chosen cereal products ( $n = 52$ ) or a variety of fruits (3.4%), as supplementary sources of dietary nutrients. It will be noted in this respect that experimental reviews of the effect of regularly exposing infants to vegetables or fruits are positively ideal, with significant increases in short-term compliance with the exposed food [35].

Nearly two-thirds of mothers ( $n = 197$ ) reported that a pacifier had been given to their infant for various reasons at some point during their baby's first year.

Let us point out that a huge number of studies have underlined a correlation between shortened duration of exclusive breastfeeding and the use of a pacifier [36,37]. In contrast, the Cochrane review, concerning use or disuse of a pacifier highlighted that there is no categorical proof that using a pacifier for infants decrease the breastfeeding duration [38].

Furthermore, in our investigation numerous nursing mothers, especially those with higher levels of education, knew nutrition health outcomes of exclusive breastfeeding. This result is consistent with the result of other studies that have reported a positive impact of education level on knowledge, attitudes, and support practices of exclusive breastfeeding [39].

This growing maternal consciousness of the benefits of breastfeeding in Morocco may be explained by the favorable effect over the years of awareness-raising campaigns striving to promote the significance of exclusive breastfeeding in light of the strategies targeted by the WHO and the UNICEF. Through these initiatives, thousands of women nationwide are benefiting annually from sensitization campaigns to incentivize the importance of breastfeeding, as well as practical guidance on the essential steps for the achievement of optimal breastfeeding [40].

Furthermore, the duration of exclusive breastfeeding in our study was significantly higher among mothers with an average socioeconomic level ( $P < .001$ ). The socioeconomic status (SES) is already acknowledged as a variable influencing breastfeeding, with mothers in a higher income bracket breastfeeding longer, regardless of race [41].

Contrary to theoretical expectations, mothers were not constantly able to individually meet the WHO guidelines despite the positive efforts of health institutions, as has previously been emphasized by other reviews [42–44]. It is well established that communication gaps make a serious contribution to the frequent discord between mothers' perceptions and clinicians' approaches to breastfeeding performance. Previous studies have unraveled current shortcomings in communication between mothers and their doctors, which may adversely affect the exchange of relevant information and the strengthening of adherence to guidelines [44].

Several women interviewed reported that a perceived lack of worry or interest from caregivers regarding the breastfeeding practices was related to breastfeeding durations falling short of ideal guidelines. These findings are in accordance with earlier studies [45,46], that mothers are quite susceptible to messages they receive implicitly and explicitly, such as encouragement, support,

and positive reinforcement, about breastfeeding from hospital staff, obstetricians, pediatricians, or other primary health care providers, even after accounting for her own will and pressures presented by immediate relatives. Indeed, physicians can take a more effective role in leading the management of breastfeeding as a driving force for mothers' decision-making, during and after the maternity.

The current study further sheds light on the heavy caregivers' influence exerted over the process of encouraging mothers to breastfeed, and involving the impact on public health. This reflects earlier work in Morocco, which emphasized that health outcomes depend not entirely on the rate of access to health services, but also on the quality of health care delivered [47].

On the other hand, many non-breastfeeding mothers felt that bottle-feeding by choice is a severe setback of their maternal function in the eyes of their community. Therefore, these mothers requested, from health professionals and family, more assistance and guidance in their chosen approach, which is in line with the findings in other studies. Several reviews reported an association between decisions to formula feed and feelings of guilt, blame and failure [48,49]. Health care workers must be aware that mothers who have to stop breastfeeding need to be understood to avoid a risk of depression [49]. Instead, hiding key messages about formula feeding to encourage breastfeeding could have harmful side-effects on babies who do not get sufficient breast milk and infant formula may be mistakenly prepared [50].

Moreover, it has been underscored in the literature [48], that moral reproach for a decision not to breastfeed for any reason is inadequate. Health professionals should promote breastfeeding without morally belittling women who do not breastfeed.

Our investigation showed that 66% of mothers did not reach their initial intended breastfeeding duration. Several mothers suffered from health issues that were largely related to perceived insufficiency or hardships with breast milk production (full breasts, breast engorgement, mastitis, etc.). Previous research has demonstrated that nipple pain while breastfeeding, was an absolute barrier to exclusive breastfeeding for women [42,51,52]. However, a key finding in the Cochrane review was that whatever the treatment adopted nipple pain will decrease in 7–10 days after birth. This information is relevant to provide to women as a way of dealing with their ache [51,52].

In our study, we also found a significant relationship between the interruption of exclusive breastfeeding and separation due to mothers' employment conditions outside the home. This observation is in agreement with the results from other investigations [53], which found that allowing mothers to stop working outside of the house has a positive effect on breastfeeding. The most negative effect of employment on breastfeeding occurs during the first three months after birth [41,54].

It is now generally established in the literature that the provision of mothers with appropriate means, to ensure compatibility between breastfeeding and working conditions, should be a national priority [46]. Government initiatives and social policies can provide further facilitative devices in order to help address the lack of substantial workplace accommodation for breastfeeding mothers as well as requiring employers to create support for lactation at work [41]. Breastfeeding women working in positions that do not provide maternity leave or workplace support for breastfeeding may find the strain too difficult to manage and choose to wean their babies prematurely [55]. Further research is required to establish public health strategies to combine breastfeeding and employment, emphasizing that pumping in the workplace can to breastfeeding benefits identical to those of direct breastfeeding [56].

On the other hand, many surveyed mothers reported that they had been asked to cover themselves while breastfeeding in a public



area. The anxiety of breastfeeding publicly was noted as a reason for some women choosing to bottle-feed. Some mothers reported that they are not at ease to breastfeed in the presence some relatives. Hence, whereas the public health consensus that breastfeeding is crucial for child health and survival, reintroducing the normality of breastfeeding in public places would be a positive step toward reducing the perception that breastfeeding in public is a sexual behavior [41,57,58]. Groleau et al. [58] brought this issue of the sexualization of breastfeeding to light in the Western world as a barrier to adopting exclusive breastfeeding for women.

Lastly, we examined the relationship between the type of breastfeeding and its association with the child's nutritional status. We have demonstrated a statistically significant interaction between the type of child feeding and the LAZ scores ( $P < .001$ ), and WAZ scores at recruitment ( $P = .005$ ). A significant link was found between exclusive breastfeeding and WLZ scores for children aged 6–8 months ( $P = .005$ ), and between breastfeeding and WAZ among children aged 9–11 months ( $P = .018$ ).

This result coincides with the findings of other studies, which identified that children who were exclusively breastfed had significantly higher weight gains, and extended exclusive breastfeeding can improve the child's height and weight development within the first few months [39,59].

Many studies demonstrated that exclusive breastfeeding longer than three months was positively correlated with childhood height. Indeed, a study conducted in city of Jahrom in 2007 [60], concluded that during the first few months of life, weight and height did not vary between formula-fed and breast-fed infants, but in the subsequent period, breast-fed children gained more weight and height than those who were formula-fed. In addition, several scientists have expressed a positive association between exclusive breastfeeding and growth in the period between 1 and 5–6 years [61,62]. However, other investigations demonstrated that formula-fed and breast-fed children did not differ in terms of growth [63].

In light of previous research, we also believe that an appropriate duration of breastfeeding, on the basis of expert recommendations, is strongly recommended as the most affordable intervention that maximizes health benefits for the mother-infant dyad by enhancing knowledge of nutrition and, to a wider extent, the involvement of the community in the breastfeeding management and promotion.

## 5. Conclusions

Our findings strengthen the well-known fact that the transition to parenthood is a complex and multidimensional event in people's lives [48,55].

Mother and child health remain one of the most relevant and compelling issues in the area of healthcare. The current study underscored the palpable tension, between expectations regarding the process of breastfeeding and existing constraints, which may hinder public health interventions directed towards prolonging the length of exclusive breastfeeding and promoting appropriate complementary feeding.

Increased focus from health authorities on education, as the principal mean to change health behaviors, has had a marginal impact on breastfeeding rates over the last several years [39]. Education about nutrition must be coupled with situational analysis and careful consideration of the social contexts in which infant feeding is addressed.

Moreover, a coordinated community approach is fundamental to spreading messages of safety regarding the nutritional requirements of children to guarantee their growth [64].

The major limitation of the present study is its retrospective design, as long as gathering data on the mother's practices associated with breastfeeding and the introduction of complementary

feeding relied primarily on the mother's memories.

In that respect, setting up a prospective study, with a much larger sample, can put the results in wider perspective for scaling up breastfeeding interventions throughout the country.

## Ethical statement

This research received prior approval from the Institutional Ethics Committee of the Faculty of Medicine in Rabat, Mohamed V University, Morocco.

The interview content was explained in detail to respondents. Free and informed verbal consent was obtained at the beginning of each investigation from all participants.

Data collection and handling were done with strict confidentiality. In addition, all participants were informed of their right to withdraw their participation in the study at any stage.

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## Conflicts of interest

The authors declare that there are no conflicts of interests associated with this work.

In addition, we confirm that this manuscript has been approved by all authors to be published in the International Journal of Pediatrics and Adolescent Medicine and all of the copyright is transferred to the International Journal of Pediatrics and Adolescent Medicine in case of acceptance.

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