ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

SCHOOL OF NURSING AND MIDWIFERY

DEPARTMENT OF NURSING

DETERMINANTS OF SPEECH AND LANGUAGE DEVELOPMENT DELAY AMONG CHILDREN IN YEKATIT 12 HOSPITAL, ADDIS ABABA, ETHIOPIA, 2023: A CASE CONTROL STUDY

BY: FEVEN YESHITILA (BSc)

A THESIS SUBMITTED TO POSTGRADUATE PROGRAM ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCE SCHOOL OF NURSING AND MIDWIFERY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF SCIENCE IN PEDIATRICS AND CHILD HEALTH NURSING

JUNE, 2023

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ABBREVIATIONS

AOR	Adjusted odds ratio
CI	Confidence Interval
DD	Developmental Delay
ETB	Ethiopian Birr
IRB	Institutional Review Board
OPD	Outpatient Department
OR	Odds Ratio
UK	United Kingdom
USA	United State of America
Y12H	Yekatit 12 Hospital

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Abstract

Background: Speech and language development delay occurs when a child isn't attaining speech and language milestones at the expected age and it can lead to poor social interaction, attention difficulties, reduced writing and reading skills, cognitive and behavioral problems. Despite increasing speech and language development delay in the country, literary works do not address determining factors for the delay.

Objectives: The study was aimed to identify the determinants of speech and language development delay among children in Yekatit 12 Hospital, Addis Ababa, Ethiopia, 2023

Method: Institutional-based unmatched case-control study was conducted from April 5 – April 30, 2023, on 50 cases and 100 controls aged between 1 and 12 years in Yekatit 12 Hospital. Interviewer-administered questionnaires were used to collect data from children's parents or caregivers. The cases were selected consecutively while the controls were selected by simple random sampling. The collected data was entered by Epi info version 7 and cleaned and analyzed by SPSS version 26. Bivariate and multivariate logistic regression analysis was conducted and the significant association was identified based on the Adjusted odds ratio (AOR), with 95% CI and p-value (<0.05).

Results: In this study, 50 cases and 100 control were included with a 100% response rate. The mean age of the cases was 50.84 (SD ±34.43) months while the control children's mean age was 51.42 (SD ±32.21). Among the cases, 46% were males and 54% were females, whereas among the controls, 54% were males and 46% were females. Mothers of 82% of the cases and 72% of the control were below diploma level. Around one-third of the fathers in the cases (32%) and controls (35%) had high school and diploma and above education respectively. A significant proportion of the mothers were housewives, with 74% of cases and 69% of controls found in this category. The majority of the fathers were employed or self-employed (72% of the cases and 85% of the controls). Most of the participants reside in urban areas, with 82% of cases and 89% of controls falling under this category. Monthly income between 5001 to 10,000 ETB was found in 64% of the cases and 36% of the controls. The majority of both the cases (90%) and controls (86%) had at least one sibling. More than half of the controls (57%) and a significant of the controls (42%) of the cases were firstborns. In both the cases and control groups, around 50% of

the fathers age at birth were between the ages of 31 and 40. Half of the cases and 64% of the controls have mothers in the age group of 31 to 30 and 21 to 30 at their birth respectively.

After the multivariate analysis older father's age at birth (>40 years) [AOR=3.38, 95 CI (1.05-10.90)], birth asphyxia [AOR=4.58, 95CI (1.23-16.99)], bottle-feeding [AOR=4.54, 95CI (1.29-16.04)], mother-child separation [AOR=2.6, 95CI (1.05-6.43)], multilingual family [AOR=2.31, 95CI (1.03-5.18)] and screen time of two or more hours [AOR=3.06, 95CI (1.29-7.28)].

Conclusion: Older father's age at birth, birth asphyxia, bottle-feeding, mother-child separation, multilingual family and screen time of two or more hours were found to be associated with speech and language development delay. Thus, interventions that target the modifiable determinants should be devised and early diagnosis and treatment should be available.

Keywords: speech and language development delay, determinants, Addis Ababa

1. INTRODUCTION

1.1. Background

When the speech and language of a child is not appropriate for his or her age or also expressed by speech sound mistake patterns not appropriate for his/her age, Speech and language development delay occurs (1). Speech and language development delay first came to be a clinical diagnosis around the 19th century and the first clearly defined diagnosis was developed in 1968 by American Speech Language Hearing Association (2). Today, it is accepted as a medical diagnosis with various interventions and therapies.

The international prevalence of speech disorders ranges from 3% to 20% (3). Speech and language development delay is impacting almost 1 in 14 children in kindergarten students (4). The prevalence of speech and language development delay is 5-8% among children between the ages of two and four and half in 2006 (5). In East Africa, there is a shortage of speech-pathologists and speech-language pathology educational programs (6). In Ethiopia, the first speech-language pathologists were enrolled in 2018 and a new graduate program in speech and language therapy has been started in 2022.

Speech and language development delay is classified as primary and secondary speech. Primary speech and language development delay include expressive and receptive delay (3). Secondary speech and language development delay is caused to autism spectrum disorder, hearing loss, intellectual disability, selective mutism and physical speech problems (3). There may be an overlap between primary and secondary speech and language development delay. The range of such problems may consist of stuttering or dysfluency, articulation disorders, delayed phonation, unusual voice quality and apraxia of speech (7). Communication disorders without autism spectrum or intellectual disability were found to be around 6% (8). Expressive delay may happen with or without receptive delay (1).

Although speech and language development delay is a significant problem, little is known about its determinants. Thus, the aim of the study was to assess the determinants speech and language development delay for possible recommendations and prevention of the issue.

1.2. Statement of the problem

Children progress through a series of steps to master speech and language. Within specific age groups speech development is achieved. When they fail to attain the appropriate speech development within a specific range of time or when they are falling behind their peers, speech and language development delay occurs.

Speech and language development delay can influence the experience of a child's school environment and the behavior of the child. In adulthood, those who experienced speech and language development delay lack independence and are prone to psychiatric disorders such as depressive disorder (9). Social relationships are difficult to navigate and they are often targets for bullying during their school years and it can persist until adolescence (9). There is an increased risk of behavioral, emotional and academic difficulties (10). Compared to their typically developing peers, adolescents with speech impairments show various symptoms of clinically important behavioral and emotional symptoms even showing 35% to 50% behavior and emotional needs (10).

Untreated speech and language development delay can persist in 40% to 60% of children, putting them at bigger risk of cognitive, emotional, behavioral, and social problems in adulthood (11). Numerous studies have found that children that suffer from speech difficulties between two and half to five years of age have a greater struggle with elementary school reading (3). Children that have a speech disorder that continue past age five and half have a bigger occurrence of social and attention issues (3). Children who have particular speech and language disorders have been linked with reduced writing abilities along with significant gaps in punctuation and spelling between the age of seven and half to thirteen years in comparison with children that do not have speech and language disorders (3).

Timely intervention can give the children a longer period to reach normal development (12). Speech and language development delay with no intrinsic and minimal visible signs during early childhood could be significantly better or even reversed as they grow older (13). The prognosis is better with idiopathic etiologies. An assessment of the determinants could lead to the development of strategies to achieve the prevention of these disorders.

Although some of the existing evidence shows the significance of the problem, in Malawi preschool children showed an estimated prevalence of 4.4% of language development delay with a higher prevalence in ages two to four (4.5%) and in children greater than five year old (3.9%) (14) studies conducted on this subject were mostly conducted in developed countries, the few studies conducted often do not include the determinates of speech and language development delay.

There have been a few studies on developmental delay (DD) in Ethiopia, but there is no documentation of the data on determinants of speech and language development delay. The Ethiopian National Mental Health Strategy highlights child development issues and the significance of screening programs and timely interventions; nevertheless, the list of these interventions and how they are to be implemented is not specified (15). A study in public hospitals in Addis Ababa revealed the health professionals that practice developmental screening at regular intervals are 27.8% with only 3.86% using the standardized developmental assessment tool (16). One study on childhood development relation with their nutritional status at 12 to 59 months of age conducted in the Wolaita district showed 19% of DD with a speech development delay of 5.8% (17).

The limited literature found on DD and speech and language development delay was completed several years ago. One study done on 99 children ages ranging from 3 months to 8 years who were adopted from Ethiopia to Belgium revealed that 12% of the children had DDs (18). More studies are needed to determine the current determinants in Ethiopia, Africa and intentionally.

Psychological interventions, counseling of the family and the child, speech therapy, play therapy and prevention of speech and language development delay can only be possible when the determinants are known and understood. Therefore, it is essential to recognize the determinants of speech and language development delay early to provide appropriate intervention and timely support.

The purpose of this study was to identify the determinants of speech and language development delay in Yekatit 12 Hospital in Addis Ababa.

1.3. Significance of the study

The study will investigate the determinants of speech and language development delay. Speech and language development delay can impact the social, physiological, communication, cognition and psychological consequences. Thus, it is important to understand the determinants of speech and language development delay. The study will be utilized for literature in future research. The study will be used to assist in the related practices in healthcare settings.

Community health nurses and pediatric nurses play a role in the early detection, referral and treatment of speech and language development delay. Healthcare providers will have more information about speech and language development delay determinants which will instigate them to do appropriate development delay screening tests.

The findings of this result will be vital to design appropriate policies, programs and strategies to address speech and language development delay, early identification and appropriate interventions of speech and language development delay. The identification of the determinants will show which child should be given priority for the full assessment of speech and language development delay.

2. LITERATURE REVIEW

2.1. Introduction to the literature review

Early in human life, language development begins and progresses from simple to complex (19). Language is an indicator of understanding, whereas speech is the sound that is produced (20). When a child fails to reach the expected developmental milestones by the typical age, speech and language development delay is identified (19).

Several studies have focused on the assessment and intervention process of speech and language development delay as timely recognition and intervention are essential. The assessment tools contribute in the accuracy of the diagnosis of speech and language development delay. The application of developmental screening tests other than medical chart review to identify children with DDs has more than doubled the detection rate, as far as 58% of participants being detected with DD (21).

The sections of the literature review include the magnitude and determinants of speech and language development delay. Numerous authors have explored the magnitude and determinants related to speech and language development delay; however, the issue is still in need of further investigation. The risk factors have been classified into socio-demographic, biological, feeding, family and environmental factors and will be discussed further below.

2.2. Magnitude of speech and language development delay

A significant number of children worldwide suffer from speech and language development delay. Various studies conducted over the years in different countries have revealed a significant prevalence of speech and language development delay. Based in the United Kingdom (UK), a systemic review revealed in children two to five years aged, the prevalence of speech and language development delay was found to be between 5% to 12% (22). In a study of incidence in the United States of America (USA), in children with the age of six years, 3.8% of speech development delay was found (23). The prevalence in the UK, New Zealand, USA, Canada and Hong Kong was revealed to be 3% to 16% with a median of 7% (22). A Columbian cross-sectional study found a prevalence of 2.9% (24).

Children who are from low-income backgrounds or who have other DDs are more likely to have speech and language development delays. A retrospective cross-sectional study in China

found a high prevalence of language development delay with 52% of the children having language development delay and an estimated a 25% of children in all of China suffering from language development delay (25). A Nepal study on low resources, setting discovered a DD of 56.4% and a speech and language development delay of 28.5% (26).

In Singapore, the most prominent referral was speech and language development delay with 29% and the definitive diagnosis was found in most (27). An Iraq cross-sectional study showed a prevalence of 11.9% primary speech and language development delay (20). An eastern India cross-sectional study had a prevalence of language development delay of 4.5% with 5.5% of the children having a delay while 2.2% had a questionable delay (24).

In an Indian cross-sectional study, the prevalence of speech and language development delay was 2.53% (28). In another India cross-sectional study, the prevalence of language development delay was reported to be 6% (29). Language development delays were more common in children over the age of one year (29). Only 1.1% of infants less than one year had a suspicious delay. Speech development delay was found in 4.3% of children aged 13 to 18 months, 16.7% of children aged 19 to 24 months, 5.9% of children aged 25 to 30 months, and 5.6% of children aged 31 to 36 months (29). Among the 38 cases out of 200 children 4%, 2% and 14% had delay, suspected and questionable respectively (29).

A cross-sectional study in Nigeria revealed a speech and language development delay of 4.1% (30). It is important to consider parental concerns about children's behavior and social skills as predictors of children's developmental difficulties. The existence of one of these concerns raises the prospect of the occurrence of an actual problem in children's life. Cross-sectional research performed in Cameron discovered parental concern for language development was 34% and isolated language development delay was found in 3.9% (31).

Research done on DD in Ethiopia by descriptive survey study design showed that infants that are the age intervals of 12 months, 18 months, 24 months, 30 months, 36 months and 48 months had 5.3%, 5.84%, 6.49%, 7.19%, 7.24% and 3.16% language development delay respectively. The study showed a 6.89% speech development delay in all children that took part in the study (32).

2.3. Risk factors of speech and language development delay

2.3.1. Socio-demographic factors of speech and language development delay

A study conducted in Bangladesh in a cross-sectional study design discovered that males had a higher rate of speech and language development delay. The association between sex, father's age and speech development delay was significant (7). Being an only child had a very strong association with speech in a case-control study conducted in Bangladesh (OR 3.90,95% CI 1.36-7.38) (1).

According to a Pakistan cross-sectional study, indicated found that male gender is a risk factor for acquiring speech and language disorder, with males accounting for 65.3% (33). Another risk factor discovered in the study is being the firstborn encompassing 44.7% of those with speech development delays. Parental illiteracy has also been linked to a significant association (33).

A case-control study in Cuba showed male gender was a risk factor for primary language delay (34). Similarly, in a census of all students in state schools including primary, secondary and special in England, boys are 2.6 times more likely than girls to be diagnosed with language disorders, representing the strong gender discrepancy found constantly in epidemiological studies (35). Children from low socioeconomic backgrounds increase the risk of getting language disorders by 2.3 times (35).

In a literature review, social class and parents' education are associated positively with their child's linguistic understanding. The number and quality of stimuli provided to the child by the parents may also be connected to family income (36). Retrospective cross-sectional research based in China on family environmental risk factors for developmental speech development delay in children discovered father's education being below average (OR 2.771, 95% CI 1.226–6.263), family monthly income being low (OR 4.447, 95% CI 1.934–10.222) and older mother's age (OR 1.312, 95% CI 1.192–1.444) were strongly related with speech development delay (37). Additionally, a Nigerian cross-sectional study showed a significant association with low mothers' education (30).

2.3.2. Biological factors of speech and language development delay

A Bangladesh case-control study revealed perinatal asphyxia (OR 0.30,95% CI 1.1-2.4) and any neonatal complications (OR 4.54, 95% CI 1.4-14.66) were birth-related factors that were significantly associated with speech development delay (1). Seizures, birth asphyxia, and physical (oropharyngeal) abnormalities were found to be associated with speech and language development delay in a case-control study in India. Seizure disorder and birth asphyxia were found in 26.2% of the case group while there was no one with a seizure disorder and birth asphyxia found in the control group. The oropharyngeal defect was shown to be 16.7% in the case group (28).

There was a higher occurrence of the prematurity risk factor during the perinatal period, which may affect features of neural plasticity, interfering with general development, including language in a descriptive and prospective study on risk factors of speech development delay in Bangladesh (38). A report on prenatal substance abuse has shown alcohol use can disrupt fetal development, including language development (39). In a Portuguese prospective descriptive study, the most common post-natal risk factors were harmful oral habits (40).

2.3.3. Feeding factors of speech and language development delay

Feeding habits can be associated with speech development delay. A case-control study conducted in Dahaka, Bangladesh found a significant association with abnormal feeding habits (OR 12.65) (1). In a case-control research in Indonesia, speech development delay was found to be substantially associated with exclusive breastfeeding that was less than 6 months (OR 3.278; 95%CI 1.244-8.637) (41).

2.3.4. Family-based factors of speech and language development delay

In Pakistan, a cross-sectional study found a family history of disorders to be associated with speech development delay, with 65.3% of study participants having a family history of speech disorders (33). An Indonesian study with a case-control design also showed a relationship between speech development delay and family history of speech development delay (OR 7.81, 95% CI 1.636–37.36) (42).

A retrospective cross-sectional study in China revealed introverted personality of fathers (OR 0.023, 95% CI 0.011–0.048), and rare parent-child communication (OR 6.445, 95% CI 3.441–

12.072) were all revealed to be risk factors for speech development delay (37). In parent-child communication sometimes or rare communication, frequent and very frequent communications were found to be 45%, 41% and 14% respectively in the case group (37). In an Indian cross-sectional study, it was discovered that less time spent with the mother (<8 hrs/day) was also associated with language development delay (29).

Family history of language delay was discovered a significant association in language delay in a case-control study performed in Canada (OR 2.24,95% CI 1.07-4.70) (43). A Cuban case-control study has also revealed a family history of language impairment was associated with primary language development delay (OR 17.2, 95% CI, 3.70-79.85) (34).

In recent years, father-child interactions have shown a vital role in child development. One retrospective study in Finland revealed that when the father was present at home at least part-time in the child's early formative years, the child's lexical skills improved. Additionally, the scientists discovered that the father's socioeconomic standing and working from home were predictors of children's language development (44).

2.3.5. Environmental factors of speech and language development delay

More screen-on time (TV watching/video-gaming) and the existence of any stressful factor in the family or environment were all strongly related to speech development delay in research conducted in a case-control study in Bangladesh (OR 4.72, 95% CI 1.55-14.3) (1). An Indonesian case-control study revealed an association between use of gadgets and television greater than two hours and speech development delay (OR 8.286, 95% CI 2.555-26.871) (41). A negative home environment was significantly associated with language development delay, with 13.1% having speech development delay in a retrospective cross-sectional study in China (37).

2.4. Conceptual framework

The conceptual framework was created by reviewing several literature (1, 28, 34, 41-43) . The diagram shows the interaction of the variables socio-demographic factors, biological factors, feeding factors and family-based factors and environmental factors with speech and language development delay.

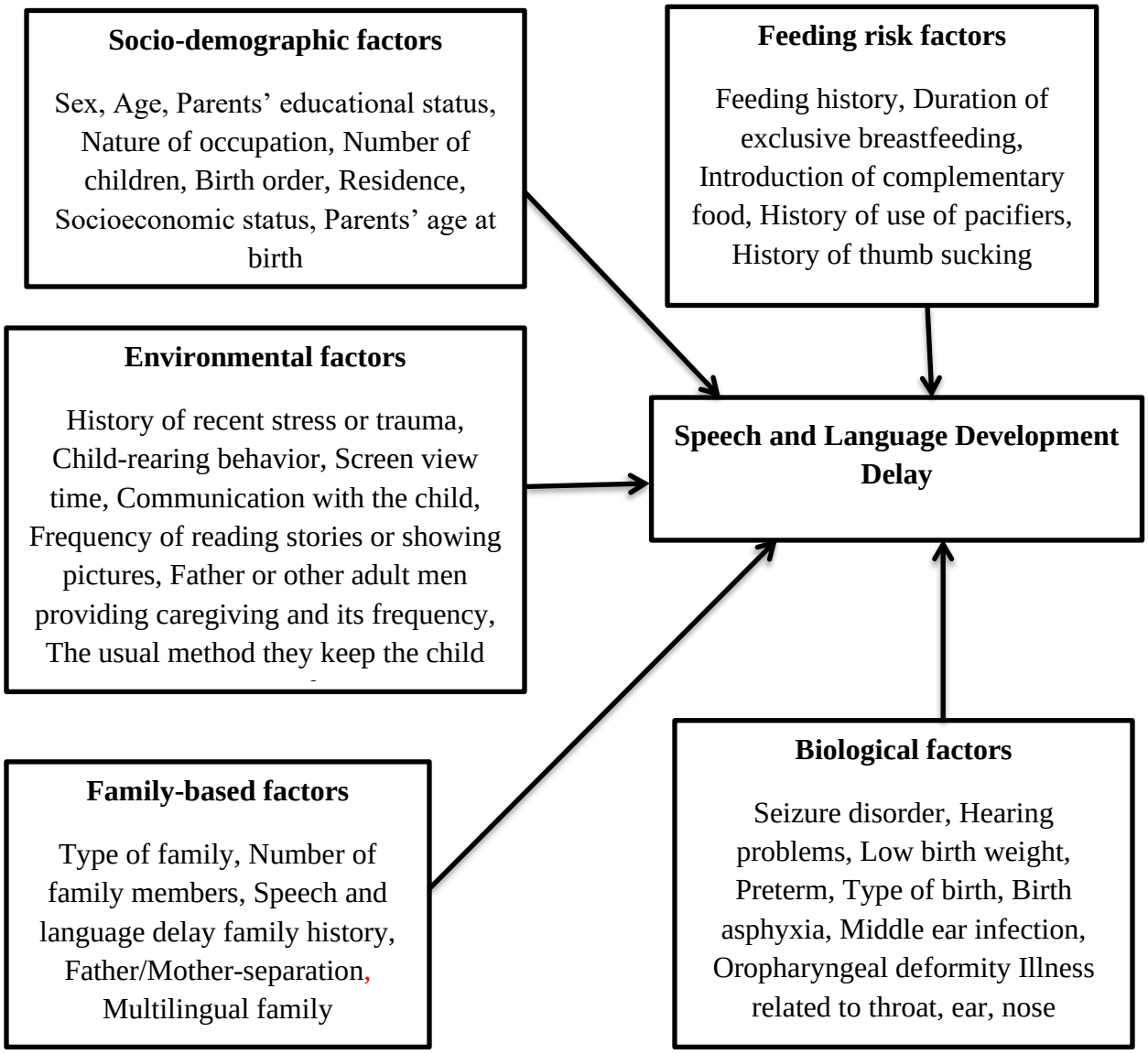

Figure 1: Conceptual framework for speech and language development delay and its determinants developed by reviewing several literatures, Addis Ababa, Ethiopia, 2023

3. OBJECTIVES

3. 1 General Objectives

- To identify the determinants of speech and language development delay among children in Yekatit 12 Hospital, Addis Ababa, Ethiopia, 2023

3.2 Specific Objectives

- To identify socio-demographic determinants of speech and language development delay among children in Yekatit 12 Hospital
- To determine biological determinants of speech and language development delay among children in Yekatit 12 Hospital
- To determine feeding determinants of speech and language development delay among children in Yekatit 12 Hospital
- To identify family-related determinants of speech and language development delay among children in Yekatit 12 Hospital
- To identify environmental determinants of speech and language development delay among children in Yekatit 12 Hospital

4. METHODS AND MATERIALS

4.1. Study area and period

The study was conducted in Yekatit 12 Hospital (Y12H) located in Addis Ababa. Addis Ababa is the capital and biggest city of Ethiopia with a population estimated above 5,005,524 (45).

Y12H is one of the regional hospitals under the Addis Ababa Administration Health Bureau. It provides health services for AA and other regions for referral cases. Y12H serves around 4 million people. It was first established in 1915 and was named Hailesellasie I Hospital till the 1970s. Presently, more than 339 beds are found distributed in 16 various inpatient wards. It has also 21 OPDs. The hospital treats an average of 450 patients monthly in the pediatric OPD. It is a referral and teaching hospital. Speech and language therapy is given in one government hospital in Addis Ababa which is Y12H in particular.

The study was carried out from April 5 to April 30, 2023.

4.2. Study Design

An institutional-based unmatched case-control study design was implemented to assess the determinants of speech and language development delay among children in Yekatit 12 Hospital, Addis Ababa

4.3. Population

4.3.1. Source population

In this study, the source population is all children attending pediatrics OPD in Yekatit 12 Hospital

4.3.2. Study population

Cases: Children selected that have been diagnosed with speech and language development delay, specifically referred for speech and language development delay or undergoing speech and language therapy in Yekatit 12 Hospital

Control: Children with normal speech and language development in Yekatit 12 Hospital

4.3.3. Sample population

Cases: Children selected that have speech and language development delay, specifically referred for speech and language development delay or undergoing speech therapy in Yekatit 12 Hospital who are selected for the study and who fulfill the inclusion criteria

Control: Children with normal speech and language development in Yekatit 12 Hospital by simple random sampling who fulfill the inclusion criteria

4.4. Inclusion and exclusion criteria

4.4.1. Inclusion criteria

Cases:

Children who have been diagnosed with speech and language development delay clinically

Children aged between 1 to 12 years old during the study period,

Children whose parent or caregiver was present and able to participate in the study

Controls:

Children with normal speech and language development clinically

Children that are aged between 1 to 12 years old,

Children who visited the data collection site during the study collection period and whose parent or caregiver were present and able to participate in the study

4.4.2 Exclusion criteria

- Children diagnosed with autism, cerebral palsy, hydrocephalus, genetic disorders such as downs syndrome

4.5. Sample Size Determination and Techniques

4.5.1. Sample size determination

The sample size was determined by the double population proportion formula of an unmatched case-control study design by Epi info version 7.2.2.6 statistical software by considering a 5% marginal error (d) power of 80 and 95% confidence interval with a case-to-control ratio that is 1:2. The most determinant factors found in a related study on speech and language development delay were duration of exclusive breastfeeding and screen exposure greater than 2 hours per day from related study (41). The maximum sample size found among the risk factors is 107, when a ten percent non-respondent rate was added, the sample size

increased to 120 with 80 controls and 40 cases. A sample size of 50 cases and 100 controls was used.

Table 1: Sample size determination of study subjects for the determinants of speech and language development delay among children in Yekatit 12 Hospital, Addis Ababa, Ethiopia, 2023

Factors OR	% of Controls exposed	% Of Cases exposed	Odds Ratio (OR)	Sample of Cases	Sample of Controls	Total sample
Screen exposure > 2 hours	9.5%	42.9%	7.16	23	45	68
EBF duration	28.6%	58.7%	3.55	36	71	107

EBF = exclusive breastfeeding

4.5.2. Sampling technique and procedure

The study subjects (cases) were chosen consecutively from the centers until the sample size is achieved. Controls that satisfy the selection standard were chosen by lottery method or simple random sampling on the same day as the cases from the pediatric OPD. For each case, two consecutive controls were sampled.

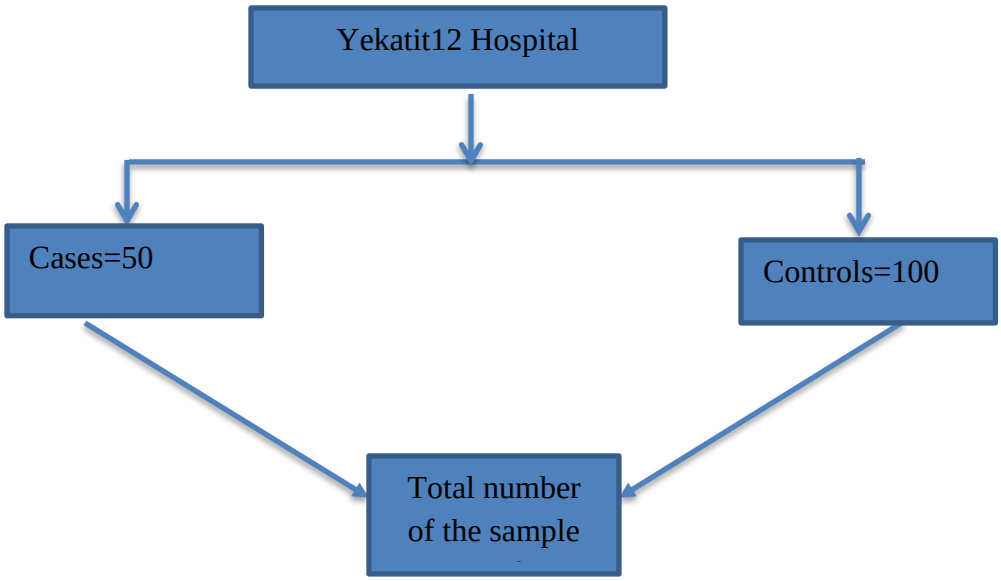

Figure 2: Schematic presentation of the sampling procedure for the determinants of speech and languages development delay among children in Yekatit 12 Hospital, Addis Ababa, Ethiopia, 2023

4.6. Data collection tools and procedure

In this study, the questionnaire was adapted by reviewing relevant literature from related studies from different sources, led with the research objectives and literature reviews, with an account of the population that is targeted (1, 29, 33). The questionnaire used for the data collection for both the cases and controls was the same. The questionnaire was composed in the languages of English and Amharic, with simple basic statements and questions for better understanding. The English version of the tool was translated to Amharic and then retranslated to Amharic for consistency. The questionnaire is divided into six, socio-demographic factors, biological factors, feeding factors, family-based factors, environmental factors and the child's status. The categories of the answers are mutually exclusive and specific directions were given when for simple comprehension. Data was obtained with an interview administered questionnaire to the parents or caregivers of the children. Three trained BSc nurses with one MSc nurse supervisor conducted the data collection and the interview-guided questionnaire with parents or caregivers.

4.7. Study Variables

4.7.1. Dependent variable

- Speech and language development delay

4.7.2. Independent variable

- Socio-demographic factors: Sex, Age, Parents' education, nature of occupation, number of children, birth order, residence, socioeconomic status, parents' age at birth
- Biological factors: seizure disorder, hearing problem, low birth weight, preterm, type of birth, middle ear infection, birth asphyxia, illness related to throat, nose and ear, oropharyngeal deformity
- Feeding factors: feeding history, duration of exclusive breastfeeding, the introduction of complementary food, history of using pacifiers, history of thumb sucking
- Family-based factors: type of family, number of family members, family history of speech and language disorder, father/mother separation, multilingual family
- Environment factors: history of recent stress or trauma, child-rearing behavior, communication with the child, screen view time, frequency of reading stories or

showing pictures, father or other adult men providing care-giving, frequency of father or other adult men providing care-giving, the usual method they keep the child occupied

4.8. Data quality control assurance

One week before data collection, a pretest with five percent of the sample size was conducted in Tikur Anbessa pediatric OPD. The data collectors were given a one-day orientation/training on data collection methods, especially in the appropriate filling of the questionnaire. The validity and reliability of the questionnaire were checked by experts in the area of the study. The Amharic version of the questionnaire has been translated from the English version. Data were collected by trained data collectors to increase data quality. The data was also double-checked, first by the data collector her/himself, and then 10% of the questionnaires were nominated by the primary investigator for consistency, error and completeness of the collected data.

4.9. Operational definitions

Cases: Children selected that have speech and language development delay, specifically referred for speech and language development delay or undergoing speech and language therapy in Yekatit 12 Hospital

Control: Children with normal speech and language development in Yekatit 12 Hospital

Speech and language development delay: delay in speech and language skills of infants and young children in receptive or expressive aspects confirmed by speech and language pathologist or pediatrician

Low birth weight: birth weight less than 2500 grams (46)

Premature: born under 37 weeks of gestation (47)

Birth asphyxia: newborn's inability to initiate and maintain breathing immediately after birth (48)

Multilingual: the acquisition and use of two or more languages (49)

4.10. Data analysis procedure

After the data collection, the data was coded and entered into Epi info version 7 by the data entry clerk and investigator and converted to SPSS version 26 for the cleaning and analysis. Descriptive statistics like frequency distribution were computed in order to describe the major variables of the study. Frequencies and percentages were used for categorical variables and means and standard deviations (simple descriptive statistics) for continuous variables. A bivariate analysis was done to identify significant variables with the case and significant variables (p-value < 0.25) were moved to multiple multivariate logistic regression model for controlling the potential effect of confounding factors and to examine association and finally variables with significant association were recognized using p-value (<0.05), Adjusted odds ratio (AOR), with 95% CI. The multicollinearity test and Hosmer-Lemeshow goodness-of-fit were checked. The result was presented with tables, graphics and charts and it was analyzed and discussed.

4.11. Ethical considerations

Before the beginning of the data collection, the study protocol was accepted by the Department of Nursing Institutional Review Board (IRB) and Addis Ababa health bureau IRB. Moreover, the permission letter from the department and Addis Ababa health bureau IRB was given to Yekatit 12 Hospital for the data collection. The parents or guardians were given information about the objectives, potential risks and benefits. Written consent was obtained from each participant's parents or guardians. Only numerical identifiers were used to identify the respondents, ensuring confidentiality and anonymity in the completion of the questionnaire.

4.12. Dissemination Plan

This study was presented to Addis Ababa University College of Health Science, School of nursing and midwifery and a hard copy will be submitted to the school. It will be distributed to Addis Ababa health bureau, the Ministry of Health, and other concerned bodies. The findings of this study will be published in appropriate journals and presented in different convections.

5. RESULTS

The study aimed to assess the determinants of speech and language development delay in Yekatit 12 Hospital, Addis Ababa, Ethiopia. With a 100% response rate, a total of 150 participants (50 cases and 100 controls) were included. Out of the 50 speech and language delayed children, 35(70%) had expressive speech and language development delay, 7(14%) had receptive speech and language development delay and 8(16%) had both expressive and receptive speech and language development delay.

5.1. Descriptive statistics results

5.1.1. Socio-demographic factors

The study showed mean age in the children with speech and language development delay was 50.84 (S.D ±34.43) months. The mean age of the control children was 51.42 (S.D ±32.21) months. The minimum age for the children was 12 months while the maximum for the children is 12 years. The mean age in the mothers at birth was 30.13 (S.D ±5.25) years. The mean age of the father at birth was 36.77 (S.D ±6.95) years. Regarding the place of residence, most of the participants live in urban areas (82% of cases and 89% of the controls). Concerning the occupation of the mothers, 37(74%) of the cases and 69 (69%) of the controls the mothers were housewives.

Table 2: Socio-demographic factors for the study of determinants of speech and language development delay among children in Yekatit 12 Hospital, Addis Ababa, Ethiopia, 2023

Variables	Responses	Cases		Controls		Total	
		Frequency(N=50)	%	Frequency (N=100)	%	Frequency (N=150)	%
Age±S.D		50.84±34.43		51.42±32.21		50.85±32.64	
Gender	Male	23	46%	54	54%	77	51.3%
	Female	27	54%	46	46%	73	48.7%
Father's educational status	Cannot read and write	6	12%	13	13%	19	12.7%
	Primary	10	20%	24	24%	34	22.7%
	High school	16	32%	19	19%	35	23.3%
	Training	5	10%	9	9%	14	9.3%
	≥Diploma	13	26%	35	35%	48	32%
Father's	Unemployed	14	28%	15	15%	29	19.3%

occupation	Employed/Self-employed	36	72%	85	85%	121	80.7%
Mother's occupation	Housewife	37	74%	69	69%	106	70.67%
	Employed	13	26%	31	31%	44	29.33%
Residence	Urban	41	82%	89	89%	130	86.67%
	Rural	9	18%	11	11%	20	13.33%
Monthly income	≤5000	10	20%	36	36%	46	30.7%
	5001-10000	32	64%	36	36%	68	45.3%
	>10000	8	16%	28	28%	36	24%
№ of siblings	Zero	5	10%	14	14%	19	12.7%
	One	16	32%	37	37%	53	35.3%
	Two	15	30%	21	21%	36	24%
	Three	5	10%	14	14%	19	12.7%
	Four	5	10%	7	7%	12	8%
	Greater than four	4	8%	7	7%	11	7.3%
Birth order	First	21	42%	57	57%	78	52%
	Second	16	32%	24	24%	40	26.7%
	Three	10	20%	13	13%	23	15.3%
	Greater	3	6%	6	6%	9	6%
Father's age at birth	≤ 20	0	0%	1	1%	1	0.7%
	21-30	8	16%	29	29%	37	24.7%
	31-40	25	50%	53	53%	78	52%
	>40	17	34%	17	17%	34	22.7%
Mother' age at birth	≤20	4	8%	1	1%	5	3.3%
	21-30	21	42%	63	63%	84	56%
	31-40	25	50%	33	33%	58	38.7%
	>40	0	0%	3	3%	3	2%

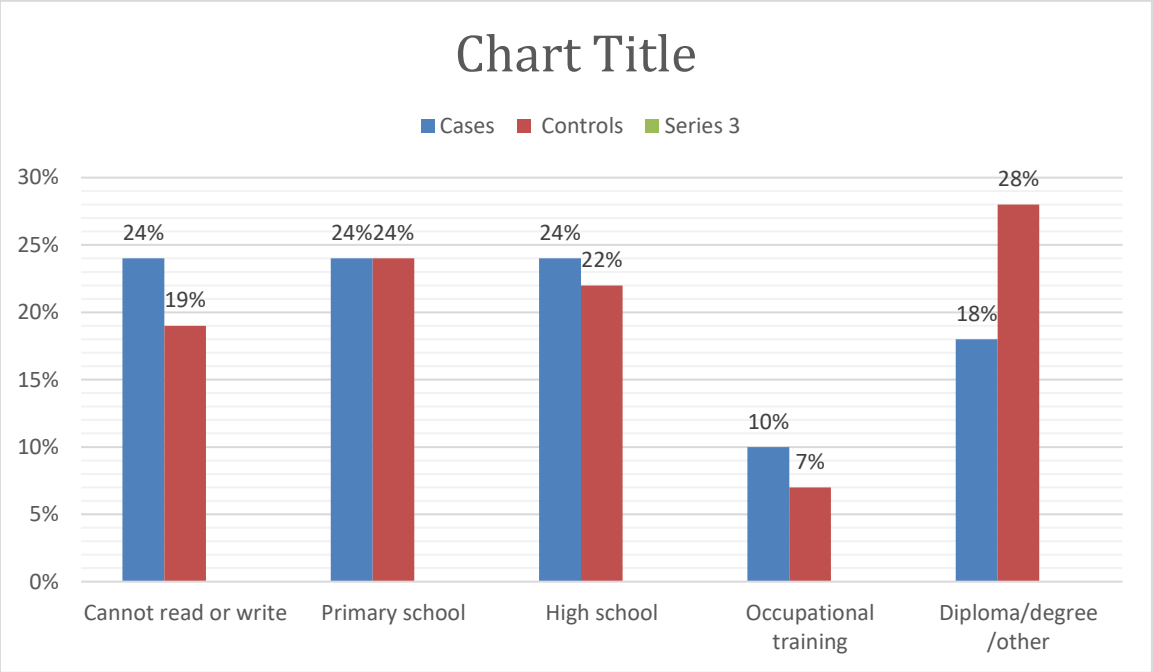

Figure 3: Mother's educational status for the study of determinants of speech and language development delay among children in Yekatit 12 Hospital, Addis Ababa, Ethiopia, 2023

5.1.2. Biological factors

The proportion of cases (14%) with seizure disorder is greater than the controls (10%). Regarding the type of birth, almost one-third of the cases (30%) and the controls (31%) were delivered by cesarean section. The proportion of cases (18%) that experienced birth asphyxia was more than three times in the controls (5%). The majority of the cases (92%) and controls (93%) didn't experience other illnesses related to throat, ear and nose.

Table 3: Biological factors for the study of determinants of speech and language development delay among children in Yekatit 12 Hospital, Addis Ababa, Ethiopia

Variables	Responses	Cases		Controls		Total	
		Frequency (N=50)	%	Frequency (N=100)	%	Frequency (N=150)	%
Seizure disorder	Yes	7	14%	8	8%	15	10%
	No	43	86%	92	92%	135	90%
Hearing problems	Yes	6	12%	1	1%	7	4.7%
	No	44	88%	99	99%	143	95.3%
Low birth weight	Yes	9	18%	12	12%	21	14%
	No	41	82%	88	88%	129	86%
Preterm	Yes	10	20%	13	13%	23	15.3%
	No	40	80%	87	87%	127	84.7%
Type of birth	Vaginal	35	70%	69	69%	104	69.3%
	Cesarean	15	30%	31	31%	46	30.7%
Birth asphyxia	Yes	9	18%	5	5%	14	9.3%
	No	41	82%	95	95%	136	90.7%
Middle ear infection	Yes	5	10%	3	3%	8	5.3%
	No	45	90%	97	97%	142	94.7%
Any other illness with throat, ear, nose	Yes	4	8%	7	7%	11	7.3%
	No	46	92%	93	93%	139	92.7%
Oropharyngeal deformity	Yes	7	14%	2	2%	9	6%
	No	43	86%	98	98%	141	94%

5.1.3 Feeding factors

The majority of the children were breastfed (74% of cases and 94% of the controls). In the case of the duration of exclusive breastfeeding, more than half of the cases (56%) and the controls (69%) were exclusively breastfed for more than 6 months. The proportion of cases (36%) with a history of pacifier use is higher than the proportion of the controls (30%).

Table 4: Feeding factors for the study of determinants of speech and language development delay among children in Yekatit 12 Hospital, Addis Ababa, Ethiopia, 2023							
Variables	Responses	Cases		Controls		Total	
		Frequency (N=50)	%	Frequency (N=100)	%	Frequency (N=150)	%
Feeding history	Breastfeeding	36	72%	90	90%	126	84%
	Bottle-fed	9	18%	5	5%	14	9.3%
	Mixed	5	10%	5	5%	10	6.7%
EBF duration	< 6 months	7	14%	9	9%	16	11.6%
	6 months	6	12%	19	19%	25	18.1%
	> 6 months	28	56%	69	69%	97	70.3%
Thumb-sucking	Yes	20	40%	35	35%	55	36.7%
	No	30	60%	65	65%	95	63.3%
Pacifier use	Yes	18	36%	27	27%	45	30%
	No	32	64%	73	73%	105	70%

EBF = exclusive breastfeeding

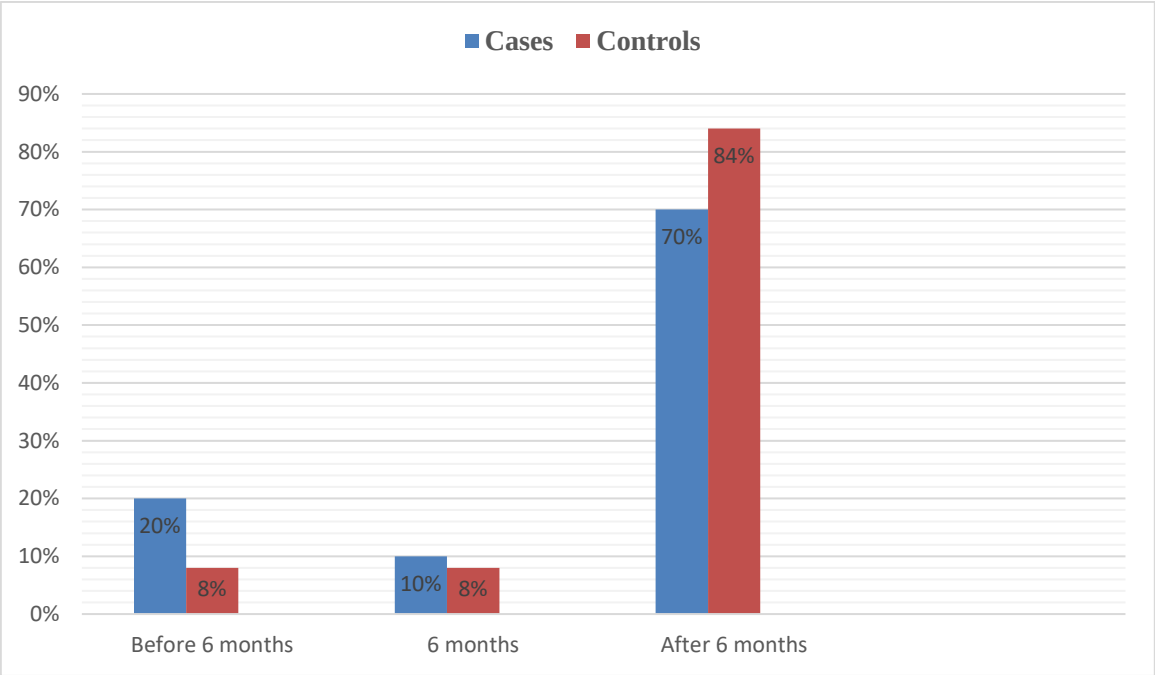

Figure 4: Complementary food introduction time for the study of determinants of speech and language development delay among children in Yekatit 12 Hospital, Addis Ababa, Ethiopia, 2023

5.1.4 Family-based factors

Regarding the type of family, more than three fourth of the cases (80%) and two third of the controls (76%) of the controls had a nuclear family. Concerning the number of family members, the proportion of the cases (58%) with greater than four family members is higher than those of the controls (46.7%). Speech and language delay family history was present in 11(22%) of the cases and controls 10(10%). The proportion of the cases (26%) with mother-child separation is greater than the controls (20%).

Table 5: Family-based factors for the study of determinants of speech and language development delay among children in Yekatit 12 Hospital, Addis Ababa, Ethiopia, 2023

Variables	Responses	Cases		Controls		Total	
		Frequency (N=50)	%	Frequency (N=100)	%	Frequency (N=150)	%
Type of family	Nuclear	40	80%	76	76%	116	77.3%
	Joint	10	20%	24	24%	34	22.7%
№ of family members	≤4	21	42%	59	59%	80	53.3%
	>4	29	58%	41	41%	70	46.7%
Family history	Yes	11	22%	10	10%	21	14%
	No	39	78%	90	90%	129	86%
Mother-child separation	Yes	13	26%	17	17%	30	20%
	No	37	74%	83	83%	120	80%
Father lives from home	Yes	36	72%	80	80%	116	77.3%
	No	14	28%	20	20%	34	22.7%
Multilingual family	Yes	21	42%	29	29%	50	33.3%
	No	29	58%	71	71%	100	66.7%

5.1.5 Environmental factors

Concerning reading and showing pictures to the child, almost half of those with the case and 41% of the control group answered hardly ever. With regards to child-rearing behaviors, gentle or friendly was slightly higher in the cases (60%) than the controls (54%). Among the cases, 12% had a recent history of trauma or stress, while 9% of the controls also reported experiencing stress or trauma in the recent past. In screen time, the proportion of cases (20%) that viewed less than two hours were almost half the proportion of the controls (41%).

Table 6: Environmental factors for the study of determinants of speech and language development delay among children in Yekatit 12 Hospital, Addis Ababa, Ethiopia, 2023

Variables	Responses	Cases		Controls		Total	
		Frequency (N=50)	%	Frequency (N=100)	%	Frequency (N=150)	%
Recent trauma or stress	Yes	6	12%	9	9%	15	10%
	No	44	88%	91	91%	135	90%
Screen time	< 2 hours	10	20%	41	41%	51	34%
	≥ 2 hours	40	80%	59	59%	99	66%
Child-rearing behaviors	Rude	1	2%	2	2%	3	2%
	Strict	11	22%	33	33%	44	29.3%
	Gentle/friendly	30	60%	54	54%	84	56%
	Permissive	8	16%	11	11%	19	12.7%
Initial talking time to the child	0-3 months	11	22%	18	18%	29	19.3%
	3-9 months	11	22%	38	38%	49	32.7%
	9-15 months	17	34%	30	30%	47	31.3%
	When they understand	11	22%	14	14%	25	16.7%
Reading stories or showing pictures	Hardly ever	23	46%	42	42%	65	43.3%
	1 or 2/month	5	10%	8	8%	13	8.7%
	≥once a week	5	10%	20	20%	25	16.7%
	≥3x a week	8	16%	18	18%	26	17.3%
	≥5x a week	9	18%	12	12%	21	14%
Caregiving by men	Yes	44	88%	95	95%	139	92.7%
	No	6	12%	5	5%	11	7.3%
Men caregiving frequency	≥once a month	5	10%	10	10%	15	10.4%
	≥ once a week	4	8%	10	10%	14	9.7%
	≥ 3 to 4x/week	15	30%	27	27%	42	29.2%
	Everyday	25	50%	48	48%	73	50.7

Usual method to keep child occupied	Give something to eat	1	2%	5	5%	6	4%
	Offer a toy	17	34%	25	25%	42	28%
	Put to nap	9	18%	21	21%	30	20%
	Encourage to keep busy	11	22%	29	29%	40	26.7%
	Play with them	12	24%	20	20%	32	21.3%

5.2 Bivariate and multivariable logistic regression analysis results of the study

All independent variables of speech and language development delay were examined for the determinants. The factors that found an association in the bivariate logistic regression analysis (P-value<0.25) were: father's occupation, place of residence, age of the father greater than forty at birth, young mother's age, hearing problems, birth asphyxia, middle ear infection, oropharyngeal deformity, bottle feeding, complementary food introduction less than six months, number of family members less than or equal to four, speech and language delay family history, mother-child separation, multilingual family, screen time of two or more hours, child-rearing behaviors associated with speech and language development delay. The multivariable analysis result showed older father's age at birth, birth asphyxia, bottle feeding, mother-child separation, multilingual family and screen time of two or more hours to be associated with speech and language development delay.

Children with older fathers at birth (>40 years) have an increased risk of speech and language development delay by 3.38 times than those that are not [AOR=3.38, 95 CI (1.05-10.90)]. Children who have had birth asphyxia were about 4.58 times more to experience speech and language development delay than the controls [AOR=4.58, 95CI (1.23-16.99)]. The odds of speech and language development delay were 4.54 times in bottle-fed children compared to breastfed children [AOR=4.54, 95CI (1.29-16.04)].

Children who were separated from their mothers had 2.6 times more increased risk of speech and language development delay compared to those with no separation [AOR=2.6, 95CI (1.05-6.43)]. Children from multilingual families increased an risk of speech and language development delay by 2.31 folds than those that are not [AOR=2.31, 95CI (1.03-5.18)]. Regarding screen time, children who viewed screens (television, mobile, or laptop) for two or more hours were susceptible to speech and language development delay with an odds ratio of 3.06 [AOR=3.06, 95CI (1.29-7.28)].

Table 7: Bivariate analysis for the study of determinants of speech and language development delay among children in Yekatit 12 Hospital, Addis Ababa, Ethiopia, 2023				
Variables	Responses	Cases (N=50)	Controls (N=100)	Crude OR with 95%CI
		Frequency (%)	Frequency (%)	
Age±SD		50.84±34.43	51.42±32.21	1.00(0.99-1.01)
Gender	Male	23(46%)	54(54%)	0.73(0.37-1.43)
	Female	27(54%)	46(46%)	1
Father's education	Cannot read and write	6(12%)	13(13%)	1.24(0.39-3.96)
	Primary	10(20%)	24(24%)	1.12(0.42-2.97)
	High school	16(32%)	19(19%)	2.27(0.90-5.69)
	Training	5(10%)	9(9%)	1.50(0.42-5.30)
	≥Diploma	13(26%)	35(35%)	1
Mother's educational status	Cannot read and write	12(24%)	19(19%)	1.96(0.64-4.57)
	Primary	12(24%)	24(24%)	1.56(0.56-4.32)
	High school	12(24%)	22(22%)	1.70(0.61-4.75)
	Training	5(10%)	7(7%)	2.22(0.56-8.76)
	≥Diploma	9(18%)	28(28%)	1
Father's occupation	Unemployed	14(28%)	15(15%)	2.20(0.96-5.03)[1]
	Employed/self-employed	36(72%)	85(85%)	1
Mother's occupation	Housewife	37(74%)	69(69%)	1.28(0.60-2.74)
	Employed	13(26%)	31(31%)	1
Residence	Urban	41(82%)	89(89%)	0.56(0.22-1.46)[1]
	Rural	9(18%)	11(11%)	1
Monthly income	≤5000	10(20%)	36(36%)	0.97(0.34-2.79)
	5001-10000	32(64%)	36(36%)	3.11(1.24-7.78)
	>10000	8(16%)	28(28%)	1
№ of siblings	Zero	5(10%)	14(14%)	0.63(0.13-3.09)
	One	16(32%)	37(37%)	0.76(0.19-2.95)
	Two	15(30%)	21(21%)	1.25(0.31-5.05)
	Three	5(10%)	14(14%)	0.63(0.13-3.09)
	Four	5(10%)	7(7%)	1.25(0.23-6.72)
	Greater than four	4(8%)	7(7%)	1
Birth order	First	21(42%)	57(57%)	0.74(0.17-3.22)
	Second	16(32%)	24(24%)	1.33(0.29-6.12)
	Three	10(20%)	13(13%)	1.54(0.31-7.72)
	Greater	3(6%)	6(6%)	1

Father's age at birth	≤ 20	0(0%)	1(1%)	0.00
	21-30	8(16%)	29(29%)	1
	31-40	25(50%)	53(53%)	1.71(0.68-4.27)
	>40	17(34%)	17(17%)	3.62(1.29-10.17)[1]
Mother's age at birth	≤20	4(8%)	1(1%)	12.00(1.27-113.43)[1]
	21-30	21(42%)	63(63%)	1
	31-40	25(50%)	33(33%)	2.27(1.07-4.57)[1]
	>40	0(0%)	3(3%)	0.00
Seizure disorder	Yes	7(14%)	8(8%)	1.87(0.64-5.50)
	No	43(86%)	92(92%)	1
Hearing problems	Yes	6(12%)	1(1%)	13.5(1.02-29.14)[1]
	No	44(88%)	99(99%)	1
Low birth weight	Yes	9(18%)	12(12%)	1.61(0.63-4.12)
	No	41(82%)	88(88%)	1
Preterm	Yes	10(20%)	13(13%)	1.67(0.68-4.14)
	No	40(80%)	87(87%)	1
Type of birth	Vaginal	35(70%)	69(69%)	1.05(0.50-2.19)
	Cesarean	15(30%)	31(31%)	1
Birth asphyxia	Yes	9(18%)	5(5%)	4.17(1.32-13.21)[1]
	No	41(82%)	95(95%)	1
Middle ear infection	Yes	5(10%)	3(3%)	3.59(0.82-15.69)[1]
	No	45(90%)	97(97%)	1
Any other illness related to throat ear, nose	Yes	4(8%)	7(7%)	1.16(0.32-4.15)
	No	46(92%)	93(93%)	1
Oropharyngeal deformity	Yes	7(14%)	2(2%)	7.98(1.59-39.98)[1]
	No	43(86%)	98(98%)	1
Feeding history	Breastfeeding	36(72%)	90(90%)	1
	Bottle-fed	9(18%)	5(5%)	4.50(1.41-14.35)[1]
	Mixed	5(10%)	5(10%)	2.50(0.68-9.16)[1]
EBF duration	< 6 months	7(14%)	9(9%)	2.46(0.64-9.48)
	6 months	6(12%)	19(19%)	1
	> 6 months	28(56%)	69(69%)	1.29(0.47-3.56)
Complementary food	< 6 months	10(20%)	8(8%)	2.00(0.47-8.56)[1]
	6 months	5(10%)	8(8%)	1
	> 6 months	35(70%)	84(84%)	0.67(0.21-2.21)
Thumb-sucking	Yes	20(40%)	35(35%)	1.24(0.62-2.49)
	No	30(60%)	65(65%)	1

Pacifier use	Yes	18(36%)	27(27%)	1.52(0.74-3.15)
	No	32(64%)	73(73%)	1
Type of family	Nuclear	40(80%)	76(76%)	1.26(0.34-1.82)
	Joint	10(20%)	24(24%)	1
№ of family members	≤4	21(42%)	59(59%)	0.50(0.25-1.00)[1]
	>4	29(58%)	41(41%)	1
Family history	Yes	11(22%)	10(10%)	2.54(1.00-6.47)[1]
	No	39(78%)	90(90%)	1
Mother-child separation	Yes	13(26%)	17(17%)	1.72(0.76-3.89)[1]
	No	37(74%)	83(83%)	1
Father lives from home	Yes	36(72%)	80(80%)	0.64(0.29-1.41)
	No	14(28%)	20(20%)	1
Multilingual family	Yes	21(42%)	29(29%)	1.77(0.87-3.60)[1]
	No	29(58%)	71(71%)	1
Recent trauma or stress	Yes	6(12%)	9(9%)	1.38(0.24-2.17)
	No	44(88%)	91(91%)	1
Screen time	< 2 hours	10(20%)	41(41%)	1
	≥ 2 hours	40(80%)	59(59%)	2.78(1.25-6.18)[1]
Child-rearing behavior	Rude	1(2%)	2(2%)	0.69(0.05-8.96)
	Strict	11(22%)	33(33%)	0.46(0.15-1.43)[1]
	Gentle/friendly	30(60%)	54(54%)	0.76(0.28-2.11)
	Permissive	8(16%)	11(11%)	1
Initial time talking to your child	0-3 months	11(22%)	18(18%)	0.78(0.26-2.31)
	3-9 months	11(22%)	38(38%)	0.37(0.13-1.04)
	9-15 months	17(34%)	30(30%)	0.72(0.27-1.94)
	When they understand	11(22%)	14(14%)	1
Reading stories or showing pictures	Hardly ever	23(46%)	42(42%)	0.73(0.27-1.99)
	Once or twice a month	5(10%)	8(8%)	0.83(0.20-3.42)
	≥once a week	5(10%)	20(20%)	0.33(0.90-1.23)
	≥3 times a week	8(16%)	18(18%)	0.59(0.18-1.97)
	≥5 times a week	9(18%)	12(12%)	1
Caregiving by men	Yes	44(88%)	95(95%)	0.39(0.11-1.33)
	No	6(12%)	5(5%)	1
Men caregiving frequency	≥once a month	5(10%)	10(10%)	0.96(0.30-3.12)
	≥once a week	4(8%)	10(10%)	0.77(0.22-2.30)
	≥3 to 4x/week	15(30%)	27(27%)	1.07(0.48-2.36)

	Everyday	25(50%)	48(48%)	1
Usual method to keep child occupied	Give something to eat	1(2%)	5(5%)	0.33(0.04-3.21)
	Offer a toy	17(34%)	25(25%)	1.13(0.44-2.91)
	Put to nap	9(18%)	21(21%)	0.71(0.25-2.06)
	Encourage to keep busy	11(22%)	29(29%)	0.63(0.23-1.71)
	Play with them	12(24%)	20(20%)	1

[1] = Variables taken for multivariate analysis EBF = exclusive breastfeeding

Table 8: Multivariable analysis for the study of determinants of speech and language delay among children in Yekatit 12 Hospital, Addis Ababa, Ethiopia, 2023				
Variables	Responses	Cases (N=50)	Controls (N=100)	AOR with 95%CI
		Frequency (%)	Frequency (%)	
Father's occupation	Unemployed	14(28%)	15(15%)	1.63(0.62,4.28)
	Employed/self-employed	36(72%)	85(85%)	1
Residence	Urban	41(82%)	89(89%)	0.64(0.18,2.28)
	Rural	9(18%)	11(11%)	1
Father's age at birth	≤ 20	0(0%)	1(1%)	0.00
	21-30	8(16%)	29(29%)	1
	31-40	25(50%)	53(53%)	1.92(0.68-5.43)
	>40	17(34%)	17(17%)	3.38(1.05-10.90)*
Mother's age at birth	≤20	4(8%)	1(1%)	0.00
	21-30	21(42%)	63(63%)	1
	31-40	25(50%)	33(33%)	1.59(0.64-3.97)
	>40	0(0%)	3(3%)	0.00
Hearing problems	Yes	6(12%)	1(1%)	4.04(0.62-26.41)
	No	44(88%)	99(99%)	1
Birth asphyxia	Yes	9(18%)	5(5%)	4.58(1.23-16.99)*
	No	41(82%)	95(95%)	1
Middle ear infection	Yes	5(10%)	3(3%)	0.93(0.10-8.67)
	No	45(90%)	97(97%)	1
Oropharyngeal deformity	Yes	7(14%)	2(2%)	2.75(0.37-20.49)
	No	43(86%)	98(98%)	1
Feeding history	Breastfeeding	36(72%)	90(90%)	1
	Bottle-fed	9(18%)	5(10%)	4.54(1.29-16.04)*
	Mixed	5(10%)	5(10%)	3.75(0.87-16.12)
Complementary food	<6 months	10(20%)	8(8%)	0.83(0.14-4.88)
	6 months	5(10%)	8(8%)	1
	After 6 months	35(70%)	84(84%)	0.51(0.13-1.91)
Nº of family members	≤4	21(42%)	59(59%)	0.78(0.32-1.90)
	>4	29(58%)	41(41%)	1
Family history	Yes	11(22%)	10(10%)	1.60(0.51-5.05)
	No	39(78%)	90(90%)	1
Mother-child	Yes	13(26%)	17(17%)	2.60(1.05-6.43)*

separation	No	37(74%)	83(83%)	1
Multilingual family	Yes	21(42%)	29(29%)	2.31(1.03-5.18)*
	No	29(58%)	71(71%)	1
Screen time	< 2 hours	10(20%)	41(41%)	1
	≥ 2 hours	40(80%)	59(59%)	3.06(1.29-7.28)*
Child-rearing behavior	Rude	1(2%)	2(2%)	0.51(0.02-13.74)
	Strict	11(22%)	33(33%)	0.40(0.09-1.72)
	Gentle/friendly	30(60%)	54(54%)	1.01(0.26-4.02)
	Permissive	8(16%)	11(11%)	1

Key: 1=Reference, *=statistically significant with P-value<0.05

6. DISCUSSION

This study is a facility-based unmatched case-control study consisting of 50 cases and 100 controls who were visiting Yekatit 12 Hospital pediatrics outpatient department. In this study, older father's age at birth, birth asphyxia, bottle feeding, mother-child separation, multilingual family and screen time of two or more hours were found to be associated with speech and language development delay.

This study revealed that older fathers' age at birth (> 40 years) was associated with speech and language development delay. The odds of speech and language development delay are 3.38 times greater in children with older fathers at birth compared to those without older fathers at birth. This result aligns with a Bangladesh study (7). The possible reason could be that as the age of men increases, they are more likely to experience mutations in their sperm. The mutations can affect the brain and nervous system development of their children which may lead to speech and language development delay and other developmental disorders (50, 51). Another explanation can be father's attitude and involvement with children can decrease in older age.

The study showed an association between birth asphyxia and speech and language development delay. Birth asphyxia-affected children were 4.58 times more at risk to have speech and language development delay. The finding is consistent with an India study (28) and in Bangladesh with odds of 4.72 (1). This could be due to experiencing neonatal hypoxic-ischemic encephalopathy after birth asphyxia. Neonatal hypoxic-ischemic encephalopathy is a brain injury that occurs as the result of the stop of flow of blood to the infant's brain at the time of birth, it can be the cause of linguistic problems (52).

In this study, children who were bottle-fed were 4.54 times to suffer from speech and language development delay compared to breast-fed children. Bottle feeding increases the chance of getting ear infections. Recurrent ear infections can lead to a decrease in hearing ability and speech and language development delay. Breastfeeding is also a protective factor against speech and language development delay as it encourages normal oro-facial development as well as dental development and it also improves muscle coordination and strength of the tongue, mouth, lips and jaw (53) (54). It is also linked with optimum neurodevelopment as breast milk fulfills the nutrition requirements of a child until 6 months old (55).

The present study has revealed an association between mother-child separation and speech and language development delay. Children that are separated from their mothers were 2.6 times more likely to have speech and language development delay. The result is supported by a Pakistan study (44) and a Bangladesh study (1) that showed an association with less time spent with the mother and a primary caregiver other than the mother. Language and cognitive development are influenced by the quality of the relationship between a child and their parents (1). This might also be due to a decreased level of care and companionship and neglect in the absence of the mother.

The study indicated also multilingual family to be with speech and language development delay. Children from multilingual families are 2.31 times more likely to have speech and language development delay. The reason may be because the children might not be able to differentiate between the various languages or they may not be receiving enough support in one or all the languages they are being exposed to.

More screen time (television, mobile, or laptop) was associated with speech and language development delay. Children with two or more hours of screen time had an increased risk of having speech and language development delay by 3.06 folds. The finding is consistent by a Bangladesh study (1) and an Indonesian study (41) with odds of 4.72 and 7.12 respectively. It is important for children to experience linguistic diversity. Children may have difficulty transferring information learned from the screen of a device to real-life use (56).

Regardless of different studies showing an association of male gender, parents' education, mother's age at birth, socioeconomic status, seizure disorder, being preterm, oropharyngeal deformity, family history of speech and language delay, history of thumb sucking and pacifier use and speech and language delay (7, 28, 30, 33-38, 42, 43) in the multivariable logistic regression analysis, this study did not find their association. The reason may be due to differences in sample size and methodology.

7. STRENGTH AND LIMITATION OF THE STUDY

7.1 Strength of the study

- The use of case-control research design to identify possible determinants of speech and language development delay
- The study had a high participation rate of respondents
- Face to face interview method was employed to collect data to reduce information bias
- It tried to incorporate several covariates
- The study is conducted in a relatively new area as there is no documented data available on this title in Ethiopia and Africa

7.2 Limitation of the study

- The small sample sizes made it difficult to determine the association of some of the potential variables.
- Because the exposure status was measured retrospectively, there could be recall bias.

8. CONCLUSION AND RECOMMENDATION

8.1. Conclusion

Speech and language development delay is one of the most common DD. It can lead to social, cognitive and behavioral problems if left untreated. There are several determinants of speech and language development delay. This study revealed statistically significant associations with determinants of speech and language development delay such as older father's age at birth, birth asphyxia, bottle-feeding, mother-child separation, multilingual environment and screen time of two hours or more hours a day.

8.2 Recommendations

The following recommendations have been made to the concerned bodies based on the findings of this study:

For health workers

- Health workers who are employed in pediatrics OPD and pediatric wards should screen for speech and language development delay routinely especially those with the risk factors and interventions should be given timely
- Health education about speech and language development delay and risk factors should be given to parents or caregivers for early recognition and prevention of speech and language development delay
- Health professionals should monitor fetal heartbeat regularly and make timely decisions when the fetus is in distress to prevent birth asphyxia

For the Ministry of Health and health service organizations

- The government's priority for speech and language development delay ought to increase and new intervention centers related to speech and language development delay should be opened as there is only one speech therapy center in Addis Ababa in Yekatit 12 Hospital

For Researchers

- Researchers interested in studying speech and language development delay should conduct it in a community setting as it may increase the efficacy of the study.

- Further research should be undertaken with variables that were not included in this study such as nutritional status and mother's alcohol consumption.

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ANNEX

Annex I. Information sheet/ Consent form for the Study (English version)

Dear Sir/Madam

Hello, Greetings! My name is _____I am here on behalf of Feven Yeshitila who is a Masters in Pediatrics and Child Health nursing student of Addis Ababa University, College of Health Sciences, School of Nursing and Midwifery, 2023. She is conducting a research on the determinants of speech and language development delay among children in Yekatit 12 Hospital.

Objectives: This study is aimed to identify the determinants of speech and language development delay among children in Yekatit 12 Hospital, Addis Ababa, Ethiopia, 2023

Potential Risks: There is no foreseen risk in participating in this study.

Benefits: No financial benefit will be related to this study.

Hence, you are kindly requested to provide genuine answers to the questions. The questionnaire contains closed-ended questions and will be provided in interview administered form. Select the response that best reflects your observations. The information you provide will be used solely for this study and will be kept strictly confidential. If you have any questions, please contact the data collector. We, therefore, ask for your genuine willingness. However, you have the option to decline if you are not willing to participate, simply fill 'No' in the box below.

Do you agree to participate in this study?

Yes ☐ No ☐

Principal Investigator's Name: Feven Yeshitila Telephone number: +251938947047

Supervisor's Name and Address: _____

Signature of the participant_____ Data collector signature _____ Date_____

Annex II. Questionnaire (English version)

I. Socio-Demographic Factors

S.N	Socio-Demographic	Response	Remark
101	Gender	1. Male 2. Female	
102	Age	___in months	
103	Father's education	1. Cannot read or write 2. Primary school 3. High school 4. Occupational training 5. Diploma/degree /other	
104	Mother's education	1. Cannot read or write 2. Primary school 3. High school 4. Occupational training 5. Diploma/degree /other	
105	Father's occupation	1. Unemployed 2. Employed/Self-employed	
106	Mother's occupation	1. Housewife 2. Employed	
107	Place of residence	1. Rural 2. Urban	
108	Monthly income	_____	
109	No of siblings	1. Zero 2. One 3. Two 4. Three 5. Four 5. Greater than four	

110	Child's birth order	1. First 2. Second 3. Three 4. Greater	
111	Age of father at child's birth	_____Years	
112	Age of mother at child's birth	_____ Years	

II. Biological factors

201	Does the child have any seizure diagnosed disorder?	1. Yes 2. No	
202	Does the child been diagnosed any hearing problems?	1. Yes 2. No	
203	Did the child have a low birth weight in birth?	1. Yes 2. No	
204	Was the child preterm?	1. Yes 2. No	
205	Type of birth	1. Vaginal delivery 2. Cesarean	
206	Did the child experience birth asphyxia?	1. Yes 2. No	
207	Did the child ever have a middle ear infection?	1. Yes 2. No	
208	Does the child have any other illness related to ear, nose, and throat (ENT)?	1. Yes 2. No	
209	Does the child have any diagnosed oropharyngeal deformity?	1. Yes 2. No	

III. Feeding factors

301	What is the feeding history of the child?	1. Breastfeeding 2.Bottlefed (if the answer is bottle-fed, skip to question number 303) 3. Mixed	
302	What was the duration of exclusive breastfeeding?	1. Less than 6 months 2. 6 months 3. Greater than 6 months	
303	When did you introduce complementary food to the child?	1. Before 6 months 2. 6 months 2. After 6 months	
304	Does the child have a history of thumb-sucking?	1. Yes 2. No	
305	Did the child use pacifiers?	1. Yes 2. No	

IV. Family-based factors

401	Type of family	1. Joint 2. Nuclear	
402	№ of family members	1. Equal to or less than four 2. Greater than four	
403	Is there a family history of speech and language disorders?	1. Present 2. Absent	
404	Are the mother and child separated?	1. Yes 2. No	
405	Does the father live from home?	1. Yes 2. No	

406	Is your family multilingual?	1. Yes 2. No	

V. Environmental factors

501	Does the child have a history of recent trauma or stress?	1. Yes 2. No	
502	About how many hours does the child view screen (television, mobile, or laptop) in a day?	____ hours	
503	What are your child-rearing behaviors?	1. Rude 2. Strict 3. Gentle/friendly 4. Permissive	
504	When did you start talking to the child?	1. 0-3 months 2. 3-9 months 3. 9-15 months 4. When he/she was old enough to understand	
505	How often does someone read stories or show pictures to the child?	1. Hardly ever 2. Once or twice a month 3. At least once a week 4. At least 3 times a week 5. At least 5 times a week	
506	Does the father or other adult men provide caregiving to the child?	1. Yes 2. No (if the answer is No, skip to question number 508)	
507	If the answer is yes to the above question, how often?	1. At least once a month 2. At least once a week 3. At least 3 to 4 times a week	

		4. Every day	
508	What do you usually do when the child isn't preoccupied?	1. Give him/her something to eat 2. Offer him/her a toy 3. Put him/her to nap 4. Encourage him/her to keep himself/herself busy 5. Play with him/her	

VI. The child's status

601	Does the child have speech and language delay?	1. Yes 2. No	
602	If the answer is yes to the above question, what type of delay does the child have?	1. Expressive delay 2. Receptive delay 3. Both	

Annex III. Information sheet/ Consent form for the Study (Amharic version)

የአማርኛ መጠይቅ

1. የመረጃ ወረቀት

የመረጃ ወረቀት

ጤና ይስጥልኝ ስሜ———————————— ይባላል፡፡ የመጣሁት በአዲስ አበባ ዩኒቨርስቲ የነርሲንግ እና አዋላጅ ነርሲንግ ትምህርት ቤት የልጆች እና የህፃናት ነርሲንግ ትምህርት ክፍል ተማሪ የሆነችውን ፌቨን የሺጥላ ወክዬ ነው፡፡ በአዲስ አበባ በተመረጡ የመንግስት ሆስፒታል እና የግል ክሊኒኮች የንግግር እና የቋንቋ መዘግየትን ምክንያቶች የሚል የጥናት እና የምርምር ስራ በመስራት ላይ ትገኛለች፡፡

የጥናቱ አላማ፡ የንግግር እና የቋንቋ መዘግየትን ምክንያቶች በአዲስ አበባ ዉስጥ ባሉ በተመረጡ የመንግስት ሆስፒታል እና የግል ክሊኒኮች ማጥናት

ሊፈጠሩ የሚችሉ አደጋዎች፡ በዚህ ጥናት ውስጥ ለመሳተፍ አስቀድሞ የተገመተ አደጋ የለዉም።

ለተጠያቂው የሚሰጠው ጥቅም፡ እዚህ ጥናት በመሳተፎ ምንም አይነት የገንዘብ ጥቅም አይኖሮትም።

ስለሆነም ለጥያቄዎቹ ትክክለኛ መልስ እንድትሰጡ በአክብሮት እንጠይቅዎታለን። መጠይቁ የተዘጉ ጥያቄዎችን የያዘ ሲሆን በቃለ መጠይቅ መልክ የሚቀርብ ይሆናል። ምልከታዎን በተሻለ ሁኔታ የሚያንፀባርቀውን ምላሽ ይምረጡ። የሚያቀረቡት መረጃ ለዚህ ጥናት ብቻ የሚያገለግል ሲሆን በጥብቅ በሚስጥር ይጠበቃል። ማንኛቸውም ጥያቄዎች ካሉዎት፣ እባክዎን መረጃ ሰብሳቢውን ያናግሩ። ስለዚህ እውነተኛ ፈቃደኛነትዎን እንጠይቃለን። ነገር ግን፣ ለመሳተፍ ፈቃደኛ ካልሆኑ ውድቅ የማድረግ አማራጭ አሎት፣ በቀላሉ 'አልስማማሁም' የሚለውን ከታች ባለው ሳጥን ውስጥ ይሙሉ።

በዚህ ጥናት ለመሳተፍ ተስማምተሃል/ሻል?

ተስማምቻለሁ ☐ አልስማማሁም ☐

የዋና መርማሪ ስም፡ ፌቨን የሺጥላ ስልክ ቁጥር: +251938947047

የተሳታፊው ፊርማ _____የመረጃ ሰብሰባ ፊርማ _____ቀን _____

Annex IV: Questionnaire (Amharic version)

የአማርኛ መጠይቅ ፎርም

ክፍል 1፡ የተሳታፊዎች አጠቃላይ መረጃ

ተ.ቁ	ጥያቄዎች	አማራጮች	ይለፍ

101	ጾታ	1. ወንድ 2. ሴት	
102	እድሜ	___ ወር	
103	የአባት የትምህርት ደረጃ	1. ማንበብ እና መጻፍ የማት(ይ)ችል 2. የመጀመሪያ ደረጃ 3. ሁለተኛ ደረጃ 4. የስራ ላይ ስልጠና 5. ዲፕሎማ/ ድግሪ/ ሌላ	
104	የእናት የትምህርት ደረጃ	1. ማንበብ እና መጻፍ የማት(ይ)ችል 2. የመጀመሪያ ደረጃ 3. ሁለተኛ ደረጃ 4. የስራላይስልጠና 5. ዲፕሎማ/ ድግሪ/ ሌላ	
105	የአባት ስራ	1. ሥራ አጥ 2. ስራ ያለዉ/የራስ ስራ	
106	የእናት ስራ	1. የቤት እመቤት 2. ስራ ያላት	
107	የመኖሪያ ቦታ	1. ከተማ 2. ገጠር	
108	ወርሃዊ ገቢ	_____	
109	የወንድም እና እህቶች ቁጥር	1. ዜሮ 2. አንድ 3. ሁለት 4. ሶስት 5. አራት 6. ከአራት በላይ	
110	ልጁ የተመወለደበት ቅደም ተከተል	1. መጀመሪያ 2. ሁለተኛ 3. ሶስት 4. ከዛ በላይ	
111	ልጁ ሲወለድ የአባት እድሜ	_____ አመት	
112	ልጁ ሲወለድ የእናት እድሜ	_____ አመት	

ክፍል 2፡ ባዮሎጂካል ምክንያቶች

201	ልጁ በህኪም የተረጋገጠ የመንቀጥቀጥ ችግር አለበት/ባት?	1. አዎ 2. የለበትም/ባትም	

202	ልጁ በሀኪም የተረጋገጠ የመስማት ችግር አለበት/ባት?	1. አዎ 2. የለበትም/ባትም	
203	ልጁ ሲወለድ ዝቅተኛ ክብደት ነበረው/ራት?	1. አዎ 2. አልነበረውም/ትም	
204	ልጁ ከጊዜዉ ቀድሞ የተወለደ ነበር/ረች?	1. አዎ 2. አልነበረም/ችም	
205	ልጁ የተወለደው/ችው በምድን ነዉ?	1. በምጥ 2. በሰርጀሪ	
206	ልጁ ሲወለድ የመታፈን ችግር ኢጋጥሞት ቶሎ/አላለቀስም ነበር/ረች?	1. አዎ 2.አላጋገጠመዉም/ማትም	
207	ልጁ የመሃከለኛ ጆሮ ህመም ነበረው/ራት?	1. አዎ 2. አልነበረዉም/ራትም	
208	ልጁ ከጆሮ፣ አፍንጫ እና ጉሮሮ ጋር የተያያዘ ሌላ በሽታ አለበት/ባት?	1. አዎ 2. የለበትም/ባትም	
209	ልጁ በሀኪም የተረጋገጠ የላንካ እና የከንፈር ጉድለት አለበት/ባት?	1. አዎ 2. የለበትም/ባትም	

ክፍል 3፡ የመመገብ ምክንያቶች

301	የልጁ አመጋገብ ታሪክ ምንድነው?	1. ጡት ጠቢታል 2. ጡጦ የጠባ (መልሶ ጡጦ የጠባ ከሆነ ወደ ጥያቄ ቁጥር 303 ይዝለሉ) 3. ሁለቱንም	
302	ልጁ ጡት ብቻ የማጥባት ጊዜ ስንት ነበር?	1. ከ6 ወር በታች 2. 6 ወር 3. ከ6 ወር በላይ	
303	ተጨማሪ ምግብን ለልጁ መቼ ተጀመረለት/ላት?	1. ከ 6 ወር በፊት 2. 6 ወር 3. ከ 6 ወር በኋላ	
304	ልጁ አውራ ጣት ይጠባ/ትጠባ ነበር?	1. አዎ 2. አልነበረም	
305	ልጁ እንጀራ እናት ጡጦ ይጠባ/ ትጠባ ነበር?	1. አዎ 2. አልነበረም	

ክፍል 4፡ በቤተሰብ ምክንያቶች

401	የቤተሰብ አኗኗር አይነት	1. ከብዙ ቤተሰብ ጋር 2. ከእናት እና ከአባት ጋር	
402	የቤተሰብ አባላት ቁጥር	1. ከአራት በላይ 2. አራት እና ከዛ በታች	
403	ከቤተሰብ ዉስጥ የንግግር እና የቋንቋ ችግር የነበረበት ሰዉ አለ?	1. አለ 2. የለም	

404	ልጁ ከእናቱ ጋር ተለያይቷል/ታለች?	1. አዎ 2. አልተለያየም/ ችም	
405	አባቱ አብሮት/ራት ይኖራል?	1. አዎ 2. አይኖርም	
406	ቤተሰቡ ከአንድ በላይ ቋንቋ ይናገራል?	1. አዎ 2. አይናገርም	

ክፍል 5፡ የአካባቢ ምክንያቶች

501	ልጁ የቅርብ ጊዜ የስሜት ቀውስ ወይም የጭንቀት ችግር አጋጥሞታል?	1. አዎ 2. አላጋጠመዉም/ትም	
502	ልጁ ቴሌቪዥን፣ ሞባይል ወይም ላፕቶፕ በቀን ምን ያህል ሰዓት ይመለከታል/ታለች?	_____ ስአት	
503	የልጅ አስተዳደግ ሁኔታ	1. አመናጭቆ 2. ጥብቅ 3. በትህትና 4. እደልጁ ፍቃድ	
504	ልጁን ማነጋገር የጀመሩት መቼ ነው?	1. 0-3 ወራት 2. 3-9 ወራት 3. 9-15 ወራት 4. እሱ/ሷ ለመረዳት ሲደርስ	
505	ሰዎች ለልጅዎ ምን ያህል ጊዜ ያነቡለታል ወይም ስዕሎችን ያሳዩታል?	1. እንብዛም 2. በወር አንድ ጊዜ ወይም ሁለት ጊዜ 3. ቢያንስ በሳምንት አንድ ጊዜ 4. ቢያንስ በሳምንት ሶስት ጊዜ 5. ቢያንስ በሳምንት አምስት ጊዜ	
506	አባት ወይም ሌሎች አዋቂ ወንዶች ለልጁ እንክብካቤ ይሰጣሉ?	1. አዎ 2. አይሰጡም (መልሱ አይሰጡም ከሆነ ወደ ጥያቄ ቁጥር 508 ይዝለሉ)	
507	ከላይ ላለው ጥያቄ መልሱ አዎ ከሆነ፣ በየስንት ጊዜው ነው?	1. ቢያንስ በወር አንድ ጊዜ 2. ቢያንስ በሳምንት አንድ ጊዜ 3. ቢያንስ በሳምንት ከ 3 እስከ 4 ጊዜ 4. በየቀኑ	
508	ልጁ ሲደብረው እርሶ ብዙውን ጊዜ ምን ያረጋሉ?	1. የሚበላ ነገር መስጠት 2. አሻንጉሊት ማቅረብ 3. እንቅልፍ ማስተኛት 4. እራሳቸው በስራ እንድጠምዱ ማበረታታት 5. ከእሱ/ ሷ ጋር በጋራ	

		መጫወት	

ክፍል 6፡ የልጁ ሁኔታ

601	ልጁ የንግግር እና የቋንቋ መዘግየት አለበት?	1. አለበት/ባት 2. የለበትም/ባትም	
602	ከላይ ላለው ጥያቄ መልሱ አዎ ከሆነ ልጁ ምን አይነት መዘግየት ነው ያለበት?	1. የገላጭ መዘግየት 2. የመቀበያ መዘግየት 3. ሁለቱም	