Awareness of Sudanese Citizens about the Benefits of Breastfeeding compared to Formula in Khartoum State, Sudan

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Abstract

Background: There are a major differences between breastfeeding and formula feeding. Therefore, it's essential for expectants and new parents to be aware of such variations, as its important determinants of infant feeding behavior. This study aimed to construct a solid foundation on the awareness and perception regarding breastfeeding verses packed formulas among the locals. Additionally, we wished to identify any possible misconceptions about their benefits.

Methods: This is a cross-sectional descriptive study, carried out during the months of July and August 2020 at Khartoum state, Sudan. The target population was all Sudanese citizens of both genders, aged 18 and above, who've agreed to participate in this study, respondents who've missed any of the aforesaid criteria were excluded.

Results: Among our study respondents (n=905), 464 (51.27%) were female and 409 (45.19%) were married. Two hundred and eleven (23.31%) had 1-2 children and 422 (46.63%) held a bachelor's degree. The mean awareness score was 10.88 (SD: 2.25, range: 0-15), suggesting an overall 72.53% ($10.88/15 \times 100$) correct rate on this awareness test. Awareness scores significantly differed across genders, age-groups, marital status, education levels, and places of residence ($P < 0.05$). Most of our sample (97.35%) agreed that breastfeeding is the ideal nutrition for infants <6 months old. Five hundred and ninety (65.19%) were aware that breastfeeding reduces the mortality rate of infants, and 712 (78.67%) of the participants answered correctly that breastfeeding decreases the maternal risk of breast and ovarian cancer.

Conclusion: Our findings suggest that the general awareness on this topic needs further improvement and more attention.

Background:

Choosing whether to breastfeed or formula feed their baby is one of the important decisions expectants and new parents will make. For many, the decision to breastfeed or formula feed is based on their social, economic and demographic factors (1). Health experts believe that breast milk is the best nutritional choice as it is associated with better outcomes for both mothers and infants. Breastfeeding is considered a life-saving practice in developing countries and has been reported to improve infant survival rates in poor countries (2)(3). Whereas, formula feeding showed an increase in infant's mortality 3–5 times (4). While breastfeeding has proven to be effective in strengthening the infant's immunity, formula feeding was associated with an increased risk of acquired immunodeficiency as well as a risk of developing respiratory and gastrointestinal diseases in childhood (5)(6)(7). However, breastfeeding showed to be healthier for infants, formula feeding may be used as a management for some medical situations (e.g. lactulose intolerance) (8)(9). Breastfed infants frequently need vitamins supplements. In comparison, formula feeding has shown that it is able to provide infants with adequate amounts of vitamins (such as vitamin D) (10). Breastfeeding reduces a mothers' risk of developing ovarian and breast cancer more than

formula feeding does (11). Also, it has been shown that breastfeeding rather than formula feeding strengthens the mother-baby bonding (12). Breastfeeding have demonstrated to lower the risk of the maternal postpartum depression (13)(14). Overweight or obese women may benefit from extra antenatal, postnatal and on-going breastfeeding support (15). Breast feeding may have particular benefits for infants of overweight or obese mothers or infants of diabetic mothers, in modulating the intrauterine programmed tendency to childhood obesity and, in the long term, type 2 diabetes mellitus and the metabolic syndrome (16).

In some situations, breastfeeding may not be possible for all women as shown in a survey conducted in UK (17). Multiple factors may contribute including delayed lacto-genesis, difficulty with positioning, attachment and latching, and maternal lack of confidence or self-esteem (18). Also, maternal problems such as painful breasts, cracked nipples and mastitis can form a barrier against breastfeeding. Also, concerns about whether the infant is growing, content and receiving enough milk make some parents prefer formula feeding (17).

The World Health Organization (WHO) recommends that infants should receive only breast milk with no solids or other fluids for the first 6 months after birth, with supplemental breast feeding continuing for 2 years and beyond (19). A survey conducted in Khartoum Province, Sudan, in 1983 found that 98% of the mothers breast-fed their babies at birth, the mean duration of breast-feeding ranged between 14.2 and 16.7 months (20). A study of maternal breastfeeding practices was conducted in 1993 in 6 states of Sudan, but Khartoum wasn't among them. This study showed that almost all mothers (99.9%) initiated breast-feeding, mostly (83.2%) on the first day between 1–5 hours following delivery. The breast-feeding rate was 92.0% at 7 months and 65.0% at one year. 4% still breast-fed at 2 years (21). In another study conducted in 1994, in the same six states that were in the study mentioned previously, showed that 77.9% believed that breast milk was the best for their children (22). According to the World Bank collection of development indicators, compiled from officially recognized sources, exclusive breastfeeding in Sudan was reported at 54.6% in 2014 (23)(24). Despite the well-known benefits of breastfeeding over formula feed, there is a well-documented decline in breastfeeding in many countries, especially developing ones. In contrast, a resurgence of breastfeeding in many industrialized countries has been noted (25).

As we had shown previously, there are wide differences between breastfeeding and formula feeding. Therefore, it's essential that expectant and new parents to be aware of such variations, as its important determinants of infant feeding behavior. In this study, we aimed to construct a solid foundation on the awareness and perception regarding breastfeeding in comparison to packed formulas among the Sudanese people. Additionally, we wished to identify if there are misconceptions about their benefits in the same regard.

Methodology:

Study design and sample:

A cross-sectional descriptive study was carried out during the months of July and August 2020 at Khartoum state, Sudan. The Study was conducted to evaluate the awareness of Sudanese citizens about the benefits of breastfeeding compared to formula. The target population was all Sudanese citizens of both genders, aged 18 years and above, Khartoum state residents, and have all agreed to participate in the study. Additionally, all respondents who have missed any of the aforesaid criteria were preemptively excluded from the study. Due to the social distancing measures and lockdowns of COVID-19 pandemic in Sudan, participants for this study were self-recruited through an online questionnaire created on Google forms. The online questionnaire was posted on the most widely used social media platforms in Sudan (Facebook, WhatsApp and Telegram). To limit information bias, participants were provided by full description concerning the nature and objectives of the study. Participants were informed that all of their responses would be concealed to insure complete anonymity. The sample size was calculated from the equation $n = z^2pq/d^2$, n = sample size, z = level of confidence = 1.96(95% CI), P = prevalence. As similar studies on the same topic are lacking in Sudan, we assumed a prevalence of 50% for having inadequate awareness regarding breastfeeding benefits compared to formulas. Therefore, $P = 0.5$, $q = 1-p = 0.5$, d = desired margin of error = 0.05. Thus, we estimated the minimum acceptable sample size was as $(1.96) (0.5) (0.5) / (0.05)^2 = 384$ participants.

Questionnaire:

To cover all aspects of interest in this study, the authors conducted an extensive literature search from different sources before constructing the study questionnaire. A 24-item questionnaire was contrived by the authors and underwent pilot study ($n = 8$) to ensure the clarity and applicability of the questionnaire. The questionnaire was drafted in English, then it was translated and distributed in Arabic language. Later, the questionnaire was rephrased with simpler terminology to insure easier comprehension to all respondents. A mandatory consent question was added at the start of the questionnaire. If a respondent did not give their approval, then they will be unable to complete the questionnaire. The questionnaire contained two parts. The first part included 8 items of demographic data (gender, age, educational level, job status, marital status, number of children, residence, and income). The second part aimed to assess the awareness of breastfeeding benefits (item no: 1–10, 13, 14) and formula benefits (item no: 11, 12, 15) as showed in table.1. Thus, the awareness section consisted of 15 question that had three possible answers (Breastfeeding, formula feeding, I do not know). Items (1–5, 7, 8, 10, 13, 14) were given 1 point if the respondent answered breastfeeding. Items (6, 9, 11, 12, 15) were also given 1 point if the respondent answered formula feeding. Consequently, the maximum possible score is out of 15 and the minimum score is 0, with high scores showing better awareness. The questionnaire was designed in a way so that it cannot be submitted until all questions were answered. Participants were free to review and change their answers before submission. The online questionnaire link was made available for 10 days (19–28 July). On 28 July, the online survey link was closed and the total sample was reached 905.

Table 1

Questionnaire about the awareness towards the benefits of breastfeeding compared to the formula

Questions (correct rate, % of the total sample)	Options
Q1. Which of the following is the ideal nutrition for infants < 6 months old? (97.35%)	BF, FF, I don't know
Q2. Which of the following can reduce child risk to infections? (88.18%)	BF, FF, I don't know
Q3. Which of the following decreases risk for child to develop asthma and allergies in general? (78.90%)	BF, FF, I don't know
Q4. Which of the following decreases the risk for child to develop Diabetes Mellitus? (79.89%)	BF, FF, I don't know
Q5. Which of the following is linked to higher intelligence scores in latter childhood? (91.05%)	BF, FF, I don't know
Q6. Which of the following is associated with higher incidence of GI upset? (72.93%)	BF, FF, I don't know
Q7. Which of the following is better for the immunity of infants? (96.80%)	BF, FF, I don't know
Q8. Which of the following strengthens mother-baby bonding? (98.56%)	BF, FF, I don't know
Q9. Which of the following has a higher mortality risk? (65.19%)	BF, FF, I don't know
Q10. Which of the following decreases maternal risk of breast and ovarian cancer? (78.67%)	BF, FF, I don't know
Q11. Which of the following maintains satiety for infants for a longer period of time? (23.20%)	BF, FF, I don't know
Q12. Which of the following has higher content of vitamin D? (8.84%)	BF, FF, I don't know
Q13. Which one promotes stress reduction and positive feelings in mothers? (90.72%)	BF, FF, I don't know
Q14. Which of the following lowers the risk of postpartum depression? (82.32%)	BF, FF, I don't know
Q15. Which of the following can be used in the management of lactose intolerance? (35.14%)	BF, FF, I don't know

Statistical analysis:

Frequencies of correct knowledge answers were described. Awareness scores of different persons according to demographic characteristics were compared with independent samples t test, or one-way analysis of variance (ANOVA) test as appropriate. Differences with p values ≤ 0.05 were considered statistically significant. We analyzed the data using statistical package for the social sciences (SPSS), version 25.0.

Results:

A total of 905 subjects participated and completed the study questionnaire. Among this final sample 464 (51.27%) were female, 369 (40.77%) were between the ages of 26–35 and 422 (46.63%) held a bachelor's degree. Four hundred and forty-eight (49.50%) of participants were unemployed, 409 (45.19%) were married and 211 (23.31%) had 1–2 children. Most of our sample (91.16%) were from urban areas and 667 (73.70%) were middle economic income people. Other demographic characteristics are shown in Table 2.

Table 2

Demographic characteristics of participants and awareness scores based on demographic variables

	Number of participants (%)	Knowledge score mean (± standard deviation)	<i>P</i>
Gender			
Male	441 (48.73%)	10.34 (± 2.40)	< 0.001
Female	464 (51.27%)	11.39 (± 1.98)	
Age-group (years)			
18–25	376 (41.55%)	10.61 (± 2.44)	< 0.05
26–35	369 (40.77%)	11.00 (± 2.13)	
36–45	104 (11.49%)	11.17 (± 2.03)	
≥ 46	56 (6.19%)	11.32 (± 1.91)	
Education			
No formal education	2 (0.22%)	2.50 (± 2.12)	< 0.001
High school or below	79 (8.73%)	9.80 (± 2.98)	
Undergraduate student	286 (31.60%)	10.65 (± 2.22)	
Bachelor’s degree	422 (46.63%)	11.17 (± 1.99)	
Master’s degree and above	116 (12.82%)	11.27 (± 2.13)	
Job status:			
Employed	448 (49.50%)	10.74 (± 2.26)	0.07
Unemployed	457 (50.50%)	11.01 (± 2.24)	
Marital status:			
Married	409 (45.19%)	11.31 (± 2.05)	< 0.001
Single	496 (54.81%)	10.52 (± 2.35)	
Number of children			
0	560 (61.88%)	10.53 (± 2.36)	< 0.001
1–2	211 (23.31%)	11.45 (± 1.94)	
3–4	97 (10.72%)	11.53 (± 1.89)	
5–7	26 (2.87%)	11.77 (± 1.18)	

	Number of participants (%)	Knowledge score mean (± standard deviation)	<i>P</i>
≥ 8	11 (1.22%)	9.82 (± 3.34)	
Residence:			
Urban	825 (91.16%)	10.95 (± 2.19)	< 0.05
Rural	80 (8.84%)	10.16 (± 2.76)	
Income:			
Low	170 (18.78%)	10.45 (± 2.35)	< 0.05
Middle	667 (73.70%)	10.96 (± 2.22)	
High	68 (7.51%)	11.18 (± 2.22)	

The correct answer rates of the 15 awareness questions were 8.84–98.56% (Table 1). The mean awareness score was 10.88 (SD: 2.25, range: 0–15), suggesting an overall 72.53% (10.88/15*100) correct rate on this awareness test. Awareness scores significantly differed across gender, where females were more knowledgeable, with a mean score of 11.39 (SD: 1.98), than males who had a mean score of 10.34 (SD: 2.40) ($P < 0.001$). Older age proved to influence awareness significantly ($P < 0.05$). People who are 46 or older were the most knowledgeable. In contrast, the 18–25 age groups awareness was the lowest compared with the other age groups. Marital status and residence also showed a significant difference in the awareness where people who are married and resident in urban areas showed more knowledge than the corresponding groups ($P < 0.05$). However, there was no difference in the awareness based on the job status ($P = 0.07$). There were a significant difference in the awareness based on the education where people with higher educational degrees showed more knowledge than the lower ones as shown in Table 2. Also there were a significant association between the income and the awareness, where higher income was associated with higher knowledge.

Most of our sample (97.35%) agreed that breastfeeding is the ideal nutrition for infants < 6 months old. Among our sample, 590 (65.19%) were aware that breastfeeding reduces the mortality rate of infants. Only 80 (8.84%) knew that the formulas contained more vitamin D than breast milk. Three hundred and eighteen (35.14%) of our participants were aware that formulas feeding can be used as a management in some medical situations (e.g. lactose intolerance). Seven hundred and twelve (78.67%) of the participants answered correctly that breastfeeding decreases the maternal risk of breast and ovarian cancer. Almost all of the participants (98.56%) were aware that breastfeeding strengthen the bond between the mother and her infant.

Discussion:

An optimum level of awareness and knowledge is required to maintain the optimum level of health practices in the community, and the decision whether to breastfeed or formula feed is not an exception. The overall correct awareness rate was 72.53% on this awareness test. Participants showed a poor level of awareness regarding formula feeding and its benefits compared to their relatively high correct rates on questions related to breastfeeding benefits (Table 1). This is suggesting a lack of knowledge in the community when it comes to the different benefits of formula feeding. While only 8.84% of respondents answered that formula feeding has a higher content of vitamin D, 97.35% agreed that breastfeeding is the ideal nutrition for infants < 6 months old. Considering the different needs of parents and infants, the community need to be aware of the different benefits and advantages of both, breastfeeding and formula feeding. Families should also understand why and when to use formula feeding or stick to breastfeeding, rather than taking a random decision. This high level of awareness, as this study results suggests, is lacking. In our study, the level of awareness was significantly affected by demographics, such as gender, age, and education (Table 2). Since Females are often directly involved in the process of feeding their infants, it wasn't a surprise that they had a higher level of knowledge than male participants ($p < 0.001$). Their direct involvement, particularly in breastfeeding, would probably encourage mothers to seek more knowledge on the topic. Knowledge score also varied across age groups with older participants scoring higher in this questionnaire ($p < 0.05$). Participants who had more children also scored higher than participants with lower number of children, with the exception of those who had 8 children or more. The association between the incline of the knowledge score with older participants and with participants who had more children could be attributed to their increasing experience and exposure to knowledge related to breastfeeding and formula feeding as they age and raise more children. Participants who had 8 children or more scored the lowest among other groups with a mean score of 9.82. This might be related to social, cultural, and other demographic factors. Education had a positive impact on the level of awareness, with the higher educated participants scoring higher in this questionnaire ($p < 0.001$). Education provides direct access to information and knowledge resources which makes this a logical result. Married participants also showed a greater level of knowledge than single participants ($p < 0.001$). As with some other demographic factors, experience and direct involvement is clearly affecting the level of awareness in the community on this topic. A higher level of awareness was also noticed among residents of urban areas compared to rural ($p < 0.05$). Residents of urban areas have better access to healthcare services and education, where more doctors are found, and more education campaigns are held, thus contributing to a better knowledge on such topics. The income of respondents has also significantly affected the results of our study, with an increase in the level of knowledge as income increases ($p < 0.05$). The study suggests that respondents with higher income have the highest knowledge on the subject. This can be related to the fact that people with higher income have better access to healthcare services and are more concerned about their health and such choices. people with lower income might not be able to afford to buy the formula for their children and are more concerned with the basic needs of their daily life. A similar study was conducted on 482 breastfeeding mothers in 2017 in Jos, Nigeria (26). Of the mothers interviewed, 77.6% showed a good level of knowledge on breastfeeding benefits. As with our study, this is an indication that females have a high level of knowledge on the topic. However, this study does not include male participants. Another study was conducted in 2018 in Saudi Arabia concluded an insufficient

knowledge about breastfeeding among Saudi women (27). Of the total 397 mothers involved in the study, 73.3% agreed that breastfeeding decreases mother risk of breast cancer. In addition, 94.2% agreed that breastfeeding improves child immunity. The findings in the studies above suggests that the general awareness on this topic needs further improvement and more attention.

Conclusion And Recommendations:

Overall, participants' awareness about the benefits of breastfeeding compared to formula were found to be appropriate. The majority of participants were aware about the breastfeeding benefits. However, the study highlighted a lack of knowledge regarding formula benefits. We recommend the health authorities to hold educational campaigns and establish programmes to improve the public awareness on this topic. We also encourage healthcare workers to provide adequate education to parents, the general population, and to actively participate in advancing the public's awareness. In addition, we recommend further studies to highlight this issue in Sudan and in the region to explore the areas of defect and perhaps suggest accurate solutions.

Study Limitations:

Our study was conducted during the COVID-19 pandemic lockdown, imposed by the Government of Sudan. For that reason, data was collected through online questionnaire and some sectors of the community (e.g. people living in rural areas, and those of no formal education) were not represented well in our study.

Declarations

Ethical Approval and consent to participate:

Consent has been approved from participants prior to questionnaire submission.

Consent for publication:

All authors agree to the journal guidelines and Terms of Service as indicated in the Cover Letter.

Availability of Data:

Data obtained and used in this research can be obtained from the Corresponding Author with reasonable requests.

Competing Interests:

The authors have declared that there are no competing interest that require disclosure.

Funding:

None.

Authors' contributions:

- AA picked up the research subject and was responsible for discussing the results, debating the findings, formulating the questionnaire, and recommending further studies.
- IAA was responsible for leadership and coordination, publishing and distributing the questionnaire, data collection and extraction, and drafting the methodology and conclusion.
- AGH was responsible for composing the introduction, information gathering and validation, data interpretation and analysis, drafting the results, and distributing the questionnaire.
- MSA and AAM contributed to the questionnaire formulation and distribution.
- AKA was responsible for proofreading, editorial revision and corrections, correspondence, and journal screening.
- AMA and MAH formulated the questionnaire, translated it, and rephrased it.

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