Study of breastfeeding performance index among infants less than 6 months age and its impaction on the infant morbidity in Gharbiya governorate, Egypt

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Abstract

Background*:* Worldwide, hunger disproportionately affects babies younger than six months. The benefit of breastfeeding increases as the breastfeeding performance index (BPI) rises.

Aim and objectives: The purpose of this research is to determine what variables contribute to inadequate breastfeeding performance in babies younger than six months by evaluating their breastfeeding habits using the breastfeeding performance index (BPI).

Subjects and methods: The study sample was randomly selected from all mothers attended the pediatric clinic and vaccination office of health offices in El Gharbiya governorate who had an infant ≤ 6 months. The calculated sample size was 201 infants≤ 6 months age using Epi Info® sample size calculator. Babies' socio-demographic characteristics, obstetric history, complete feeding patterns, medical history, and the seven BPI components were all recorded. In order to find out what causes bad breastfeeding, it was treated.

Results: According to the breastfeeding performance index (BPI) score, 4.4 (±1.8) was the mean (+SD) of the BPI score. Around two thirds (68.6%) had poor breastfeeding (BPI) scores either low (35.3%) or medium (33.3%) while only (31.4%) had high BPI scores. About (50.2%)of the studied infants suffering from fever, (42.3%)suffering from a persistent cough accompanied by shallow, quick breathing and (42.3%) suffering from diarrhea in the last two weeks before the study.

Conclusions: In addition to identifying at-risk populations who can benefit from breastfeeding promotion programs, the Breast-Feeding Performance Index (BPI) can assist establish a link between breastfeeding and newborn morbidity outcomes.

Keywords: breastfeeding, breastfeeding performance index, infant feeding, breast milk.

Introduction

Breastfeeding is ideal for feeding human infants due to its proven benefits for the infant, mother, and community ***(WHO, 2020).***

Many of the seventeen Sustainable Development Goals (SDGs) aimed at eradicating hunger and poverty may be advanced via breastfeeding, improvement of health, education, gender equality, and combat climate change and stimulate economic growth. Being the superior, optimum, safest, cheapest source of infant nutrition and protection for the first 2 years of life ***(United Nation, 2015)***.

Direct and indirect monetary gains abound as breastfeeding rates rise. If breastfeeding improves mother and baby health, which in turn reduces medical expenses (e.g., doctor visits, hospital stays, prescription medications, medical supplies, etc.), the economy will reap the direct advantages. Indirect economic benefits result when improved health from breastfeeding reduces parents' lost wages from missed work. Annually breastfeeding is associated with additional income –nearly 0.5 percent of world gross national income ***(Rollins et al., 2016).***

Worldwide, undernourishment is thought to be the cause of mortality for at least 35% of children under the age of five. Inappropriate feeding habits are associated with about two-thirds of these fatalities, which occur in the first year of life ***(WHO, 2020).*** It has the makings of a leading nutrition intervention to lower the infant mortality rate. ***(Victora et al., 2016)***.

According to the World Health Organisation (WHO), the best way to breastfeed a baby is to start as soon as possible after birth, to breastfeed exclusively for the first six months, and to continue breastfeeding for a maximum of two years, supplementing with baby food beginning at six months. ***(WHO, 2003)*** and ***(Oot et al., 2015).***

The World Health Organisation created the Breastfeeding Performance Index (BPI) to track how well different nations are doing in promoting, protecting, and supporting breastfeeding as well as in measuring the results of breastfeeding programs. This index includes 7 infant feeding practices (initiation of breastfeeding, duration and exclusivity, pre-lacteal feeding, receiving liquids, receiving formula, and receiving solids). The benefits of breastfeeding will be larger with a greater breastfeeding performance index (BPI). ***(WHO, 2019).***

Countries should use this information to identify and measure the success of interventions that promote, protect and support breastfeeding, then develop strategies to improve breastfeeding rate.

Aim of the Work

Analyse nursing behaviours in babies younger than six months of age using the breastfeeding performance index (BPI). Additionally, seek for variables linked to a low BPI.

Patients and Methods

Over the course of six months, from April to September 2023, this cross-sectional research was conducted at the paediatric clinic and vaccination office of the health offices in El-Gharbiya governorate.

Study population:

The study sample was randomly selected from mothers attending the hospital who had infants aged ≤6 months.

Sampe size calculation:

The sample size was calculated using the Epi Info® sample size calculator, considering a prevalence of breastfeeding practice of 26%, as reported by **El-Gilany and Badawy (2013**). Assuming a 95% confidence

level and a margin of error of ±5%, and based on the annual flow of infants to the health office, the minimum required sample size was determined to be 200 infants aged ≤6 months.

Inclusion criteria:

Infants less than /equal 6 months, male and female sex, healthy mothers & infants who are willing to participate.

Exclusion Criteria:

Infants with any medical condition that interfere with breast feeding or infants more than 6 months or mothers who had any health problems and/or taking medicine and prohibited from breastfeeding by a doctor were excluded.

- They refused to complete the study questionnaire.

Patients were subjected to the following:

Every mother will be subjected to full social history as residence, educational level, socioeconomic status that measured by El-Gilany study ***(El-Gilany & Elwasify, 2012),*** religion, marital status, antenatal care visits, place of delivery, mode of delivery and post-natal visits .

As regard the infant, they will be subjected to full feeding practices as (age in months, sex, current breastfeeding, liquids given, bottle feeding given, formula food given & solid food given) , and full medical history.

Ethical Considerations

This study was conducted in accordance with established ethical standards. Ethical approval was obtained from the Ethics Committee of the Faculty of Medicine for Girls, Al-Azhar University, Cairo, Egypt. Prior to data collection, formal permission was granted by the health office. Informed consent was obtained from all participating mothers after clearly explaining the objectives and procedures of the study. Participation was entirely voluntary, and confidentiality and privacy of personal data were strictly maintained. The researcher, under the supervision of academic advisors, was solely responsible for the design of the study, data collection, coding, statistical analysis, and the overall execution of the research.

Methods:

Tool of the Study:

An oral consent was obtained before fulfilling an interview structured questionnaire. The designed questionnaire was prepared by research team to meet the objectives of the study and included the following data:

Personal data: Name, sex of infant, infant age, residence, educational level of mothers, current marital status (currently married/in union, formerly married), employment status (working, housewife).

- Maternal health services access: delivery place, mode of delivery if they received antenatal care (ANC) and postnatal care (PNC) checks.
- Infants feeding and medical history: current breastfeeding, liquids given, bottle feeding given, formula food given & solid food given, full medical history

Assessment of breast-feeding practice:

Breastfeeding practices among infants aged less than six months were assessed using the Breastfeeding Performance Index (BPI) method. The BPI is composed of seven components that collectively form the outcome variable. These components include: initiation of breastfeeding within the first hour of life; absence of prelacteal feeding during the first three days; no use of feeding bottles or teats within the last 24 hours; breastfeeding within the last 24 hours; no provision of water or water-based fluids (with the exception of drops or syrups containing vitamins, mineral supplements, or medications) within the last 24 hours; no provision of formula or any other

type of milk within the last 24 hours; and the infant has never been given solid or semi-solid foods. To calculate the BPI, each of the seven feeding practices was assigned a binary score out of seven. Practices considered inappropriate for optimal breastfeeding received a score of zero, whereas those aligned with recommended breastfeeding practices were assigned a score of one. All practices were given equal weight in the scoring system (**Haile and Biadgilign, 2015).**

According to this index, a total score of 0 indicates poor breastfeeding performance, a score of 7 reflects optimal performance, and a score of 5 represents the median or primary threshold. Thus, higher BPI scores reflect improved adherence to optimal breastfeeding practices (**WHO, 2020).** As described by Haile and Biadgilign (2015), infants were categorized into three groups based on their BPI scores: low (scores 0–3), medium (scores 4–5), and high (scores 6–7). For the purpose of defining the outcome variable representing inadequate breastfeeding practices, the low and medium categories were merged into a single group. This approach is supported by **Hussien et al. (2018**), who reported no significant differences in nutritional and health outcomes between the low and medium BPI score groups.

Statistical Analysis.

The analysis was performed with SPSS version 16. The variables were summarised using descriptive statistics. For qualitative variables, we computed proportions and frequencies and compared them using a chi-square test. For each quantitative variable, we determined the mean and standard deviation (SD). When comparing more than two groups, we used the analysis of variance (ANOVA) test. Statistical significance was used throughout the study as a p value ≤0.05.

Results

Table (1): sociodemographic traits of moms and their babies under six months of age.

Characteristics	No.	%
Maternal residence		
-Urban	**0**	**0.0**
-Rural	**201**	**1000.0**
Maternal age groups (years)		
Range	**17-43**	
Mean ±SD	**27.4± 6.8**	
Maternal age groups (years)		
<20	**36**	**17.9**
20-35	**129**	**64.2**
≥35	**36**	**17.9**
Current Marital status		
-Married (in union)	**194**	**96.5**
-Divorced/ Widowed	**7**	**3.5**
Maternal education		
-Illiterate	**25**	**12.4**
-Primary	**72**	**35.8**
-Secondary	**54**	**26.9**
-Higher	**50**	**24.9**
Maternal occupation		
-House wife	**163**	**81.1**

-Working	**38**	**18.9**
Age of infants (months) Mean ±SD	**3.9± 1.6**	
Age group of infants (months)		
≤2	**58**	**28.9**
2 ≤ 4	**61**	**30.3**
4-6	**82**	**40.8**
Sex of infant		
-Male	**89**	**44.3**
-Female	**112**	**55.7**

Table 1 shows that the study included 201 eligible rural mother–infant pairs. Most mothers (96.5%) were married or in a union, with a mean age of 27.4 ± 6.8 years; 64.2% were aged 20–35, while only 17.9% were under 20 or over 35. Regarding education, 51.8% had secondary (26.9%) or higher (24.9%) education, 35.8% had primary education, and 12.4% were illiterate. The majority (81.1%) were housewives. The infants had a mean age of 3.9 ± 1.6 months, with 40.8% aged 4–6 months, 30.3% aged 2–4 months, and 28.9% under 2 months. Females represented 55.7% of the infants.

Table (2): Feeding practices among infants aged less than 6 month and scoring system for the breastfeeding performance Index (BPI)

Practice (Score)	NO	%
First suckling		
- <1 hour (1)	166	82.6
- ≥1 hour (0)	35	17.4
Prelacteals in first 3 days		
- Not given (1)	138	68.7
- Given (0)	63	31.3
Current breastfeeding till 6 months		
- Yes (1)	166	82.6
- No (0)	35	17.4
Feeding bottle use		
- No (1)	96	47.8
- Yes (0)	105	52.2
Liquids		
- Not given (1)	109	54.2
- Given (0)	92	45.8
Formula/other milk		
- Not given (1)	100	49.8
- Given (0)	101	50.2
Solids		
- Not given (1)	115	57.2
- Given (0)	86	42.8
Breastfeeding performance Categories		
-Low (0-3)	71	35.3
-Average/ medium (4-5)	67	33.3
-High (6-7)	63	31.4
Overall BPI score Mean ± SD	4.4±1.8	

Table 2 presents the Breastfeeding Performance Index (BPI) scores and related newborn feeding behaviors. The majority of mothers (82.6%) continued breastfeeding for at least six months, and 82.6% initiated breastfeeding within the first hour after birth. However, 31.3% of newborns received prelacteal feeds within the first three days, and 52.2% were bottle-fed. By six months of age, 45.8% of infants had been introduced to fluids, and 42.8% had received solid or semi-solid foods.

Additionally, 50.2% were given formula or other types of milk. The mean BPI score was 4.4 ± 1.8, with 68.6% of infants classified as having poor BPI scores—35.3% low and 33.3% medium—while only 31.4% achieved high BPI scores.

Table (3): Difference between low &medium and high BPI scores among mothers of infants aged less than six months.

Studied groups Variables	Low BPI score 71		Medium BPI score 67		High BPI score 63		Significant test & P-value
	No.	%	No.	%	No.	%	
Maternal age groups (years)							
-<20	**17**	**23.9**	**9**	**13.4**	**10**	**15.9**	**X^2=16**
-20-34	**33**	**46.5**	**49**	**73.2**	**47**	**74.6**	**P=0.003***
-35 and above	**21**	**29.6**	**9**	**13.4**	**6**	**9.5**	
Current Marital status							
-Married (in union)	**65**	**91.5**	**66**	**98.5**	**63**	**100.0**	**X^2=8.3**
-Divorced/ Widowed	**6**	**8.5**	**1**	**1.5**	**0**	**0.0**	**P=0.016***
Maternal education							
-Illiterate	9	12.7	8	11.9	8	12.7	X^2=5.2
-Primary	28	39.4	20	29.9	24	38.1	P=0.5
-Secondary	21	29.6	21	31.3	12	19.0	
-Higher	13	18.3	18	26.9	19	30.2	
Maternal occupation							
-House wife	56	78.9	53	79.1	54	85.7	X^2=1.3
-Working	15	21.1	14	20.9	9	14.3	P=0.5
Age of infants (months)							F=16.7
Mean ± SD	4.5±1.5		4±1.5		3±1.5		P=0.000*
Age group of infants (months)							
≤2	11	15.5	13	19.4	34	54.0	X^2=36
2 ≤ 4	16	22.5	28	41.8	17	27.0	P=0.000*
4-6	24	62.0	26	38.8	12	19.0	
Sex of infant							
-Male	30	42.3	32	47.8	27	42.9	X^2=0.5
-Female	41	57.7	35	52.2	36	57.1	P=0.8
Antenatal care checkup							
-Yes	70	98.6	67	100.0	62	98.4	X^2=1.2
-No	1	1.4	0	0.0	1	1.6	P=0.6
Place of delivery							
- Healthcare facility	68	95.8	62	92.5	57	90.5	X^2=1.5
- Home	3	4.2	5	7.5	6	9.5	P=0.5
Mode of delivery							
-Vaginal	14	19.7	15	22.4	15	23.8	X^2=0.3
-Cesarean section	57	80.3	52	77.6	48	76.2	P=0.8
Postnatal care checkup							
-Yes	62	87.3	63	94.0	56	88.9	X^2=1.9
-No	9	12.7	4	6.0	7	11.1	P=0.4
Infants suffering from fever							
-Yes	50	70.4	40	59.7	11	17.5	X^2=41
-No	21	29.6	27	40.3	52	82.2	P=0.000*
Infants suffering from cough with difficult or short rapid breathing	41	57.7	29	43.3	15	23.8	X^2=15.8
-Yes	30	42.3	38	56.7	48	76.2	P=0.000*

Studied groups Variables	Low BPI score 71		Medium BPI score 67		High BPI score 63		Significant test & P-value
	No.	%	No.	%	No.	%	
-No							
Infants suffering from Diarrhea							X^2=35
-Yes	46	64.8	30	44.8	9	14.3	P=0.000*
-No	25	35.2	37	55.2	54	85.7	

p≤0.05 is considered statistically significant

Table 7 shows that over half of the mothers (53.5%) had low Breastfeeding Performance Index (BPI) scores, which were significantly more common among mothers aged <20 or >35 years, compared to 73.2% of those with medium and high BPI scores being in the 20–34 age group ($p \leq 0.05$). Educational level was also significantly associated with BPI scores: 52.1% of mothers with low BPI were illiterate or had only primary education, in contrast to 29.6% with medium and 18.3% with high BPI who had secondary or higher education. Conversely, 58.2% and 49.2% of mothers with medium and high BPI scores, respectively, had attained at least secondary education ($p \leq 0.05$). While a high proportion of mothers across all groups were housewives (78.9% low, 79.1% medium, and 85.7% high BPI), the difference was not statistically significant ($p > 0.05$).

Infant age was significantly associated with BPI scores. The mean age of infants in the low BPI group was highest (4.5 ± 1.5 months), with 62.0% aged 4–6 months, compared to 38.8% and 19.0% in the medium and high BPI groups, respectively. Most infants in the medium BPI group (41.8%) were aged 2–4 months, while 54.0% of those in the high BPI group were younger than 2 months ($p \leq 0.05$). Antenatal care (ANC) was nearly universal, reported by 98.6%, 100.0%, and 98.4% of mothers in the low, medium, and high BPI groups, respectively. Similarly, the majority of infants were born in healthcare facilities: 95.8% (low BPI), 92.5% (medium), and 90.5% (high BPI). Cesarean section was the predominant mode of delivery, observed in 80.3% of low BPI, 77.6% of medium BPI, and 76.2% of high BPI groups. Postnatal check-up attendance was also high across groups (87.3%, 94.0%, and 88.9% for low, medium, and high BPI, respectively), with no significant differences ($p > 0.05$).

Regarding infant morbidity, those with high BPI scores had significantly lower rates of recent illness: 82.2% had no history of fever, 76.2% had no cough, and 85.7% had no diarrhea. In contrast, illness history was more common among low and medium BPI groups. Among the low BPI group, 70.4% had fever, 57.7% had cough with rapid or difficult breathing, and 64.8% had diarrhea. Similarly, in the medium BPI group, 59.7% had fever, 43.3% had cough with breathing difficulties, and 44.8% had diarrhea ($p \leq 0.05$).

Discussion

There is ample evidence of the advantages of nursing for moms, babies, and society as a whole, and fresh data about the benefits of breastfeeding and its effect on infant morbidity is coming to light **(WHO, 2020)**.

Approximately 804,000 child fatalities, or twelve percent of all deaths in children under five, are caused by breastfeeding issues alone each year; these deaths may be avoided with proper nursing **(Black et al., 2022).** In children under five years old, inadequate breastfeeding practices account for eighteen percent of acute respiratory mortality, thirty percent of diarrhoeal deaths, and forty-five percent of newborn infectious deaths **(WHO, 2019)**.

Breastfeeding is nearly universal, according to **the Egypt Demographic and Health Survey (EDHS) 2014**; 96 percent of

infants born in the two years prior to the survey were ever breastfed, but just forty percent of infants younger than six months were exclusively breastfed (EBF), and only thirteen percent of infants were exclusively breastfed by the time they were 4-5 months old.

Because of the low rate of 6-month exclusive breastfeeding worldwide, including Egypt, therefore factors affecting exclusive breastfeeding (EBF) need to be studied and manipulated to promote exclusive breastfeeding (EBF) programs.

Thus, this cross-sectional study aims to shed light on the prevalence of exclusive breastfeeding (EBF) practices, evaluate breastfeeding performance using the Breastfeeding Performance Index (BPI), and determine the factors associated with exclusive breastfeeding as well as its impact on infant morbidity **.**

A total of 201 mothers and infants participated in this study, most age of participating mothers was between 20-35 years with an average around 27.4 years. About (48.2%) of the mothers received primary education or were not able to read and write (illiterate) and about half of mothers (51.8%) were with secondary education and above, whereas (81.1%) of mothers were housewives.

About 82.6% of the newborns in the current research were given breast milk within an hour of their birth, indicating an early commencement of breastfeeding**.**

This figure is consistent with research by **(Amadou, 2022),** who collected data from Ethiopia's Mini Demographic and Health Survey and reported (75.8%).

Also, it was higher than ***Shaheen et al., (2018)*** who performed a study in Menoufia, Egypt, and ***(Tollah et al., 2020)*** who conducted research among Cairo's basic healthcare facilities' female patients, finding that just 2.7% and 5.5% of them were affected, respectively. Furthermore, in an Uttarakhand rural region, (Shili et al., 2012), and ***(Mehlawat et al., 2020)*** in India, found that initiation within the first hour were (21.3% &29.7% respectively)..

In our study, even though most of mothers (78.1%) were delivered by cesarean section (CS), they gave first suckling to their babies in the first hour (82.6%).This can be explained by adequate support was given to mothers in health facilities.

According to the Egypt Demographic and Health Survey "EDHS" (2014), which found that roughly forty percent of infants under six months of age were exclusively breastfed, the practice was not exclusive, as nearly 45.8 percent of infants started drinking fluids other than breast milk. This is higher than the forty percent reported in the previous year.

This finding was higher than studies conducted by ***(Hailu et al., 2020)***, a study in Ethiopia**,** and ***(Tollah et al., 2020)*** in Cairo, who reported that 34.0% & 28% respectively were exclusively breastfed.

Regrettably, within three days after delivery, over one-third (31.3%) of the babies in our research were administered prelacteal nutrition. Nevertheless, this result was lower than what was reported by (**Shili et al. 2012)** in Uttarakhand.

Sixty percent of newborns have received prelacteal feed after delivery, according to the Egypt Demographic and Health Survey **(EDHS, 2014).**

The majority of babies (82.6%) had breastfed in the recent 24 hours, indicating current breastfeeding, according to the components of the breastfeeding performance index (BPI)**.**

While 94.5% of women who visited primary health care centres in Cairo were found to be breastfeeding, this statistic was somewhat lower than that of the research by **Tollah et al. (2020).** Consistent with previous research, the frequency was also high in Ambo(82.2%) and the West Mamprusi District of Northern Ghana (84.3%). **(Shitie et al., 2022)**.

Our research found that almost all women (93.0% of the time) gave birth at a healthcare facility, and that most mothers received ANC (99.0% of the time) and PNC (90.0% of the time) follow-ups**.**

This is in line with the findings of **Shitie et al. (2022**), who hypothesised that mothers may benefit from immediate access to trained health care providers during an institutional delivery, increasing the likelihood that they would breastfeed their babies exclusively.

According to the results of this research, various complementary meals were introduced at an early stage. In the first year of life, 50.2% of babies were given formula or another kind of artificial milk. About half of newborns (52.2%) were bottle-fed, while 45.8% were introduced to fluids and 42.8% to solids/ semisolids before six months of age, respectively**.**

Consistent with these results, **Mehlawat et al. (2020**) found that in India, a quarter of babies did not get breast milk at all, with baby formula being the most popular choice at 81.3% and semi-solid meals at 34.6%. Among newborns, 23.8% were found to be eating from a bottle**.**

According to the breastfeeding performance index (BPI) score, the current study revealed that around two thirds of infants had low (35.3%) or medium (33.3%) breastfeeding performance index(BPI) scores while only (31.4%) had optimal breastfeeding practice (high (BPI)category).

Tamiru et al., (2012) had documented in a study done in Ethiopia that the prevalence of optimal breastfeeding was (24.6%).

In Mansoura, the percentage of babies falling into the poor group was 27.0%, according to **El-Gilany & Badawy (2013),** medium breastfeeding performance index (BPI)category were (41.7%) , while nearly one third (31.3%) were of high breastfeeding performance index (BPI) category.

Contrarily, our results were superior to those of **Hussien et al. (2018)** in Ethiopia, where 56.6 percent of moms had low BPI scores, 25.7 percent had medium scores, and less than 1 in 5 had high scores.

In this research, a mean BPI score of 4.4 (±1.8) was determined, and 68.6% of participants had poor or medium BPI scores**.**

Researchers in Ethiopia found comparable results in their studies, with an average BPI score of 4.38 (±1.25), 4.4±1.77, and 5.15 ±1.39, respectively (**Senarah et al., 2007; Berhanu et al., 2022).**

Contrarily, it was more than the frequency of low BPI scores found in an earlier research in Ethiopia (**Hailu et al., 2020),** which was 40.7%.

Although there are many potential influences on breastfeeding, the present research found that just a few characteristics were significantly related to the practice, while the others were not**.**

In contrast, additional research in Mansoura **(El-Gilany & Badawy, 2013)** and other regions of Ethiopia **(Gessese et al., 2022)** found that moms who are not married are better able to breastfeed their children than those who are, despite the fact that married mothers often have the financial means to purchase infant formula**.**

Regarding maternal education, nearly half (52.9%) of those with poor score versus (49.2%) of good score received secondary and higher maternal education all were statistically insignificant and this may be due to mothers who get higher educational level have more opportunities to get work so they stay long time without their babies and introduce early complementary feeding.

In a contentious study conducted in Cairo (**Tollah et al., 2020),** participants were moms who exclusively nursed their children, and their average age was 26 , nearly two thirds had university educational level.

In addition, ***(Hussien et al., 2018)*** in Ethiopia stated that as mothers get older and received higher education enables them having had prior experience with nursing and knowing the advantages of it.

The current study showed that good breastfeeding performance index (BPI) score

was insignificantly higher among infants of housewives (85.7%) versus (14.3%) in infants of working mothers compared to counterpart of poor score (79.0% in housewives versus 21.0%).

The traditional wisdom is that a mother's job makes it more difficult for her to nurse her child, and that working outside the house is incompatible with nursing **(EL-Gilany & Elwasify, 2012)**.

In contrast, working moms had a nearly fourfold lower risk of achieving a poor breastfeeding performance index (BPI) score than did housewife mothers. The findings of **Anstey et al. (2017)** lend credence to the idea that working mothers are often a sign of well-off parents.

The current research demonstrated that the likelihood of exclusively breastfeeding decreased as babies grew older. Compared to women whose children were older than four months, those whose infants were four months old or less were approximately three times more likely to attain a satisfactory breastfeeding performance index (BPI) score. **Bombong et al. (2016**) and **Adugna et al. (2017)** have found similar results in Cameroon and Hawassa, Ethiopia, respectively**.**

Hussien et al. (2018) speculate that this could be because, as babies became older, their moms were less inclined to nurse them and, simultaneously, they might have thought their babies were ready for solid meals.

Considering that the BPI measures current feeding behaviour and is therefore largely age dependent, items 3–7 (providing bottles, liquids, formula, solids) are important to examine. It is reasonable to assume that at this point in time, most babies were not being fed just breast milk and were instead getting other sources of nutrition. The total BPI was thereby reduced to a considerable degree.

In the present study, there was insignificant difference regarding sex in achieving poor or good score (57.1%) of infants insignificantly achieving high breastfeeding performance index (BPI) score were females compared to (42.9%)of their counter parts and(55.1%) of infants achieving (poor)low/medium BPI score were also female compared to(44.9%) were male.

In accordance, ***Tollah et al., (2020)*** showed that the sex of infants did not have significant importance with breastfeeding rates.

Our analysis observed that despite of 99.0% of mothers had attended at least one antenatal check-up (ANC), they achieved low breastfeeding performance index (BPI) score (98.6%) and (100.0%,98.4%) achieved medium and high(BPI)score respectively.

In the current study, The vast majority of infants were delivered at healthcare facilities (93%) and only (7.0%) were Home delivery , Women who delivered at health institution were more likely to achieve good (90.5%) breastfeeding performance index (BPI) score than those at home (9.5%) .

Similarly, compared to women who gave birth at home, those who gave birth in a medical facility had a higher chance of receiving a high BPI score (**Hussien et al., 2018).** According to **Legesse et al. (2015),** traditional midwives and other household members who have an impact on mothers' behaviours should be educated.

Women who had caesarean sections as their delivery method had a much lower success rate (79.0%). **El-Gilany and Badawy (2013)** also noted similar results in Mansoura, Egypt**.**

Compared to babies whose nursing performance index was high or medium, those whose index was poor reported more cases of cough, fever, and diarrhoea in the two weeks leading up to the research**.**

Similarly, **Senarath et al. (2007)** observed that the low BPI group had a higher 2-week period prevalence of diarrhoea than both the medium and high BPI groups in an Ethiopian research that was carried out in Timor-Leste.

The majority of newborns in this research did not have a history of fever (82.5%), cough (76.2%), or diarrhoea (85.7%), in contrast to the (bad) scores of (65.2%), (50.7%), and (55.1%), respectively**.**

This is in line with the findings of an Ethiopian study **(Haile et al., 2015**) that found that BPI was linked to less fever symptoms in the two weeks leading up to the survey.

Conclusion

When trying to determine if there is a correlation between breastfeeding and newborn morbidity outcomes, the Breast-Feeding Performance Index (BPI) can be useful. One useful tool for determining which populations may benefit most from breastfeeding promotion initiatives is the Breast-Feeding Performance Index (BPI).

Recommendations

1- Redirecting the government focus towards health services, education and socio-economic factors result in better breastfeeding practices.
2- Health workers implement WHO recommendations of 10 steps for successful breastfeeding and follow up.
3- Raise health facility staff's understanding of the need of educating women throughout prenatal and postnatal care (ANC and PNC) on the many aspects of baby feeding, including the information, mindset, and abilities needed to encourage breastfeeding and supplemental feeding.

Limitations

This study has some limitations that should be considered when interpreting the findings. First, the cross-sectional design limits the ability to establish causal relationships between maternal characteristics and breastfeeding performance. Second, the data were collected from a single rural health office, which may affect the generalizability of the results to other urban or diverse settings. Third, self-reported information from mothers regarding breastfeeding practices may be subject to recall bias or social desirability bias. Additionally, the study did not explore cultural, psychosocial, or support-related factors that may influence breastfeeding behavior.

Acknowledgments

Conflict of interest

None.

Funding

Self-funding.

Ethical approval

Patients had informed consent.

Authorship

All the listed authors contributed significantly to the conception and design of study, acquisition, analysis, and interpretation of data and drafting of the manuscript, to justify authorship.

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