Evolution of Exclusive Breastfeeding Practices According to Demographic and Health Surveys (DHS) From 2010 to 2019 and Associated Factors in Senegal

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Abstract

Introduction

The first two years of a child's life are particularly important because optimal nutrition during this period will reduce morbidity and mortality rates. Despite the efforts of the Government and its partners, this situation has remained almost stationary for the last 10 years according to the Demographic and Health Surveys (DHS) data between 2010 and 2019. Thus, the objective of our study is to assess the evolution of exclusive breastfeeding practices (EBP) in the first six months of life from 2005 to 2020 and the associated factors.

Methodology

This is a quantitative cross-sectional study using data from the Senegalese Demographic and Health Surveys (DHS) from 2010 to 2019. The study covered the entire population of Senegal, particularly men, women aged 14–49 years, and children under five years. The DHS data used are available from the DHS Program STAT compiler database, (The DHS Program STATCompiler. Funded by USAID. http://www.statcompiler.com/). A secondary analysis of the 2017 Senegal Demographic and Health Surveys (DHS) data was done to identify key predictors of AME and the practice of giving water in addition to breast milk were done. All analyses were performed using Stata 15.1 software.

Results

The rate of AME was 47.2% among infants who received MSP versus 39.1% among those who did not (P = 0.007). Mothers who reported receiving breastfeeding counseling two days after delivery were 40% more likely to breastfeed exclusively up to six months than those who did not. (P = 0.003). Mothers who belong to the Wolof, Serer, and Soninke ethnic groups are 42% more likely to give water to infants under six months of age than mothers who belong to the Poular, Mandingue, and Diola ethnic groups (P = 0.0025). Adolescent mothers are more likely to give water to infants under six months of age than older mothers. Adolescent mothers were 2.7 times more likely to give water to infants under six months of age than were mothers aged 35–48 years (P < 0.001). Mothers who received postpartum breastfeeding counseling were 30% less likely to give water to infants younger than 6 months of age than mothers who did not receive breastfeeding counseling (P < 0.001).

Discussion

The results of this study will therefore be used to guide infant feeding awareness strategies for young women (mothers-to-be) to adhere to and continue exclusive breastfeeding up to six months as recommended by the World Health Organization.

INTRODUCTION

Infant and young child feeding is a critical area for improving child survival and promoting healthy growth and development. The first 2 years of a child's life are particularly important because optimal nutrition during this period will reduce morbidity and mortality, reduce the risk of chronic diseases, and contribute to better overall development.

Despite positive economic growth in West and Central Africa, the number of stunted children under five years of age increased from 23 to 29 million between 2000 and 2018. In addition, the region is home to an estimated 4.9 million children with severe acute malnutrition [3, 4]. Several studies have shown that about 2.7 million of the annual child deaths attributable to undernutrition, or 45% of all child deaths [1, 2]

Breastfeeding, improved complementary feeding, and available nutritional interventions have been shown to be effective in reducing stunting. Optimal breastfeeding and complementary feeding practices have been shown to be extremely effective in promoting healthy child development. When implemented optimally, these practices can reduce mortality and stunting in young children by approximately 20% [5, 6]. Inadequate breastfeeding practices significantly compromise the health, development and survival of infants, children and mothers. According to The Lancet, suboptimal breastfeeding is estimated to account for 1.4 million child deaths and 77% of child deaths are due to non-exclusive breastfeeding in the first six months of birth. [7] Indeed, recent analyses show that suboptimal breastfeeding practices, including non-exclusive breastfeeding, are the cause of 11.6% of deaths in children under 5 years of age, which in 2011 corresponded to 804,000 deaths [1]. The benefits were observed in women and children in all countries, rich and poor. According to the series of studies on breastfeeding published in The Lancet, if breastfeeding became nearly universal, 823,000 deaths of children under five years of age and 20,000 maternal deaths from breast cancer would be prevented each year. Breastfeeding promotes brain development, reduces the risk of obesity in children, and protects women from ovarian cancer and also from diabetes [1, 8, 9, 10]. Thus, optimal breastfeeding practices are one of the best interventions for reducing infant mortality [11]. Optimal breastfeeding practices are also an investment in human capital development, and beneficial to a country's economy. Every dollar invested in breastfeeding generates $35 in economic benefits [12]. Promoting proper feeding practices during pregnancy and the early years of life is therefore essential nutrition education has been shown to increase exclusive breastfeeding rates by more than 30% [13].

Breastfeeding is essential for achieving global goals for nutrition, health and survival, economic growth, and ecological sustainability. The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) recommend that breastfeeding should begin within one hour of birth, continue exclusively for the first six months of life, and continue, along with healthy and satisfying complementary foods, until two years of age or beyond [14, 15]. Overall, these recommendations affect only a minority of infants and children: only 44% of infants begin breastfeeding within 1 hour of birth, and 40% of all infants under 6 months of age are exclusively breastfed. At two years of age, 45% of children are still breastfed [16, 17]. In developing countries, lack of breastfeeding, especially exclusive breastfeeding in the first 6 months of life, is an important risk factor for morbidity and mortality for infants and children, especially following diarrheal disease or acute respiratory infection.
In West and Central Africa, only three in 10 infants under six months of age are exclusively breastfed. Seven out of 10 infants receive fluids and foods in addition to breast milk during their first six months of life, contributing to malnutrition, illness, and even child deaths. Most breastfed babies receive other fluids and foods, in most cases water is given [18]. The highest risk of inappropriate feeding during the first 6 months of life occurs in developing countries where 96% of total infant mortality is due to suboptimal breastfeeding [12].

In 2017, 42% of children in Senegal under six months of age were exclusively breastfed with a median duration of 2 months [19]. Despite the efforts of the Government and its technical and financial partners, this situation has remained almost stationary for the last 10 years according to data from the Demographic and Health Surveys conducted between 2010 and 2019 [20, 21].

Thus, the objective of our study is to assess the evolution of exclusive breastfeeding practices in the first six months of life from 2005 to 2020 and the associated factors.

I- OBJECTIVES

1- To assess the evolution of breastfeeding practices from 2005 to 2020 and the factors affecting these practices.

2- To identify the different social and behavioral factors that influence early and exclusive breastfeeding practices in the first six months of life.

II- METHODOLOGY

1-Framework of the study

The study was conducted in Senegal, which has 14 regions and 16,705,608 inhabitants in 2020, most of whom are young people with an average age of 19 years. It is made up of ethno-linguistic groups: Wolof, Séréres, Poulars, Mandingues, Diolas, Soninké.

Women represent 50.23% of the population and the total fertility rate is estimated at 4.93 children per woman [22]. The school enrollment rate between 2014 and 2018 went from 85.5% to 80.9 for primary and 50.2 to 43.7 for secondary. [19]

Senegal’s Gross Domestic Product (GDP) grew by more than 5% in 2019. Agriculture, exports and infrastructure investments undertaken as part of the Emerging Senegal Plan are the main drivers of this economic growth. In 2020, as a result of COVID-19, growth slowed sharply to an estimated 1.3 percent. With nearly half of the population (46.7%) living below the national poverty line, economic growth has not translated into improved well-being for the Senegalese population. Indeed, Senegal’s Human Development Index (HDI) for 2018 stands at 0.514, placing the country 166th among 189 countries and territories.

Maternal and infant mortality indicators show declining trends with an estimated maternal mortality ratio of 236 deaths per 100,000 live births [19].

As for infant mortality, it fell from 72‰ in 2010 to 37‰ in 2019. Access to prenatal care is equitable in Senegal with almost 98% of pregnant women receiving prenatal care from skilled health personnel. In 2019, 80% of deliveries took place in a health facility, and 74% of deliveries were attended by skilled health personnel. [21].

The nutritional situation of women of childbearing age reflects their dietary vulnerability, which is manifested by the coexistence of multiple micronutrient deficiencies. Indeed, according to the latest estimates in 2017, slightly more than one in two women of childbearing age is anemic [19], most often due to iron deficiency [23]. In addition to these micronutrient deficiencies, the two forms of malnutrition coexist, namely energy deficiency in 23% of women and overweight/obesity observed in 7% of women [24].

As for children under five years of age, only 8% and 18% of them suffer from wasting and stunting respectively [21]. Anemia affects 71% of children. Zinc deficiency affects 50.1% and vitamin A deficiency 24.4%. This worrying nutritional situation of children under 5 years of age may be due in part to sub-optimal infant and young child feeding practices. Indeed, even if breastfeeding remains universal in Senegal with 98% of children breastfed, its practice according to international and national recommendations remains suboptimal. According to the DHS 2019, early initiation of breastfeeding is effective for only 30% of newborns and breastfeeding is exclusive for only 41% of infants under six months. The minimum food intake is acceptable for only one child out of 10; the diet of these young children is characterized by a low diversification of foods (23.3%) and an insufficient number of meals (36.9%) [21]. Sweet snacks are becoming an important part of the diet of these young children, regardless of whether they live in urban or rural areas.

2-Type of study

This is a quantitative cross-sectional study using data from the Senegalese Demographic and Health Surveys (DHS-C) from 2010 to 2019 on changes in exclusive breastfeeding practices and associated determinants among infants under six months of age. A quantitative methodology through secondary analysis of the Senegalese Demographic and Health Surveys (EDS-C) data was used.

3- Study population

The study population was the entire population of Senegal, particularly males, females aged 14–49 years, and children under five years.

4- Sampling

The sample is based on a stratified areal survey drawn in two stages. In the first stage, 214 clusters (Primary Survey Units UPS) were drawn from the list of Enumeration Zones (ZD) established during the General Census of Population and Housing, Agriculture and Livestock (RGPHAE) [25] conducted in 2013,
using a systematic draw with probability proportional to size, the size of the UPS being the number of households. A count of households in each of these clusters provided a list of households from which a sample of 22 households per cluster was drawn in the second stage, both in urban and rural areas with systematic drawing with equal probability. A total of 4,708 households (1,848 urban and 2,860 rural) were selected. All women aged 15–49 usually living in the selected households or present the night before the interview were eligible to be interviewed. In addition, in a subsample of every other household, all men aged 15–59 were eligible to be interviewed. Also, all children under the age of five were eligible for anthropometric measurements.

5- Data collection

Four questionnaires were used in the DHS-Continue: the household questionnaire, the women's questionnaire, the men's questionnaire, and the specific biomarker questionnaire for anthropometric measurements.

The household questionnaire registered all household members and identified women, men and children eligible for individual interviews and/or anthropometric measurements.

The individual women's questionnaire was used to record information from women aged 15–49 years. The individual male questionnaire aged 15–59 years is identical to those asked of women aged 15–49 years. The biomarker questionnaire was used to record anthropometric data (weight and height) collected from children under 5 years old [26]. The DHS data used are available from the DHS Program STAT compiler database, (The DHS Program STATcompiler. Funded by USAID. http://www.statcompiler.com)

6- Data Analysis

The secondary analysis of the DHS-C data from 2010 to 2019 was done to better understand the determinants of AME as well as breastfeeding associated with the practice of giving water to infants under six months. Thus, the purpose was to conduct:

- A descriptive analysis was done on the evolution of data on breastfeeding practices for infants under six months of age at the national and regional level using the results of the DHSs from 2010 to 2019.
- A bivariate analysis with the aim of identifying the determinants of AME in infants under six months of age. The bivariate analysis was conducted for the AME variable on the 2010 to 2019 DHSs to better understand trends over time and their distribution by various characteristics, including place of residence, regions, ethnicity, household wealth quintile, female asset ownership, highest level of female education literacy, father's education level, early marriage, mother's age at last birth, child's birth rank, Antenatal Consultation visits, place of delivery, time of postnatal checkup after delivery or discharge from hospital, and skilled delivery. A significance level of 5% was used to determine the association between independent and dependent variations.
- A multivariate logistic regression analysis using 2017 DHS-C data to identify key predictors of AME the AME and the practice of giving water in addition to breast milk. The analysis focused on 2017 data. The dependent variable was the proportion of children aged 0–6 months exclusively breastfed. The independent variables included in the models were selected based on a literature review of the determinants of MEA [27] Thus, in addition to the independent variables from the bivariate analysis, the following variables were included in the different models: polygamy, household size, inter-generational interval, women's occupation, women's earnings, women's participation in decision making, water collection time, access to media, breastfeeding counseling, membership in tontine groups, distance to the nearest health center, use of modern contraceptives, skin-to-skin contact, cesarean section, sex of the child, and low birth weight of the child. In the models for exclusive breastfeeding and breastfeeding combined with water feeding, child illness in the last 2 weeks was also included.

All analyses were performed using Stata 15.1 software and weighted to reflect the survey design. The final model was tested for model fit and multicollinearity.

7- Ethical Considerations

Ethically, the information provided in the study was confidential and kept in a safe place at the Ministry. The selected individuals will not be identified in the results and presentation of the data. Their names will not appear on any documents.

Participation in the study for those surveyed was free and voluntary. An informed consent form was offered to the participants, read and approved. It provided all the information needed to understand and make a decision to participate. No form of financial or material incentive or compensation was given to participants.

IV-RESULTS

1. Evolution of Exclusive Breastfeeding from 2010 to 2019

a-Evolution of exclusive breastfeeding at the national level

Between 2010-11 and 2017, there was no significant change in either the median duration of exclusive breastfeeding or that of predominant breastfeeding. Indeed, regarding exclusive breastfeeding, the median duration increased from 1.5 months to 2.0 months and that of predominant breastfeeding from 5.6 months to 6.1 months. Exclusive breastfeeding practice rates remained below 50% from 2010-11 to 2019. After a steady decline from 2010-11 to 2015, oscillating increases between 3 and 5 percentage points are observed from 2015 to 2018. In 2019, the rate dropped to 41%, further widening the gap toward achieving the global target of at least 50% by 2025. (see Figure 1)

b-Evolution of exclusive breastfeeding at the regional level
With the exception of Diourbel and Matam, all the other regions of Senegal show time series characterized by irregular evolution with spectacular decreases and/or increases in some regions as shown in figure 2 below.

c- Ranking of regions according to the national average for 2010-2017

Table 1 shows the average exclusive breastfeeding rates by region over the period from 2010-11 to 2017. The ranking of regions according to regional averages puts Kaolack, Fatick, Tambacounda, Kaffrine, Matam and Diourbel at the bottom of the scale. In these regions, about seven out of ten infants and their mothers do not benefit from the protective effects of breastfeeding.

Table 1: Regional averages from 2010-2017 and ranking of regions according to the national average from 2010-2017

<table>
<thead>
<tr>
<th>Regions</th>
<th>KEDOUGOU</th>
<th>ZIGUINCHOR</th>
<th>KOLDA</th>
<th>LOUGA</th>
<th>SEDHIOU</th>
<th>SAINT-LOUIS</th>
<th>THIES</th>
<th>DAKAR</th>
<th>DIOURBEL</th>
<th>MATAM</th>
<th>KAFFRINE</th>
<th>TAMBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average 2010-2017 %</td>
<td>52.4</td>
<td>46.2</td>
<td>44.2</td>
<td>43</td>
<td>43</td>
<td>41</td>
<td>40.5</td>
<td>36.9</td>
<td>33.5</td>
<td>31.5</td>
<td>31.3</td>
<td>29.8</td>
</tr>
<tr>
<td>Rank</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>

National average is 38%.

3- Status of breastfeeding combined with the practice of giving water to children aged 6 to 59 months

a- At the national level

The practice of giving water affects an average of four (4) infants out of 10 and constitutes the major obstacle to AME. (See figure 3.)

b- At the regional level

Marked variations in the prevalence of breastfeeding associated with the practice of giving water are observed within regions over time and between regions (Table 2). Each region has a specific profile

Although a common practice across all regions of Senegal, regional time series of the practice of giving water to infants under six months of age in addition to breast milk show that Matam, Tambacounda, Saint Louis, Sédhiou, Louga, Kaffrine, Fatick, Kaolack, and Diourbel are the priority regions for any intervention to reduce this practice.

2. Predictive factors for exclusive breastfeeding

a- Predictive factors of AME and maternal and community determinants

Three (3) socio-demographic factors clearly identify the women most at risk of not practicing exclusive breastfeeding. These are the mother's age at delivery, ethnicity, and the mother's level of education.

Indeed, the rate of exclusive breastfeeding increases progressively with the mother's age. Adolescent mothers are less likely to practice AME than older, more experienced mothers. Mothers aged 35-48 years were 3.2 times more likely to practice AME than teenage mothers. (p <0.001.)

Exclusive breastfeeding was less prevalent among Wolof and Serer mothers (33.8%) than among Manding/Socé mothers (50.1%) (P=0.015).

 Mothers with two or more children were 45% less likely to practice AME than primiparous mothers (P<0.001).

Women with primary school education were more likely to breastfeed exclusively than women with no schooling (52.64% versus 37.02%). (P<0.001).

b- Predictive factors of AME and health system determinants

Children who had contracted illnesses in the two weeks preceding the survey, such as diarrhea, fever, or cough/cold, were 53% less likely to be exclusively breastfed than children who had not been sick. Indeed, the rate of exclusive breastfeeding among children who had not been sick during the two weeks preceding the survey was 47.38% versus 31.07% for the others (P<0.001). Another no less important factor positively affecting the practice of exclusive breastfeeding is early initiation of breastfeeding. The rate of AME was 47.2% for infants who received MSP versus 39.1% for others (P=.007). Mothers who reported receiving breastfeeding counseling two days after delivery were 40% more likely to breastfeed exclusively for up to six months than those who did not. (P= 0.003) Breastfeeding counseling and support is critical to improving breastfeeding practices, mothers were 1.4 times more likely to practice AME if they received postpartum breastfeeding counseling. (P=0.001) And finally, women using modern contraceptives were 0.6 times less likely to practice exclusive breastfeeding than women not using contraceptives (p=000).

3-Factors related to the practice of giving water to infants under six months of age

a- Predictive factors related to the practice of giving water to infants under six months of age and maternal and community determinants

Giving water to infants under six months of age in addition to breast milk persists in infant and young child feeding practices in Senegal. The results of the situational analysis showed that:


b- Predictive factors related to the practice of giving water to infants under six months of age and health system determinants

Access to key health services, including prenatal care and breastfeeding counseling, reduces the likelihood of giving water to infants less than six months old. Mothers who had fewer than four Pre-Natal Consultation visits were 1.4 times more likely to give water to infants younger than six months of age than mothers who had four or more ANC visits (P=0.006). Mothers who received postpartum breastfeeding counseling were 30% less likely to give water to infants <6 months of age than mothers who did not receive breastfeeding counseling (P=0.001). Water was often given to sick infants, and infants younger than 6 months of age were 1.5 times more likely to receive water if they had been sick in the past 2 weeks compared with infants who had not been sick (P=0.0054).

V- DISCUSSION

Breastfeeding contributes to the health of the child and the mother [28,29]. Today, the benefits of breastfeeding are well documented in the literature and its protective effect depends on its duration and exclusivity [28]. It is thought to promote growth and development of the child and to help reduce the incidence and severity of infectious diseases such as pneumonia and gastroenteritis. However, to achieve these benefits, it is recommended that children be exclusively breastfed for at least the first six months of life. In 2016, globally, only 43% of children under six months of age were exclusively breastfed [29]. This rate is highest in South Asia (59%) and East Africa (57%); it is much lower in Latin America, and the Caribbean (33%), East Asia (28%), West Africa (25%) and West Asia (21%). [30] The Lancet series on breastfeeding, published in 2016, highlighted the multifactorial determinants of breastfeeding and emphasized the need for sustained interventions, simultaneously, through various channels [31]. Senegal is below WHO standards for exclusive breastfeeding during the first six months of childhood. Over the past decade, exclusive breastfeeding has remained suboptimal for more than half of the infants under six months of age in Senegal. Exclusive breastfeeding has evolved in recent years, however, efforts are still needed to enable the majority of infants to benefit from this practice and for the country to reach the 2015 global target that would like all countries to be at least 50% [32]. In 2019, in Senegal, the rate dropped to 41%, further widening the gap towards the global target of at least 50% by 2025 [21]. In addition, we note a disparity between regions. The regions of Kaolack, Fatick, Tambacounda, Kaffrine, Matam and Diourbel are below the national average. [19]. Thus, in the challenge of achieving equitable development outcomes for all of Senegal’s children, these regions become priorities for any breastfeeding promotion, protection and support program. The prevalence of exclusive breastfeeding in Senegal is lower than in Burundi, Eritrea, Kenya and Uganda, which are among the champions of the continent, with rates above 60%. However, Senegal has higher rates than Côte d'Ivoire (12%) or Nigeria (17%) [33]. These low rates of exclusive breastfeeding could be explained by insufficient communication with mothers and the invasion of the media by advertisements for breast milk substitutes. One study showed that more than half (51%) of parents and pregnant women are exposed to aggressive marketing of breastmilk substitutes [34]. Our results showed that adolescent mothers are less likely to practice AME than older, more experienced mothers. This corroborates the findings of Rose, Verlyn, Warrington, et al. 2004, who showed that there is a positive correlation between maternal age and breastfeeding rate. [35] Adolescent modesty, body image, and misconceptions about the quality and quantity of breast milk that circulate about breastfeeding are thought to play an important role in the choice of formula feeding. [36]. Misconceptions were related to beliefs about poor quality colostrum and breast milk, and doubts about the quantity or quality of breast milk available to teenage mothers to meet their babies’ needs, leading them to give water or other liquids or foods. In contrast to our results, a study in Côte d'Ivoire showed that age had no statistically significant relationship with exclusive breastfeeding practice. [37] Our study also showed that ethnicity has an impact on the probability of practicing AME. However, the study conducted by Alive & Thrive and UNICEF on actors influencing exclusive breastfeeding and other infant feeding practices during the first six months of life in West and Central Africa did not show an association with ethnicity [27]. The probability of exclusive breastfeeding was higher among women with primary education than among women without primary education (52.64% versus 37.02%). This corroborates the results of Alive & Thrive and UNICEF which showed that higher maternal education was positively associated with exclusive breastfeeding practices. Mothers' perception of the benefits of breastfeeding was positively associated with exclusive breastfeeding. [27] This tends to differ from what has been the reality in developing countries for many years, where newborns of illiterate mothers were 1.9 times more likely to be breastfed than those whose mothers had completed seven years of education [38].

Our study showed that primiparous mothers were more likely to practice AME unlike Traore in Mali who found no association between parity and exclusive breastfeeding practice and Coulibaly in Côte d'Ivoire found that only 33.51% of primiparous mothers practiced exclusive breastfeeding[37, 39] . Access to quality health care services supports exclusive breastfeeding. Mothers who received postpartum breastfeeding counseling were 30% less likely to give water to infants under six months of age than mothers who did not receive breastfeeding counseling. Breastfeeding counseling and support are critical to improving breastfeeding practices-mothers were 1.4 times more likely to practice AME if they received postpartum breastfeeding counseling. This finding is corroborated by other authors who point out in the literature that professional support has a positive impact in breastfeeding mothers [40]. In the same sense, the Pan American Health Organization, 2013, [41] mentions the importance of support in pregnant and breastfeeding mothers. Support from health professionals is a key factor in successful breastfeeding [42]. Indeed, support received at three days of life is associated with continued breastfeeding [43]. Beake S. et al report that a structured breastfeeding support program has a positive effect on breastfeeding rates [44]. Also in Mali, a study found that counseling during pregnancy and postpartum played a protective role on AME (OR = 0.64). [39]. It is important that professionals are willing to discuss with parents and do not put pressure on them to make an informed choice about how to feed their child. In general, prenatal and postnatal care present opportunities to counsel pregnant women and mothers about the importance of breastfeeding, especially AME up to six months. The first month of a child's life is a time when breastfeeding may be abandoned. Professionals must therefore be vigilant in identifying mothers at risk of weaning and be attentive in guiding them through their first maternity experience. Furthermore, regarding breastfeeding support interventions, according to the National Agency for Health Accreditation and Evaluation (NAHAE) 2002, [45], any form of support offered to mothers in the postnatal period decreases the risk of discontinuing exclusive breastfeeding until...
According to interviews conducted by Séménick, Groleau, Rodriguez, Gray-Donald, Bell, 2012, [46], encouraging breastfeeding without providing a minimum of support during the postnatal period places mothers in a situation of failure with regard to their breastfeeding and decreases their sense of maternal competence. Beliefs about feeding a sick child are a major barrier to AME. Sick children were 53% less likely to be exclusively breastfed than children who had not been sick. This result is consistent with that of Traoré M. in Mali who found that the number of episodes of illness experienced by the child (p < 0.0005), were associated with discontinuation of the AME within six months [39].

Mothers’ perception of the benefits of breastfeeding was positively associated with exclusive breastfeeding. However, in some countries, women who thought they were practicing exclusive breastfeeding were not actually doing so. This was related to poor maternal understanding of what “exclusive” breastfeeding means and how long it should last[47,48]. Despite the universality of breastfeeding in Senegal (98% of infants are breastfed), its exclusive nature is undermined by the practice of giving water to infants under six months of age. In Senegal, water is routinely given to breastfed infants under six months of age, regardless of their age, based on the belief that breast milk is thirsty despite its liquid consistency. In fact, despite efforts to promote AME by the government of Senegal supported by its technical and financial partners, the rates of giving water in addition to breast milk have remained below the national target from 2010 to 2019. It is estimated that if water was not given, 80% of infants would be exclusively breastfed, allowing Senegal to far exceed the global target of 50% by 2025 set by the WHA. However, the persistence of the practice of giving water to children under six months of age is evidence of its entrenchment in social norms and socio-cultural practices. Water is given from birth and during the first six months of life for various cultural, religious, or environmental reasons. Indeed, a study conducted in 2015 by ADEMAS [49], demonstrated that the recommendation not to give water before six months does not convince most mothers. In the collective consciousness, breast milk cannot both feed and hydrate the child and it is unthinkable not to give water to infants: “It is not possible for the child to live for six months without drinking water”. Moreover, the belief is shared by the whole community: husbands, elderly women, and village chiefs... “. After 2 to 3 months, I advise my wife to give water to the child because, I think that after 2 months, the milk no longer has enough water to quench the child's thirst” interview man Kédougou[50].

CONCLUSION

Breastfeeding is crucial to a child's nutrition, health and well-being throughout life. Breastfeeding is essential to give every child the best start in life. Breastfeeding is a smart investment in a country's health and human capital, as it lays the foundation for good health in newborns and young children. This situational analysis provided a better understanding of the predictive and programmatic factors of exclusive breastfeeding. Senegal has extensive experience in breastfeeding policies and programs. Since 1991, the country has adhered to declarations, adopted international recommendations, and implemented breastfeeding programs. In spite of all these efforts made by the government and its partners, rates are still low due to various social, environmental and political factors.

Breastfeeding practices are limited by various social and behavioral factors such as ecological zone, ethnic group, use of holy water (tokental), age of the mother, and level of education of the mother, as well as other social, behavioral and environmental factors. Addressing this practice requires the design and implementation of innovative evidence-based interventions targeting different levels of the social-ecological model (individuals, families, communities, and public policy).

Abbreviations

DHS
Demographic and Health Surveys
GDP
Gross Domestic Product
HDI
Human Development Index
NAHAENational Agency for Health Accreditation and Evaluation
RGPHAEGeneral Census of Population and Housing, Agriculture and Livestock
UNICEF
United Nations Fund
UPS
Primary Survey Units
WHO
World Health Organization

Declarations

Author Contributions

All authors made substantial contributions to the design, data acquisition, analysis, and interpretation of the data. They participated in the writing of the article and critically reviewed it for important scientific content. They agreed to submit it to the current journal and gave final approval to the version to be published.

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Availability of data and materials

The research team will have access to all data. All data generated or analyzed during this study are included in the article. The DHS data used are available from the DHS Program STAT compiler database. (The DHS Program STATcompiler. Funded by USAID. http://www.statcompiler.com.)

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Ethical approval and consent to participate

The National Ethics Committee for Health Research (CNERS) of the Ministry of Health of Senegal approved the survey protocol. For the DHS 2017: SEN17/09 "Continuous Demographic Health Survey (DHS Continuous, 2017)" : Date and number of the notice: 03/04/2017 n°35. Informed consent was obtained from respondents. The informed consent form signed by the respondent is kept confidential. No form of financial or material incentive or compensation was given to respondents. All methods were applied in accordance with the relevant guidelines and regulations in force and the Declaration of Helsinki.

Informed Consent for Minors' Participation

An information letter and informed consent form were offered to all parents or guardians of participants under the age of 16. The information letter provided all the information needed to understand and make a decision to participate. The consent form informed signed by the parent or guardian is kept confidential. No form of incentive or financial or material compensation was given to participants.

Consent to publish

Not applicable

Competing Interests

There are no conflicts of interest between the authors.

Authors details

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Table 2

Table 2 is available in the Supplementary Files section.

Figures

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<thead>
<tr>
<th>Evolution of exclusive breastfeeding practice according to the DHS from 2010 to 2019 at the national level</th>
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Figure 1
Evolution of exclusive breastfeeding practice according to the DHS from 2010 to 2019 at the national level.

Figure 2
Trends in Exclusive Breastfeeding Practices at the Regional Levela (EDS, 2010)

Breastfeeding combined with the practice of giving water to infants under 6 months of age

Figure 3
Breastfeeding combined with the practice of giving water to infants under 6 months of age

Supplementary Files
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- Table2.docx