

# Complementary Feeding Practices and Weaning Practices in Morocco: A Systematic Review and Meta-Analysis

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**Abstract:** *Introduction:* Complementary feeding represents a crucial phase in an infant's developmental journey. Inadequate implementation, marked by an imbalance in both quantity and quality, can lead to varying degrees of nutritional disorders, whether from excess or deficiency.

*Study Objectives and Methods:* Conducted from December 2023 to February 2024, this research aims to assess the weaning age and the age of initiating dietary diversification among Moroccan infants. Additionally, it seeks to scrutinize specific nutritional practices and behaviors within the Moroccan infant population. Our methodology involved an extensive bibliographic search using databases such as PubMed, Science Direct, Scopus, and Google Scholar, focusing on research conducted in Morocco from 2005 to 2020. Variables examined include the prevalence of breastfeeding at six months, the age of weaning, the commencement of dietary diversification at six months, and the prevalence of advice from healthcare professionals, particularly nursing experts, provided to Moroccan mothers.

*Results and Discussion:* Complementary feeding practices in Morocco navigate the intersection of maternal nutritional beliefs and a plethora of infant feeding concepts, resulting in a complex landscape. The crucial role of medical and nursing personnel in conveying appropriate information and advice to Moroccan mothers is highlighted.

*Conclusion:* Complementary feeding is a pivotal milestone in infant nutrition, necessitating adjustments and updates in Moroccan practices. The active involvement of medical and nursing personnel is essential to ensure optimal weight development and prevent infant nutritional disorders.

*Impact and Contribution of Patient or Public:* Emphasizing the importance of the results in positively influencing infant feeding practices in Morocco, with a focus on the crucial role played by medical and nursing personnel in promoting infant health.

**Keywords:** Complementary feeding practices, weaning practices, infant nutrition, dietary diversification age, prevalence, nursing, healthcare, maternal nutrition, pediatric health, infant development.

## 1. INTRODUCTION

Weaning, defined as the gradual introduction of an infant to the future adult diet while reducing reliance on maternal milk, is a pivotal phase in infant development [1]. Complementary feeding, encompassing the introduction of non-breast milk foods, plays a crucial role in this process, according to the World Health Organization's definition [2]. Beyond mere nutritional considerations, weaning addresses psychomotor and sensory aspects, facilitating the transition to a diverse, family-oriented, omnivorous diet [3]. This transition period is intricate, demanding careful attention due to variations in psychomotor, physiological, and sensory development among individual children [4].

In the Moroccan context, complementary feeding practices are deeply intertwined with socio-cultural factors. Traditional beliefs, family customs, economic

conditions, and access to resources significantly shape these practices. Traditional beliefs often dictate the types and timing of foods introduced during weaning, influenced by cultural norms and religious practices. Family customs passed down through generations also play a significant role in guiding feeding practices, with older family members exerting influence.

Economic conditions impact access to diverse and nutritious foods, leading to variations in complementary diets among different socio-economic groups. Additionally, factors such as access to clean water and sanitation facilities influence food preparation and hygiene practices, impacting infant feeding practices and health outcomes.

The availability and affordability of commercial infant foods and feeding products further influence caregiver preferences and practices. Urban areas may see a higher reliance on packaged foods, while rural areas may prefer traditional homemade preparations.

Addressing these socio-cultural factors is crucial for promoting optimal infant feeding practices in Morocco.

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Collaborative efforts involving healthcare professionals, policymakers, community leaders, and caregivers are necessary to ensure that complementary feeding practices align with nutritional guidelines while respecting cultural preferences and socio-economic realities. Acknowledging and addressing these contextual factors can improve infant health outcomes and promote healthy growth and development in Moroccan children [5].

## 2. BACKGROUND

Weaning, representing the gradual transition from exclusive breastfeeding to the introduction of complementary foods, is a critical phase in an infant's developmental journey. This period is characterized by a delicate balance between maternal nutritional beliefs, cultural practices, and a multitude of infant feeding concepts. Inadequate implementation of complementary feeding, marked by imbalances in both quantity and quality, has been identified as a potential risk factor for various nutritional disorders, ranging from deficiencies to excesses. The World Health Organization (WHO) defines complementary feeding as the introduction of foods other than breast milk, excluding vitamin and mineral supplements, water, and oral rehydration. Understanding the historical and socio-economic context is crucial in examining the evolving landscape of complementary feeding practices in Morocco. Culinary traditions, varying across different socio-economic backgrounds, contribute to the complexity of this issue. This background sets the stage for our comprehensive literature review, where we aim to delve into the evolution of food diversification in Morocco over the past two decades, with a focus on weaning practices, the initiation of complementary feeding, and the role of caregivers in disseminating information on early-age nutritional practices [5].

Our primary objective is to conduct a comprehensive literature review on food diversification in Morocco, examining its evolution over the past two decades. Specific goals include analyzing weaning practices, determining the age of complementary feeding initiation, and elucidating the role of caregivers in disseminating information on early-age nutritional practices.

## 3. MATERIALS AND METHODS

Conducted from December 2023 to February 2024, this research aims to assess the weaning age and the age of initiating dietary diversification among Moroccan

infants. The data underpinning this review are sourced from Moroccan studies and surveys spanning 2005 to 2020. Our comprehensive review encompasses all studies and works dedicated to food diversification in Morocco over the past 15 years. This investigation is exclusively rooted in Moroccan data and focuses on the infant population of Morocco.

### 3.1. Design

We conducted an extensive search using reputable databases such as PubMed, Science Direct, and Google Scholar. Furthermore, we meticulously examined all available PhD theses related to this subject since 2005 across the accessible platforms of all faculties of Medicine and Pharmacy in Morocco [6-8].

### 3.2. Search Method

For the search process, we employed carefully selected keywords, coupled with the Boolean logical operator "AND," including "Complementary feeding practices," "Weaning," "Age of weaning & Morocco," "age of start of food diversification & Morocco," and "age & food diversification & Morocco." Our search parameters were customized to cover the period from 2005 to 2020.

Initially, we performed a preliminary selection based on title and abstract readings to ensure alignment with the objectives of our study, excluding works that did not address our specific research problem. Subsequently, a deeper analysis was conducted on the selected works that met our predefined inclusion criteria. The variables scrutinized in this review encompass the age of Food Diversification (FD), the modalities of food diversification, the age of weaning, and the sources of FD information.

### 3.3. The Inclusion Criteria

Our articles were selected by the following conditions and criteria:

- a. The studies follow and respect the ethical rules of clinical research recognized in Morocco and approved by the CERB biomedical research ethics committee.
- b. Studies carried out and/or published since 2005: Articles concerning the age of weaning and dietary diversification.

- c. These deal with the age of weaning and the age of dietary diversification.
- d. Articles written in French and/or English for practical operating reasons.
- e. Studies that follow the IMRAD structure: Introduction, material, methods, results, analysis, and discussion.
- f. Studies citing credible scientific references.

### 3.4. The Exclusion Criteria

All articles that do not deal with the Moroccan infant population.

### 3.5. Statistical Analysis

Microsoft Excel 2016 software was used for numerical data entry. Statistical analysis was performed using SPSS version 20.0 [8] and MEDCALC software [10]. Heterogeneity was quantified ( $I^2$ ) by the  $\chi^2$  test based on the Cochrane Q statistic. Prevalences were reported with a 95% confidence interval (95% CI). A  $p$ -value  $<0.05$  was considered significant for all statistical analyses.

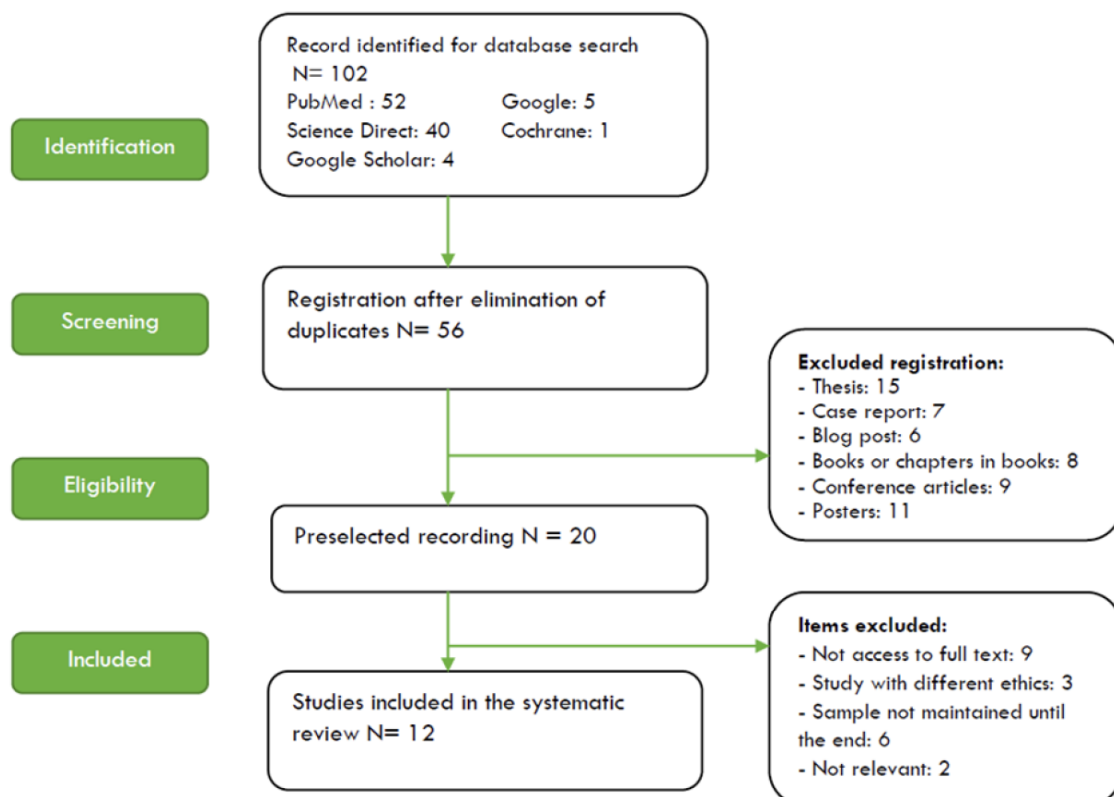
## 4. RESULTS

Our search yielded 102 articles. After applying inclusion criteria, 15 articles were excluded. Six articles were excluded due to their perceived weak statistical power. Furthermore, nine full-text articles could not be accessed due to limitations in certain search engines.

Following meticulous filtration and adherence to our judgment criteria, a final set of 12 studies was included in our analysis. These studies collectively involved 6,463 patients, comprising 5,136 candidates from six articles and 1,327 mother–newborn pairs from six theses. The recruitment and selection process is visually represented in the flow chart, detailing the strategy for study inclusion and those accepted for subsequent statistical analysis (Figure 1).

All the selected works are presented in the Tables 1 and 2.

We then consulted and downloaded the Moroccan PhD theses which met our criteria. These theses are available on the official websites of the Faculties of Medicine and Pharmacy [6-8]. These theses are presented with the characteristics and the results in an illustrative Table 3.



**Figure 1:** Flow chart of the studies selected for the review.

Table 1: Description of Selected Articles

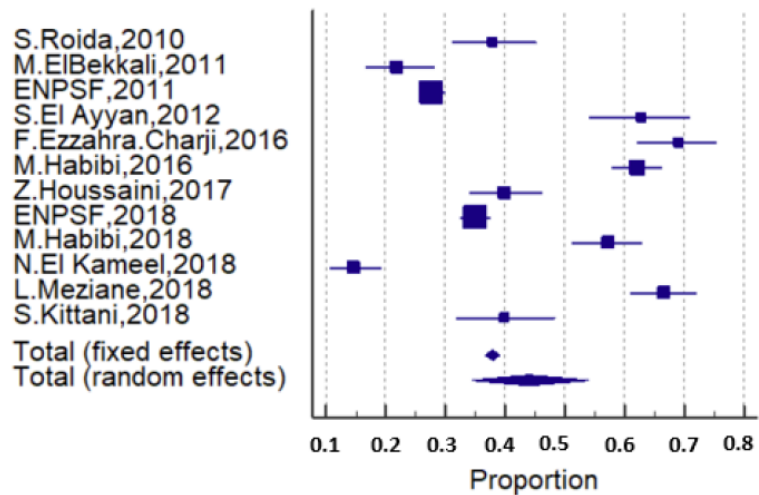
Study of	Year	Type of Study	Study Level	Region	The Aim of the Study	Period and Population Studied
S. Roidaa, <i>et al.</i> [11]	2010	Prospective study	Grade C	Marrakech-Safi. Geography code: 7	Evaluate mothers' knowledge and their predictions regarding weaning and dietary diversification.	October 1 to November 30, 2006. at the Ibn Tofail maternity hospital in Marrakech. 200 mother-newborn pairs.
ENPSF [12]	2011	A cross-sectional study	Grade C	16 regions of Morocco are involved.	Determine the weaning modalities and detect the age of diversification in the Moroccan infant population.	The work lasted 2 years between completing the survey and collecting all data from the different regions of Morocco.
Mouna Habibi <i>et al.</i> [13]	2016	A cross-sectional study	Grade C	Casablanca-Settat. Geography code: 6	To assess the effect of women's work on breastfeeding (AM) 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.
Zineb Sqalli Houssaini <i>et al.</i> [14]	2017	Prospective study	Grade C	Rabat-Salé-Kénitra. Geography code: 4	Explore mothers' perceptions of introducing appropriate and timely complementary feeding.	From April 1 to December 30, 2015, 574 mothers with children aged 0–24 months attended 12 health centers in the prefecture of Ain Chock in Casablanca, Morocco.
ENPSF [15]	2018	A cross-sectional study	Grade C	Rabat-Salé-Kénitra Geography code: 4	Determine the weaning modalities and detect the age of diversification in the Moroccan infant population.	The work lasted a year and a half between the completion of the survey and the collection of all data from the different regions of Morocco.
Mouna Habibi <i>et al.</i> [16]	2018	A cross-sectional study	Grade C	Rabat-Salé-Kénitra. Geography code: 4	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 were seen for routine primary health care in the twelve public health centers in Ain Chock, Casablanca district.

Table 2: The Results of the Selected Articles

Study of	Year	No. of Cases	The Exclusive Breastfeeding Rate at 6 Months	Food Diversification at 6 Months	Weaning Age	Advice from Healthcare Professionals
S. Roidaa, <i>et al.</i> [10]	2010	200	38%	6%	17.2 months	37.5%
ENPSF [11]	2011	2079	27.8%	40.6%	16.3 months	--
Mouna Habibi <i>et al.</i> [12]	2016	574	--	62.1%	--	25.4%
Zineb Sqalli Houssaini <i>et al.</i> [13]	2017	275	40%	--	6.9 months	--
ENPSF [14]	2018	1711	35%	44.9%	17.4 months	--
Mouna Habibi <i>et al.</i> [15]	2018	297	57.23%	54.5%	5 months	41.4%
Total		5136				

Table 3: The theses Selected with the Results Found

Thesis	Year	Description	Number of Samples	Geographical Area	Food Diversification at 6 Months	The Exclusive Breastfeeding Rate at 6 Months
Meriem El Bakali [17]	2011	Evaluate complementary feeding at the age of 6 months and test the knowledge of health professionals	227	Rabat-Salé-Kénitra. Geography code: 4	77%	22%
Salahiddin El Ayyan [18]	2012	This is a prospective study comprising 120 women who gave birth at the Souissi Maternity in Rabat and 20 women seen at the Masjid Health Center in Akkari.	140	Rabat-Salé-Kénitra. Geography code: 4	–	63%
Fatima Ezzahra CHARJI [19]	2016	This is a prospective descriptive and analytical survey that lasted from April 21, 2014, to July 31, 2014. The objective is to study their planned practices regarding weaning and dietary diversification.	210	Marrakech-Safi. Geography code: 7	28%	69%
Nadia El Kameel [20]	2018	This is a cross-sectional CAP-type study on knowledge, attitudes, and practices of food diversification carried out in the city of Fez from September 1, 2017, to January 1, 2018.	300	Fès. Geography code: 3	42%	14.7%
Lamyae Meziane [21]	2018	This is a descriptive and analytical survey that took place over a period of 4 months, extending from June 15, 2017, to October 15, 2017. The study was carried out at the Souissi maternity of the Ibn Sina University Hospital Center. from Rabat.	300	Rabat-Salé-Kénitra. Geography code: 4	–	66.7%
Samih Kitan [22]	2018	This is an observational prospective, descriptive, and analytical study that took place over three months, from October 1, 2017, to December 31, 2017.	150	Larache, Ksar Elkebir. Geography code: 4	85%	40%
Total			1327			



**Figure 2:** Forest plot of the exclusive breastfeeding rate at six months of selective studies.

The variables studied in this review are:

The age of food diversification (FD).

The modalities of food diversification.

The age of weaning.

Source of FD information.

Once the selected articles were analyzed in response to the chosen judgment criteria, a comparison of the results was made with data from national surveys carried out on the topic.

**4.1. Analysis of Data from Selected Articles**

In order to facilitate an understanding of the results, we first presented a summary of the various articles selected, specifying for each survey the type and objective of the study and the population studied and we extracted all the results that meet our criteria.

**4.2. Exclusive Breastfeeding at Six Months**

The table of indicator averages taken from the selected studies showed that the rate of exclusive breastfeeding at six months was 43.04%.

The forest plot (Figure 2) shows that the distribution of the overall prevalence of exclusive breastfeeding at

six months of the studies selected from the general population was of the order of 43.04%, with a minimum of 14.70% and a maximum of 69%, which shows a disparity between the values of the studies chosen.

It should be mentioned here that the prevalence of exclusive breastfeeding at six months in rural areas is higher than that recorded in urban areas. The latter is of the order of 53.46%, while the rural world was of the order of 63.04% ( $p < 0.0001$ ).

**4.3. Weaning Age**

The average weaning age in our review is around 14.37 months (Table 4); the curve shows that the weaning age was more than 15 months between 2010 and 2016 (Figure 3). However, after 2016, the average age of weaning decreased, with a value of five months being recorded in 2018 in the work of M. Habibi [16].

**4.4. Weaning Practices**

Weaning was mainly explained by insufficient breast milk; this reason was cited with a maximum value in the work of Z. Houssaini (53% of cases), while in the ENPSF in 2011, this reason for weaning was found in 22.80% of cases (Figure 4).

In addition, there is brutality in breastfeeding termination. This was cited in the 2011 ENPSF in 84%

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

	The Exclusive Breastfeeding Rate at 6 Months	Food Diversification at 6 Months	Weaning Age	Advice from Healthcare Professionals
Average of the indicators of the elected studies	43%	49%	14.3 months	34.7%

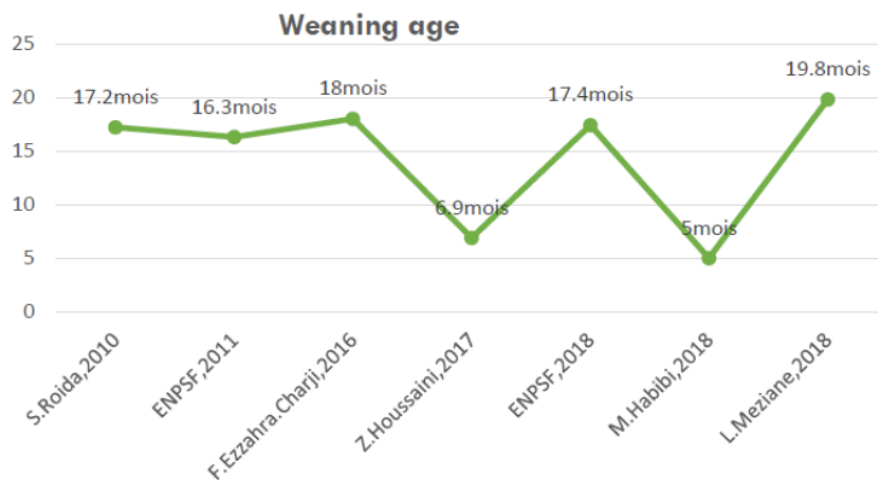


Figure 3: The age at weaning of the various studies.

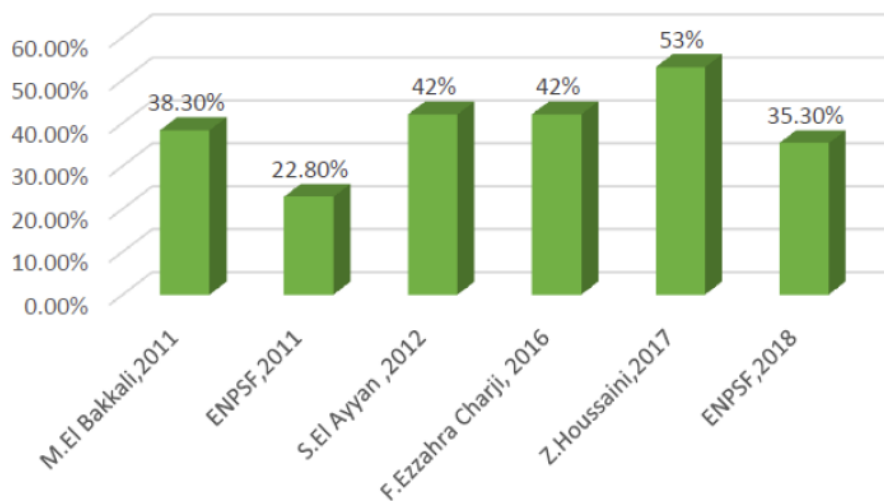


Figure 4: Diagram of weaning due to lactation insufficiency.

and the 2018 ENPSF in 80.8%. Zineb and his team reported a similar result, registering a sudden withdrawal in 64%. Moreover, most mothers were not informed about the consequences of abrupt withdrawal [10-14].

**4.5. The Prevalence of Food Diversification at Six Months**

The curve of the prevalence of complementary feeding for six months (Figure 5) shows great variability during the last years. The minimum value is recorded in the work of S. Roida [11], which was 6%, while the maximum value was 85%, cited in the study of S. Kittani [21] (Figure 6).

The overall prevalence of complementary feeding six months of studies selected from the general population was 51% (95% CI: 97.97 to 98.86; I<sup>2</sup>:

98.48%) (Table 5). The graph of the chosen studies (Figure 5) shows that food diversification condenses in

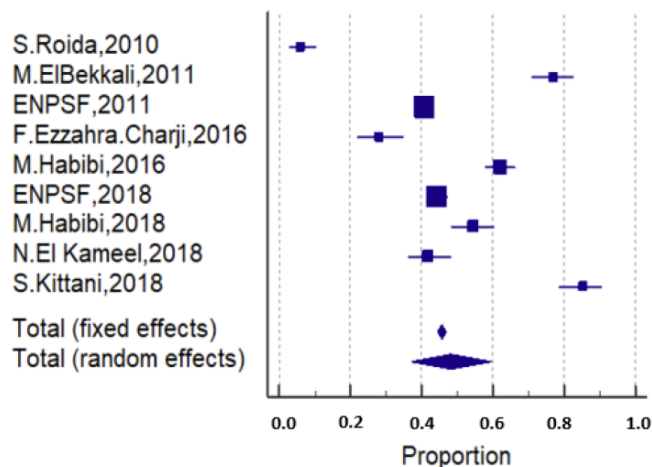
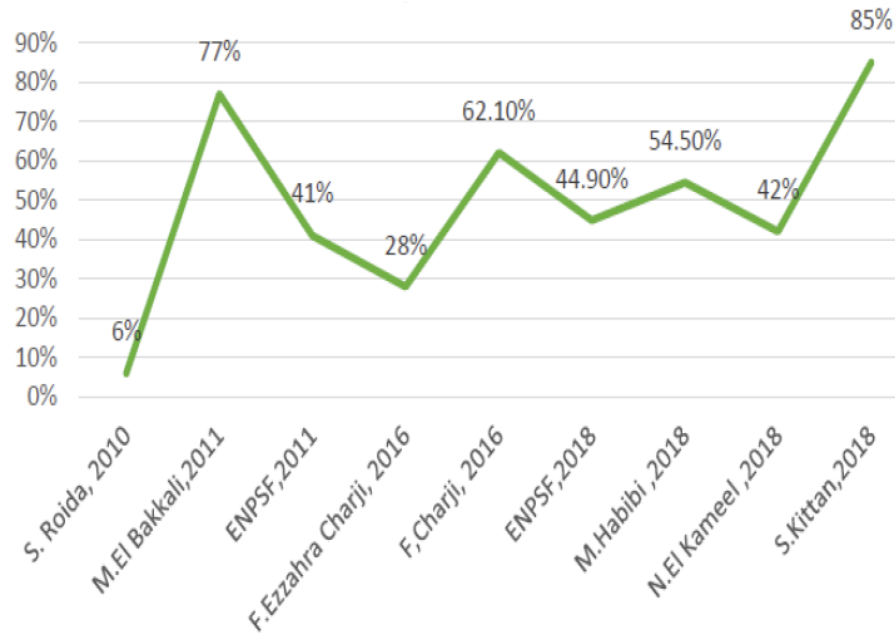


Figure 5: Forest plot of food diversification at six months of selected studies.



**Figure 6:** The prevalence of complementary feeding for six months.

a confidence interval between 37.126% to 59.707% with a minimum margin of 6% and a maximum of 85%.

**Table 5: The Heterogeneity Test of Diversification Dietary of the Selected Studies**

Q	526.3830
DF	8
Significance level	$p < 0.0001$
$I^2$ (inconsistency)	98.48%
95% CI for $I^2$	97.97 to 98.86

Q: Cochran's Q.  $I^2$ : Heterogeneity test. DF: Degree of freedom. CI: Confidence interval.

We must not forget to show that the prevalence of diversification at six months in rural areas is higher

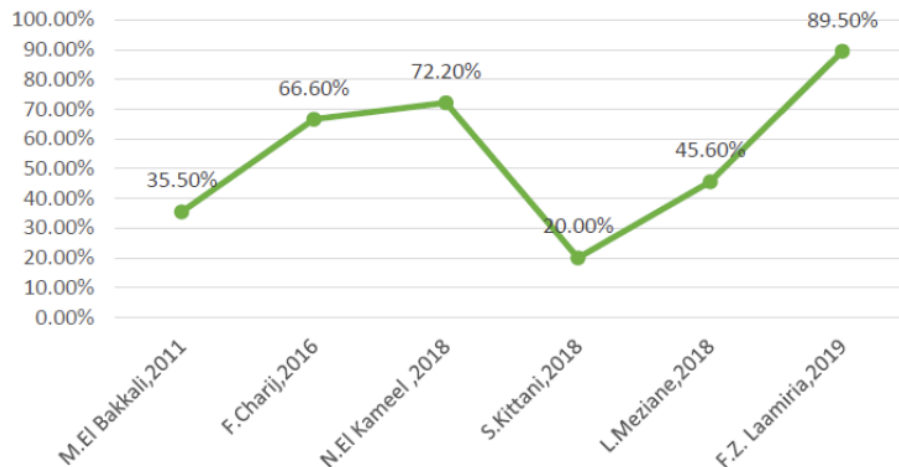
than that recorded in urban areas. The latter is of the order of 38.45%, while the rural world was of the order of 46.75%. This shows a significant heterogeneity of studies ( $p < 0.0001$ ).

#### 4.6. Diversification Practices

The review showed a great disparity in practices according to the studies:

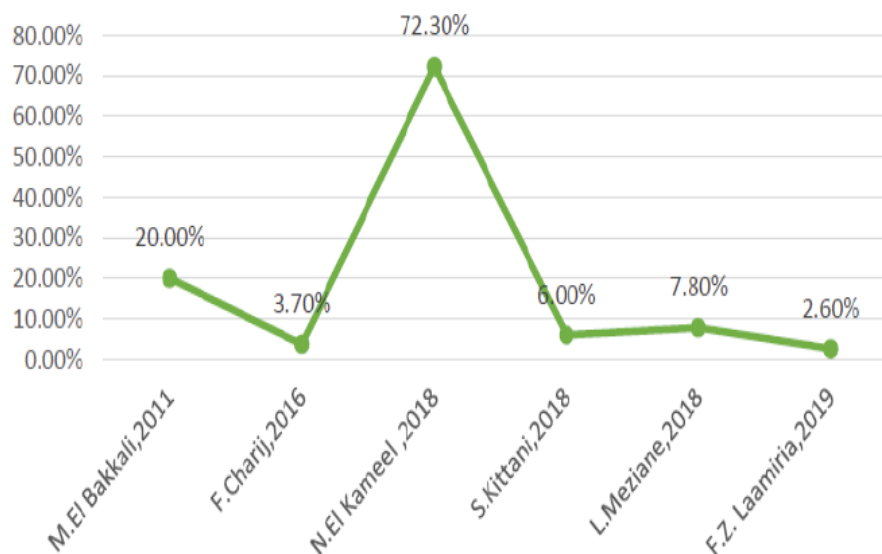
Continue exclusive breastfeeding for up to six months while introducing other complementary foods from the age of six months with a rate of 43.04% (Table 4).

Diversify the diet of infants at the age of six months with a rate of 51% (Table 4).



**Figure 7:** Rate of administration of herbal tea before six months.





**Figure 8:** Rate of water administration before six months.

Introduce 54.90% herbal tea (Figure 7).

Give water even before four months, 18.73% (Figure 8).

#### 4.7. The Role of Caregivers in Providing Information on Nutritional Practices

In all studies, mothers reported a real lack of emotional support. Most Moroccan mothers have expressed fear and anguish by asking for information and advice from healthcare professionals (HCPs). In Morocco, there is a traditional means of information from grandmothers to mothers. It appears from the table of averages calculated from our review (Table 4) that the instructions are provided by health professionals in 34.77% of cases and by family and friends in all other cases.

## 5. DISCUSSION

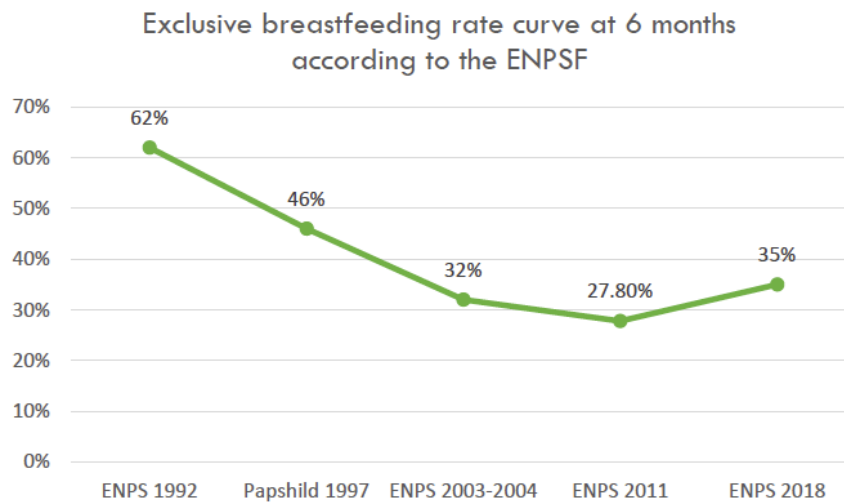
This work allowed us to describe and evaluate the studies made on food diversification during these 15 years in Morocco. In fact, it allowed us to analyze weaning practices and the age of complementary feeding in the Moroccan infant population and clarify the role of caregivers concerning information on nutritional practices at a young age. The data for this review come from Moroccan studies and surveys spanning from 2005 to 2020.

Our review brought together 12 relevant studies, including 6463 patients. It allowed us to highlight several nutritional practices in Moroccan food diversification, in particular, sudden weaning, the

introduction of water before six months, and the misuse of herbal tea (Figures 7 and 8). Indeed, the reasons for the administration of other non-milk liquids and herbal tea or water are explained by the belief of Moroccan mothers in the benefits of herbal tea for the health of a newborn baby and its need for hydration. The heterogeneity that produces the curve in Figure 8 is due to the different regions belonging to the mother where the environment and food habits reign. It should be emphasized here that the family plays a crucial role in pushing the mother to administer water to her newborn baby before the age of four months. Certainly, these beliefs have no scientific or medical credentials and may threaten the nutritional status of newborns [12].

Healthcare professionals contributed to information on food diversification and weaning, only a mean of 34.8% (Table 4). We must emphasize that the rate of exclusive breastfeeding at six months from the studies chosen for our review shows a mean of 43% (Table 4). This value is higher than that of the last national family population survey, which was 35%, but this figure remains very far from that recorded in 1992, which is 62% [10, 13, 21].

The curve (Figure 9) shows that the practice of exclusive breastfeeding at six months increased from 27.8% in 2011 to 35% in 2018 from an increase of 7.2%, and the highest value recorded was in 1992, at 62%, according to data from national surveys and Moroccan infant nutrition studies [10, 13, 21]. This shows that over the past 10 years, exclusive breastfeeding has improved in its practice, and these



**Figure 9:** The exclusive breastfeeding rate curve is at six months, according to the ENPSF. ENPSF: National survey of population and family health. EB: Exclusive breastfeeding.

improvements go in parallel with national infant nutrition strategies and action plans set by the Ministry of Health in Morocco [23-25]. In addition, it should be remembered that the age at weaning is significantly correlated with the practice of exclusive breastfeeding and the start of correct complementary feeding [26]. The latter is linked in our review to milk failure, with an average of around 38.90% (Figure 4). This figure is more than that recorded in the last national survey, around 35.2% [15].

The analysis of the data from our review shows that the environment influences the practice of latching and its exclusivity. The calculated average of our data affirms that the rural environment (63.04%) (Table 6) is more favorable than the urban environment (53.46%) in the practice of exclusive breastfeeding. According to the National Population and Family Health Survey 2018, this is explained by the fact that the rural Moroccan woman breastfeeds for more than six months and, in some cases, up to two years, while the Moroccan woman in the urban environment is confronted by several constraints, including work which impinges on the proper conduct of the practice of exclusive breastfeeding (Figure 3).

Regarding dietary diversification, our review records a rate of 49% of those who began complementary

feeding six months ago. This shows an increase of 4.1% from that observed by the last national family health survey, which was 44.9%. Certainly, there is a relationship between stopping exclusive breastfeeding and the correct initiation of food diversification from the age of six months, according to the recommendations of the World Health Organization [27]. Given this, the newborn takes its nutritional needs from its mother until the age of six months, and the introduction of food will not be useful before the age of six months, taking into account the digestive and renal immaturity and bucco-lingual motor skills of newborn infants. Starting from the age of six months is too late and may cause nutritional deficiencies, which will set up nutritional disorders from childhood [28]. We must not forget that the prevalence of diversification at six months in rural areas (46.75%) is higher than in urban areas (38.45%). Indeed, this may explain why the advice given by health professionals is easier to apply to rural Moroccan women compared to urban women. The latter confronts work constraints, and both begin to wean and begin complementary feeding at four months (Figure 8). Moreover, it is well known that early dietary diversification, before the age of six months, was practiced during 1975–1980 and gave frightening results, causing digestive metabolic problems and insulin-resistance problems [29].

**Table 6: The Averages of the Indicators of the Studies were Selected according to the Environment**

	The Exclusive Breastfeeding Rate at 6 Months		Food Diversification at 6 Months	
	Urban	Rural	Urban	Rural
Average of the indicators of the studies elected according to the environment	53.46%	63.04%	38.45%	46.75%

Based on the analysis of the studies in our review, there is a real lack of transgenerational emotional and social support. In fact, this was well explained in the work of Mouna Habibi, who showed that 84.6% of mothers of children under six months of age said they had not received an explanation. These explanations concern the incentive of complementary feeding that should be provided within maternity and neonatal care services. Mouna Habibi *et al.* reported that mothers expressed a deep ambiguity about good food diversification practices [13]. This converges with the calculated average of the studies elected from our review of a mediocre rate of advice provided by health professionals at 34.77% (Table 4). The weaning age had to be between one and 36 months, with an average age of 17.2 months [10]; this average is higher than that recorded in the calculated average of our review, which is of the order of 13.38 months (Table 4). Our work shows that, contrary to theoretical expectations, mothers were not consistently able to respond individually to WHO guidelines despite the positive efforts of health facilities.

This review brought together the articles dealing with the theme of food diversification in Morocco and took us a lot of time because we carried out too deep analysis and too careful a reading, word by word, in order to clarify the situation and reveal all the obstacles of food diversification in Morocco; these obstacles are real nutritional disruptors.

Our review based on purely Moroccan data has made it possible to make several observations, particularly with regard to the role of health professionals who play a vital role in the enlightening of Moroccan mothers and this on several relative aspects: The methods of weaning and the ideal age for the introduction of food. It makes sense to take more account of the role of nutritionists through specific strategies. In addition, early contact between mother and child should be encouraged, and appropriate discourse conveyed on the timing of complementary feeding should encourage women to meet current recommendations. We must underline the role of the fathers, who are named the key actors, due to their roles of support and accompaniment of mothers in the decision to wean and the beginning of adequate food diversification.

The variations observed in complementary feeding to certain socio-cultural and demographic characteristics make it possible to identify groups to target in order to remedy what we could. The efforts

made by the Moroccan Ministry of Health must be further multiplied by its media campaigns on food diversification in its correct concept and concerning the favorable timing. All partners must commit to remedying the nutritional situation of the Moroccan child by putting in place health policies and through the implementation of strong and concrete action plans with the involvement of the state for the implementation of tangible measures for the correct timing of food diversification.

Our analysis of studies on food diversification over the past 15 years in Morocco has allowed us to describe and evaluate practices in this area. However, it is crucial to recognize the potential limitations of these studies for a more balanced interpretation of the results. Among these limitations, sample size deserves mention. Although our review compiled 12 relevant studies, totaling 6463 patients, the sample size may not exhaustively represent the diversity of the Moroccan population. Additionally, the representativeness of samples may vary from one study to another, which can influence the generalization of results to the entire population.

Furthermore, it is important to consider the potential biases present in the included studies. Selection, recall, or response biases may have influenced the collected data, affecting the validity of the results. For example, mothers with feeding practices that are more in line with health recommendations may be more inclined to participate in studies, introducing a selection bias. Similarly, reliance on self-reported data can lead to memory or response biases, affecting the accuracy of the collected information.

Despite these limitations, our review has shed light on several nutritional practices regarding food diversification in Morocco. The results have highlighted practices such as abrupt weaning, early introduction of water, and inappropriate use of herbal tea. These practices, although often rooted in cultural beliefs, can have implications for the nutritional health of infants. By identifying these practices, we hope to raise awareness among healthcare professionals and policymakers about the specific challenges faced by Moroccan infants in terms of feeding.

In conclusion, while acknowledging the limitations of our analysis, it is imperative to continue efforts to improve complementary feeding practices in Morocco. Future studies should aim to overcome these limitations by using more representative samples and

mitigating potential biases. By integrating these considerations, we can develop more effective strategies to promote healthy and appropriate feeding practices for Moroccan infants.

## 6. CONCLUSIONS

Addressing cultural nuances is paramount in designing effective interventions. Culturally sensitive approaches, such as community-based education programs and tailored messaging campaigns, can help bridge gaps in understanding and promote positive nutritional practices among caregivers.

Furthermore, strengthening the healthcare infrastructure is essential to provide comprehensive support for mothers and caregivers. This includes ensuring access to accurate information, counseling services, and other essential resources necessary for promoting optimal infant feeding practices.

Lastly, fostering collaboration among policymakers, healthcare professionals, and community stakeholders is pivotal. By working together, evidence-based guidelines and policies can be developed to streamline efforts toward promoting healthy feeding practices across Morocco.

In conclusion, our study sheds light on key challenges in infant nutrition in Morocco and underscores the urgent need for concerted action. By implementing targeted interventions and fostering collaboration across sectors, we can strive towards ensuring that all children in Morocco receive the necessary nutrition for healthy growth and development during their formative years.

## AUTHOR CONTRIBUTIONS

Conceptualization, MEM; methodology, MEM; software, MEM; validation, MEM, HA and AB; formal analysis, MEM; investigation, MEM; resources, MEM; data curation, MEM; writing—original draft preparation, MEM; writing—review and editing, MEM, AB; visualization, MEM; supervision, MEM; project administration, MEM; funding acquisition, AB All authors have read and agreed to the published version of the manuscript.

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## CONFLICTS OF INTEREST

The authors declare that they have no links of interest.

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