

Prevalence and Determinance of Failure to Thrive Among Children in Bayelsa State, Nigeria

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ABSTRACT

The aim of the study was to determine the prevalence of failure to thrive among children in Bayelsa state and its associated factors. It was a cross-sectional study designed to obtain anthropometric data and history of failure to thrive children and determine associated factors by using a pre-tested questionnaire. A total of 374 failure to thrive children ages 1 to 5 years were investigated from three local government areas of the State; Southern Ijaw (124), Yenagoa (126) and Nembe (124). 185 were males while 189 were females. The Gomez classification and four-week recall approaches were used as criteria to estimate failure to thrive among children. 24.6% (92) of the children were diagnosed to have failure to thrive using the Gomez criteria while 19.8% (18) of the children were said to have failure to thrive using the four weeks' recall approach. Furthermore, result also showed that majority of the cases of failure to thrive are a mix of organic and non-organic factors with a significant relationship between health status of child at birth using Chi-square (X^2) = 14.357, difference (d) = 1, and P-value = 0.000 at 95% confidence interval, thus showing a significant relationship between failure to thrive and child being ill at birth and health status of the mother. Also, there was a significant relationship between failure to thrive and exposure to environmental pollutants with Chi-square (X^2) = 11.607, difference (d) = 1, and P-value = 0.001 at 95% confidence interval. The high prevalence of failure to thrive among children under the age of five in Bayelsa State calls for immediate public actions such as promotion of optimum infant and young child nutrition and regular growth monitoring of children and mothers health in the state for improved growth and development and health outcomes of children in the state.

Key Words: Failure to thrive children, exposure, ill health, Prevalence, Bayelsa State, Gomez criteria, organic factors, non-organic factors.

INTRODUCTION

During infancy and childhood, children gain weight and grow more rapidly than at any other time in life. However, some children do not gain weight at a normal rate, either because of expected variations related to genetics, being born prematurely, or because of undernutrition, which may occur for a variety of reasons [1].

Failure to thrive (FTT) is a descriptive term and diagnosis used to describe conditions whereby children fail to grow at the expected rate of the peers [2]. Rabinowitz defined it as a significant interruption in the expected rate of growth during early childhood. It describes an infant or child whose current weight or rate of weight gain is significantly below that expected of

similar children of the same age, sex and ethnicity [2]. Failure to thrive is an issue of concern in paediatric and child health as it could affect the physical and mental growth of a child and sometimes an indication of an underlying organic or non-organic ailment that necessitates paediatric and nursing interventions [3].

The National Institute for Health and Care Excellence noted that this symptom commonly occurs in children aged 1-2 years of life but may present at any time in childhood [4]. Some authors have even limited the definition of FTT to only children less than 3 years old despite the fact that there is no precise age limitation to poor growth among children. However, most children with FTT in resource poor countries like Nigeria are under 3 years of age [5].

The causes of Failure to thrive have been assessed. This has been grouped into those due to: (i) inadequate caloric intake (ii) inadequate absorption (iii) increased caloric requirement and (iv) defective utilization of calories [6]. It has also been categorized as organic and non-organic with organic characterized by the presence of an existing medical condition while non-organic include causes outside underlying medical conditions such as poor feeding by mother which may stem from psychological disturbance of the mother or poverty [7].

Globally, the epidemiology of this condition is not known. However Onyiriuka reported that the prevalence is estimated at 5-10% in developed nations with a higher prevalence in developing nations like Nigeria [8]. The absence of a definitive epidemiology of this condition could be attributable to the fact that the condition is poorly defined and other terms such as poor weight gain and malnutrition have been used more globally in defining weight faltering among children [1].

Thus far, despite the common experience of nurses and paediatricians on children who fail to thrive, little is known on their prevalence and determinants in Bayelsa State. An understanding of this condition is

therefore important as it serves as a pointer to existing illness or poor feeding and brings about public health response to address the underlying causes of this condition which could affect the physical and mental growth of children in Bayelsa State and beyond. This study is therefore designed to assess the prevalence and determinants of Failure to thrive among children under the age of 5 years in Bayelsa State.

1.2 Statement of the Problem

Failure to thrive is an issue of public health concern. Growth and development in the first few years of life is an important indicator of child health and survival that needs to be taken seriously for improved child and wellbeing. Severe growth retardation has strong associations with morbidity and mortality among children under the age of five years [8], while developmental delay is strongly associated with impaired psycho-social and intellectual development and learning ability [4]. These could affect the intellectual capacity at adulthood and their contribution to economic growth and development of a nation. It is important to identify the factors responsible for failure to thrive as well as its prevalence in a state like Bayelsa considering her location among oil producing state due to exposure to various pollutants and lack of social amenities as well as inadequate health care.

1.3 Justification

It may not be impossible that factors such as poor nutrition, infections and environmental exposure to toxins which are on the rise due to climate change and even lack of access to proper health care by mothers and inadequate breast feeding as well as adoption of western lifestyle may have an unhealthy effect on communities in Bayelsa State. There is a gap in the prevalence and determinance of failure to thrive considering the fact that most mothers and caregivers seems not to be well acquainted on the causes and how to prevent this unexpected condition.

1.4 Aim

The aim of the study was to examine the prevalence and determinance of failure to thrive among children under 5 years in Bayelsa state.

2.0 MATERIALS AND METHOD

2.1 Study area and location

The study location was three local government areas namely southern Ijaw, Yenagoa and Nembe.

2.2 Study population

The study population were children between 1 to 5 years with the condition of failure to thrive from three local government areas.

2.3 Study design

It was a cross sectional design which assessed the same children's weights measured twice to determine weight gain among the children and make a diagnosis of failure to thrive. It also employed the use of questionnaires, face to face interviews with the mothers of the children, measurements of weight were by weighing balance, height was determined using measuring tape.

2.4 Subject Selection

Subjects were randomly selected using questionnaires, face to face interview in which mothers of failure to thrive child or children helped to give informed consent and fill the questionnaires for and on behalf of their failure to thrive child or children as the case may be. Both male and female children with failure to thrive were recruited for the study. 374 children whose parents were administered questionnaires and the children anthropometric parameters of weight, height and age were taken.

2.5 Sample Collection/Technique

Sample collections were done using questionnaires, weighing scale, measuring tape and face to face in interview with the child or children with failure to thrive condition as well as the mothers of the child or children. Where necessary the mothers were allowed to answer for the failure to

thrive child or children who could not answer some questions for themselves even after interpretation in the local language.

2.6 Data collection

English language (pidgin for most of the mothers) was used by the researcher to communicate the essence of the study followed by obtaining an informed consent. A total number of 374 questionnaires was administered and retrieved by the researcher within a period of one month. The data collection tool used in the was mainly questionnaire which was distributed to the selected mothers. They also helped in filling the questionnaires with regards to their children who are not able to read or write. A face to face interview was also adopted to ensure proper understanding and explanation where necessary. Also weighing balances and measuring tape were also employed obtain birth weight where necessary.

2.7 Inclusion Criteria

The children between ages 1-5 years were recruited in the study as they form a major part of those affected with failure to thrive who are resident in the three selected local government area of the state.

2.8 Exclusion Criteria

Pregnant or breast-feeding mothers were excluded. Children above 5 years with failure to thrive were not included and pregnant and breast-feeding mothers were excluded. Those who did not fill the consent form were also not included.

2.9 Sample Size

The formula used for sample size calculation was by

$$n = \frac{z^2 pq}{d^2} \quad \text{or} \quad \frac{z^2 p(1-p)}{d^2}$$

Where

n = minimum sample size (with population > 10,000)

Z = the standard normal deviate, 1.96 at 95 percent confidence level.

P = the percentage of the target group (children under the age of 5 years) assumed

to have the characteristic of interest which is failure to thrive 20% (Abiye et al., 2019).

$$q = 1 - p$$

d = degree of accuracy desired/margin of error allowable, usually set at 5% i.e., 0.05 substituting

$$n = \frac{1.96^2 \times 0.2 \times (1-0.2)}{0.05^2}$$

$$n = \frac{3.84 \times 0.2 \times 0.8}{0.0025}$$

$$0.8464 / 0.0025$$

$$n = 339$$

Sample Size: 339

Adjusting for drop out at 10%

$$10\% \text{ of } 362 = 34$$

$$339 + 34 = 373$$

Adjusted final sample size = 374 was used to reduce fractions.

2.10 Laboratory Methods

Dynamic measures of weight gain were used by observing fall from a normal birth weight below a given cut-off, dropping through major centile spaces and slow conditional weight gain, taking into account the normal phenomenon of regression to the mean, with small children tending to move upwards through the centiles and large children tending to cross downwards. Thus, weight gain was expressed as a percentage of the median weight for age as in the Gomez criterion, whereas severe under-nutrition was assessed using weight for height, which has the advantage of not requiring age to be known. Thus, Waterlow's criterion expresses weight as a percentage of the median weight for measured height [10-11, 6, 7].

2.11 STATISTICAL ANALYSIS

Data collected was analyzed using the STATA version 13.0 to obtain descriptive and inferential statistics. Descriptive statistics were tabulated into frequency and

percent while inferential statistics on study variables were presented in a table with key elements such as the chi-square value, difference and P-Value was set at 95% confidence interval.

3.0 RESULTS

Table 3.1 Socio-demographic distribution of the respondents. A total of three hundred and seventy-four (n = 374) mothers/caregivers and their children participated in the study. 185(49.5%) of the children were male while 189 (50.5%) were females; 350(93.6%) of the mothers were Christians while 4(1.1%) belong to other religions; 46(12.4%) of the mothers have no formal education, while 86(23.2%) of the mothers had tertiary education; 65(17.4%) of the mothers were civil servants, 74(19.8%) were farmers/fisher women, 61(16.3%) were housewives and 169(45.2%) were traders.

Table 3.1 Shows the socio-demographic data of Respondents (n = 374)

| Variable | Frequency (f) | Percent (%) |
|---------------------|---------------|-------------|
| Gender: | | |
| Male | 185 | 49.5 |
| Female | 189 | 50.5 |
| Religion: | | |
| Christianity | 350 | 93.6 |
| Pagan | 16 | 4.3 |
| Islam | 4 | 1.1 |
| Others | 4 | 1.1 |
| Education: | | |
| No formal education | 46 | 12.4 |
| Primary | 84 | 22.6 |
| Secondary | 155 | 41.8 |
| Tertiary | 86 | 23.2 |
| Occupation: | | |
| Civil Servant | 65 | 17.4 |
| Farmer/Fisher | 74 | 19.8 |
| Housewife | 61 | 16.3 |
| Public Servant | 5 | 1.3 |
| Trader | 169 | 45.2 |

Table 3. 2 shows the prevalence of failure to thrive among children under the age of 5 years in Bayelsa State. 74(19.8%) of the children were fail to thrive while 300 (80.2%) did not experience failure to thrive.

Table 3.2 shows prevalence of Failure to Thrive among Children Under 5years

| Variable | No of children(f) | Percent (%) |
|--|-------------------|-------------|
| Baby failed to gain weight: | | |
| Yes | 161 | 43.2 |
| No | 212 | 56.8 |
| Diagnosis of Failure to Thrive Based on no weight gain for 4weeks and above: | | |
| Yes | 74 | 19.8 |
| No | 300 | 80.2 |

| | | |
|---|-----|------|
| Gomez Classification (<75% of median weight for age): | | |
| Normal | 282 | 75.4 |
| Failure to thrive | 92 | 24.6 |

Table 3.3 revealed that 118(31.6%) of the mothers were ill during pregnancy while 256(68.4%) of the mothers did not fall sick during pregnancy. Among those that are sick during pregnancy, malaria contributed to 55(14.7%), hypertension was 25(6.7%) of cases, anaemia in pregnancy was 5(1.3%), diabetes was 2(0.5%), vaginal discharge 15(4.0%), HIV 1(0.3%), others 15 (4.0%) and no illness 256(68.4%). 177(47.3%) of

the children fell sick while 197(52.7%) of them did not fall sick after delivery. 38(10.2) were cases of malaria, 38(10.2) were respiratory tract infection, 34(9.1%) were diarrhoea, 18(4.8%) were low birth weight, 16(4.3%) were lactose intolerance, 2(0.5%) were cleft palate, 2(0.5%) were febrile convulsion, 26(7.0%) were other conditions while 199(53.2%) were not sick after birth.

Table 3.3 shows the diseases associated with failure to thrive, number of children affected and percentages.

| Variable | No of children (f) | Percent (%) |
|---|--------------------|-------------|
| Mothers Health Status during pregnancy: | | |
| Sick | 118 | 31.6 |
| Healthy | 256 | 68.4 |
| Diagnosis of Mother if Sick: | | |
| Malaria | 55 | 14.7 |
| Hypertension | 25 | 6.7 |
| Anaemia | 5 | 1.3 |
| Diabetes | 2 | 0.5 |
| Vaginal discharge | 15 | 4.0 |
| HIV | 1 | 0.3 |
| Others | 15 | 4.0 |
| None | 256 | 68.4 |
| Baby's Health status After Birth: | | |
| Sick | 177 | 47.3 |
| Healthy | 197 | 52.7 |
| Diagnosis of Baby if sick After Birth: | | |
| Malaria | 38 | 10.2 |
| Respiratory tract infection | 38 | 10.2 |
| Diarrhea | 34 | 9.1 |
| Low birth weight | 18 | 4.8 |
| Lactose intolerance | 16 | 4.3 |
| Cleft plate | 3 | 0.8 |
| Fibrile Convulsion | 4 | 1.07 |
| Others | 26 | 7.0 |
| None | 197 | 52.7 |

Table 3.4 shows exposure to pollutants of children under the age of 5years: 23(6.2%) were exposed to maternal smoke while 351(93.8%) were not; 152(40.6%) are exposed to smoke from a family member while 222(59.4%) were not exposed to smoke; 47(12.6%) were exposed to

pollutants during and after pregnancy while 327(87.4%) were not; 5(1.3%) are exposed to contaminated water, 3(0.8%) pollutant from vehicle, 29(7.8%) dust, 7(1.9%) smoke while 330(88.2%) were not exposed to pollutants.

Table 3.4: shows the various pollutants associated with failure to thrive, the number of children affected and percentages.

| Variable | No of children (f) | Percent (%) |
|--|--------------------|-------------|
| Exposure to maternal smoke: | | |
| Yes | 23 | 6.2 |
| No | 351 | 93.8 |
| Exposure to smoke from family member: | | |
| Yes | 152 | 40.6 |
| No | 222 | 59.4 |
| Exposure to pollutants during and after pregnancy: | | |
| Yes | 47 | 12.6 |
| No | 327 | 87.4 |
| Type of pollutants exposed to: | | |

| | | |
|------------------------|-----|------|
| Contaminated water | 5 | 1.3 |
| Pollutant from vehicle | 3 | 0.8 |
| Dust | 29 | 7.8 |
| Smoke | 7 | 1.9 |
| None | 330 | 88.2 |

Table 3.5 shows the relationship between a diagnosis of failure to thrive and maternal health status during pregnancy. At 95% confidence interval, Chi-square (X²) = 12.488, difference = 1, P = 0.000, there was

a statistically significant relationship between maternal health status during pregnancy and under five years old children failing to thrive in Bayelsa State, Nigeria.

Table 3.5 shows the relationship between failure to thrive and health status of mothers that had given birth to children with failure to thrive

| Variables | Maternal Illness during Pregnancy | | | Total | Chi-square value (X ²) | Difference (df) | P-Value |
|--------------------------------|-----------------------------------|-----|-------|-------|------------------------------------|-----------------|---------|
| | No | Yes | Total | | | | |
| Diagnosis of Failure to Thrive | No | 218 | 82 | 300 | 12.488 | 1 | 0.000 |
| | Yes | 38 | 36 | 73 | | | |
| Total | 256 | 118 | 374 | | | | |

P<0.001 was significant

Table 3.6 shows the relationship between a diagnosis of failure to thrive and health status of children under the age of 5years at birth. At 95% confidence interval, Chi-square (X²) = 14.357, difference = 1, P =

0.000, there was a statistically significant relationship between health status of under 5years at birth with a diagnosis of failure to thrive.

Table 3.6 shows the relationship between failure to thrive and health status of under 5years Children

| Variables | | Health Status of birth at Birth | | | Total | Chi-square value (X ²) | Difference (df) | P-Value |
|--------------------------------|-----|---------------------------------|------|-------|--------|------------------------------------|-----------------|---------|
| | | Not sick | Sick | Total | | | | |
| Diagnosis of Failure to Thrive | No | 171 | 129 | 300 | 14.357 | 1 | 0.000 | |
| | Yes | 24 | 50 | 74 | | | | |
| Total | | 195 | 179 | 374 | | | | |

P<0.001 was significant

Table 3 7 shows the relationship between a diagnosis of failure to thrive and under five exposures to pollutants. At 95% confidence interval, Chi-square (X²) = 11.607, difference = 1, P = 0.001, there was a

statistical significant relationship between exposure to environmental pollutants and failure to thrive among children under the age of 5years.

Table 3.7 shows the relationship between failure to thrive and Environmental Exposure to Pollutants.

| Variables | | Exposure to Pollutants | | | Total | Chi-square value (X ²) | Difference (df) | P-Value |
|--------------------------------|-----|------------------------|---------|-------|--------|------------------------------------|-----------------|---------|
| | | Not exposed | Exposed | Total | | | | |
| Diagnosis of Failure to Thrive | No | 271 | 29 | 300 | 11.607 | 1 | 0.001 | |
| | Yes | 56 | 8 | 74 | | | | |
| Total | | 327 | 47 | 374 | | | | |

P<0.001 was significant

DISCUSSION

The term 'failure to thrive' (FTT) is widely used to describe inadequate growth in early childhood [12-13]. It however, does not have a consensus criterion to define and therefore several criteria have been employed over the years which has made

harmonization of data difficult on this issue [14].

The result from this study shows that (18)19.8% of children under the age of 5years experienced failure to thrive using the recall method while using the Gomez criteria, a total of 92(24.6%) had failure to thrive. It is in line with reports in

developing nations where the burden of failure to thrive and undernutrition of various forms was high [15-16]. The sociodemographic data from this study implicated both maternal and child ill health as constituting important factors to the condition of failure to thrive in children especially growing children [17-18]. These conditions contributed to the children failing to thrive and current study also revealed that children with failure to thrive often fall ill as 47.3% of the failure to thrive screened were found having various illnesses after birth during the period which they experienced failure to thrive but maternal ill health of participants which constituted 31.6% were found to have suffered various sicknesses while been pregnant these children and babies. Several reports have implicated maternal and child ill health in failure to thrive [11, 19]. Common conditions associated with failure to thrive among children are malaria, respiratory tract infection, diarrhea, low birth weight, lactose intolerance, cleft palate and other disease conditions which was similar in a way to those of the maternals. These conditions have been noted to cause failure to thrive [20]. The presence of environmental pollutants was shown to be associated with the occurrence of failure to thrive in this study and it has also been reported in other studies [21]. This implies that there is need to control pollution for improve outcome of the health of children in Bayelsa State. This study has clearly demonstrated the fact that there is a high burden of failure to thrive among children in Bayelsa State with almost one in every five having the condition. This points to the fact that the underlying causes of malnutrition that triggers failure to thrive are abundant in Bayelsa State. Addressing this challenge will therefore need a concerted efforts of nurses both in the public and private sectors to strategies on improving infant and young child nutrition [22, 6] providing adequate newborn care, encouraging maternal health and bonding between mothers and children which is needed for improve growth and

development and cognitive capacity of the children. Since nursing aims to provide best care to mothers and children, there is therefore a call to action in Bayelsa State to address the various causes of failure to thrive which has significant cognitive and developmental impacts on the children. Furthermore, there is more need for nurses to ensure regular growth monitoring for children in all health care facilities to detect cases of failure to thrive in a timely manner in order to give early treatment that will mitigate further damages associated with the condition [24-25]. Mothers and caregivers are also to be called to action as the cost of managing children with failure to thrive is high when these conditions are actually preventable by appropriate infant and young child nutrition as well as proper child care practices [26-27]. The findings from this study may further be strengthened by further studies in other parts of the country where failure to thrive in children and even adult have been observed so as to ascertain where common factors or differences in causes of failure to thrive may be implicated. It would also be of great relevance and clinical value if to what extent preterm birth play a role in failure to thrive.

SUMMARY

The study was carried out on children under 5 years with failure to thrive in Bayelsa State. The rate of prevalence of the disease was investigated and an association between failure to thrive and maternal health as well as health of the child was assessed. The study also sought to know if an association between exposure to unhealthy environment *visa vis* pollutant and failure to thrive as well as economic and political status existed in the occurrence of the disease. Bayelsa State of Nigeria needs to be given attention in the areas of social facilities especially good drinking water, establishment of hospitals and other primary healthcare facilities with well trained personnel as well as adequate social awareness. There was a significant relationship between failure to thrive and health status of child and mother.

There was also a significant relationship between failure to thrive and environmental exposure to pollutants.

CONCLUSION

It was concluded from this study that there was a high prevalence of failure to thrive among the children between 1 to 5 years in Bayelsa State and that maternal and child ill health as well as socio and environmental factors are contributory to the condition of failure to thrive in the state not excluding awareness on the part of mothers and caregivers.

Recommendations

Routine nutrition surveillance and assessment of the nutrition status of children should be carried out and on time to identify children with failure to thrive in order to provide effective and early care of the identified children with the condition while policy makers and government functionaries and non-governmental organizations should help in ensuring the availability of social facilities such primary health cares, hospital and clinics as well as good drinking waters among others.

Limitation of Study

One limitation of this work was sample size which could not be increased due to non-compliance by some mothers and caregivers on participation for the project which as they complained about the lack of time to respond to the questionnaire and their non-willingness to give their children for measurements as well as finance to encourage the mothers of failure to thrive to be available. This study did not carry out any statistical analysis between maternal health and failure to thrive.

Authors' Contributions

All authors read and approved the final manuscript."

Consent

A consent form was filled by mothers on behalf of their failure to thrive children.

Declaration by Authors

Ethical Approval: Ethical clearance was obtained from the Bayelsa State Government Ministry of Health that covered for the three local government with reference number BSHREC/Vol.1/21/04/01.

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