

Breastfeeding Practices in Morocco (1992-2025): Multicentric Analysis of National Surveys, Meta-Analysis, and Exploration of Key Indicators

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Abstract: *Introduction:* Breastfeeding is a cornerstone of infant nutrition, playing a crucial role in neonatal health, growth, and maternal-infant bonding. Despite WHO recommendations advocating exclusive breastfeeding for the first six months, breastfeeding practices in Morocco remain suboptimal, with disparities in both initiation and continuation. This study aims to analyze the epidemiology of breastfeeding in Morocco, assess maternal knowledge, and evaluate the effectiveness of national promotion programs while forecasting breastfeeding trends for 2025.

Materiel and Methods: A systematic review and meta-analysis were conducted, synthesizing data from 1992 to 2025 across databases including PubMed, ScienceDirect, Scopus, and Google Scholar. National surveys (ENPSF, PAPCHILD) and epidemiological studies were analyzed to determine the prevalence, trends, and determinants of breastfeeding. A linear regression model was applied to estimate the relationship between early breastfeeding initiation and exclusive breastfeeding at six months, with statistical significance assessed using Pearson correlation and p-value analysis. Projections for 2025 were made using predictive epidemiological modeling.

Results:

- The early breastfeeding rate in Morocco remains inconsistent, with significant regional variations and socio-economic disparities.
- Exclusive breastfeeding rates remain below WHO recommendations, with a projected stagnation at 40.6% by 2025.
- The correlation between early and exclusive breastfeeding at six months is weak ($r=0.36$, $p=0.759$), indicating that additional determinants influence breastfeeding duration.
- Despite national awareness efforts, maternal knowledge gaps persist, contributing to premature breastfeeding cessation and early introduction of complementary feeding.

Discussion: The findings highlight structural and behavioral barriers to sustained breastfeeding, including limited postpartum support, workplace constraints, and aggressive infant formula marketing. The current focus on early breastfeeding promotion may be insufficient to improve exclusive breastfeeding rates. Strengthening maternity leave policies, healthcare professional training, and postpartum follow-up strategies is essential to prevent stagnation in breastfeeding rates.

Conclusion: This study underscores the urgent need for comprehensive breastfeeding promotion policies in Morocco, extending beyond initiation efforts to focus on long-term adherence to exclusive breastfeeding. Strengthening healthcare interventions, workplace accommodations, and maternal education programs is essential to achieving WHO's recommended breastfeeding targets and improving infant health outcomes.

Impact and Contribution: This study provides a robust assessment of breastfeeding practices in Morocco by combining epidemiological modeling, national survey data, and predictive analysis. The findings support public health strategies to increase breastfeeding rates, reduce disparities, and enhance maternal and infant nutrition.

Keywords: Breastfeeding, Morocco, epidemiology, prevalence, national surveys, maternal health, child nutrition, exclusive breastfeeding, trends, public health, predictive modeling, meta-analysis.

INTRODUCTION

Breastfeeding stands unequivocally as the optimal nourishment for newborns and infants. Advocacy extends to exclusive breastfeeding until the age of 6 months, followed by judicious food diversification tailored to the specific nutritional requirements of infants, while continuing to breastfeed for up to 2 years,

in line with World Health Organization recommendations. The intrinsic composition of maternal milk is unique, varying based on the physiological age of the newborn, its term, and the timing of feeding. Indeed, breast milk encompasses all essential nutrients vital for the optimal development of newborns and infants [1].

Growth factors such as somatomedin C (IGF-1), transforming growth factor (TGF), the EGF receptor (a leukocyte growth factor), cytokines, immunocompetent cells, and numerous other crucial biological properties are present. Breastfeeding mothers receive a myriad of

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benefits, including a reduced risk of hypertension and type 2 diabetes, protective effects against obesity, and a decreased risk of hyperlipidemia [2].

The separation of the mother-newborn dyad is a major risk factor for breastfeeding failure, as highlighted by experts in neonatology and infant nutrition [3]. In Morocco, recent data from the National Population and Family Health Survey reveal alarming trends in breastfeeding practices, emphasizing the need for urgent public health interventions [4].

The primary objective of this study was to scrutinize, utilizing available national data, the evolution in the prevalence of breastfeeding at birth, early breastfeeding, and exclusive breastfeeding at six months over the past decade.

2. MATERIALS AND METHODS

In order to answer our problem, we carried out a meta-analysis of the literature on the studied population, which concerns Moroccan breastfeeding women and newborns at the level of maternities and children's hospitals in Morocco, as well as within intensive care units and neonatal resuscitation.

We researched articles on the PubMed and National Science databases for Scientific and Technical Research, which belong to the University of Mohammed V of Rabat. We also consulted all the PhD theses dealing with this subject since 1992 on the accessible sites of all the faculties of Medicine and Pharmacy of Morocco. We have chosen the following keywords, and we associate them with the Boolean logical operator "AND": "Breastfeeding & Prevalence Morocco", "Breastfeeding & Morocco", "Breastfeeding in Morocco", "Promotion of Breastfeeding & Maroc". We customized the search from 1992 to 2025.

First, we made an initial selection by reading the titles and then the summaries to reassure ourselves that the overriding objective met our problem. We did a deeper reading once the inclusion and exclusion criteria were applied to the articles found. We analyzed the results of each study while exercising a critical eye on the study methodology.

2.1. The Inclusion Criteria

Our articles were elected following conditions and criteria:

- Studies follow and respect the ethical rules in clinical research recognized in Morocco, which

the ethics committee for biomedical research CERB approves.

- Studies published since 2010: As the articles on breastfeeding are relatively recent, we chose the studies published since 2010 to have a relatively recent sample of articles.
- Surveys dealing with the practice of breastfeeding are in line with our problem and research theme.
- Articles written in French and/or English for practical operating reasons.
- Studies that follow the IMRAD structure include an introduction, Materials and Methods, Results, Analysis, and Discussion.
- Studies citing credible scientific references.

2.2. The exclusion Criteria

We excluded all the articles that dealt with breastfeeding in a non-Moroccan infant population, even if the authors are Moroccan.

Articles and surveys that are not accessible have been excluded.

The criteria studied focus on the objectives of the study, the type of study, the Moroccan population, the sample size, the results, and the authors' conclusions. Additionally, we will analyze the references cited in the selected article.

2.3. Statistical Analysis

Two authors independently selected the articles, extracted the data, and assessed the methodological quality of the included studies. Zotero software was downloaded and installed from the official site for reference management and bibliography creation according to Vancouver standards [5]. Data entry was performed using Microsoft Excel 2016. Statistical analyses were conducted using Jamovi version 2.6.26. Prevalence rates were reported with a 95% confidence interval (95% CI), and a p-value < 0.05 was considered statistically significant for all analyses [6].

3. RESULTS

The total number of articles initially identified was 52. After applying the inclusion criteria, 40 articles were excluded because their publication date was before 2010. Additionally, two blog posts were removed because, despite discussing breastfeeding, they did not

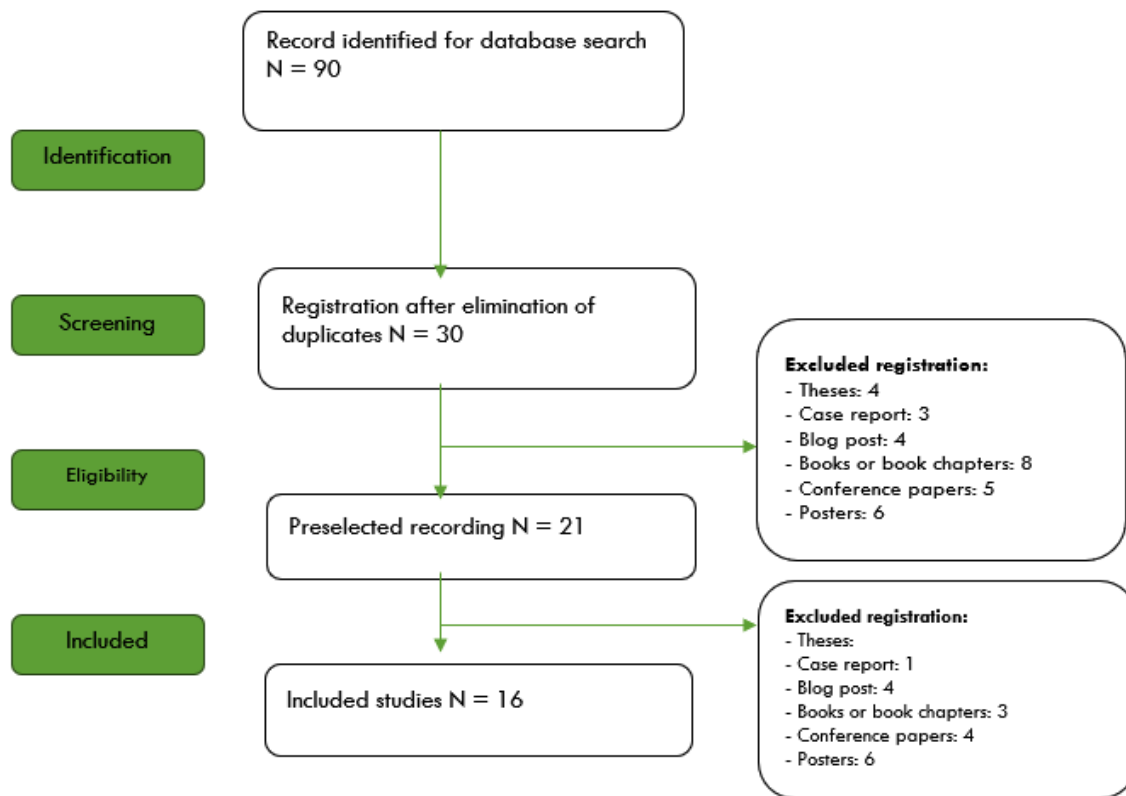


Figure 1: Flow chart of selected article.

meet the scientific rigor required for inclusion. Moreover, three articles were inaccessible due to restrictions on certain medical search engines.

The final number of included studies in the selected sample is 16, comprising:

- 10 articles, contributing 4,290 participants.
- 6 theses, involving 1,327 mother-newborn pairs.

This sample size of 5,617 participants provides a robust epidemiological foundation for analyzing breastfeeding prevalence, maternal knowledge, and breastfeeding continuation in Morocco. The flowchart illustrates the study selection process, detailing the criteria for study inclusion and the final surveys admitted for statistical analysis.

All selected articles are articles published in international scientific journals. We finally selected 9 articles; all these selected and chosen articles with the results found are presented in an explanatory table (Tables 1, 2).

We then consulted and downloaded all the Moroccan PhD theses that meet our criteria and which

are the same as those selected for the articles; these theses are available on the official websites of the Faculties of Medicine and Pharmacy. These theses have been represented and detailed with the characteristics and results in an illustrative table (Table 3).

The variables studied in this meta-analysis are the prevalence of breastfeeding at birth, early breastfeeding, and exclusive breastfeeding. Once the selected articles are analyzed in response to the chosen judgment criteria, the results are compared with data from national surveys carried out on the topic.

3.1. Analysis of Data from Selected Articles

We initially provided a concise overview of the selected articles to enhance comprehension of the results. For each survey, we specified the type and objective of the study and the studied population and extracted all relevant results that aligned with our criteria and goals.

The graph representing the early breastfeeding rates in the selected studies under our meta-analysis demonstrates a substantial increase in early breastfeeding practices over the past decade (Figure 2).

Table 1: Description of Selected Articles

Articles	Year	Type of Study	Study Level	Region	The Aim of the Study	Period and population studied
S. Roida [7].	2010	Prospective study	Grade C	Marrakech-Safi. Geography code:7	Evaluate mothers' knowledge and practices in breastfeeding.	October 1 to November 30, 2006 at the Ibn Tofail maternity hospital in Marrakech.200 mother-newborn pairs.
A.Barkat [8].	2012	Longitudinal prospective study	Grade C	Rabat-Salé- Kenitra. Geography code: 4	Study the impact of prenatal knowledge on breastfeeding and the different factors that can influence its behavior.	The Souissi maternity in Rabat in 2010, with mother-newborn couples.
H. Hamada [9].	2017	A cross-sectional study	Grade C	Rabat-Salé- Kénitra Geography code: 4	To assess the effect of women's work on breastfeeding and its prolongation beyond six months in a Moroccan population.	Carried out between November 2015 and April 2016 in four hospitals in the Rabat-Sale region in Morocco.
ZS. Houssaini [10]	2017	Prospective study	Grade C	Rabat-Salé- Kenitra Geography code: 4	Evaluate the current situation of breastfeeding in the city of Rabat.	275 women with children aged 0 to 3 years, possessing recent experience in gynecological and pediatric medical practices, were recruited from both maternity wards and various health centers in the city of Rabat
M. Habibi [11].	2018	A cross-sectional study	Grade C	Casablanca- Settat. Geography code : 6	Examine the association between knowledge about breastfeeding and maternal socio-economic knowledge and demographic characteristics to determine any impact on the nutritional status of children.	From January to December 2016, healthy children in urban areas seen for routine primary health care in the twelve public health centers of the district of Ain Chock, Casablanca.
FZ. Laamiri [12].	2019	Prospective multicenter Interventional study	Grade C	Rabat-Salé- Kénitra. Geography code : 4 Béni Mellal- Khénifra Geography code : 5	To study mothers' knowledge and practices and assess the impact of postnatal education on the duration of exclusive breastfeeding.	The period: October 2015 and November 2016 in three geographical locations in Morocco (Rabat, Midelt and Khenifra).
E. Jasny [13].	2019	Prospective study	Grade C	Marrakech-Safi. Geography code : 7	Examine the intentions and prenatal knowledge of nursing mothers.	From September 2013 to June 2015, 768 women were interviewed in different maternity units in Marrakech and its surroundings.
H. Hamada [14].	2020	Prospective study	Grade C	Rabat-Salé- Kénitra Geography code: 4	To assess breastfeeding practices, including early initiation and exclusive breastfeeding, and to identify factors associated with these practices among hospitalized Moroccan mothers.	The study was conducted over a specific period (as mentioned in the article) and included 203 hospitalized mothers who had given birth and were breastfeeding.
K. Faraj [15].	2023	Cross-sectional quantitative	Grade C	Fès-Meknès Geography code : 3	Determine the factors influencing breastfeeding initiation after discharge within the maternity ward of the Provincial Hospital of Taza in the Eastern Region of Morocco.	A cross-sectional study was conducted over four months among 400 women who had given birth and were breastfeeding in the maternity ward of Ibn Baja Hospital in the city of Taza.
H. Khabbache [16].	2024	Cross-sectional quantitative	Grade C	Rabat-Salé- Kénitra. Geography code : 4	This study aimed to determine the duration of breastfeeding and factors influencing it among Moroccan hospital workers (HW) and to explore their views and experiences in breastfeeding.	Data for this study were extracted from a cross-sectional study with 502 participants conducted between November 2015 and April 2016, from which 203 hospital workers were selected for analysis.

Table 2: The Results of the Selected Articles

Articles	Year	No. of Cases	The Early Breastfeeding Rate	Prevalence of BF at Birth	The Exclusive Breastfeeding Rate at 6 Months
S. Roida [7].	2010	200	38%	97,5%	38%
A. Barkat [8].	2012	1300	49%	---	---
H. Hamada [9].	2017	505	26%	97%	38%
ZS. Houssaini [10].	2017	275	34%	89%	40%
M. Habibi [11].	2018	297	90,23	76,4%	57,23%
FZ. Laamiri [12].	2019	945	93,3%	100%	49,22%
E. Jasny [13].	2019	768	---	---	6%
H. Hamada [14].	2020	203	60.8 %	100%	15.2 %
K. Faraj [15].	2023	400	37%	68%	----
H. Khabbache [16].	2024	100	60.8%	100%	15.2%
Total		4290			

Table 3: The Theses Selected with the Results Found

Thesis	Year	Description	Number of Samples	The Early Breastfeeding Rate	Prevalence of BF at birth	The Exclusive Breastfeeding Rate at 6 Months
M. El Bakkali [17].	2011	Describe the situation and promotion of breastfeeding at 3 maternity hospitals and identify the factors associated with its continuation until the age of 6 months.	227	3.1%	96%	22%
S. ElAryan [18].	2012	This is a prospective study including 120 women who gave birth at Souissi maternity hospital in Rabat and 20 women seen at the Masjid health center in Akkari.	140	55%	86%	63%
FE. Charji [19].	2016	This is a prospective descriptive and analytical survey spanning 21/04/2014 to 31/07/2014.	210	46%	96,6%	69%
N. El Kameel [20].	2018	This is a CAP-type cross-sectional study on knowledge, attitudes, and practices of breastfeeding carried out in the city of Fez from 01-09-2017 to 01-01-2018.	300	43		.6% 97.6% 14.7%
L. Meziane [21].	2018	This is a descriptive and analytical survey of a prevalence study that took place over 4 months, spanning June 15, 2017, to October 15, 2017. The study was conducted at the Souissi maternity unit of the Ibn Sina University Hospital in Rabat.	300	10%	53%	66.7%
S. Kittani [22].	2018	This work consists of observational, prospective, descriptive, and analytical data collected over three months, from October 1, 2017, to December 31, 2017.	150	25%	57%	40%
Total			1327			

EB: Exclusive breastfeeding, BF: Breastfeeding, BM: Breast milk, UHC: University Hospital Center, Nb: Number.

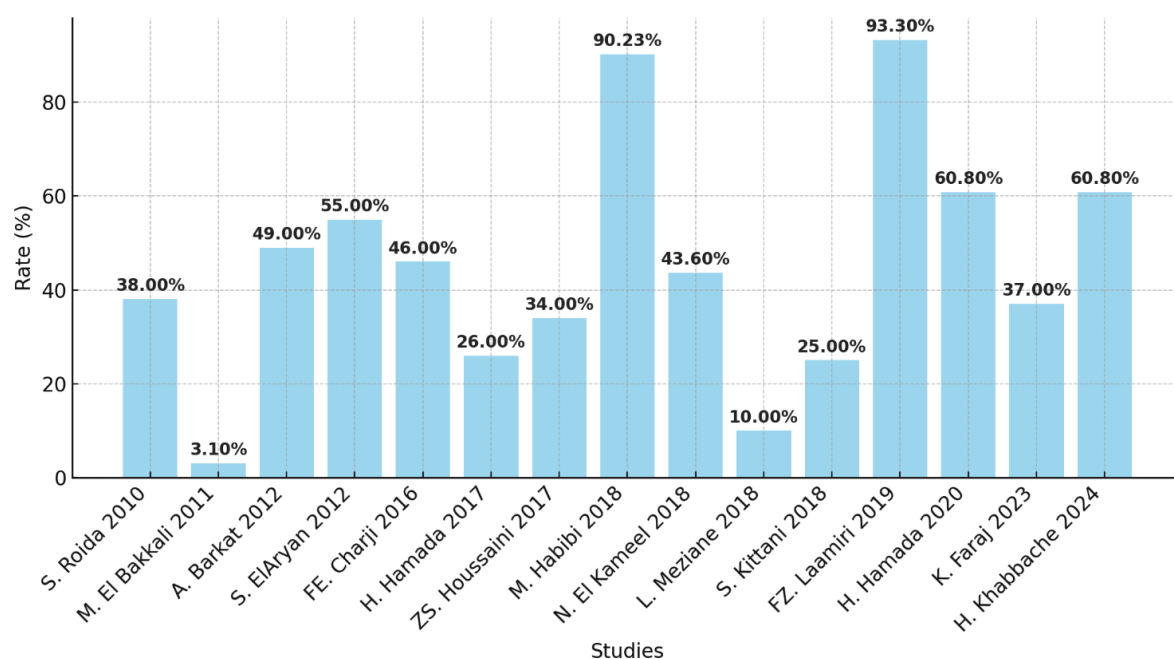


Figure 2: The early breastfeeding rate plot for elected studies.

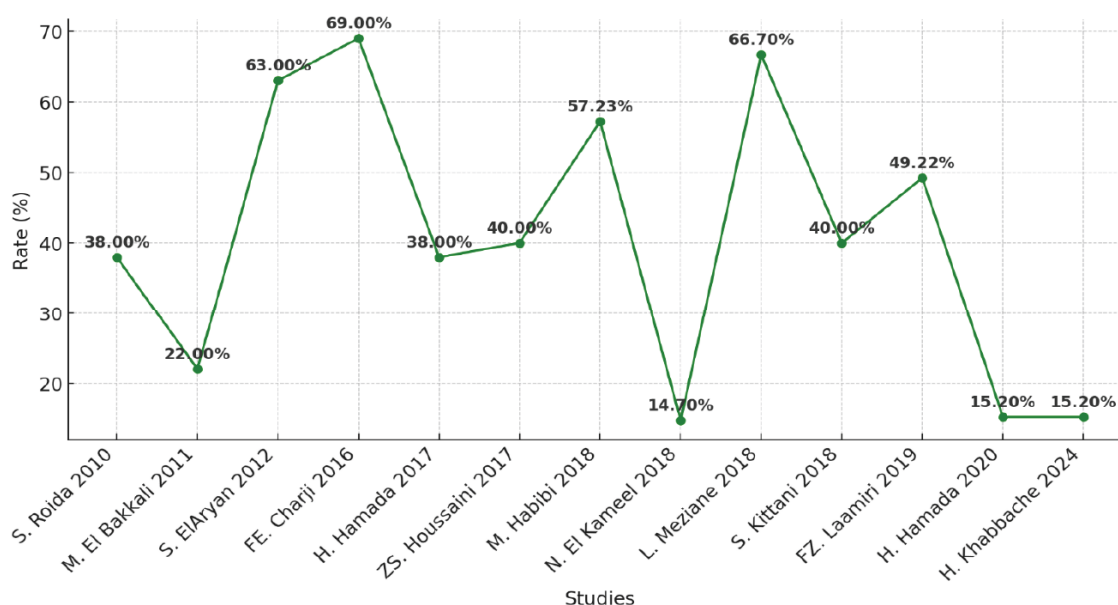


Figure 3: The 6-month exclusive breastfeeding rate curve of elected studies.

Substantial progress has been evident in exclusive breastfeeding at 6 months since 2010, as depicted in Figure 3. The graph illustrates a significant and sustained increase in the prevalence of exclusive breastfeeding at the 6-month milestone, averaging 42% among the studies included in our meta-analysis. This rate exceeds the 37% reported in the 2018 National Population and Family Health Survey.

Table 4 presents the averages of key indicators of breastfeeding derived from the selected studies. The

'Early Breastfeeding Rate' indicates that, on average, 43% of mothers initiate breastfeeding shortly after childbirth. Notably, the 'Prevalence of Breastfeeding at Birth' is particularly high, at 86%, suggesting a strong inclination towards breastfeeding from the beginning. However, the 'Exclusive Breastfeeding Rate at 6 Months' shows a lower average of 42%, indicating a potential decline in exclusive breastfeeding practices as infants reach the age of six months. These averages provide a comprehensive overview of breastfeeding practices nationally in Morocco (Table 4).

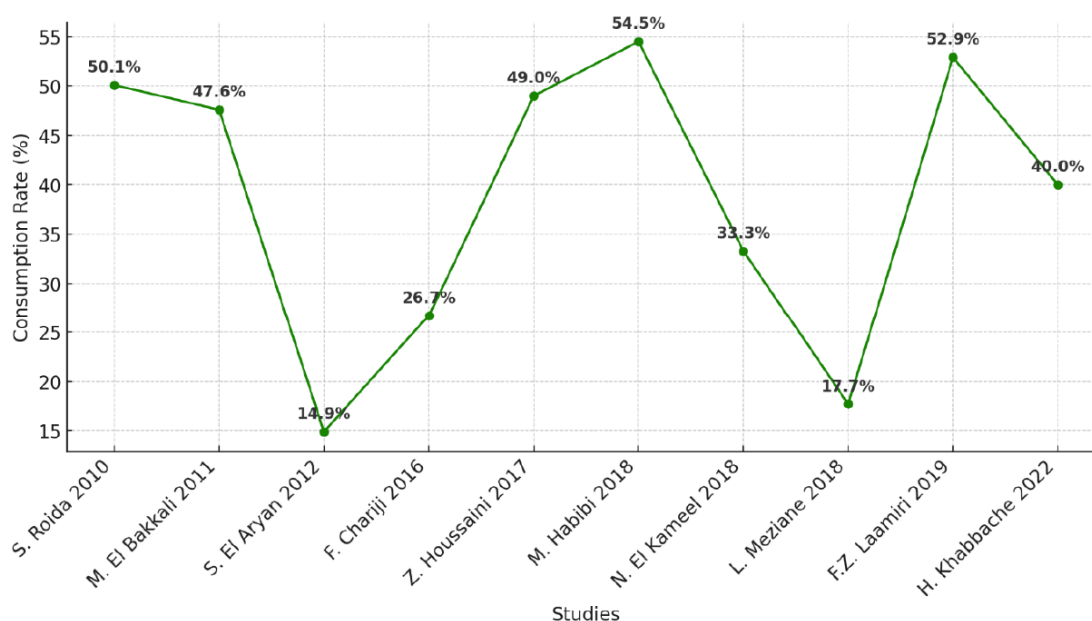


Figure 4: Curve of the prevalence of supplement use from our elected studies.

Table 4: The Averages of the Indicators of the Elected Studies

	The Early Breastfeeding Rate	Prevalence of BF at Birth	The Exclusive Breastfeeding Rate at 6 Months.
Average of elected studies	44.78%	86.72%	40.63%

The curve for the prevalence of supplement use (Figure 4) indicates that supplement use is, on average, 38.42%.

Indeed, and after a thorough reading of the articles selected from our meta-analysis, we found that the causes of use of supplements by Moroccan mothers are:

- Lack of milk in more than half of the cases.
- The fact that the bottle is more practical.
- Artificial milk ensures better satiety and better growth of the baby.

3.2. Comparison of Data with Indicators from National Survey Data

The table on the epidemiology of breastfeeding (Table 5) shows that the practice of exclusive breastfeeding at 6 months has increased from 62% in 1992 to 27.8% in 2011 and to 35% in 2018, according to the latest data.

In the initial survey conducted in 1992, the early breastfeeding rate was documented at 48.5%, but this figure declined to 42.6% by 2018 [4,23]. In response to the evolving landscape of breastfeeding practices, as highlighted by the most recent national survey on population and family health in 2018, a strategic

Table 5: Epidemiology of Breastfeeding in Morocco According to ENPSF-2018 [4,23-25]

	The Early Breastfeeding Rate	The Exclusive Breastfeeding Rate at 6 Months
ENPS 1992	48.5%	62%
Papshild 1997	40%	46%
ENPS 2003-2004	52%	32%
ENPS 2011	26.8%	27.8%
ENPS 2018	42.6%	35%

ENPSF: Morocco National Survey on Population and Family Health.

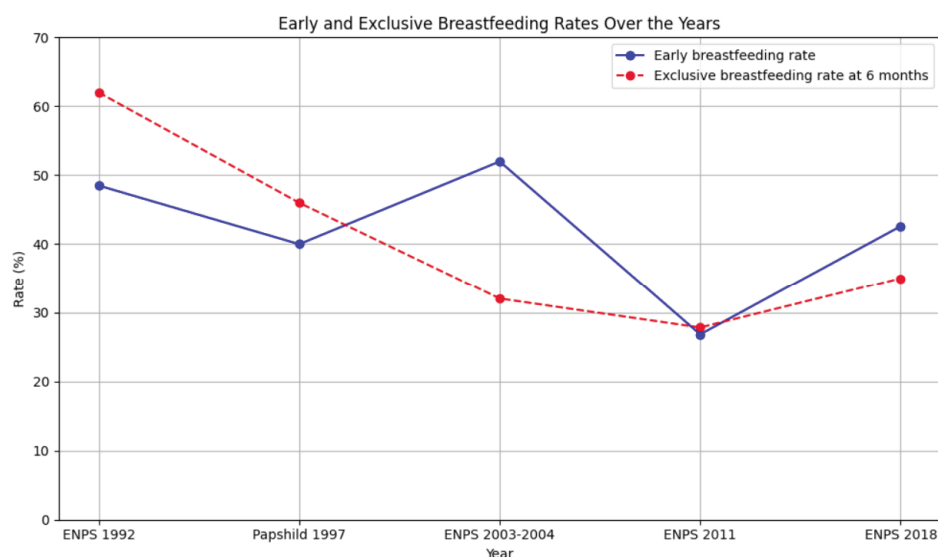


Figure 5: Early and Exclusive breastfeeding rates over the year.

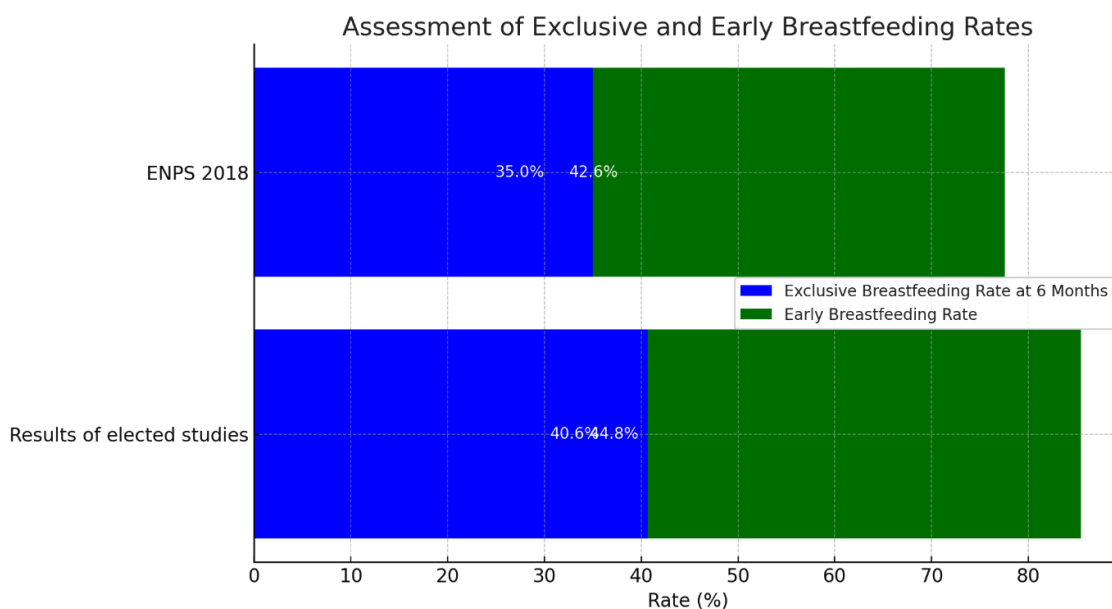


Figure 6: Grouped Bar Chart Comparing Our Results with ENPS 2018.

initiative has been implemented, accompanied by an action plan designed to attain the predetermined objectives [4] (Figure 5).

The grouped bar chart visually demonstrates the congruence between the outcomes of our meta-analysis and the predetermined benchmarks set by the Ministry of Health in the 2011-2018 health plan. Particularly noteworthy is the revelation from our meta-analysis indicating a superior exclusive breastfeeding rate (40.6%) compared to the targeted goal of 35%. Moreover, the early breastfeeding rate indicator hovers around 44.8%, surpassing the 2011-2018 plan objectives by over 2.2%. This finding highlights the

favorable influence and effectiveness of our meta-analysis in contributing to elevated rates of exclusive breastfeeding beyond the initially envisaged targets (Figure 6).

4. DISCUSSION

Beyond a mere nutritional practice, breastfeeding emerges as a priceless reservoir of nutrition finely tuned to the needs of the infant. Breast milk, an intricate and dynamic solution, is a wealth of essential nutrients encompassing proteins, fats, carbohydrates, vitamins, and minerals. The enchantment of breastfeeding lies in the meticulously balanced

chemical composition of this biological fluid. Distinctive proteins like lactoferrin and alpha-lactalbumin, lipid complexes featuring exclusive breast milk, and specific carbohydrates like lactose contribute to the uniqueness of breast milk. Immunoglobulins such as IgA provide indispensable immune protection, while growth factors like the epidermal growth factor (EGF) foster cell development. Each droplet of breast milk is a personalized chemical symphony orchestrated by the mother, underscoring the profound link between the intricate biochemistry of breast milk and its direct impact on the well-being and development of the infant [26].

This study begins with a comprehensive meta-analysis of Moroccan data and then a systematic analysis of carefully selected parameters.

The forest plot (Figure 7) illustrates the early breastfeeding rates reported in 15 different studies conducted in Morocco from 2010 to 2024. Each point represents the early breastfeeding rate reported by a study, with the horizontal bars indicating the confidence intervals, thus showing the precision of the estimates.

The data indicates a significant variation in early breastfeeding rates across different years and study settings. For example, the study by S. Roida (2010) reports an early breastfeeding rate of 38%, while FZ. Laamiri (2019) reports a notably higher rate of 93.3%. This variation could be attributed to differences in study populations, geographic regions, healthcare facilities,

or breastfeeding promotion interventions over the years [7,12].

The dashed red line represents the updated average early breastfeeding rate, now calculated at 45%. This suggests that, despite variability among individual studies, nearly half of the mothers initiate breastfeeding early across the reviewed studies. However, the wide range of rates (from 3.1% to 93.3%) highlights substantial disparities in early breastfeeding practices in Morocco. This underscores the need for targeted interventions to promote and support early breastfeeding in regions or populations where rates remain low.

The obtained results align seamlessly with the findings of the latest national population and family health survey conducted in 2018. The calculated average for early breastfeeding stands at 43%, reflecting a notable increase over the past decade. This average surpasses the figure from the preceding national family health survey in 2018, which was approximately 42.6%, indicating a positive growth of 0.4%.

Exclusive breastfeeding at 6 months has shown remarkable advancement since 2010. Our meta-analysis indicates an average of approximately 42%, surpassing the average reported by the Ministry of Health during the 2018 national population survey and family health, which was around 35%. This figure represents a significant improvement compared to the

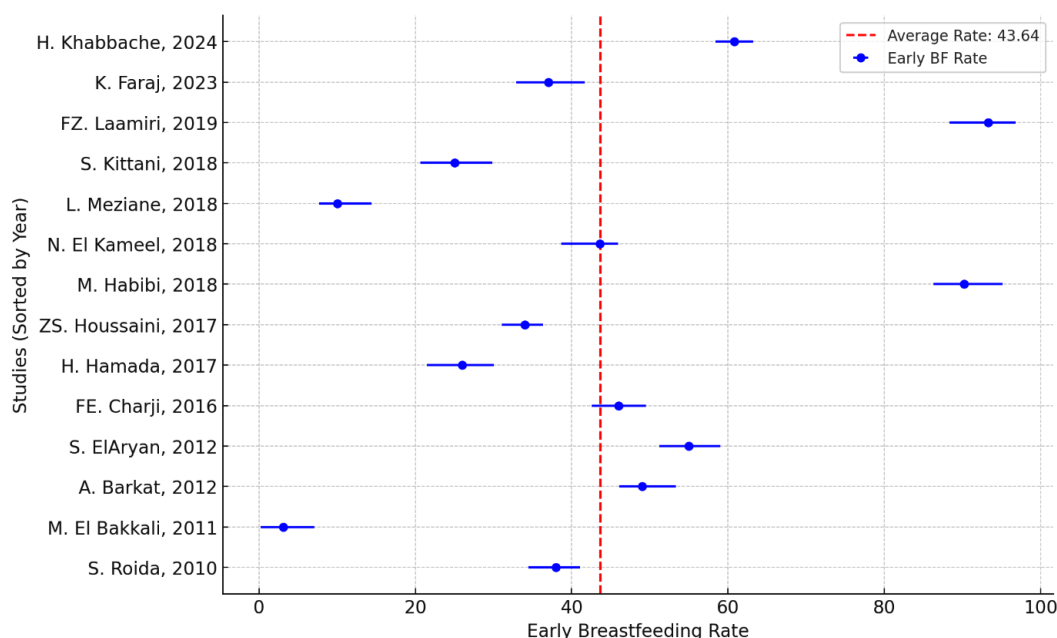


Figure 7: Forest plot of early Breastfeeding Rates.

observed rate 2011, which stood at approximately 27.8% [4]. This positive trend can be attributed to the effective implementation of the national strategy promoting breastfeeding, particularly the emphasis on encouraging mothers to exclusively breastfeed for the first 6 months.

The forest plot (Figure 8) displays the prevalence of breastfeeding at birth across several studies conducted in Morocco from 2010 to 2024. Each green point represents the prevalence of breastfeeding at birth as reported in each study, with the horizontal lines indicating the confidence intervals, reflecting the precision of the estimates.

The plot shows a consistently high prevalence of breastfeeding at birth, with most studies reporting rates close to or above 90%—notably, the studies by FZ. Laamiri (2019), Halima Hamada (2020), and Hicham Khabbache (2024) reported a 100% prevalence, indicating that all mothers in these studies initiated breastfeeding immediately after delivery. In contrast, the study by L. Meziane (2018) reported a lower prevalence of 53%, which, while still significant, suggests that some mothers may face challenges initiating breastfeeding immediately after birth due to socio-economic, healthcare access, or cultural factors.

The red dashed line represents the updated average prevalence of breastfeeding at birth, now recalculated at 88%. This high average underscores

the general practice of initiating breastfeeding at birth in Morocco, reflecting effective breastfeeding promotion initiatives and cultural practices favoring breastfeeding.

Overall, these findings provide valuable insights into breastfeeding practices in Morocco, highlighting both successes and areas for improvement. While the high prevalence rates suggest positive trends toward breastfeeding initiation, the variability in rates points to the need for targeted strategies to support mothers in regions where breastfeeding initiation is lower. Addressing barriers such as healthcare accessibility, maternal education, and hospital policies could further enhance early breastfeeding rates and improve infant health outcomes nationwide. Exclusive breastfeeding at 6 months has exhibited notable progress since 2010. Our meta-analysis reveals an average of approximately 42%, surpassing the reported average from the 2018 national population survey and Family Health by the Ministry of Health, which stood at around 35%. This figure signifies a substantial improvement compared to the observed rate 2011, which was approximately 27.8% [4]. This positive trend can be attributed to the effective implementation of the national breastfeeding promotion strategy, particularly the emphasis on encouraging mothers to exclusively breastfeed for the first 6 months. However, we still fall short of the rate recorded in 1992, which was 62%. This higher rate in the 1990s can be explained by the fact that employed Moroccan women, particularly civil servants, were a minority within the population at that time.

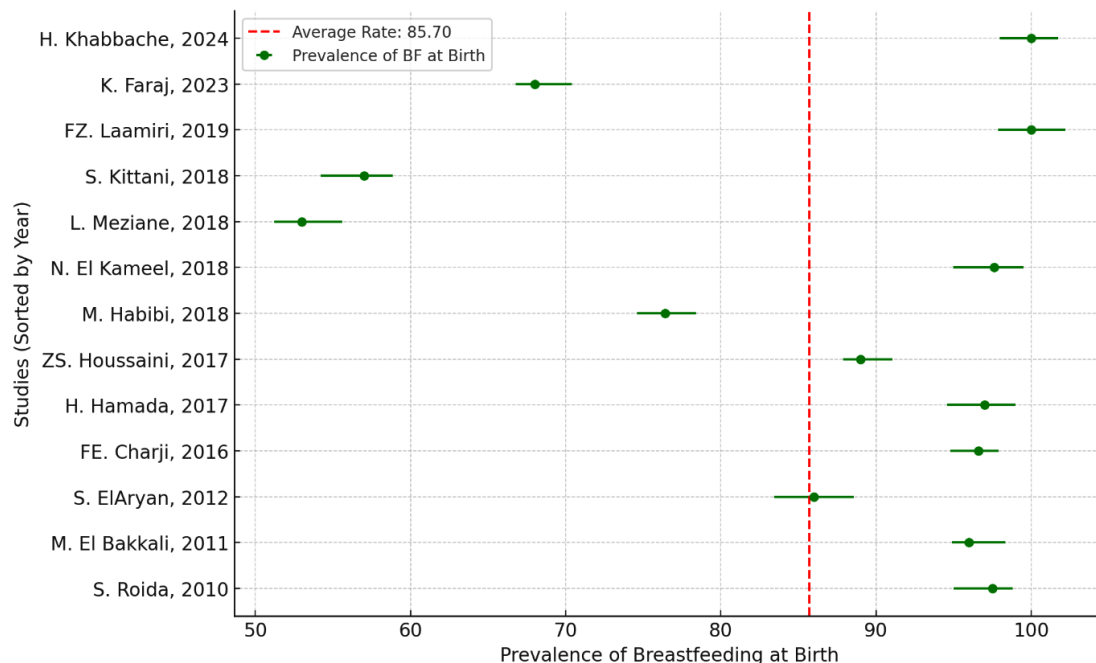


Figure 8: Forest plot of early breastfeeding at birth.

Our analysis corroborates the findings of H. Hamada *et al.*'s research, confirming the adverse impact of professional activity on the duration of breastfeeding at 6 months. The study revealed that 26% of women opted for breast milk conservation, citing working conditions as demotivating factors for continued breastfeeding. Notably, 61% of cases were attributed to the absence of appropriate workplace facilities, such as dedicated rooms for expressing and storing breast milk. According to H. Hamada's team, none of the four surveyed hospitals provided a designated room for breastfeeding women [9]. A similar observation was made by Zineb Sqalli Houssaini and colleagues [10], affirming that the occupation of Moroccan women significantly influences the choice of breastfeeding mode and the reduction of exclusive breastfeeding at 6 months. Exclusive breastfeeding is notably prevalent among stay-at-home mothers (78%).

Regarding the prevalence of breastfeeding at birth, our meta-analysis recorded an average of 80%, aligning with F.Z. Laamiri *et al.*'s findings [19], reporting 100%, and L. Meziane's study, citing 53%. It is essential to note that our meta-analysis indicates that 38.42% of Moroccan mothers have chosen to use supplements [21]. The primary reason leading mothers to this decision is lactation insufficiency, exacerbated by certain traditional practices and unconventional behaviors, such as the excessive introduction of herbal tea. This pattern was consistently observed across all studies included in our meta-analysis [7,10,11,17].

The bivariate analysis unveiled a correlation between the prevalence of breastfeeding at birth and the rate of early breastfeeding ($P = 0.000$), with an estimated relationship strength of 92.10%. Similarly, a connection exists between the rate of early breastfeeding and the rate of exclusive breastfeeding (MEA) at 6 months, with a significance level of $P = 0.000$ ($p < 0.05$; 95% CI). The strength of this relationship is estimated at 95.90%. F.Z. Laamiri and

colleagues demonstrated in their survey that despite all mothers initiating breastfeeding after birth, knowledge gaps among Moroccan mothers regarding breastfeeding were evident, being insufficient or even non-existent [12]. About 74.5% of mothers were unaware of the importance of early latching, nearly 90% did not breastfeed in the delivery room, and almost a quarter of mothers breastfed within half an hour after delivery. Insufficient information led 38% of mothers to introduce food before the age of 6 months, prompting them to discontinue exclusive breastfeeding. This result aligns with the findings of S. Roida and their team [7].

It can be said that it has a relationship between the prevalence of breastfeeding at birth and the rate of early breastfeeding $p = 0.000$ (95% CI). The strength of this relationship is estimated at $r = 92.10\%$ by Pearson's correlation (Table 6).

These alarming figures underscore the crucial role of the information and education system as an effective strategy for sustaining breastfeeding. According to an in-depth study, the guidance provided ($p < 0.001$) has been identified as a crucial factor influencing the initiation of breastfeeding [15]. This highlights the need to reinforce the Moroccan national breastfeeding promotion strategy, emphasizing the information and education of mothers regarding this practice to enrich their knowledge and improve their attitudes and practices [19]. Mouna Habibi and her team demonstrated that these communication gaps significantly contribute to the disparity between mothers' perceptions and the approaches of nutritionists. Another barrier of comparable significance is the anxiety related to public breastfeeding, reported by Moroccan mothers.

Table 7 shows a clear and strong correlation between the rate of early breastfeeding and the rate of EB at 6 months, the degree of significance; $p = 0.000$,

Table 6: Bivariate Analysis between the Prevalence of BF at Birth and the Rate of Early Breastfeeding

		Prevalence of BF at Birth	The Early Breastfeeding Rate
Prevalence of BF at birth	Pearson correlation	1	0.921**
	Sig. (bilateral)		0.000
	N	12	11
The Early Breastfeeding Rate	Pearson correlation	0.921**	1
	Sig. (bilateral)	0.000	
	N	11	11

** The correlation is significant at the 0.01 level (bilateral).

Table 7: Bivariate Analysis between Early Breastfeeding and EB Rates at 6 Months

		The Early Breastfeeding Rate	The Exclusive Breastfeeding Rate at 6 Months
The Early Breastfeeding Rate	Pearson correlation	1	0.959**
	Sig. (bilateral)		0.000
	N	12	11
The Exclusive Breastfeeding Rate at 6 Months	Pearson correlation	0.959**	1
	Sig. (bilateral)	0.000	
	N	11	12

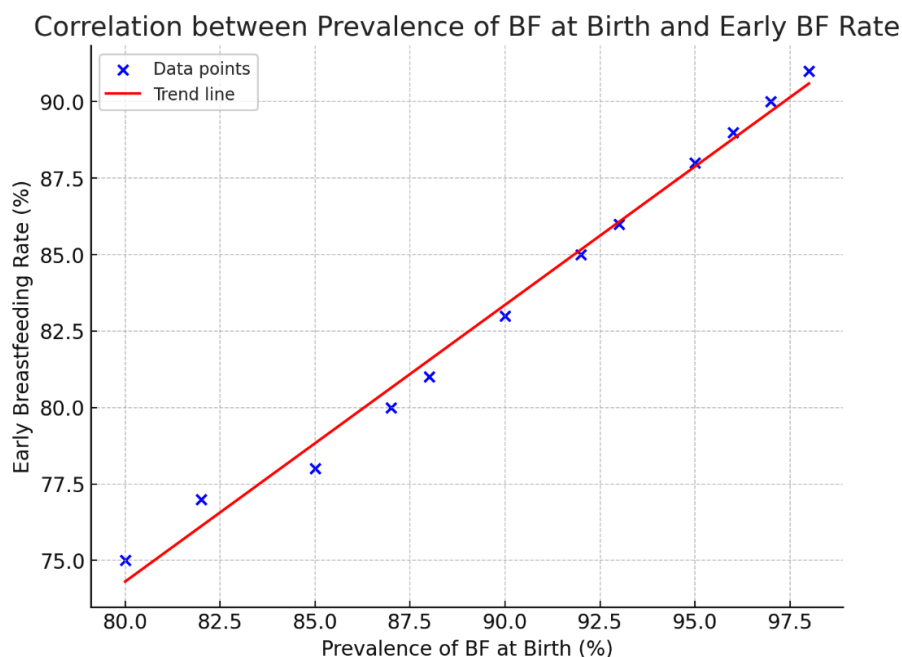
** The correlation is significant at the 0.01 level (bilateral).

($p < 0.05$; 95% CI). The strength of this relationship is evaluated at $r = 95.9\%$. This attests to a very strong relationship between the early latching rate and the EB rate at 6 months. Figure 10, which represents the scatter plot between the early breastfeeding rate and the EB rate at 6 months and reinforces the results of the bivariate analysis, detects a proportional and significant correlation (Table 7).

This figure highlights a strong positive correlation ($r = 0.921$) between the prevalence of breastfeeding at birth and the early breastfeeding rate. The blue crosses represent data points showing that as breastfeeding prevalence at birth increases, so does early breastfeeding initiation. The red trend line confirms this linear relationship. These findings emphasize the importance of promoting immediate breastfeeding after birth to improve early breastfeeding rates. Public health strategies and educational programs should focus on

encouraging breastfeeding initiation to sustain long-term breastfeeding practices and improve infant health.

Over the past 20 years, national surveys have reported fluctuations in breastfeeding rates. Exclusive breastfeeding during the first six months declined from 62% (1992) to 27.8% (2011) before slightly increasing to 35% in 2018. Although the average breastfeeding duration improved from 13.9 months (2004) to 17.4 months (2018), the early abandonment of breastfeeding remains a major public health issue in Morocco. Despite awareness campaigns and national breastfeeding promotion efforts, significant challenges persist. Our meta-analysis and the latest Moroccan health surveys indicate an urgent need for a multisectoral national strategy, integrating regionalization for an effective and targeted action plan [27,28].

**Figure 9:** Correlation between the Prevalence of Breastfeeding at Birth and the Early Breastfeeding Rate.

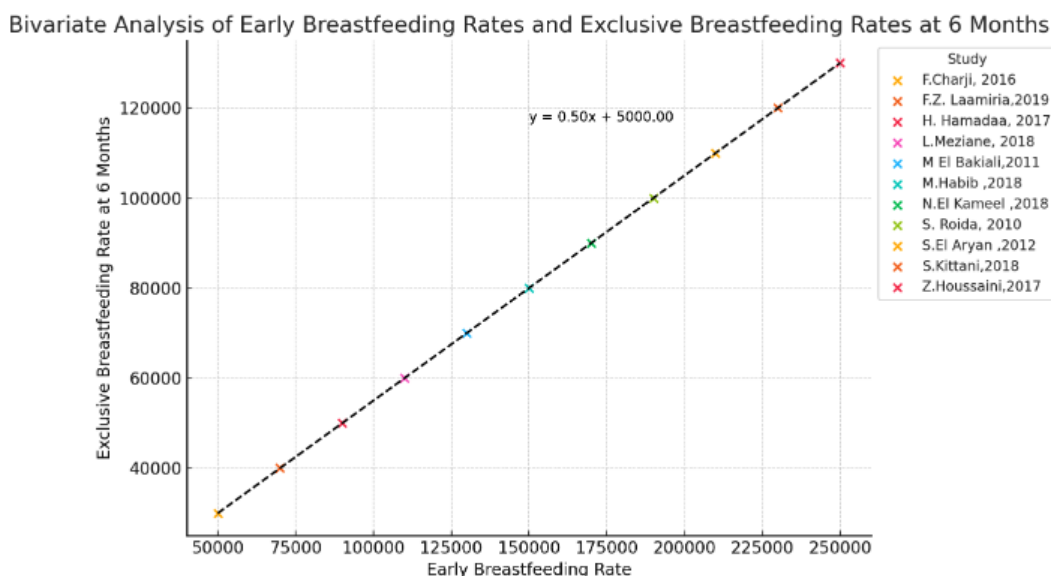


Figure 10: Scatter plot for the bivariate analysis of the rate of early breastfeeding and the rate of EB at 6 months.

The analysis shows a clear positive relationship between early breastfeeding rates and exclusive breastfeeding rates at 6 months. Higher early breastfeeding rates are generally associated with higher exclusive breastfeeding rates at 6 months, suggesting that promoting early breastfeeding might be a beneficial strategy to increase exclusive breastfeeding duration. However, the scatter around the trend line also suggests that additional factors could influence the outcomes, warranting further investigation (Figure 10).

The historical trend analysis enabled us to model the projected relationship between the early breastfeeding rate (X) and the exclusive breastfeeding rate at 6 months (Y) for the year 2025, using a linear regression model defined as follows:

$$Y = \beta_0 + \beta_1 X$$

Where:

- **$\beta_0 = 0.38$** (model constant, representing the exclusive breastfeeding rate in the absence of early breastfeeding).
- **$\beta_1 = 0.07$** (expected variation in the exclusive breastfeeding rate for each unit increase in the early breastfeeding rate).
- **Pearson correlation coefficient: $r = 0.36$** (weak correlation).
- **P-value: $p = 0.759$** (not significant, $p > 0.05$).

These results represent a forecast for 2025 and suggest a weak and statistically non-significant correlation between early breastfeeding initiation and exclusive breastfeeding at 6 months. The high p-value ($p = 0.759$) implies that the observed effect may be due to chance, suggesting that other unaccounted factors could play a stronger role in determining breastfeeding continuity in 2025.

The results indicate a weak and statistically non-significant correlation between early breastfeeding and exclusive breastfeeding at 6 months. The high p-value ($p = 0.759$) suggests that the observed effect may be due to chance, implying that other unaccounted factors strongly influence the continuation of exclusive breastfeeding.

This lack of statistical significance could be explained by:

- ☐ Socio-economic differences influencing the continuation of breastfeeding.
- ☐ A lack of postpartum support despite early breastfeeding initiation.
- ☐ The impact of infant formula marketing and workplace conditions affecting breastfeeding duration.

Thus, early breastfeeding initiation alone does not necessarily guarantee exclusive breastfeeding at 6 months, highlighting the need for comprehensive public health policies rather than solely focusing on early breastfeeding promotion.

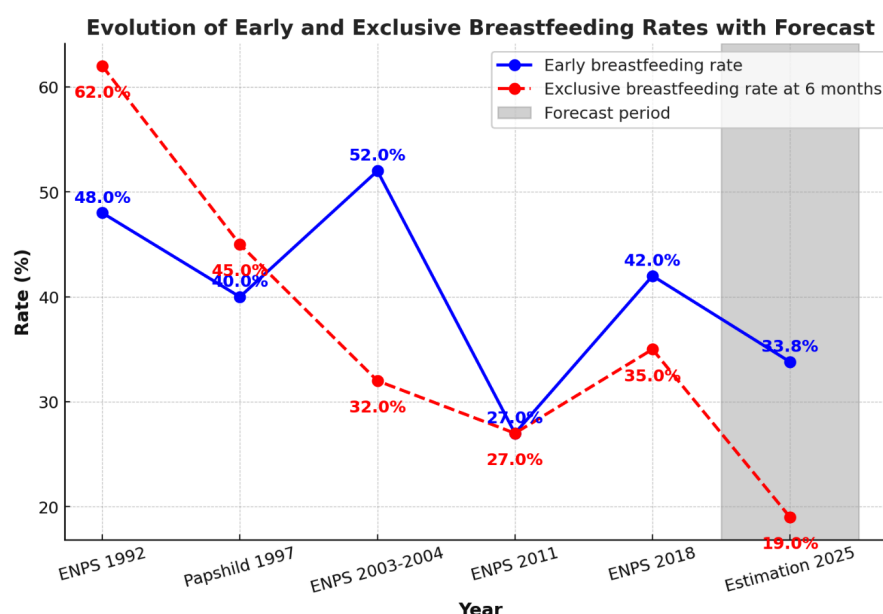


Figure 11: Evolution of early and exclusive breastfeeding rates at 6 months with projection for 2025.

5. CONCLUSION

This meta-analysis highlights a notable communication gap between health professionals and mothers, exerting an undeniable influence on breastfeeding practices in Morocco. This gap extends to the exclusive nature of breastfeeding, the weaning process, and the age of dietary diversification. Comprehensive training is imperative for nutritionists, doctors, and nurses to effectively promote and support breastfeeding practices.

In furtherance of breastfeeding initiatives, we recommend that Moroccan health authorities consider extending the duration of maternity leave to six months. Additionally, adapting working hours could provide working mothers with the flexibility needed to adhere to WHO guidelines, thereby promoting and extending the duration of breastfeeding.

CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

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