EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 6
Issue: 2
308-316
Year: 2019

PREVALENCE AND ASSOCIATED FACTORS FOR INITIATION OF INFANT FORMULA FEEDING AMONG MOTHER WHO ATTEND PUBLIC HEALTH INSTITUTIONS IN DIRE DAWA CITY, EASTERN ETHIOPIA

Imam Dagne[1*], Mesfin Kebede[1] and Robel Mokonnen[2]

[1*]Department of Public Health, College of Medicine and Health Science, Dire Dawa University, Diredawa P.O. Box 1362, Diredawa, Ethiopia.
[2]Department of Laboratory, College of Medicine and Health Science, Diredawa University, P.O. Box 1362, Diredawa, Ethiopia.

***Corresponding Author: Dr. Imam Dagne**
Department of Public Health, College of Medicine and Health Science, Dire Dawa University, Diredawa P.O. Box 1362, Diredawa, Ethiopia.

Article Received on 12/12/2018 **Article Revised on 02/01/2019** **Article Accepted on 23/01/2019**

ABSTRACTS

Introduction: Breastfeeding for infants and young children provides the ideal food for healthy growth and development. Through direct and indirect campaign use of infant formula feeding increase worldwide. In Ethiopia it is not practiced. Thus, the aim of this study is to determine prevalence and associated factors for initiation of infant formula feeding among mothers attending in public health institutions of Dire Dawa town, Eastern Ethiopia. **Methods**: A health facility based, cross-sectional study design was used. With a sample size of 186 using interviewer administered questionnaire. Bivariate, multivariable logistic regression model were fitted and COR and AOR with 95% CI were computed to check the associations among the variables and to control the confounding factors. **Results:** The prevalence of initiation of infant formula feeding was 21.4 %. The main reason for initiation of infant formula feeding was mothers had no adequate breast milk. Evident factors that increase initiation of infant formula feeding were counselling during ANC follow up, mode of delivery, monthly family income, source of information. **Conclusion**: There is high prevalence of initiation of infant formula feeding among mothers attending public health institutions in Dire Dawa city. Lack of counselling regarding breast feeding during ANC follow up, delivery through caesarean section, increasing family income were associated with increased in initiation of infant formula feeding. Thus, design and implementation of community and facility based health education and government to consider adopting stricter regulations and enforcement for the marketing of infant formula which will help resolve the current increasing infant formula feeding prevalence in the city.

KEYWORDS: breast feeding, initiation of breast feeding, Eastern Ethiopia.

INTRODUCTION

Backgrounds

Breastfeeding contributes to infant nutrition and health through a number of important mechanisms and provides a complete source of nutrients for the first six months of life.[1] and the healthiest way to feed an infant, but many mothers for a variety of reasons choose to feed their infant with infant formula.[2] Infant formula is manufactured using modified cows' milk and does not contain any of the protective antimicrobial or bioactive substances. It is not a sterile product and can be a growth medium for harmful bacteria.[3] Mothers who choose not to breastfeed, do not receive any of the health benefits of breastfeeding. It is not only the absence of breast milk that poses a risk to future health; giving infant formula in itself is associated with specific risks to infant health,[4] and no matter how appropriate infant formula may be from a nutritional standpoint, when infants are not breastfed or breastfed only partially, feeding with formula remains a deviation from the biological norm for virtually all infants.[6]

Reports indicate that Infants under 2 months old who are not breastfed are six times more likely to die from diarrhea or acute respiratory infections than those who are breastfed and nearly 1.3 million deaths could be prevented each year if exclusive breastfeeding rates increased to 90%.[4, 5] The use of infant formula has grown rapidly and has a profound negative impact on breastfeeding practices. Compared to breastfed infants, formula-fed infants have higher risks of contracting infectious diseases in the first year of life 8-10**.** Formula feeding has also been linked to some chronic diseases like asthma, diabetes and childhood obesity which are recently the problem of developing countries.[7]

The idea that breastfeeding is superior thus powerfully disseminated to the lay population. Yet the number of women who feed their babies formula milk remains very large when set against the policy goal of six months exclusive breastfeeding. Similarly global survey conducted by UNICEF shows majority of women wholly or partly uses formula for baby feeding well before their babies reach 6 months of age.[8] With the development of a commercial industry that manufactures and heavily markets cow's milk formula and due to its perceived benefits of convenience and equivalent nutrition, formula feeding has become the norm in many western, industrialized countries.[9]

There has been limited research that focuses on gaining a better understanding of why so many mothers choose to formula-feed their infants. However, a number of studies suggest socio-demographic factors are associated with the choice to formula-feed. These include younger age, lower education and income, being a single parent and a current smoker.[15, 16] Although many of these same women seem to be knowledgeable about the benefits of breastfeeding, young low-income women tend to be greatly influenced by the attitudes held by their social environment[17] as well as the attitudes and support, or lack of support, from their own mothers.[16, 18, 19] Many of these factors are difficult to modify and what is needed is a better understanding of why mothers with these characteristics make their decision to formula-feed in order to develop targeted interventions.

Formula marketing in hospitals is still widespread, especially in the form of commercial discharge bags containing free samples of infant formula. New mothers who receive these samples are more likely to stop breastfeeding sooner than those who don't receive these samples. Different study found that the hospital staff and routines exerted a stronger influence on mothers' infant-feeding practices by nonverbal teaching (the hospital "modeling" of infant formula products) than by verbal teaching (counseling supporting breast-feeding). A number of reasons are cited for why more mothers do not breastfeed: aggressive formula product marketing, lack of support from friends/family, insufficient knowledge among medical professionals, maternity hospital practices, cultural attitudes, and an increasing number of women in the work force.[13, 14] In addition, given the well-known risks of formula feeding for mother and baby[13, 16] from a public health perspective, it is critical to better understand the factors that influence these decisions with the overall goal of promoting a behavior that will improve the health of both the baby and mother.[18, 20]

There has been limited research in Ethiopia that focuses on gaining a better understanding of the prevalence of infant formula feeding, however, a number of studies suggest socio-demographic factors are associated with the choice to formula-feed. Even though a comprehensive Information, Education and Communication and antenatal care strategies for improving infant and young child feeding studies showed the group education at health facility level not much focused on Infant and Young Child Feeding as the focus given to diseases such as TB, HIV/AIDS, etc.[10] There is no data available in Dire Dawa administration city. However, with the fast economic growth and urbanization, it will be expected to increase for the use of infant formula feeding.

METHODS AND MATERIALS

Dire Dawa administrative city is found in Eastern Ethiopia located 515 km away from the capital city of Addis Ababa. The town has 1 referral and 1 primary hospital, 3 private hospitals, 32 health posts, 2 clinics and 32 mid-level clinics,15 health centers (8 in rural and 7 in urban). A health facility based cross sectional study design was conducted from February 7-29, 2018. The sample size was determined by using single population proportion formula by considering the following assumption, proportion of 12.4%, (Z = 1.96), Margin of error 5% (d = 0.05), sample size became 186.

Sampling proportion

Simple random sampling technique was used to select four health facilities from the total 7 health facilities. Then, the total sample size was allocated proportionally for the selected health centres and a systematic random sampling technique was used to select pregnant mothers who were attended services to avoid selection bias and to minimize disproportion between them. The source population was pregnant mothers attended in selected health centres. So that totally 186 mothers were allocated for Dilchora Referal hospital, Sabian primary hospital, Gendekore and Legehare health center. The first mother interviewed from each health facility was chosen by lottery method and then the next study subject was selected by calculating sampling interval of (K^{th})= N /n. for each health centres.

Data on socio-demographic information (age, marital status, maternal occupation, maternal educational status and obstetrics history) were collected using a pretest structured questionnaire. The questionnaire was developed after reviewing different literatures. The questionnaire was pre-tested on 5% of the total sample size in other health centers and adjustment was made before using for data collection. Data collectors and supervisors were trained and data were collected through "face to face" interviews after respondents received the service, and the interview took a maximum of 30 minutes.

Prior to analysis, data cleaning, coding, checking for normality, completeness was done, then data was entered into SPSS version 20.0. The results were presented in tables and text using frequency and summary statistics such as mean, standard deviation, and percentage. Most of the variables were fitted to the bivariate analysis to obtain OR and the CI for association of variables. Then

all the variables with p ≤ 0.2 in the bivariate analysis were further entered into multivariate logistic regression model and standard enter techniques were fitted to analyze. Finally, statistical significant association was determined based on [AOR, 95% CI, P < 0.05]). The Hosmer and Lemeshow goodness of- fit test was used to assess whether the necessary assumptions for the application of multiple logistic regression were fulfilled, and p value > 0.05 was considered a good fit.

Ethical clearance was obtained from the Ethics Review Board of Haramaya University and formal letter of cooperation was written to Dire Dawa administrative health bureau and then to selected health centers. After explaining the purpose of study, data collectors obtained voluntary verbal consent from each study participant. The participants were informed that participation was on voluntary basis and they could withdraw at any time if they were not comfortable about the questionnaire. Personal identifiers were not included so that a participant's confidentiality was assured.

RESULT

1. Socio-demographic Characteristics

All 186 (100%) sampled women were included in the analysis. The mean age of respondent was 25.65 years with age range.[15–40] One hundred twenty nine (69.4%) were in age group of 21-30 years, almost all 182(97.8%) were married, more than half 99(53.2%) were house wife, majority, 106(57%) were Muslim, 77(41.4%) were Oromo by ethnicity and 18 (9.7%) were illiterate, nearly half 88 (47.3%) had monthly income ranges 2500 to 5000 Ethiopian birr. Regarding babies 101 (54.3%) of infants were males. Regarding age majority (48.8%) of infant's age were 1 to 6. **See Table1.**

Table.1: Socio demographic characteristics of mother attending public health institutions in Dire Dawa city, Eastern Ethiopia, 2018.

Socio demographic characteristics		Frequency	Percent
Age of mothers grouped	<=20	31	16.7
	21-30	129	69.4
	31-40	26	14.0
	Total	**186**	**100.0**
Marital Status	Married	182	97.8
	Divorced	3	1.6
	Widowed	1	.5
	Total	**186**	**100.0**
Ethnic Group	Oromo	77	41.4
	Amhara	46	24.7
	Somali	33	17.7
	Tigre	12	7
	Gurage	17	9.1
	Total	**186**	**100.0**
Religion	Muslim	108	58.1
	Orthodox Christian	66	35.5
	Protestant	12	6.5
	Total	**186**	**100.0**
Occupation of mothers	House wife	99	53.2
	Government employee	24	12.9
	Merchant	37	19.9
	Others*	26	14.0
	Total	**186**	**100.0**
Educational Level of Mother	Not attended school	18	9.7
	primary school	60	32.3
	secondary school	64	34.4
	more than secondary	44	23.7
	Total	**186**	**100.0**
Family monthly income	<=2500	64	34.4
	2500-5000	88	47.3
	>5000	34	18.3
	Total	**186**	**100.0**

***NGO, daily labour**

2. Obstetric and Delivery History of respondents

Among all mothers 186(98.4%) of them had history of ANC follow up at hospitals (48.6%) and health centers (50.3) while three(1.6%) mothers had no ANC follow up. During ANC follow up majority (50.8%) of respondents did not taken counseling on breast feeding and only 49.2

%(89) of them had taken counseling regarding breast feeding. Majority of the respondents 59.7 %(111) were multiparous and 40 %(75) were primiparous. Regarding mode of delivery 75.3 %(140) of mothers gave delivery through spontaneous vaginal delivery while the remaining 24.7% were through caesarean delivery. Even though 97.3% of delivery was at health institutions (72% at hospitals, 25.3% at health centers) only 76.9% of mother got counseling regarding breast feeding after delivery and the remaining 23.1% didn't had any counseling after delivery.

Table 5.2: Obstetric and delivery characteristics of mother attending public health institutions in Dire Dawa city, eastern Ethiopia, Feb 2017.

Obstetric and Delivery characteristics		Frequency	Percent
ANC follow up	Yes	183	98.4
	No	3	1.6
	Total	**186**	**100.0**
Place of ANC follow up	Hospital	89	48.6
	Health centers	94	51.4
	Total	**183**	**100.0**
Counselling on breast feeding during ANC	Yes	90	49.2
	No	93	50.8
	Total	**183**	**100.0**
Place of delivery	Health centers	47	25.3
	Hospital	134	72.0
	Home	5	2.7
	Total	**186**	**100.0**
Mode of delivery	Spontaneous vaginal delivery	140	75.3
	Caesarean delivery	46	24.7
	Total	**186**	**100.0**
Counselling on breast feeding after delivery	Yes	143	76.9
	No	43	23.1
	Total	186	100.0
Number of babies delivered in last pregnancy	One	183	98.4
	Two(twins)	3	1.6
	Total	**186**	**100.0**

2. Infant formula feeding practice

One hundred sixty five (88.7%) respondents had heard of infant formula milk. The frequently cited source of information were Peers, families and neighbourhoods (79.4%) followed by health professionals (42.4%) and radio and TV (2.4%) and others (3%).

The prevalence of infant formula feeding in infants' age between 0 to 6 month was 21.5 %. One in every ten infants (10.8%) first initiated feeding with infant formula milk while76.9% with breast milk, 12.4% with plane water, sugar solution and others. 32.5% of infants started infant formula feeding with in the first day, 72.5% within one week, and 80% within one month after delivery. The main reason for the initiation of infant formula feeding were my breast has no adequate milk(85%), followed by my neonate was unable to breastfeed or has disease (15%), caesarean delivery(12.5), I am out of home for work(10%) and others(10%).

Of those who started infant formula feeding 67.5 %[27] of them continue to give infant formula milk while 32.5 %[13] stopped to give formula feeding. The reason for stopping infant formula feeding includes I had adequate breast milk (61.5), my child was sick (23.1%) advice from health professionals (7.7%) and others (7.7%). 60.5% of respondents do not know risk factor of infant formula feeding to the infants but 16.8% of mothers responds infant formula cause diarrhoea, 16.2% and 7.8% of mothers responds infant formula cause vomiting and dry stool respectively.

Table 3: Infant formula feeding practice of mother attending public health institutions in Dire Dawa city, Eastern Ethiopia, Feb 2018.

	Response	Frequency	Percent
Ever heard of Infant formula milk	Yes	165	88.7
	No	21	11.3
	Total	**186**	**100.0**
Have you ever given Infant formula milk for the index baby	Yes	40	**21.5**
	No	146	78.5
	Total	**186**	**100.0**
Reason to start infant formula feeding	My breast has no adequate milk	34	85
	My neonate was unable to breastfeed or has disease	6	15
	caesarean Delivery	5	12.5
	I am out of home for work	4	10
	Other reasons	4	10
Have you stopped to give infant formula feeding for your baby	Yes	13	32.5
	No	27	67.5
	Total	**40**	**100.0**
Reason for stopping infant formula feeding	My child was sick	3	23.1
	Advice from health professionals	1	7.7
	I had adequate breast milk	8	61.5
	Others	1	7.7
	Total	**13**	**100.0**
Risk of infant formula feeding	Don't know	101	60.5
	Diarrhoea	28	16.8
	Infection	14	8.4
	Vomiting	27	16.2
	Dry Stool	13	7.8
	Others	5	3

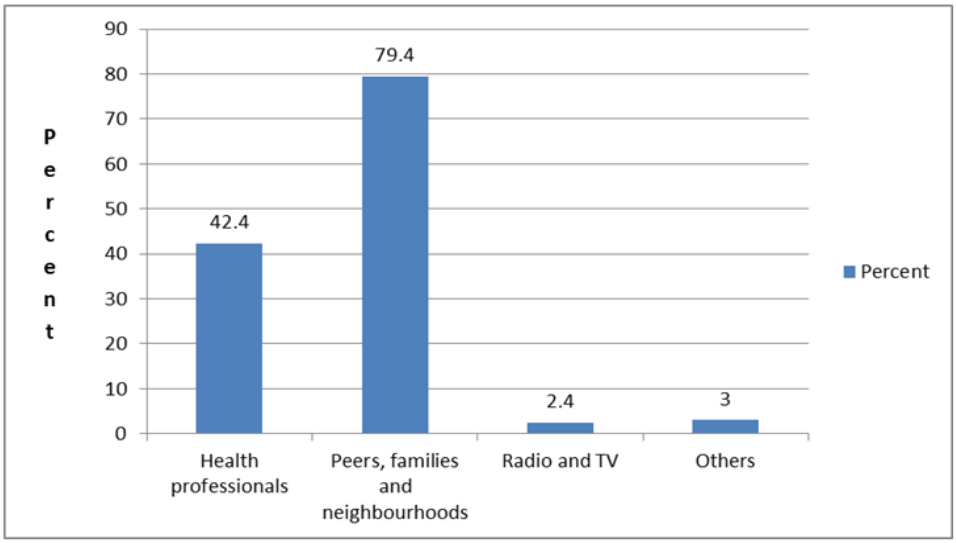

Figure 1: source of Infant formula feeding among mother attending public health institutions in Diredawa city, Eastern Ethiopia, Feb 2018.

Factors affecting initiation of infant formula feeding

The bivariate logistic regression analysis showed that initiation of infant formula feeding was associated with occupational status, family income, counseling on breast feeding during ANC follow up, mode of delivery, Time of initiation of infant feeding, and source of information about infant formula milk. From these variables, Family income, Counselling on breast feeding during ANC follow up, Mode of delivery, source of information were significantly and independently associated with initiation of infant formula feeding in multiple logistic regression analysis.

Mothers with family income more than 5000.00 birr per month were 2.427 times [AOR: 2.427, 95% CI: 1.272-4.630] more likely to initiate infant formula feeding than

those who had less than 2500 birr monthly family income. Mothers who had no Counselling on breast feeding during ANC follow up were 3.29 times [AOR: 3.296, 95% CI: 1.272 - 8.542] more likely to initiate infant formula feeding than those mothers who had counselling. Women who delivered with caesarean section had 3.38 times [AOR: 3.382, 95% CI: 1.186-9.632]) more likely to initiate infant formula feeding as compared with women delivered through spontaneous vaginal delivery.

Mother who heard information from family, friends and neighbours regarding infant formula milk had 3.47 times (3.472[1.161-10.382] *P=0.026*) more likely to initiate infant formula than other source of information, however women whose source of information about infant formula milk were health profession were 0.34 times (AOR: 0.347, 95%CI: [0.126-0.955], *P=0.04*) less likely to initiate infant formula feeding than those women whose source of information were not health professionals (Table 5).

Table 5: Logistic regression models showing the determinants of initiation of Infant formula feeding among mother who attends public health institutions in Dire Dawa city, Eastern Ethiopia, 2018.

		Initiation Infant formula feeding		logistic regression		
Monthly family income		**Yes**	**No**	**COR[95%CI]**	**P value**	**AOR[95%CI]**
	<=2500.00	6(9.4%)	58(90.6%)	1		
	2500.00-5000.00	17(19.3%)	71(80.7%)	9.66 [3.29-28.36]	0.00	0.99(0.78-7.44)p=0.06
	>5000.00	17(50.0%)	17(50.0%)	4.17[1.77-9.82]	0.001	2.42[1.27-4.63] **P=0.007**
Employment status						
	unemployed	14(14.1%)	85(85.9%)	1		
	employed	26(29.9%)	61(70.1%)	2.58[1.24-5.36]	0.01	1.41{.56-3.52] P>0.05
Counselling on breast feeding during ANC follow up						
	Yes	13(14.4%)	77(85.6%)	1		
	No	27(29.0%)	66(71.0%)	2.42[1.15-5.07]	0.019	3.29[1.272-8.54] **P=0.014**
Mode of delivery						
	Spontaneous vaginal delivery	17(12.1%)	123(87.9%)	1		
	Caesarean delivery	23(50.0%)	23(50.0%)	7.23[3.35-15.61]	0.000	3.38 [1.18-9.63] **P=0.022**
Time of initiation of infant feeding						
	<=1 hour	18(15.1%)	101(84.9%)	1		
	> 1 hour	22(32.8%)	45(67.2%)	2.74[1.34-5.60]	.006	1.12 [0.39-3.14] P0.056
Health professionals						
	Yes	29(41.4%)	41(58.6%)	0.18[0.084-0.40]	.000	0.34 [0.12-0.95] P=0.04
	No	11(11.6%)	84(88.4%)	1		
Peers, families and neighbourhoods						
	Yes	23(17.6%)	108(82.4%)	4.69(2.09-10.54)	.000	3.47[1.16-10.38] P=0.026
	No	17(50.0%)	17(50.0%)	1		

DISCUSSION

The economy of Dire Dawa city has grown rapidly in recent years. The rise in living standards accompanying the economic growth has led to a demand for improved health care and in particular, the application of advanced medical technologies. Infant feeding practices are another part of the culture which has been influenced by economic development. There is now widespread promotion of infant formula and mothers are fascinated by the prospect of a high-technology product which promises much for their infants. On the other hand, cultural beliefs are still strong and most mothers commence breastfeeding, but they tend to combine this with infant formula in the early months of their infants' lives.

This study is proposed to assess the prevalence & factors associated with initiation of infant formula feeding among women who attend public health institutions in Diredawa city, Eastern Ethiopia. The findings of this study indicated that the prevalence of initiation of infant formula feeding among women who attend public health institutions in Diredawa city was 21.5 % as compared with prevalence of 12.4% in Gonder city[11], 57% in Scotland[2], 88% in china[21] and 52.7% in Ghana[23] In this study 10.8% of mothers had first introduced infant formula into their infant's diet at birth this is less than a research done in other areas like 30% in global survey done by UNICEF[8], 70% in China, 38% in Scotland, and 23.6% in South Africa.[24] Even though the rate is lower than developed countries which is probably due to

change in economic status and social and cultural differences between study subjects this is high as compared to research done in Gonder.[11]

The principal reasons for initiation of infant formula feeding were my breast has no adequate milk(85%), followed by my neonate was unable to breastfeed or has disease (15%), caesarean delivery(12.5), I am out of home for work(10%). A similar study conducted in Durham Region in 2009-2011 shows the Top Five Reasons for Formula Introduction before Six Months, include "Milk supply concerns/hungry baby"(39%) was the most common reason for introducing formula before six months, followed by baby/mother's medical issues(16%) and latching difficulties(9%).[5] But a study done in china the belief that 'the more or the quicker the baby gained weight, the healthier the baby is' was the main reason.This study shows that patients have a range of reasons for initiation of infant formula feeding.

The study showed of those who started infant formula feeding 67.5 % of them continue to give infant formula milk while 32.5 %[13] stopped to give formula feeding. The reason for stopping infant formula feeding includes I had adequate breast milk (61.5), my child was sick (23.1%) advice from health professionals (7.7%) but a study done in South Africa showed that the most common reasons why the mothers reported discontinuing the infant formula included that the infant did not like the taste (n = 8; 34.8%), it caused constipation in the infant (n = 3; 13.0%) or it was too expensive (n = 3; 13.0%).[24]

Family income, counseling on breast feeding during ANC follow up, mode of delivery and source of information about infant formula milk had significant association with initiation of infant formula feeding. Based on the multivariate analysis mothers with family income more than 5000.00 birr per month were more likely to initiate infant formula feeding than family income less than 5000.00 birr. This study is supported by a research done in Canada on 2013.[33]

Another factor identified by current study was the presence of ANC follow up does not affect infant feeding practice rather counselling regarding breast feeding is very important which is evidenced with mothers who had no Counselling on breast feeding during ANC follow up 3.29 times more likely to initiate infant formula feeding than those mothers who had Counselling on breast feeding during ANC follow up. A study conducted in England on 2012 showed that those intending to formula feed were more likely to discuss feeding at an antenatal check-up than those intending to breastfeed (81% and 75% respectively).[5]

Mode of delivery is another important factor identified by this study which has significantly associated with initiation of infant formula feeding. Women who delivered with caesarean section had 3.38 times (p=*0.022*) more likely to initiate infant formula feeding as compared with women delivered through spontaneous vaginal delivery. The study conducted in Vietnam (OR: 2.94, 95% CI: 2.39-3.61)[45] and Brazil showed one of the factors that influence infant formula feeding was mode of delivery (vaginal delivery, 8.1% caesarean delivery 15.4%).[32]

The other interesting finding in this study was that mother who hear information from family peers and neighbours regarding infant formula milk had 3.47 times more likely to initiate infant formula than other source of information, however women whose source of information about infant formula milk were from health profession were 0.347 times (*P=0.04*) were less likely to initiate infant formula feeding than those women whose source of information were not health professionals. The reason could be information from health professionals include both risk of infant formula milk and importance of exclusive breast feeding. But information from peers family and neighbours mainly didn't focus on risks of infant formula milk which facilitate the initiation of infant formula feeding. This is evidenced by 60.5% of study population didn't know any risk associated with infant formula feeding. But in contra-distinction to the western countries particularly, the South Africa, Iowa, and Oregon, where for instance, information from health professionals is related to higher rates of initiation of infant formula feeding, this is may be due to the nature of advertisement which is associated with provision of free formula milk sample to mothers which strongly affect decision of mother on initiation of infant formula feeding.[34, 35, 36, 37, 38]

Even though associations between maternal age, education, residence (urban or rural), age of infant, higher maternal education level and formula milk introduction before six months were statistically significant I other researches[13,32,33] this study doesn't show significant association after multiple logistic regression analysis but residence is not included in this study since all of study population live in urban areas.

Limitation of the study

The findings may not be generalized to the women who did not visit health institution.

By virtue, this study is expected to be prone for the limitation of cross sectional survey or establishing causal relationship is impossible and the wider confidence interval observed with some variables may also indicate inadequate sample size.

CONCLUSION

There is high prevalence of initiation of infant formula feeding among mothers attending public health institutions in Dire Dawa city. Lack of counselling regarding breast feeding during ANC follow up, delivery through caesarean section, increasing family income were associated with increased in initiation of infant formula feeding. Thus, design and implementation of

community and facility based health education and government to consider adopting stricter regulations and enforcement for the marketing of infant formula which will help resolve the current increasing infant formula feeding prevalence in the city.

Abbreviations: SVD: Spontaneous vaginal delivery; CS: Caesarean delivery.

ACKNOWLEDGMENTS
We would like to thank Haramaya University, College of Medicine and Health Sciences and RTI for their technical support and giving clearance and funding to conduct this study. We are also grateful to our colleagues, who in one way or another helped us to undertake this research.

Competing interests
We declare that there are no conflicts of interest to disclose.

Availability of data and materials
Data will not be share in order to protect the participants' anonymity.

Authors' contributions
ID designed and implemented the study, performed the statistical analysis and drafted the manuscript. NA participated in the study design, implemented the study. All of us contributed to the data analysis, read and approved the final manuscript.

Ethics approval and consent to participate
Ethical clearance was obtained from the Ethics Review Board of Haramaya University, ON behalf of the department of midwifery, College of Medicine and Health Sciences. Ethical letter was being written to the selected health center. Informed voluntary verbal consent was obtained from each participant after giving information and thoroughly explaining the aim of the study to each respondent. The study subjects were interviewed in their homes individually to maintain privacy.

Consent to publication.
Not applicable.

Funding
Financial support was obtained from research and community engagement of Haramaya University for writing the manuscript, design of the study and collection, analysis, and interpretation of data.

REFERENCE

1. WHO, Complementary Feeding: Family. Foods for Breast Feeding Children. Geneva, 2014.
2. Scottish Government, Improving Maternal and Infant Nutrition: A Framework for Action, Edinburgh, 2011.
3. Department of Health and the Food Standards Agency, Guidance for health professionals on safe preparation, storage and handling of powdered infant formula. 2012. http://www.food.gov.uk
4. WHO, *Enterobactersakazakii* and *Salmonella* in powdered infant formula: Meeting Report, MRA Series 10, Geneva, 2006.. http://www.who.int/foodsafety/publications/micro/mra10/en/index.html
5. England Health and Social Care Information Centre, 2012 Infant Feeding Survey 2010, www.ic.nhs.uk
6. WHO, infant and young child nutrition, Geneva, 2016.
7. Chung M, Raman G, et al. Breastfeeding and maternal and infant health outcomes in developed countries. Evid Rep Technol Assess, 2013; 153: 1-186.
8. UNICEF, 'UK Baby Friendly Initiative' 2005. http://www.babyfriendly.org.uk/matern.asp (accessed 07/02/2016).
9. Abrahams SW,: Milk and social media: online communities and the International Code of Marketing of Breast-milk Substitutes. J Hum Lact, 2012; 28: 400–406.
10. Ethiopian Health and Nutrition Research Institute, Assessment of status of infant and young child feeding (IYCF) practice, policy and programs: Achievements and Gaps, in Ethiopia, 2013.
11. Muluken Asfaw Admasu, Erika Cione., Breastfeeding Knowledge, Attitude, and Practice and Related Determinants Among Maternal in Gondar, Ethiopia: Cross-Sectional Study, 2015. *International Journal of Nutrition and Food Sciences*, 5(1): 25-30.
12. IBFAN, Report on the situation of infant and young child feeding in Ethiopia, 2015.
13. UCSF, literature review: infant formula marketing, Family Health Outcomes Project, 2015.
14. Jon Weimer, The Economic Benefits of Breastfeeding: A Review and Analysis. Food and Rural Economics Division, Economic Research Service, U.S. Department of Agriculture. Food Assistance and Nutrition Research Report, No. 13. 2013.
15. Duke PS, Parsons WL, Snow PA, Edwards AC: Physicians as mothers: breastfeeding practices of physician-mothers in Newfoundland and Labrador. Can Fam Physician, 2007; 53: 887–891.
16. Earle S: Why some women do not breast feed: Bottle feeding and fathers' role. Midwifery, 2010; 16(4): 323–330.
17. Morrison L, Reza A, Cardines K, Foutch-Chew K, Severance C: Determinants of infant-feeding choice among young women in Hilo, Hawaii. Health Care Women Int, 2008; 29(8): 807–825.
18. Chalmers B, Levitt C, Heaman M, O'Brien B, Sauve R, Kaczorowski J, Maternity Experiences Study Group of the Canadian Perinatal Surveillance System, Public Health Agency of Canada: Breastfeeding rates and hospital breastfeeding

practices in Canada: A national survey of women. Birth, 2009; 36(2): 122–132.
19. Alexander A, O'Riordan MA, Furman L: Do breastfeeding intentions of pregnant inner-city teens and adult women differ? Breastfeed Med, 2010; 5(6): 289–296.
20. Avery AB, Magnus JH: Expectant fathers' and mothers' perceptions of breastfeeding and formula feeding: a focus group studies in three US cities. J Hum Lact, 2011; 27(2): 147–154.
21. Li Tang, Colin W. Binns, Andy H. Lee, Infant Formula Crisis in China: A Cohort Study in Sichuan Province School of Public Health, Curtin University, Perth, Australia, 2010.
22. LiqianQiu Yun Zhao, Colin W Binns, Andy H Lee and Xing A cohort study of infant feeding practices in city, suburban and rural areas in Zhejiang Province, PR China,*International Breastfeeding Journal* 2008, http://www.internationalbreastfeedingjournal.com/content/3/1/4
23. Tan KL, Knowledge, attitude and practice on breastfeeding in Klang, Malaysia, IMJ, 2006.
24. Sowden M, Marais D, Beukes R, Factors influencing high socio-economic class mothers' decision regarding formula-feeding practices in the Cape Metropole, South Africa, journal of Clinical Nutrition, 2009; 22(1): 37-44.
25. Ameena E Goga, Tanya Doherty, Debra J Jackson4, David Sanders, Mark Colvin, Mickey Chopra and Louise Kuhn, Infant feeding practices at routine PMTCT sites, South Africa: results of a prospective observational study amongst HIV exposed and unexposed infants - birth to 9 months. International Breastfeeding Journal 2012, http://www.internationalbreastfeedingjournal.com/content/7/1/4
26. Jerzy Kuzma, Knowledge, attitude and practice related to infant feeding among women in rural Papua New Guinea: a descriptive, mixed method study, International Breastfeeding Journal 2013, http://www.internationalbreastfeedingjournal.com/content/8/1/16
27. Central Statistical Agency [Ethiopia] and ICF International. Ethiopia Demographic and Health Survey 2011. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Agency and ICF International, 2012.
28. International Baby Food Action Network (IBFAN)., Protecting babies fed on formula Why the UK government should fulfill its obligation to implement the *International Code of Marketing of Breast milk Substitutes, UK,* 2013.
29. Koletzko B, von Kries R, Closa R, Escribano J, Scaglioni S, Giovannini M, Beyer J, Demmelmair H, Gruszfeld D, Dobrzanska A, et al: Lower protein in infant formula is associated with lower weight up to age 2 y: a randomized clinical trial. American Journal of Clinical Nutrition, 2009; 89(6): 1836-1845.
30. Hawkins SSC, Law TJC, the Millenium Cohort Study Child Health Group: An ecological systems approach to examining risk factors for early childhood overweight: findings from the UK Millenium Cohort Study. J Epidemiol Community Health, 2009; 63: 147-155.
31. Noble S, Emmett P: Differences in weaning practice, food and nutrient intake between breast- and formula-fed 4-month-old infants in England.Journal of Human Nutrition & Dietetics, 2006; 19(4): 303-313.
32. Audi CAF et al. factors associated with infant feeding practice, 2005.
33. IFSS, Focused Report on Formula Introduction and Breastfeeding, Durham Region, The Durham Region Health Department (DRHD), May 2013.
34. Dr. Ellie Lee and Professor Frank Furedi, Mothers' experience of, and attitudes to, using infant formula in the early months University of Kent, 2013.
35. Parry K, Taylor E, Hall-Dardess, Understanding women's interpretations of infant formula advertising. *Birth*, 2013; 40(2).
36. Reiff MI, Essock-Vitale SM, Hospital influences on early infant-feeding practices. *Pediatrics*; 2015; 76(6): 872-879. http://www.ncbi.nlm.nih.gov/pubmed Accessed Dec, 16, 2016.
37. K. D. Rosenberg et al., "Marketing Infant Formula through Hospitals: the Impact of Commercial Hospital Discharge Packs on Breastfeeding," *American Journal of Public Health*, 2010; 98(2): 290-295.
38. Dusdieker LB, Dungy CI, Losch ME. Prenatal office practices regarding infant feeding choices. *ClinPediatr (Phila)*, 2009; 45(9): 841-845.
39. National Health and Medical Research Council, Literature Review: Infant Feeding Guidelines. Canberra: National Health and Medical Research Council, 2014. http://www.nhmrc.gov.au
40. WHO/UNICEF,. Acceptable medical reasons for use of breast-milk substitutes. 2008 Geneva.
41. Florence Jairus Saka factors influencing exclusive breastfeeding among HIV positive mothers at Ilala municipality, Dar essalaam, 2012.
42. Central Statistical Authority (CSA) of Ethiopia. The National Statistics 2007.http://www.csa.gov.et/ text files/_national_statistics.htm.
43. Dire Dawa Administration Bureau, Dire Dawa Administration statistical abstract, 2014.
44. Haile R., Procter TD., Alton GD. et al. 2015. Infant Feeding Surveillance Pilot Study: Final Report and recommendation, Canada.
45. Nguyen, Tuan T et al. "Infant Formula Feeding at Birth Is Common and Inversely Associated with Subsequent Breastfeeding Behaviour in Vietnam." *The Journal of Nutrition*, 2016; 146.10: 2102–2108. *PMC*. Web. 6 May 2017.