



# **Evaluation of Exclusive Breastfeeding Practices among Mothers of Children Aged 0 to 59 Months in the Rural Commune of Sinder, Tillabery, Niger**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## ABSTRACT

Feeding practices play a major role in the nutritional status of children (WHO/UNICEF, 2009). The objective of this study was to evaluate the practice of exclusive breastfeeding among mothers of children aged 0 to 59 months in the rural commune of Sinder. This is a cross-sectional descriptive study, which involved a representative and random sample of mothers of children aged 0 to 59 months. A questionnaire was completed through a structured interview. The data were collected with ODK software then analyzed with SPSS and Epi Info version 7.2 software. A total of 250 mother/child couples were enrolled. About 58% of newborns receive breast milk as their first food and 42% received pre-lacteal fluids. The majority of children are put to the breast early, including 55.2% immediately after birth and 34.4% within the next 24 hours, but 10.4% wait more than 24 hours. 66.4% of mothers say they have been made aware of EBF practices by health workers and 33.6% by those close to the mother. Around 37% of mothers say they do not believe in the nutritional and health benefits of EBF. Only 44% of infants receive EBF up to 6 months. The average duration of EBF is  $4.4 \pm 2.77$  months. Among children receiving other foods in addition to breast milk before their sixth month, 56% receive water, 32.8% receive a herbal decoction, 45.6% take family meals, 50.4% drink the porridge. The practice of EBF in the rural commune of Sinder is suboptimal.

*Keywords: Colostrum; exclusive breastfeeding; Infants; nutrition; rural commune; Sinder.*

## 1. INTRODUCTION

Feeding practices play a major role in the nutritional status of children [1]. Inadequate feeding practices among young children are immediate causes of the high prevalence of malnutrition in this age group [2]. Due to its importance, the feeding practice that receives particular attention is that of breast-feeding. Breast milk is, in fact, an essential food for the optimal growth of infants and young children; it constitutes the exclusive source of nutrients and micronutrients in children under 6 months of age. In addition to its nutritional aspect, breast milk contains many non-nutritional bioactive constituents which play an important role in the survival and health of the infant and which a newborn needs to grow healthy and vigorous [3]. It contains numerous growth factors that exert major effects on the intestinal tract, vascular system, nervous system, and endocrine system [4]. It also contains a variety of immunocompetent cells including T cells, stem cells and lymphocytes [4,5]. Mature woman's milk contains oligosaccharides indigestible by the newborn [6], which are essential for the growth and development of beneficial intestinal bacteria [7,8]. In Niger, malnutrition problems begin early in life, mainly during the first two years. Indeed, feeding practices among infants and young children are not the best in Niger and constitute, with morbidity, one of the determining factors in the nutritional status of children [9]. The objective of this study was to evaluate the practice of exclusive breastfeeding among mothers of

children aged 0 to 59 months in the rural commune of Sinder [10-12].

## 2. METHODOLOGY

### 2.1 Study Framework

The study was conducted in the rural commune of Sinder, an island commune on the Niger River. It covers an area of 300 km<sup>2</sup> and is made up of around fifty islands. It is located in the Tillabéry region (15°2'27"N 2°42'18"E), one of the eight (8) regions of Niger. Twelve (12) villages were the subject of this study by random draw.

### 2.2 Type, Period and Duration and Population of the Study

This is a descriptive cross-sectional study with two passages. The 2 visits to the study area were carried out just after the harvests (October-December) and during the lean period (June-August) of the year 2021. Questionnaires relating to the perception and practice of Exclusive breastfeeding was administered to all study participants.

### 2.3 Data Collection and Processing

The ODK Open Data Kit software (<https://opendatakit.org>) was used for data collection and processing was carried out with SPSS software (version 28.0) IBM Corp. Released 2021. IBM SPSS Statistics for

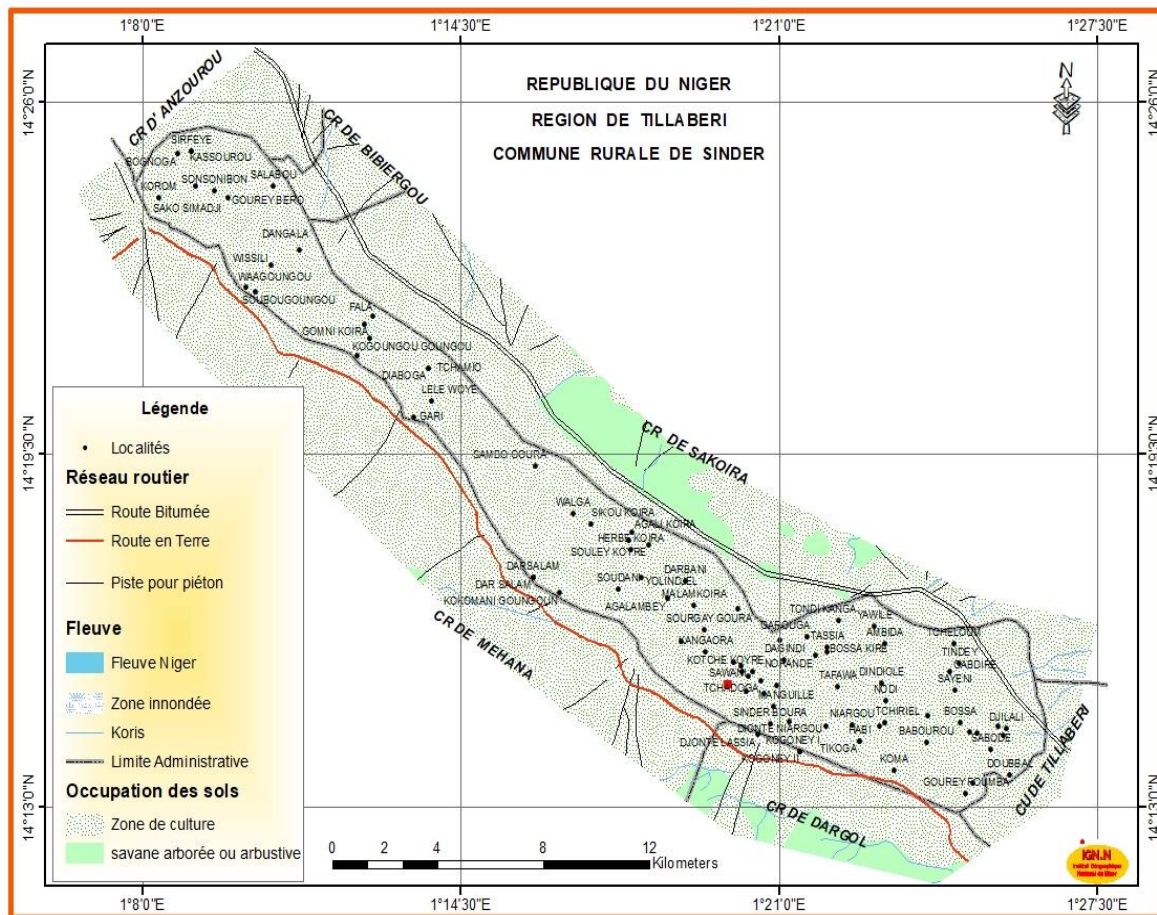


Fig. 1. Map of the rural commune of Sinder (IGNN, 2021)

Windows, Version 10. Armonk, NY: IBM Corp and Epi info software version 7.2. Atlanta Center for Disease Control and Prevention (CDC), United States in collaboration with the World Health Organization (WHO) free software tools for public health practitioners and researchers worldwide.

## 2.4 Sampling

The minimum household size  $n$  which will ensure a level of confidence  $\alpha$  will be determined by the following formula:

$$n = z\alpha^2 p(1-p) / \text{deff}/i^2 \text{ (Schwartz, 1960).}$$

$$n = 1.96^2 \times 0.09(1-0.09) \times 1.5 / 0.05^2$$

$n = 188.77$  so the minimum size  $n$  of our sample is 189.

For this work we collected a sample of 250 children aged between 0 and 59 months.

## 3. RESULTS

### 3.1 Economic and Socio-Demographic Characteristics of the Mother/Guardian of the Child

The study involved 250 mothers and their children aged 0 to 59 months. The economic and socio-demographic characteristics of the mothers are reported in Table 1. The age of the mothers is between 15 and 53 years old with an average age of  $28.49 \pm 3.88$  years and the dominant age group is 15 - 25 years old 42.4%. Married mothers are 96.4%; widows and divorcees represent 3.6%. The Wogos constitute 80.4% of the population, followed by the Haussas (11.6%) and the Peuls and Tuaregs (8.8%). Around 68.8% are out of school, 19% have a primary level and 12.4% have a secondary or higher level. Around 58% of mothers are unemployed and 28.4% work in small businesses or crafts. Primiparous represent 12%, biparous 16.8% and multiparous 71.2%. 62% of deliveries took place in health centers and 38% at home.

**Table 1. Economic and socio-demographic characteristics of the mother/guardian of the child**

Parameters	Pourcentage (%)	Numbre (N)
<b>Age</b>		
Maximum	53	
Minimum	15	
Average	28.49 ± 3,88	
<b>Age groups</b>		
15 to 24	36	90
25 to 34	37.2	93
35 to 53	26.8	67
<b>Marital status</b>		
Married	96.4%	241
Divorced / Widower	3.6%	9
<b>Ethnic group of the mother</b>		
Wogo	80.4	201
Peul/ Touareg	8.8	22
Haoussa	11.6	29
<b>Level of education</b>		
unschooled	68.8%	172
Primary	18.8%	47
Secondary + higt level	12.4%	31
<b>Profession</b>		
Unemployed	58%	145
Agriculture / livestock	6%	15
Casual work / Daily work / Civil servant	7.6%	19
Trader / Crafts	28.4%	71
<b>Parity</b>		
Primiparous	12%	30
Biparous	16.8%	42
Multiparous	71.2%	178
<b>Place of birth</b>		
Health center	62%	155
Home	38%	95

Table 2 presents the practice of exclusive breastfeeding (EBF) in the study area. About 58% of newborns receive breast milk as their first food, 18.8% simple, sweetened or holy water, 10.8% goat's milk, 8.5% chewed date juice and 3.6% an artificial milk formula. The majority of children are put to the breast early, including 55.2% immediately after birth and 34.4% within the next 24 hours, but 10.4% wait more than 24 hours. Within 72 hours of birth, all newborns have been breastfed but only 50% continue to be fed exclusively with breast milk. Among newborns not exclusively breastfed, approximately 11% received goat or sheep milk and 39% other additional foods to breast milk.

With regard to mothers' awareness of exclusive breastfeeding (EBF) practices, 66.4% reported they have been made aware of EBF practices by health workers and 33.6% by the mother's entourage. Around 37% of mothers say

they do not believe in the nutritional and health virtues of EBF. The reasons they give for stopping EBF are: the child is thirsty (8%), the mother's or child's illness (4.8%), the child t cries a lot because he is hungry and breast milk alone does not satisfy him (11.2%) and finally the perception of insufficient milk (13.2%). Only 44% of infants receive EBF up to 6 months in accordance with international recommendations. The average duration of EBF recorded is 4.4± 2.77 months. Among children receiving other foods in addition to breast milk before their sixth month, 56% receive water, 32.8% receive a herbal decoction, 45.6% take family dish, 50.4% drink porridge and around 12% take dairy products.

### 3.2 Factors Influencing the Practice of EBF

Mothers in the age group of 25 to 34 years gave relatively more maternal colostrum as the first

food to their babies (67%), followed by mothers over 35 years old (61%) and mothers aged 15 to 34 years (47%) but the difference is not significant ( $p=0.15$ ). Mothers not in school were the most likely to give their infants first breast milk (64%), followed by mothers at primary level (47%) and those at secondary/higher level (42%), the difference is significant ( $p=0.0035$ ).

All mothers practicing agriculture and livestock, 68.5% of mothers having daily, casual or civil servant work, 59.3% of unemployed mothers and 43.37% of mothers working in commerce and crafts gave colostrum as the first food to their newborns. The difference is very significant ( $p=0.000$ ). A significant association was found between parity ( $p=0.003$ ), advice given to mothers on the practice of EBF ( $p=0.0001$ ), place of delivery ( $p=0.000$ ) and giving colostrum to the newborn as the first food. Thus 60% of primiparous and multiparous mothers gave colostrum as their first food compared to 52.4% of biparous mothers. Likewise, 65% of mothers who received information on EBF from health workers gave colostrum compared to 44% of uninformed mothers. Finally, 74% of mothers who gave birth in health centers gave colostrum compared to 31.5% of those who gave birth at home. On the other hand, there is no significant association between status and the fact of giving colostrum as the first food ( $p = 0.91$ ) even if widowed or divorced mothers (89%) gave relatively more colostrum than married mothers (57%).

Table 4 shows that the age of the mother is not a predictor of early breastfeeding ( $p = 0.35$ ), even mothers in the age group of 15 to 24 years gave the breast relatively more immediately after childbirth 61.11%. After 24 hours, breastfeeding was approximately 90% among mothers under 35 and 87% among those 35 and over. Breastfeeding immediately after childbirth increases significantly when the mother's level of education increases ( $p=0.014$ ). Breastfeeding immediately after childbirth was more frequent among mothers with secondary and higher education (67.74%) but also it is among these mothers that we find the largest fraction who do not give the breast within 24 hours (13%). The mother's profession has a significant influence on early breastfeeding ( $p=0.005$ ). After 24 hours, breastfeeding varies from 68% (casual/daily/civil servant work) to 85% (commerce and crafts). Approximately 90% of multiparous women, 81% of biparous women and only 60% of primiparous

women put their infants to the breast within 24 hours after birth. However, there is no significant association between parity and early breastfeeding ( $p=0.11$ ). There is also no significant association between marital status and early breastfeeding ( $p=0.15$ ). Certainly, divorced and widowed mothers breastfed their children more after birth than cohabiting mothers (88.89% compared to 53.53%) but the frequencies are the same after 24 hours, around 90%. Mothers who were made aware of the practice of EBF by health workers were those who put their infants immediately to the breast the most, compared to those who were not made aware (59.04% versus 47.62%), likewise they were the ones who breastfed much more in the 24 years after birth 91.57% and 85.72%, respectively. The difference is significant ( $p=0.048$ ). Likewise, early breastfeeding after birth was more frequent among mothers who gave birth in health centers compared to those who gave birth at home ( $p=0.000$ ).

Table 5 presents the practice of EBF according to the sociodemographic and economic profile of mothers and guardians of children. Around 57% of biparous and 48% of primiparous but only 21% of multiparous practice EBF up to 6 months. However, the difference does not reach the threshold of significance ( $p=0.088$ ). The level of education is also not a predictor of EBF practice ( $p=0.63$ ), just like parity ( $p=0.37$ ) and marital status ( $p=0.097$ ). However, the trends show that mothers at secondary + higher level (48.39%) practice EBF more than non-schooled mothers (44.76%) and those at primary level (38.29%). Around 50% of biparous mothers practice at EBF compared to 44% of multiparous mothers, 44% and 37% first-time mothers. Regarding marital status, 45% of married mothers and 11% of widowed or divorced mothers practice EBF for up to 6 months. The profession ( $p=0.004$ ), information on EBF ( $p=0.000$ ) and place of delivery ( $p=0.001$ ) of mothers are, however, significantly associated with the practice of EBF. Depending on the profession, it is farmers and breeders who practice EBF the most up to 6 months (80%) while mothers doing casual work/day laborers/ or civil servants practice it the least (16%). Likewise, 47% of mothers who received advice from health workers practice EBF for up to 6 months compared to 38% among those who did not receive it. Finally, the practice of EBF is 55.26% among mothers who gave birth in a health center and 30.53% among those who gave birth at home.

**Table 2. Practice of exclusive breastfeeding from 0 to 6 months**

<b>Parameters</b>	<b>Percentages</b>	<b>Numbres</b>
First food received after birth		
Breast milk colostrum alone	58	145
Artificial milk	3,6	9
Pure water	8	20
Simply sweetened water	5.2	13
Holy water	5.6	14
Chewed dates	8.8	22
Goat milk	10.8	27
<b>Time taken by the mother before giving the breast</b>		
Immediately after birth	55.2	138
In the hours following birth	34.4	86
24 hours or more after birth	10.4	26
<b>Feeding the child during the three days following birth</b>		
Breast milk (colostrum) alone	50	125
Breast milk + something else: ( <i>Djitti</i> , Artificial milk Pure water, Sweet water, Holy water).	39.2	98
Goat or sheep milk	10.8	27
<b>Sources of information for mothers on the need to practice EBF</b>		
Health workers (nurses, midwives)	66.4	166
The mother's entourage (mother-in-law, grandmother, mothers, marabouts, husband, etc.)	33.6	84
<b>Mothers' belief in EBF</b>		
Yes	62.8	157
No	37.2	93
<b>Mothers' reasons for not believing in EBF</b>		
The child is thirsty	8	20
Illness of mother or child	4.8	12
The child cries a lot, he is hungry, does not get enough	11.2	28
The mother does not have enough milk	13.2	33
<b>EBF practice</b>		
No	56	140
Yes	44	110
<b>Average EBF duration 4.4±2.77 months</b>		
<b>Median duration of EBF = 4.9 months</b>		

Parameters	Percentages	Nombres
<b>Number of feedings per 24 hours</b>		
<8	64.8	162
≥8	35.2	88
<b>Children receiving other food in addition to breast milk before 6 months</b>		
<i>Djitti</i> and water	8	20
Family dish and water	9.6	24
Porridge and water	8.4	21
Dairy products and water	4.8	12
Child having received the combination of these foods	25.2	63

Table 3. first food of the infant after birth according to social characteristics and information on the practice of EBF of mothers

Parameter	First food of the newborn after birth							Total	Probability
	Colostrum alone	Chewed dates	Holy water	Pure water	Sugared water	Artificial milk	Goat's milk		
<b>Age</b>									
15 to 24	46.67(42)	15.56(14)	10(9)	13.33(12)	4.44(4)	2.22(2)	7.78(7)	100(90)	0.15
25 to 34	66.67(62)	6.45(6)	4.3(4)	3.23(3)	5.38(5)	3.23(3)	10.75(10)	100(93)	
35 to 53	61.2(41)	3(2)	1.49(1)	7.46(5)	5.97(4)	5.97(4)	14.93(10)	100(67)	
<b>Level of education</b>									
None	63.95(110)	5.81(10)	5.23(9)	6.39(11)	4.65(8)	2.91(5)	11.04(19)	100(172)	0.0035
Primary	46.8(22)	14.89(7)	2.13(1)	14.89(7)	4.26(2)	6.39(3)	10.64(5)	100(47)	
Secondary/ higher	41.94(13)	16.13(5)	12.9(4)	6.45(2)	9.68(3)	3.23(1)	9.68(3)	100(31)	
<b>Profession</b>									
Unemployed	59.31(86)	6.21(9)	0	9.66(14)	0	6.21(9)	18.62(27)	100(145)	0.000
Agriculture/ Livestock	100(15)	0	0	0	0	0	0	100(15)	
Daily/casual/civil servant work	68.42(13)	0	10.53(2)	21.05(4)	0	0	0	100(19)	
Trader/ crafts	43.37(31)	18.31(13)	16.9(12)	2.82(2)	18.31(13)	0	0	100(71)	
<b>Parity</b>									
Primiparous	60(18)	0	10(3)	16.67(5)	6.67(2)	0	6.67(2)	100(30)	0.003
Biparous	52.38(22)	11.90(5)	9.52(4)	2.38(1)	7.14(3)	11.90(5)	4.76(2)	100(42)	
Multiparous	59(105)	9.55(17)	3.93(7)	7.87(14)	4.49(8)	2.25(4)	12.92(23)	100(178)	

Parameter	First food of the newborn after birth						Total	Probability	
	Colostrum alone	Chewed dates	Holy water	Pure water	Sugared water	Artificial milk			Goat's milk
<b>Information of mothers on EBF</b>									
Oui	65.06(108)	9.04(15)	1.81(3)	7.83(13)	4.82(8)	0.6(1)	10.84(18)	100(166)	0.0001
Non	44.05(37)	8.33(7)	13.1(11)	8.33(7)	5.95(5)	9.52(8)	10.71(9)	100(84)	
<b>Marita status</b>									
Mariées	56.85(137)	9.13(22)	5.81(14)	8.3(20)	5.39(13)	3.73(9)	10.79(26)	100(241)	0.91
Divorcées/ Veuves	88.89(8)	0	0	0	0	0	11.11(1)	100(9)	
<b>Place of birth</b>									
Health center	74.19(115)	9.03(14)	1.29(2)	4.52(7)	3.87(6)	5.81(9)	1.29(2)	100(155)	0.000
Home	31.58(30)	8.42(8)	12.63(12)	13.68(13)	7.37(7)	0	26.32(25)	100(95)	

The number in parentheses indicates the number of mothers

**Table 4. Distribution of the time taken to breastfeed after birth according to the social characteristics of the mothers and information on the practice of EBF of the mothers**

Paramètres	I %(N)	II %(N)	III%(N)	Total	Probabilité (p)
<b>Age</b>					
15 - 24	61.11(55)	30(27)	8.89(8)	100(90)	0.35
25 - 34	51.61(48)	38.71(36)	9.68(9)	100(93)	
35 - 53	52.24(35)	34.33(23)	13.43(9)	100(67)	
<b>Level of education</b>					
un schooled	50.58(87)	39.53(68)	9.9(17)	100(172)	0.014
Primary	63.83(30)	25.53(12)	10.64(5)	100(47)	
Secondary et higher level	67.74(21)	19.35(6)	12.90(4)	100(31)	
<b>Profession</b>					
unemployed	52.41(76)	26.21(38)	21.38(31)	100(145)	0.005
Agriculture/ livestock	33.33(5)	40(6)	26.67(4)	100(15)	
Casuel work/daily work/ Civil servants	42.11(8)	26.32(5)	31.58(6)	100(19)	
Trader / crafts	52.11(37)	33.8(24)	14.08(10)	100(71)	
<b>Parity</b>					
Primiparous	30(9)	30(9)	40(12)	100(30)	0.11
Biparous	35.71(15)	45.23(19)	19.04(8)	100(42)	



Paramètres	I %(N)	II %(N)	III%(N)	Total	Probabilité (p)
Multiparous	60.67(108)	29.78(53)	9.55(17)	100(178)	
<b>Information of the mothers on EBF</b>					
Yes	59.04(98)	32.53(54)	8.43(14)	100(166)	0.048
No	47.62(40)	38.1(32)	14.28(12)	100(84)	
<b>Marital status</b>					
Married	53.53(129)	35.68(86)	10.79(26)	100(241)	0.15
Divorced + widowed	88.89(8)	00	11.11(1)	100(9)	
<b>Place of birth</b>					
Health center	71(110)	19.35(30)	9.68(15)	100(155)	0.000
Home	29.47(28)	59(56)	11.57(11)	100(95)	

The number in parentheses indicates the number of mothers %(N). I: Immediately; II: During the first 24 hours; III: Beyond 24 hours

**Table 5. Practice of EBF according to the sociodemographic and economic profile of mothers and guardians of children**

Parameter	EBF practice %(N)		Total %(N)	Probabilité (p)
	Yes	No		
<b>Age</b>				
15 à 24	47.78(43)	52.22(47)	100 (90)	<b>0.088</b>
25 à 34	57(53)	43(40)	100 (93)	
35 à 53	21(14)	79(53)	100 (67)	
<b>Education level</b>				
un schooled	44.76(77)	55.23(95)	100(172)	<b>0.63</b>
Primary	38.29(18)	61.7(29)	100(47)	
Secondary+ higher	48.39(15)	51.61(16)	100(31)	
<b>Profession</b>				
unemployed	41.38(60)	58.62(85)	100(145)	<b>0.0042</b>
Agriculture/ livestock	80(12)	20(3)	100 (15)	
Work (casuel, daily, civil servants)	15.79(3)	84.21(16)	100 (19)	
Trader/ crafts	49.29(35)	50.70(36)	100 (71)	
<b>Parity</b>				
Primiparous	36.67(11)	63.33(19)	100(30)	<b>0.37</b>
Biparous	50(21)	50(21)	100(42)	
Multiparous	43.82(78)	56.18(100)	100(178)	
<b>Information of the mothers on EBF</b>				

Parameter	EBF practice %(N)		Total %(N)	Probabilité (p)
	Yes	No		
Yes	47(78)	53(88)	100(166)	<b>0.000</b>
No	38.1(32)	61.90(52)	100(84)	
<b>Marital status</b>				
Married	45.23(109)	54.77(132)	100(241)	<b>0.097</b>
Divorced/ widowed	11.11(1)	88.89(8)	100(9)	
<b>Place of birth</b>				
Health center	55.26(81)	47.74(74)	100(155)	<b>0.001</b>
Home	30.53(29)	69.47(66)	100(95)	

## 4. DISCUSSION

### 4.1 Economic and Socio-Demographic Characteristics

During the present study, the age of mothers ranged from 15 to 53 years and the dominant age group was 25 to 34 with 37.2%. These results are consistent with previous observations which reported an age of mothers between 15 and 55 years with a predominance of the age group between 25 and 34 years [13,14]. Mothers were 96.4% married, widows and divorcees represented 3.6% [15]. In this study, 68.8% of mothers are not educated, 18.8% of mothers have primary education and 12.4% have secondary and higher education. Generally speaking, the level of education of the Nigerien population remains one of the lowest in the world, particularly with regard to women [16]. A study done in Ethiopia reported that 48.2% of mothers are not in school; 35.2% have primary level and 16.6% of mothers have secondary or higher level [14].

### 4.2 Exclusive Breastfeeding Practices

#### 4.2.1 First food

Breast milk is an irreplaceable food for the newborn, in fact it contains all the nutrients necessary for the proper development and optimal growth of the child during its first six months of existence [17]. In this study, maternal colostrum was given to 58% of newborns as their first food. According to the report of the demographic, health and multiple indicator survey in Niger, 49% of newborns received food before being breastfed and that this practice depends on the environment of residence since it concerns 51% of children in rural areas compared to 38% in urban areas [11]. During a study carried out in the Agadez region of Niger, mothers administered to their newborns, immediately after birth, a mixture of lemon and sugar which is supposed to relax their nerves [18]. In the United States, among Muslims, shortly after birth and preferably before the first feeding, a small piece of chewed date is introduced into the baby's mouth by a family dignitary followed by invocations in his favor [19].

#### 4.2.2 Early breastfeeding

Early breastfeeding, that is to say within the hour following birth, is an essential practice for the successful start of breastfeeding and late

breastfeeding would compromise the maintenance of exclusive breastfeeding for various reasons. including insufficient milk flow and difficulty for the newborn to latch on [20]. In general, the risk of neonatal death is 33% higher among newborns who were put to the breast 2 to 23 hours after birth, and more than twice as high among those for whom breastfeeding stopped. done a day or more after birth, compared to newborns who were put to the breast within the first hour after birth [21]. In this study, 55.2% of newborns were breastfed immediately after birth, 34.4% were breastfed within the first 24 hours after birth, and the remainder (10.4%) waited more than 24 hours before being breastfed. These results are similar to those of an earlier study carried out in the capital Niamey which reported that 48% of newborns were put to the breast within an hour of birth, 39% within 24 hours and finally 11% after 24 hours of birth [22]. In 2017, globally, authors estimated that 78 million newborns waited more than an hour before being put to the breast. In sub-Saharan Africa, authors have reported an early breastfeeding rate of 42.4% in Benin [23] and 73.3% in Mali [24].

#### 4.2.3 Practice of EBF up to 6 months

In the rural commune of Sinder, exclusive breastfeeding for up to 6 months is practiced by 44% of mothers. This rate is twice higher than the national average which was 23% in 2011 [11] and 21.1% in 2019 [25]. Generally speaking, in Africa, the practice of EBF, in several countries, is below WHO recommendations [26]. In Ethiopia, among mothers who practice EBF, 44.2% practice it until 6 months or beyond. The prevalence of EBF was 49% in 2005 and 52% in 2011 [27]. In Mali, according to data, the rate of EBF up to 6 months fluctuates between 20 and 33% [28,29]. The average duration of EBF in this study is  $4.4 \pm 2.77$  months. This average value is similar to that reported from Ethiopia (4.2 months) [30]. At 5 months already 56% of infants have been introduced to early dietary diversification. In Tunisia, 29% of mothers think that EBF should be practiced until 3 to 4 months and 20% beyond 4 months [31]. Still in Tunisia but in Monastir, only 8.1% of mothers declared having practiced EBF up to 4 months [32].

#### 4.2.4 Sources of information for mothers on the need to practice EBF

Around 66.4% of mothers declared having received information on the importance of EBF

during prenatal (CPN) and postnatal (CPON) consultations from health workers, including 37% from midwives, women and 29.4% from nurses. These results corroborate those found in a study carried out in France which states that 63.06% of parturients had followed birth preparation sessions and 57.65% had received information on breastfeeding on this occasion [33]. These also agree with the results found in Senegal which report that 59% of mothers had contacted health professionals as a source of information on the optimal practice of EBF [34]. However, 33.6% of mothers claim not to have received information on the need to practice EBF as recommended by the WHO from health personnel. These mothers received advice on practices and treatments for their babies from their mothers-in-law, grandmothers, marabouts, mothers, or their spouses. In a study carried out in Burkina Faso, the fact that some mothers do not receive information on the practice of EBF at the appropriate time from health workers is due to an organization of the health system that is not favorable to its implementation. implemented [35].

### 4.3 EBF Practices According to Economic and sociodemographic Characteristics

#### 4.3.1 Practice of EBF according to the age of the mother

**First food:** The mothers in the age group of 25 to 34 years (66.67%) gave maternal colostrum as the first food to their babies more than mothers aged 15 to 24 years (46.67%) and 35 to 53 years (61.2%). They are the least likely to give pre-lacteal fluid to their infants. However, there is no significant difference in the first food given to the newborn and the age of the mother ( $p=0.15$ ). In a study carried out in rural Pakistan, the authors reported a significant association ( $p=0.0001$ ) between colostrum donation and maternal age. Thus, 37.33% of mothers under 20 years old, 94.35% of mothers aged 21 to 40 years old and all mothers aged > 40 years old gave colostrum to their newborns instead of pre-lacteal foods [36].

**Early breastfeeding:** In this study, mothers aged between 15 and 24 years were more likely to introduce their newborns to early breastfeeding (61.11%) than other mothers. In Canada, a large majority of mothers under the age of 25, 81%, breastfed their babies immediately after birth [37]. A French study

shows that age is the most discriminating determinant for the initiation of exclusive breastfeeding [38].

**Practice of EBF up to 6 months:** According to several studies, the age of the mother influences the practice of EBF but the results are mixed [39]. During the present study, 44% of mothers practiced EBF up to 6 months. The practice of EBF increases from the age group 15 to 25 years (17.2%) to that of 25 to 34 years (21.2%) then decreases with age (5.6%). There is no significant difference in the practice of EBF according to the age of the mother ( $p = 0.088$ ). In Nigeria, authors also observed that the practice of EBF increased with the age of the mother until around 32 years and then declined regularly thereafter [40]. However, in a previous study the authors did not observe any peak, the practice of EBF increased significantly with the age of the mothers [41]. In a study carried out with 74 mothers in Bamako, Mali, the authors indicated that the younger age (less than 30 years) of mothers was favorable to the practice of EBF [42]. In Spain, it is rather an age > 35 years that was associated with the start and maintenance of EBF up to 6 months [43]. Indeed, according to several studies, mothers who give birth at a later age are those who breastfeed more often [44].

#### 4.4 Practice of EBF According to Level of Education

**First food:** Non-schooled mothers introduced more maternal colostrum as their first food 63.95% compared to 44.87% among schooled mothers. There is a significant difference between the newborn's first food and the mothers' level of education ( $p=0.0035$ ). However, during the previous multiple indicator health survey in Niger, the proportion of children who received food before taking colostrum decreased when the mother's level of education increased, varying by 50% when she was not in school, to 40% when she has a secondary level or higher [11]. In a study carried out in Ivory Coast, the authors reported that mothers and nurses who were educated gave colostrum as their first food more (67.86%) than those who were not educated (38.17%) [45].

**Early breastfeeding:** It appears from the present study that the mother's level of education has a significant positive influence on early breastfeeding ( $p=0.018$ ). Mothers with secondary and higher education levels were more likely to introduce their newborns to the breast

immediately after delivery (67.74%), followed by those at primary level (43.33%). In a previous study, 41% of babies were put to the breast during the first day among mothers with at least primary education, compared to 28% among those who had not attended school [46]. The mother's level of education significantly influences breastfeeding practices. Indeed, although the children of non-schooling mothers are the most frequently breastfed (94%), they are the least likely to be breastfed within an hour of giving birth (28%) and even in the 24 hours after the ac bedtime (43%) [47]. They are then proportionally the least likely to receive food before the start of breastfeeding (51%) [46].

**Practice of EBF up to 6 months:** Mothers at secondary and higher education levels practiced EBF more up to 6 months (48.39%) followed by those at primary level (43.33%). There is a positive association between the practice of EBF up to 6 months and the level of schooling ( $p=0.018$ ). The results confirm previously reported observations from the Maradi region [48]. Also, a study carried out in Nigeria agrees with this by showing that the rate of exclusive breastfeeding is higher when the mother's level of education is high [49]. Other authors have stated that one of the main factors favoring the practice of exclusive breastfeeding is the mother's high level of education [50]. A study from South Korea agrees, confirming that a high level of education is among the factors favoring EBF [51]. On the other hand, in Lebanon a study noted that the low level of education of the mother was associated with an increase in the rate of exclusive breastfeeding. These practices are believed to be linked to the fact that women who have a low level of education generally stay at home to feed babies [52].

#### 4.5 Practice of EBF According to the Mother's Profession

**First food:** In this study, women who practice agriculture and livestock all gave their newborns maternal colostrum as the first food followed by those who perform casual, daily work and civil servants (68.42%). According to the results of this study, the practice of colostrum donation linked to the profession of the respondent ( $p=0.000$ ). However, we do not have data from previous work to compare these results.

**Early breastfeeding:** Unemployed mothers were those who most initiated EBF immediately after childbirth (52.41%), however this relationship is

not significant. Employed women, women in management or in intermediate professions have a significantly higher probability of breastfeeding immediately after birth [53].

**Practice of EBF up to 6 months:** In the rural commune of Sinder, 58% of the mothers surveyed were unemployed and 28% were in crafts and commerce. Mothers practicing agriculture/breeding (80%) and those engaged in crafts and commerce (49.29%) practiced EBF more than other mothers. The practice of EBF is significantly associated with the mother's occupation (0.0042). However, studies conducted in the East and Central African regions show that mothers' work outside the home has been negatively associated with EBF as women are often unable to leave their homes. work to breastfeed their children [54,55,56]. In a study carried out in Ivory Coast, mothers employed in the public or private sector breastfed their children less exclusively. This situation would be justified by the fact that the labor code would be unfavorable to the practice of EBF because it only grants mothers 14 weeks of maternity leave and only 60 minutes of breastfeeding time per working day [57,58]. Another study carried out in Thailand corroborates this observation by mentioning that housewives have an EBF rate 2.73 times higher than those of employed mothers [59]. In a study conducted in the town of Bhairahawa in Nepal, the authors reported that the prevalence of EBF was lower among employed mothers 13.8% than among unemployed mothers 82.2% [60].

#### 4.6 Practice of EBF According to Parity

**First food:** According to the results of this study, first-time mothers are those who most often gave colostrum as the first food to their infants (60%). Parity is significantly associated with colostrum donation ( $p=0.003$ ). This association between parity and colostrum donation to the newborn was also observed in Pakistan ( $p=0.0001$ ). However, according to these authors, it was on the contrary first-time mothers (65.42%) who most refused to give colostrum as the first food, compared to multi-parous mothers (34.6%) [36].

**Early breastfeeding:** Multiparous mothers mainly initiated EBF in this study (60.67%). A study carried out in Rabat in Morocco showed that multiparity was associated with early breastfeeding and a prolonged expected duration of EBF [61]. In 2011, during the National

Population and Family Health Survey, the percentage of early breastfeeding was 37.3% for the fourth child and above compared to only 19.4% for the first [62]. Still in Morocco but in Marrakech, 54.6% of multiparas had early breastfeeding compared to 38.5% of primiparas [63]. In Ariana in Tunisia, the authors found that only 20% of first-time mothers had breastfed their infant for the first time within the first hour after delivery [31]. Recently, a study carried out in Karawa reported early breastfeeding of 54.6% for multiparous women versus 38.5% for primiparous women [64].

**Practice of EBF up to 6 months:** In this study, biparous and multiparous mothers practiced EBF more with 50% and 44% respectively. However, we note that there is no significant association between parity and the practice of EBF ( $p=0.37$ ). A study carried out in Algeria agrees, observing that among women who had exclusively breastfed, multiparous women were twice as likely to exclusively breastfeed their babies until 6 months as primiparous women [65]. In a study in Ethiopia, multiparous mothers were 3.5 times more likely to exclusively breastfeed their infants than primiparous and biparous mothers [66].

#### 4.7 Information for Mothers on the Practice of EBF

**First food:** Mothers who received information from health workers on the practice of EBF mostly did EBF from birth (65.06%). Mothers' information is significantly associated with colostrum donation from birth ( $p=0.0001$ ). Participation in prenatal information sessions on breastfeeding may lead to longer and exclusive breastfeeding [67]. Another study showed that 60.5% of mothers who were monitored during their pregnancy breastfed their children compared to 45.8% of mothers who were not monitored [68].

**Early breastfeeding:** The data from this study show early breastfeeding in 59.04% of mothers who received information from health workers. Raising awareness among mothers by health workers on EBF practices is predictive of early breastfeeding ( $p=0.048$ ). A study carried out in Marrakech in Morocco confirms these observations by showing that monitoring of pregnancy by health workers is accompanied by a high rate of early breastfeeding (69%) compared to 20% of unmonitored pregnancies [63].

**Practice of EBF up to 6 months:** In this study, mothers who received advice on EBF from health workers practiced EBF more than mothers who did not receive awareness (47% versus 38.1%). The difference is significant ( $p= 0.000$ ). This significant association between the advice received and the practice of EBF was also observed in Mali where 66.8% of mothers who had received advice on EBF during prenatal consultations and 67.6% of those who had it received during postnatal consultations had significantly practiced EBF [69]. In Togo, mothers who received prenatal monitoring and appropriate advice from health professionals had significantly practiced EBF (74.4%) compared to those who were followed by grandmothers (54.9%) [70]. Similar observations have been reported from Ghana [71]. But also from Algeria, [65]. Likewise, researchers have indicated that prenatal education reduces the risk of cessation of EBF by 30% before the age of six months [72]. Studies carried out in East Africa support this idea by confirming that women who received information on breastfeeding during ANC practice more EBF than their peers who did not receive advice [73,74].

#### 4.8 Practice of EBF According to the Marital Status of the Mother

**First food:** The data from this study show that 89% of mothers living alone introduced colostrum as the first food to their newborns compared to 59% of married mothers, the difference is however not significant ( $p=0.91$ ). A study in Ivory Coast showed that married women gave 47.2% liquids other than breast milk [75]. Our results confirm those of a study carried out in Niamey which indicated that the foods given to infants at birth are not linked to the marital status of the mother [22].

**Early breastfeeding:** In this study, single mothers initiated breastfeeding more immediately after childbirth (88.89%). In a study carried out in Ghana, the marital status of the mother had a negative influence on the initiation of breastfeeding because the husbands were not in favor of EBF. They used their role as head and breadwinner of the family to regulate infant feeding practices in the family [76]. In an Australian prospective cohort of 1,069,059 women, upon leaving the maternity ward, the most important factor preceding the age for the initiation of breastfeeding was the support of the spouse. Several other studies give the same conclusions [77,78].

**Practice of EBF up to 6 months:** The absence of the father is often a source of socioeconomic fragility and this could represent a negative aspect for divorced and widowed mothers regarding the practice of EBF [44]. During the present study, approximately 45% of marrieds and 11% of widows and divorcees practiced EBF for up to 6 months. This result is similar to that of a study carried out in Mali which reported a rate of 77.1% of EBF among married mothers [24]. On the other hand, in Abidjan in Ivory Coast, only 20.1% of married mothers practiced EBF up to 6 months, 78.2% administered pre-lacteal foods to their infants and approximately 2% have never breastfed [44]. In Togo, a study showed that spousal support was significantly associated with EBF success ( $p < 0.001$ ). Thus, 79.3% of mothers with the support of their husbands had practiced EBF compared to only 44.0% of those who had not benefited from the support of their husbands [79,70]. In Niger, during a study carried out in the Tessaoua region, data showed that 99% of the mothers surveyed had a husband who was in favor of the practice of EBF compared to only 1% who was against it. On the other hand, in the group of those who breastfed mixed, 44% had a husband favorable to the practice of EBF [48]. In the present study, the association between the mother's marital situation and the practice of EBF does not reach the threshold of significance ( $p=0.091$ ), which confirms the results reported from France on the sociodemographic and cultural determinants of the initiation of breastfeeding in the 21st century [53].

#### 4.9 Practice of EBF According to Place of Delivery

**First food:** The present study highlights a significant relationship between the place of delivery and the donation of colostrum as the first food in this study ( $p = 0.000$ ). Mothers who gave birth in a health center gave more colostrum as their first food (74.19%) than those who gave birth at home (32%) [80]. The same is true in Pakistan where, in rural areas, the practice of discarding colostrum and giving pre-lacteal foods was more widespread among women who gave birth at home (79%) [36]. In a previous study carried out in West and Central Africa, the introduction of supplementary foods to newborns from the maternity ward is quite common in health facilities that do not actively apply baby-friendly practices, such as early skin-to-skin contact and adherence to the International Code of Marketing of Breast-milk Substitutes [81].

**Early breastfeeding:** Assistance during childbirth and the place where it took place seem to have an influence on the start of breastfeeding. Early breastfeeding after birth was more common among mothers who gave birth in health centers (71%) compared to those who gave birth at home (29.47%) ( $p=0.000$ ). After 24 hours, latch rate was 90% and 88.5%, respectively. In Cameroon, a similar trend was observed, breastfeeding within 24 hours of birth was 70% with the assistance of a health professional and 48% with that of a traditional birth attendant [47]. When women give birth in a health facility, newborns are more often put to the breast in the first hour (49%) than when the birth took place at home (26%) [11]. A study compiling data from 58 countries showed an increase in early breastfeeding where maternity deliveries increased by more than 20% [82].

**Practice of EBF up to 6 months:** Mothers who gave birth in health centers breastfed their children exclusively (55%) more than mothers who gave birth at home (42%) ( $p=0.000$ ). In DR Congo, in South Kivu, the authors found that there was a difference in the rate of exclusive breastfeeding depending on whether mothers gave birth in a maternity ward (72%) or at home (63%) [83]. Several studies carried out in West Africa, specifically in Nigeria and Ghana, showed that the rate of exclusive breastfeeding was higher among infants whose delivery was assisted by health workers, compared to mothers who were assisted by traditional birth attendants or untrained birth attendants [84,85]. In Togo, in the district of Thaoudjo, authors mentioned that giving birth in the maternity ward was an important factor significantly associated with the practice of EBF in fact, of the 85.3% of mothers who gave birth in a maternity center [86]. health, the majority (74.6%) had practiced EBF [70].

## 5. CONCLUSION

Breastfeeding always remains a very simple act, the most natural and most beneficial for the health of the newborn. However, the practice of exclusive breastfeeding is not optimal in the rural commune of Sinder because on the one hand, young mothers still receive advice on the practice of EBF from their mothers, grandparents, mothers, mothers-in-law etc. which are in most cases contrary to WHO recommendations. Complementary foods are introduced very early which could expose children to several diseases. However, we note a fairly acceptable early breastfeeding of the mothers surveyed. Mothers,

guardians, fathers and other caregivers should have access to objective, regular and comprehensive information on appropriate dietary practices, free from commercial interference. In particular, they should be aware of the recommended duration of exclusive breastfeeding, continuation of breastfeeding, when to introduce complementary foods, the type of food to give, the quantity to give and the frequency and manner of providing these foods in good hygienic conditions.

### DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

### CONSENT AND ETHICAL APPROVAL

The study was approved by the University's Academic Scientific Council. It was authorized by the regional and municipal administrative authorities. The protocol conformed to the 1975 Declaration of Helsinki as revised in 2008. Participation in the study was voluntary. All mothers with children aged 0 to 59 months whose informed consent was obtained were included in the study. No biological samples of any kind were taken.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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