

Timely Initiation of Complementary Feeding and Associated Factors Among Children aged 6-23 Months in Negelle Arsi District, Southern Ethiopia, 2019: A Community-Based Cross-Sectional Study

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Abstract

Background: The period of transition from exclusive breastfeeding to family foods, referred to as complementary feeding, covers a child from 6-23 months of age. According to World Health Organization 2015; untimely initiation of complementary feeding has negative effect on child health, growth and development and an important cause of under nutrition in children less than 5 years of age which is an underlying cause of more than 40% of morbidity and mortality.

Objective: To assess the Timely Initiation of Complementary Feeding practice and Associated factors among children aged 6-23 Months in Nagelle Arsi District, Southern Ethiopia, 2019.

Methods: A community-based cross-sectional study was carried out. Systematic random sampling method was used to select 400 study participants. Data was collected using structured questionnaire using face to face interview. The collected data was coded, entered in to Epi-Info version 7 and then exported to SPSS version 21 for analysis. Descriptive statistics, binary and multiple logistic regressions were used for data analysis at 95% confidence intervals. A p-value <0.05 was considered to declare statistical significance.

Results: Out of 398 study participants, the proportion of timely initiated complementary feeding was 296 (74.4%) at 95%CI: (70.14, 78.66). In this study Postnatal care follow up [AOR=2.484; 95% CI: (1.478, 4.176)], ANC follow up [AOR=2.221; 95% CI: (1.276, 3.876)] and maternal counseling about timely initiation of complementary feeding at delivery place were positively associated with timely initiation of complementary feeding practice [AOR=2.362; 95% CI: (1.399, 3.986)].

Conclusion and recommendation: In this study, three-fourth (74.4%) of children were initiated complementary food at six months of age which was lower than the WHO cut-off point of $\geq 80\%$. ANC follow up, having postnatal care visits and being counseled about timely initiation of complementary feeding at place of delivery were significantly associated with timely initiation of complementary feeding. Therefore promoting ANC follow up, postnatal care visits and counseling about timely initiation of complementary feeding at delivery place were recommended to the concerned bodies to improve the coverage of timely initiation of complementary feeding practice.

Background

Complementary feeding practice is the period when other foods or liquids along with mother's milk are given to the baby which is started at six months based on the biological and developmental aspects of infants(2). Sub-optimal breast feeding and poor complementary feeding practices leads to mal-nutrition, which is the single biggest contributor to child mortality and the underlying causes of more than half of all deaths among children 6–59 months aged by UNDP 2012(1). The period of transition from exclusive breastfeeding to family foods, referred to as complementary feeding, covers a child from 6–23 months of age(3). Infants and young children are vulnerable to malnutrition because high nutritional requirements for growth and development and particularly begin at six month(4). For an optimal growth of an infant,

the World Health Organization recommends exclusive breast feeding for the first 6 months and the timely initiation of complementary feeding (CF) at the age of 6 months(5).

Early introduction of complementary feeding is increased morbidity due to gastro-intestinal diseases while Delayed introduction of CF is also negative consequences to the infants' health(6) .The child 6-23months is the time when malnutrition starts in many infants, contributing to the high prevalence of malnutrition in children under-two years of age. Although deaths in children under 5 years of age have decreased by 50%, i.e., 12.7 million in 1990, 5.9 million died in 2015 mostly because of preventable causes, and under nutrition is the underlying cause in 45% of these deaths globally(7). According to UNICEF estimates, 26% or 165 million children were stunted globally in 2011, and three-quarters of this burden was distributed in South Asia and sub-Saharan Africa(8).

Proper feeding of breast milk alone in the first six months could avert about 15% of infant deaths, and optimal complementary feeding could further reduce 6% of all deaths among children under 5years.Timely initiated complementary feeding with enough nutritious and safe foods prevents malnutrition(9).Women are more likely to continue optimal infant and young child feeding practices if they recognize the benefits, believe they can overcome perceived and actual barriers, and feel supported(10, 11). For infant and young child feeding programs, monitoring focuses on the proportion of mothers with children below 24 months received appropriate infant and young child feeding (IYCF) counseling and current status of feeding practices recommended by WHO the core indicators(12).

The main purpose of timely initiation of complementary foods is to fill in the energy and micronutrient gap created after 6 months of age when nutrient needs cannot be met by breast milk alone. Therefore timely initiation of complementary foods to child's diet is recommended. This means introducing an infant with solid, semi-solid or soft foods at age 6 months and continued breast feeding until two years of age (4, 13).

The feeding of infants and young children is crucial in determining the health, nutrition, survival, growth and development of the individual (14, 15).

It is important that mothers understand when to start complementary feeding, what foods to start with, how to feed a child and how to ensure that the food is hygienic and safe, because poor feeding practices coupled with high rates of infection in infancy and early childhood that result in malnutrition contribute to significant morbidity, delayed mental and motor development, poor school performance and reduced productivity in later life(13). This study was focused on the assessment Timely Initiation complementary feeding and associated factors among mothers of 6–23 months Children in Nagelle Arsi district, West Arsi Zone, Oromia Regional State, Ethiopia, 2019.

Methods And Materials

Study Setting

This study was conducted in Nagelle Arsi Woreda West Arsi Zone, Oromia Regional State Ethiopia. Part of the west Arsi zone located in the Great rift valley which is bordered on the south by Shashemane rural, on the south-west by Lake shala which separates it from shala, on the west from the southern nations, nationalities and peoples region, on the north by East Shewa with which it shares the shores of Lakes Abijatta and Langano, and on the east by the Heban Arsi woreda. Its' an area of 2081.463km² that extends between 07°09'00"-07°42'00"N latitudes and 38° 40'00"- 38°54'00"E longitudes. It has seven health centres, nine private primary clinic and thirty-seven health posts. The district has a total population of 211,059 residing in 36 rural Kebeles administrative with 104,474 male and 106,585 female. Children aged 6-23 months in the district about 8,970 (4.28%) of the population. The livelihood of more than 85 % of the district population is based on farming.

Study design and period

Community based cross-sectional study design was conducted from October 01–25, 2019

Sample size determination

The sample size for the first objective was calculated by using single population proportion formula by considering assumption about timely initiation of complimentary feeding practice 61.5% from study in Fiche, North Showa Zone, 2017(19), with assumption of 95% confidence level, non-response rate of 10% and margin of error (5%). The final **sample size for the first objective was = 400**

The sample size for the second objective was calculated using stat Calc of Epi Info from the study conducted in Mekelle, Northern Ethiopia 2013 (30), from assumption $n_i = 188$, With 10% non-respondent, final sample size for the second objective was = 199.

Therefore, sample sizes were calculated for the first and the second objectives and the largest sample size was found to be 400 from the first objective 400.

Generally, sample sizes were calculated for the first and the second objectives and the largest sample size was found to be 568 from the second objective.

Sampling procedure

Simple random sampling technique was employed to select twelve (12) Kebeles (33%) of total Kebeles (36) of Negelle Arsi district. Mothers in each selected Kebele with children aged 6–23 months were listed by using community health information system (CHIS) at health post (Fig. 2). The calculated sample size was allocated to each selected Kebele proportional to the size of the population and the first study participant was selected using simple random sampling from first k^{th} interval. Then the study participants were selected using systematic random sampling every k^{th} interval through house number of each household of Kebele by using community health information system at health post. If selected house is closed or mother is absent revisit and if more than one eligible child randomly takes one child. The twelve kebeles that included in the study were:

K₁ = CiriLalu, K₂ = Danshe, K₃ = Xurgee, K₄ = Ashoka,

K₅ = ShallaBila, K₆ = Gode, K₇ = Kararu, K₈ = DakaHoraKalo,

K₉ = GorbiArba, K₁₀ = Mako Oda, K₁₁ = Karsa Gara, K₁₂ = KarsaMaja.

Method of data collection and Tools

The quantitative data was collected by face-to-face interview to mothers who had children age 6–23 months through home to home visits. The questionnaires was adapted from WHO standard questions, Indicators for assessing Infant and Young Child Feeding practices part 2 measurement and EDHS 2016 to suit the study setting(20, 43). The prepared questionnaire includes information on socio demographic characteristics, health system related factors, Childs Characteristics and knowledge about when to start complementary feeding. Training were provided to 6 data collectors and 2 supervisors for one day on the objective, relevance of the study, confidentiality of information, respondent's right, informed consent, and techniques of interview and on how to use the data collection instruments.

Data quality assurance

The questionnaire was prepared in English and it was translated to Afan Oromo language and back translated to English by language expert to maintain consistency well. One day training was given to data collectors to be familiar with data collection instruments. The pretest will be made in 40 (10%) mothers who had children aged 6–23 months, outside the study area in the in Heban Arsi district to assess the content and approach of the questionnaire and direct observation to assure the feasibility of study. The collected data were supervised and checked for completeness and quality during data collection by supervisors and principal investigator before data entry.

Data processing and analysis

The data were checked for completeness, consistencies, cleaned, coded and entered in to Epi-Info version 7 software then exported to a computer using statistical package for social sciences (SPSS) version 21 for data analysis and present using the descriptive statistics (percentage) for socio-demographic characteristics, maternal health care services and child characteristics. Binary logistic regression used to look for crude association between exposure and outcome variables. Exposure variables with $P < 0.25$ were considered as candidates for multivariate logistic regressions to control for confounding. Thus we reported Adjusted Odds Ratio (AOR) along with 95% CI for the effect measure for association, and statistical significance was declared at $P\text{-value} < 0.05$. Finally the results of the study were presented using tables, figures and texts based on the data obtained.

Results

Socio-demographic characteristics of the respondents

Among proposed 400 mothers, 398 participated in the study, making the response rate (99.5%). The mean age of mothers was 25.79 (SD \pm 4.6) years with the range being from 15 to 45years old. Out of the

total mothers 224(40.7 %) were in the age group of 20–24 followed by age group 25–29 years old100 (25.1%). The majority of the participants 390(98%) were married and 337(84.7%) house wife. Concerning respondent's educational status 210(52.8%), religious 316(79.4%) and ethnicity 373(93.7%) were primary, Muslim followers and Oromo respectively. Among all children in the age of 6–23 months, 193(48.5%) were boys and the rest were girls. Children in the age range of 6–11 months constituted 46% of the rest age groups (Table 1).

Table 1
Socio Socio-demographic characteristics of the respondents ($n = 398$), Negelle Arsi,
Oromia Region, Ethiopia, 2019

Variables (n = 398)	Frequency Percent (%)	
Age of respondents	15-19	110.3
	20-24	162 40.7
	25-29	100 25.1
	30-34	77 19.3
	35 and above	18 4.5
Age of Child	6-11	183 46.0
	12-17	134 33.7
	18-23	81 20.4
Marital Status of Respondent	Single	3 .8
	Married	390 98.0
	Divorced	5 1.2
Educational Status of Respondent	No Formal Education	110 27.6
	Primary	210 52.8
	Secondary and above	78 19.6
Occupational Status of Respondents	House wife	337 84.7
	Student	10 2.5
	Government Employee	13 3.3
	Merchant	38 9.5
Religious of respondents	Orthodoxy	29 7.3
	Muslim	316 79.4
	Others	53 13.3
Ethnicity of Respondent	Oromo	373 93.7
	Amhara	13 3.3
	Others	12 3.0
Family Income	Less than or equal to 1500	293 73.6
	1501 and above	105 26.4

Variables (n = 398)	Frequency Percent (%)	
Number of under five children	1	111 27.9
	2-3	287 72.1

Maternal health service related factors of the respondents

Among the all respondents 361 (86%) reported that they had history of postnatal care follow up, about 368 (92.5%) of respondents had ANC follow up. From this, 153 (38.4%) had ANC follow up three and less than three times during the last pregnancy whereas, the rest 215 (54%) had ANC follow up greater than or equal to four times. More than half of the respondents, 264(66.3%) were heard health information from health extension worker. From those who were delivered at health institution 270 (67.8%), 193(48.5%) of them were counseled on timely initiation of complementary feeding practice (Table 2).

Table 2

Maternal health service related factors of respondents, Negelle Arsi, District, Oromia Region, Southern Ethiopia, 2019

Variables (n = 398)	Frequency Percent (%)		
Parity	1	52	13.1
	2-4	223	56.0
	Greater than 5	123	30.9
ANC Follow UP	Yes	368	92.5
	No	30	7.5
Number of ANC visit	1-3 Visits	215	54.0
	≥ 4 Visits	153	38.4
	No Visit	30	7.5
ANC visit advised on Timely Initiation of Complementary Feeding	Yes	301	75.6
	No	67	16.8
PNC Follow UP	Yes	219	55.0
	No	179	45.0
Number of PNC visit	1-3	196	49.2
	4 and above	23	5.8
	No Visit	179	45.0
PNC visit advised on Timely Initiation of Complementary Feeding	Yes	203	51.0
	No	16	4.0
HEWs within this last 6month	Yes	224	56.3
	No	174	43.7
Counseling on Home Visits	Yes	201	50.5
	No	23	5.8
	No Home Visit	174	43.7
Source of Health Information	Health Ext/Workers(at HP)	264	66.3
	Health Workers (HC, Hospital)	74	18.6

Variables (n = 398)	Frequency Percent (%)		
	WHDA, Radio/TV, Family,	60	15.1
Place of Delivery	At home	128	32.2
	Health Facility	270	67.8
Counseling on place of Delivery	Yes	208	52.3
	No	190	47.7

Complementary feeding practice of respondents

Majority of the mothers, 393(98.7%) were started complementary feeding for their child but 5 (1.3%) not started. From those who were started complementary feeding 55(13.8%), 296(74.4%), 47(11.8%) were before six month, at six month and after six month of age respectively. Out of the total mothers 334(85%) were initiate complementary feeding to their child timely by mashed food or fluid (cow milk or Powder milk).The majority of respondents, 388 (97.5%) were continued breast feeding but 10 (2.5%) were stopped breastfed when child age was ≥ 17 month.(Table 3).

Table 3

Complementary feeding practice of respondents, Negelle Arsi District, Oromia Region, Southern Ethiopia, 2019

Variables (n = 398) Frequency Percent (%)			
Child breast feeding practices in the past 24hrs	Yes	388	97.5
	No	10	2.5
Age to stop breast feeding	12–17	23	5.8
	18–23	179	45.0
	24 and above	196	49.2
Have you introduced complementary feeding	Yes	393	98.7.0
	No	5	1.3
Source health information when start complementary feeding	Health Workers (HC and Hospital)	203	51.0
	Health Ext/Workers(at HP)	66	16.6
	WHDA, Radio/TV, Family, School	27	6.8
	I Do not know	102	25.6
Reason for Timely Initiation of Complementary feeding (n = 296)	Not having enough milk	33	8.3
	Breast milk alone is no longer sufficient to meet all their nutritional needs	163	41.0
	Information acquired when to start complementary feeding	93	23.4
	Working mother	5	1.3
	Baby should learn how to eat	2	.5
Reason for Untimely Initiation of CF (n = 102)	Did not know exactly when to start CF	68	17.1
	Mother feels that her milk is not enough for baby	20	5
	Mother feels child may not be able to digest it at this age	14	3.5
How do you feed your child	by schedule	165	41.5
	On the demands of child	216	54.3
	When family eat	17	4.3
What do you use to feed your child	Bowel and spoon	155	38.9
	Bottle feeding	174	43.7

Variables (n = 398) Frequency Percent (%)			
	Hand feeding	69	17.3

Factors associated with timely initiation of complementary feeding practice

Candidate variables for multivariate logistic regression were identified by using bivariate logistic regression analysis. The criteria was set to $P < 0.25$ as a yardstick. Accordingly; socio-demographic characteristics such as respondents' achieved educational status, husbands' educational status and Family incomes, and maternal health service related characteristics such as PNC follow up, frequency of PNC visits, ANC follow up, frequency of ANC visits, home visits, counseling during recent pregnancy, PNC, place of delivery and home visits were identified as factors associated with initiation of complementary feeding at 6 month and also candidates for multivariate logistic regression.

Multiple logistic regressions Analysis

Multivariate comparisons of characteristics of timely introduction of complementary feeding practice of mothers of children aged 6–23 months. Adjusting for other variables, attending antenatal care at health facility during pregnancy, Post natal care follow up and Complementary feeding counseling at place were found to be predictors of timely initiation of complementary feeding practice. Mothers who had attended antenatal care follow up were 2.221 times more likely to practice timely initiation of complementary feeding than those mothers who had not attended Antenatal care (AOR: 2.221; 95% CI:1.276–3.865). Mothers who had attended Postnatal care follow up were 2.484 times more likely to practice timely initiation of complementary feeding than those mothers who had not attended postnatal visit (AOR: 2.484; 95% CI:1.478–4.176). Those mothers who had received counseling about complementary feeding at place of delivery were 2.362 more likely to practice timely initiation of complementary feeding than those mothers who did not receive counseling (AOR 2.362 CI: 1.399, 3.986). Having antenatal care and postnatal care visit at health facility and getting counseling related to complementary feeding at place of delivery were identified as predictor of timely initiation of complementary feeding.

We applied multivariate logistic regression for controlling possible confounders.

Discussion

This community based cross-sectional study with the objective of the assessment of the prevalence and factors associated with timely initiation of complementary feeding were conducted in Negelle Arsi District, Oromia Region, Southern Ethiopia. The findings from this study showed that the prevalence of initiation of complementary feeding at 6 months of age was 74.4% in children aged 6–24months in Negelle Arsi district. This finding is lower than WHO recommendation for timely initiation of complementary feeding which was greater than or equal 80 %(21).

On the other hand, timely initiated complementary feeding practice in this study was relatively in line with study conducted in Damot sore district (74.2%) in Southern Ethiopia in 2017(40), Sidama (72.2%) in Southern Ethiopia 2013(39). This might be due to the fact that nutrition counseling and other services are provided at the ANC, PNC and delivery service and similar socio demographic factors with study area.

However, this finding is higher than studies conducted in rural Soro District(34.3%) in Southern Ethiopia(36), Kamba Woreda, South West Ethiopia (40.4%) (32), Urban Community in Lagos State Nigeria (47.9%) (26), Axum town (52.8%) in northern Ethiopia(31), Mekele town (62.8%) in Northern Ethiopia (30), Lasta district (56.5%) in Amhara region (28), Tahtay Maichew district 53.4%) in Northern Ethiopia(34), Fiche (61.5%) in Northern Shoa (19) and Benishangul Gumuz Region (61.8)(33). The higher prevalence of timely initiation of complementary feeding in the study areas could be related to the time of study conducted, improvements in utilization of frequency of ANC visits, PNC visits and counselling at delivery place. Hence, nutrition education and counseling are components of maternal health care services; a higher utilization of these services will bring an added benefit to improve mothers' awareness on appropriate child feeding practices. This is probably related to the current improvements in the implementation of the Health Extension Program. Health extension workers are making home to home visits on regular bases to support families in accessing basic health services.

Among maternal health service factors antenatal follow up, postnatal care follow-up and counseling about timely initiation of complementary feeding at delivery place were independent predictors for the outcome. This study indicated that mothers who had history of postnatal care visit for this child were 2.484 times more likely to timely initiate complementary feeding to infants compared to those who did not attend any postnatal care visit. Similar findings were reported from Soro District in Southern Ethiopia(36), Kamba Woreda, South West Ethiopia(32), Lasta District (28) in Amhara region, Bensa Sidama zone (39) and Gombora District (29) in Southern Ethiopia. Mothers who had no postnatal care follow up would start complementary feeding earlier (before 6 months) or later (after 6 months) compared to mothers who followed the care. This is explained Mothers who get advice and Health education on complementary feeding during Post natal has favorable impact on the promotion of timely initiation of complementary feeding. A postnatal period could be an ideal time to counsel mothers on timely initiation of complementary feeding practice. This study shows that mothers who had ANC follow up were 2.221 times more likely to initiate timely complementary feeding compared to those mothers who did not receive ANC follow up. This is similar to a study conducted in Mokele town(30), Axum town(31), Bensa District (39), Gomora District(29) and Sodo town administration(35). This might be due to the fact that nutrition counseling and other services are provided to mother during ANC visits. Provision of complementary feeding counseling during pregnancy influences complementary feeding initiation at the appropriate time and promoting continue breastfeeding.

Furthermore, this study indicates that mother who had received counseling about timely initiation of complementary feeding at place of delivery were 2.362 times more likely to initiate complementary feeding compared to mother who were not received counseling at place of delivery. This is in line with study a conducted in Sodo town administration (35), Sore District in Southern Ethiopia(36), Tahtay

Maichew District in Northern Ethiopia (34). The possible reason for this finding might be the better health seeking behavior of the mother and the potential of getting advice about exclusive breast feeding and timely initiation of complementary feeding.

Strength and Limitation of the study

Strength

The study used primary data and its response rate was 99.5% which could be reduced nonresponse bias.

Limitation

Some level of recall bias was expected while interviewing respondents

Since the study was cross sectional study it may not shows temporal relationships.

Conclusion

The study came up with the three-fourth (74.4%) of children were initiated complementary food at six months of age which was lower than the WHO cut-off point of $\geq 80\%$. ANC follow up, having postnatal care visits and being counseled about timely initiation of complementary feeding at place of deliveries were significantly associated with timely initiation of complementary feeding.

Recommendation

Negelle Arsi Woreda Health Office should promote rigorous ANC follow up, postnatal care visits, health facility delivery and counseling on appropriate complementary feeding practices.

Health professionals who are involved in maternal health services should give focus to advice and counsel mothers on timely initiation of complementary feeding during prenatal and delivery and post natal period. Postnatal care utilization should be strengthened on one hand and it should get due emphasis for counseling mothers on appropriate optimal complementary feeding practices

Further research should be conducted by using qualitative study design to understand deeply socio-cultural and behavioral related factors towards initiation of complementary feeding at six month to develop and implement better strategy to improve timely initiation of complementary feeding practice.

Acronyms/ Abbreviations

AIDS	Acquired Immune Diseases Syndrome
AMIYCN	Adolescent Maternal Infant Young Child Nutrition
ANC	Ante Natal Care
AOR	Adjusted Odds Ratio
BF	Breast Feeding
CF	Complimentary Feeding
CFP	Complimentary Feeding Practice
CHIS.	Community Health Information System
EDHS	Ethiopia Demographic Health Survey
HHs	House Holds
IYCF	Infant Young Child Feeding
MCH	Maternal and Child Health
MOH	Minister of Health
OR	Odds Ratio
PI	Principal Investigator
PNC	Post Natal Care
SPSS	Statistical Package for the Social Science
SRS	Simple Random Sampling
WHDA	Women Health Development Army
WHO	World Health Organization

Declarations

Ethics approval and consent to participate

Ethical clearance was obtained from Research and Ethical Review Committee of Arsi University, College of Health Sciences. A necessary permission was also obtained from Health research Ethical Committee of Oromia Regional Health Bureau, West-Arsi zone health department, Nagelle Arsi district health office and local administrations. An informed verbal consent was obtained from the study participants and the privacy of the participants and confidentiality of the information was assured. Mothers with no and low awareness on when to start complimentary feeding for 6–23-month aged infant young children were informed on the recommended practices.

Consent for publication

Not applicable for this section.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

No financial and non-financial competing interest between the authors.

Funding

Not applicable for this section.

Authors' contributions

All authors have made substantial contributions to design, acquisition of data, analysis and interpretation of data. In addition to this the first and the second authors have been involved in drafting the manuscript and revising it critically for important intellectual content.

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Corresponding author was graduated in BSc Midwifery and MSc in Maternity and Reproductive Health Nursing and he is lecturer and researcher at Madda Walabu University, Ethiopia.

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Figures

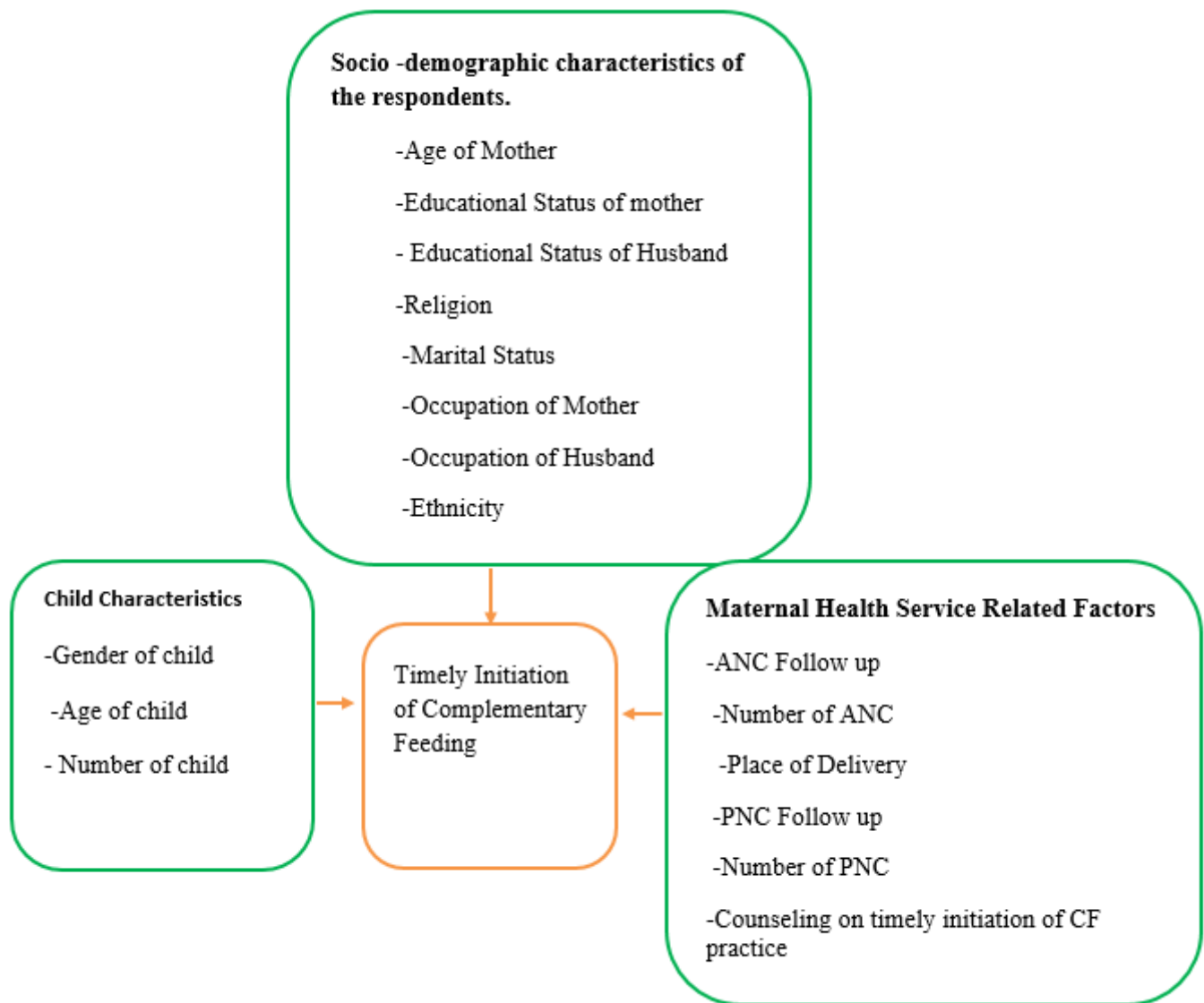


Figure 1

Conceptual framework for the determinants of timely initiation of CF among mothers of children aged 6-23 months in Negelle Arsi District, Southern Ethiopia, 2019. Source: Adapted from Sampling procedure for the Study

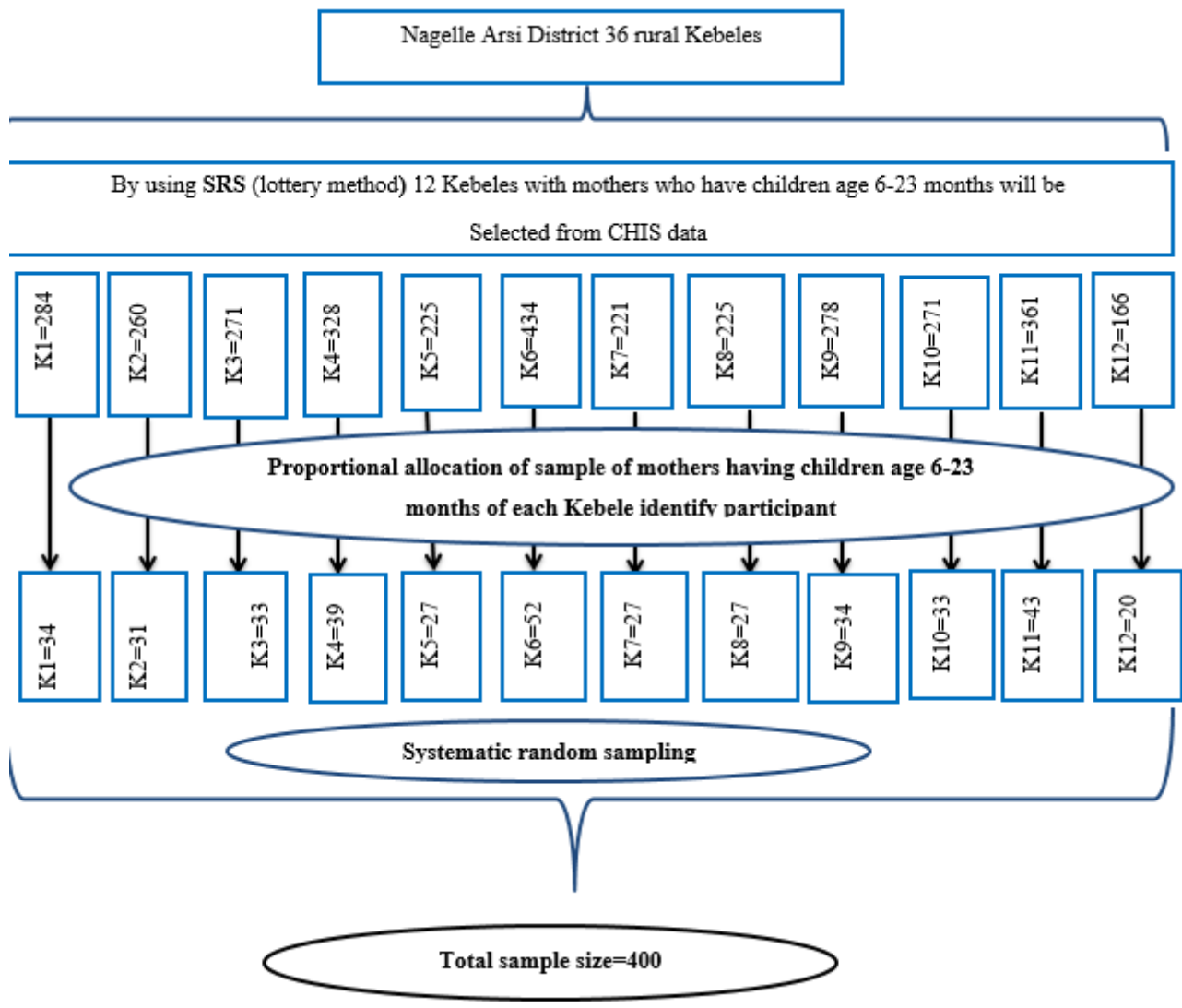


Figure 2

Schematic presentation of sampling procedures for mothers of children aged 6-23 month in Nagelle Arsi, Oromia region, Southern Ethiopia, 2019

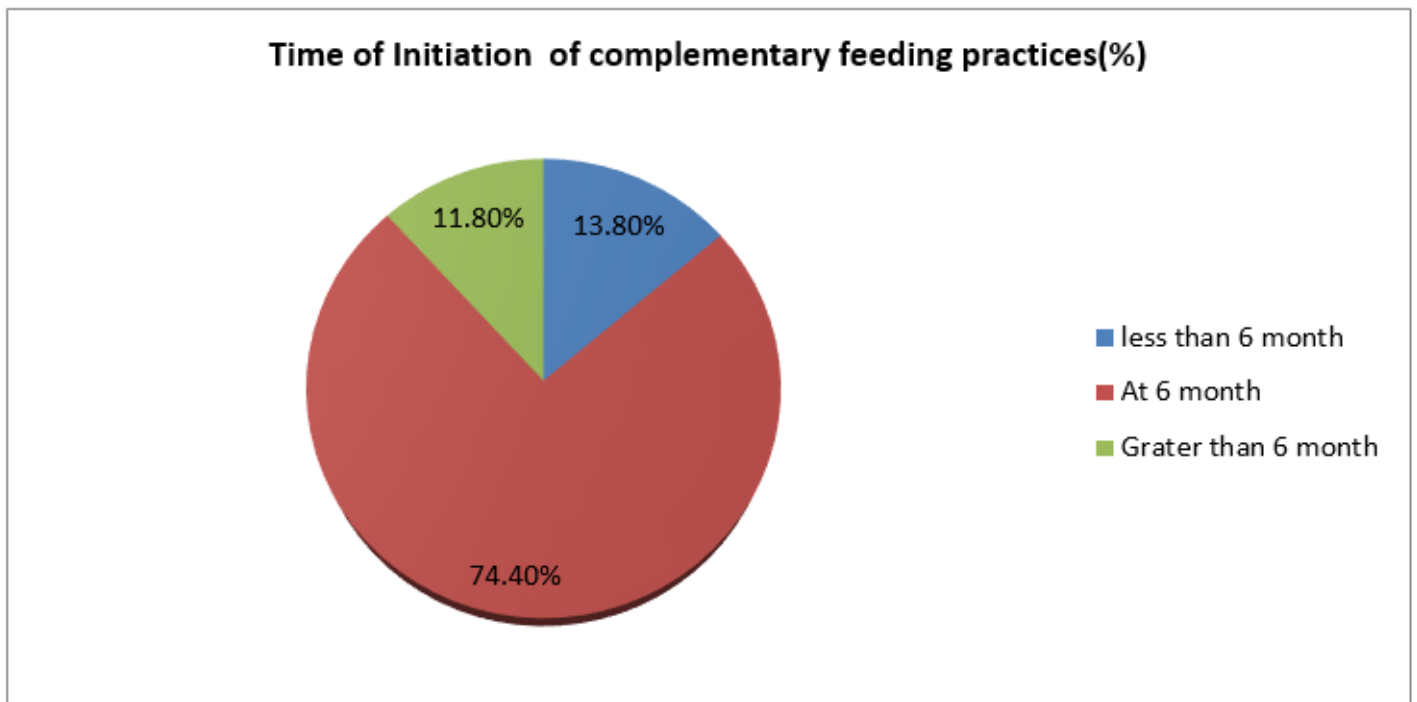


Figure 3

Age at which mothers who have children age 6-23 month initiate complementary feeding to their child, Negelle Arsi District, Oromia Region, Southern Ethiopia, 2019

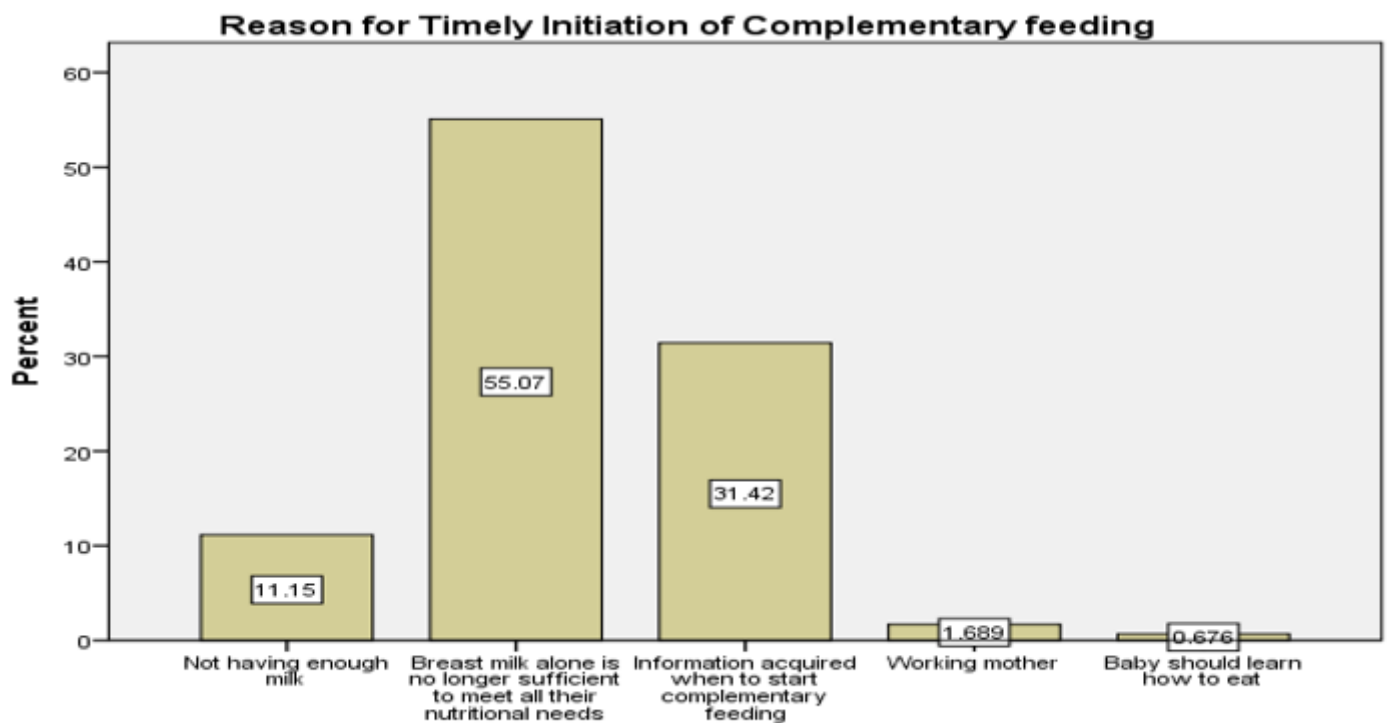


Figure 4

Reason for timely initiation of complementary feeding practice to their child, Negelle Arsi District, Oromia Region, Southern Ethiopia, 2019

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