



## **Under-Five Mortality Prevalence, Risk Factors and Preventive Measures in Nsukka Enugu State Nigeria**

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### **Abstract**

*Under-5 mortality (U5M) is a major public health challenge in developing countries. Despite efforts made by various stakeholders to curb its occurrence through immunization, it appears to remain on the increase in Nigeria. This study assessed U5M mortality prevalence, risk factors, and preventive measures in Nsukka Enugu State Nigeria. A retrospective cross-sectional study was conducted between April and July, 2022 at 10 major primary and secondary health facilities in Nsukka health district. A total number of 400 childbearing mothers participated. Data collection was done using self-structured Under-five Mortality Inventory Proforma (U5MIP), and self-structured Risk Factors for Under-five Mortality and Preventive Measures Questionnaire. Frequency, percentage, and Chi-square test were used for analyses. The findings revealed that the highest proportion of under five deaths occurred in 2017, while the lowest proportion occurred in 2018. More than two-thirds of childbearing mothers (CBMs) reported the common U5M risk factors, and majority of CBMs reported the common the preventive measures for death of under-5 children. Childbearing mothers differed significantly in the perceived risk factors for U5M based on parity ( $p < .05$ ), but did not differ based on maternal education, maternal age, maternal place of residence, and birth interval ( $p \geq .05$ ). This research proves that the preventive measures indicated by CBMs can help to reduce the perceived risk factors for U5M. However, there is need for health educators to be properly guided in sensitizing the CBMs on health-seeking behaviours to adopt in order to enhance under-five survival rate and reduce their death rate.*

**Keywords:** Under-Five mortality, Prevalence, Risk factors, Preventive measures, Childbearing mothers

### **Introduction**

Under-5 mortality (U5M) is a major public health challenge in developing countries. It remains an issue of utmost concern to man, and assumes a dangerous, and uncomfortable dimension especially if its occurrence is predominantly at the very early stage of life (between the point of birth and the fifth birth day) thus threatening the very existence and continuity of a people, race or a nation.

Under-5 mortality appears to be on the increase. Globally, 4.6 million deaths appear annually and 99% of which occur in developing countries at infancy (Lubloy et al., 2016). According to United Nations Development Programme (UNDP, 2015), U5M rates seems to remain



unacceptably high, especially in sub-Saharan Africa, where close to 40 per cent of childhood deaths take place, although the region accounts for only one-fifth of the world's child population. On the report of United Nations' Children Fund (UNICEF), (Sohail, 2017) indicated that 6.4 million under-five children are dying annually in the world; in which more than 50 per cent occurred in five South Asian countries (Afghanistan; India; Pakistan; Bangladesh; Maldives); and about 2.8 million of these deaths, are happening in the neonatal period. Reported cases of 5.0 million children under 5 years of age died, which translates to 13,800 children under the age of five dying every day in 2020 (United Nations' Children's Fund [UNICEF], 2021). In a work reviewed by Rahemi and Masih (2021), more than 50 per cent of the U5M rate has occurred in five countries, such as India (25%), Pakistan (6%), Congo (5%), China (4%), and Nigeria (13%). Nigeria appears to still suffer U5M despite the substantial global decline in childhood deaths. Progress in reducing under-five deaths at the global level and in some regions, including sub-Saharan Africa, has slowed at a rate almost two times that of the decline recorded between 2015 and 2022 (United Nation's Interagency Group for Child Mortality Estimation Report).

Under-5 mortality (U5M), which is known to be the death of children aged between 0-59 months, appears to remain a challenging health problem in Nigeria. Reported cases of the 5.2 million global deaths of children younger than 5 years old in 2019, Nigeria contributed nearly 0.9 million of these deaths, which earned Nigeria the highest contributor to global U5M (World Health Organization [WHO], 2020). An overwhelming number of these deaths are preventable or treatable with optimal healthcare, affordable, accessible and cost-effective interventions (UNICEF & WHO, 2015).

Preventive measures of U5M tends to reduce the incidence of the death, through the distribution of insecticide-treated bed nets, the expanded programme of immunisation, fostering the prevention of mother-to-child transmission of HIV, improved living standards, better health care, and public health programmes. In addition, WHO (2016) revealed that adequate nutrition, exclusive breastfeeding, skilled delivery at birth, reduction of household air pollution, safe water, food, adequate sanitation and hygiene are among the preventive measures of U5M. Despite the concerted effort made by the Federal and State governments to ensure reduced under-five mortality through successful immunization, it is very disheartening to note that many children are not fully immunized till date. This makes children to be exposed to factors associated with under-five mortality.



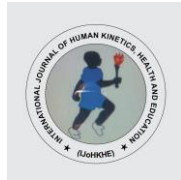
The factors associated with under-five mortality are also known as modifiable and non-modifiable risk factors. According to Rahman et al. (2020), the risk factors of U5M include: poor sanitation, inadequate safe water, malnutrition, age of the mother, women's employment, parental education, sex of the child, unintended pregnancy, contraceptive use, and smoking. Studies have shown that the use of vaccines to prevent the occurrence of diseases, such as measles, diphtheria, pertussis, Hib, and pneumococcus, has the potential to largely reduce morbidity and mortality incidence in under-five (Akinyemi et al., 2015).

U5M is a leading indicator of child health and overall development of a Nation. According to Lozano et al. (2017), Sustainable Development Goals- 2030, has 17 general goals; and the third goal of this strategy is “Good health and wellbeing” aiming to reduce U5M to at least as low as 25 deaths per 1,000 live births in all countries by 2030. In addition, UNICEF (2021) disclosed that the global U5M rate declined by 61 per cent, from 93 deaths per 1,000 live births in 1990 through 37 in 2020. Despite this considerable progress, improving child survival remains a matter of urgent concern (UNICEF, 2021).

The efforts to reduce the scourge, such as: mass campaign against childhood killer diseases, awareness on the causes of U5M, and adoption of preventive measures (ensuring that children are properly immunized, and encouraging female education to increase mothers' level of education) are very necessary and geared towards reducing the mortality rate among under-five. Despite all these effort to reduce the rate of mortality among under-five, U5M appears to remain high in Nigeria, especially among the Childbearing mother's.

The childbearing mothers (CBMs) in Nsukka are mainly farmers, traders and civil servants; some are literate while majority are illiterates. These activities or occupations occupy their time with little or no time to care for their children, especially the under-five, thereby giving room for early (under-five) mortality. Additionally, most CBMs in the study area seem not to earn enough to provide adequate care and nutritional supplements required to ensure survival of children, most especially at the early stage of life. These factors may contribute to increase in U5M in the study area.

Unfortunately, researchers and educators in the study area have not given much desired attention on U5M prevalence, risk factors and preventive measures. Evidently, limited research has been conducted on U5M prevalence, risk factors and preventive measures among childbearing mothers. This study addresses this gap in the literature. In view of these facts, the study investigated the U5M prevalence, risk factors, and preventive measures in Nsukka Enugu State Nigeria. Specifically, the study determined: prevalence of death of under-5 from 2016-2021; risk factors for death of under-5; and preventive measures for death



of under-5. Also, the study hypothesized that there is no significant difference in risk factors for death of children under five years of age based on maternal education, maternal age, place of residence, parity, and birth interval in Nsukka Enugu State, Nigeria.

The study findings would help to sensitize Ministry of Health on the need to improve Maternal and Child Health (MCH) services through provision of essential teaching and learning experiences to help make the concept presented by health educators very meaningful to the CBMs for curbing U5M. Also, the findings would help health educators to encourage mothers to make informed decisions towards their child's health. It would further inspire health educators to be in a better position to sensitize the CBMs on the health-seeking behaviours to adopt in order to improve under-five survival rate and reduce (early) U5M.

## **Materials and Methods**

### **Study design and setting**

A retrospective cross-sectional study was conducted between April and July, 2022 at 10 major primary and secondary health facilities in Nsukka health district, Enugu State Nigeria. Nsukka District is one of the districts in Enugu State South East, Nigeria. Geographically, Nsukka is bounded on the North by Igbo-Eze South LGA, on the North-East by Udenu LGA, on the South-West by Uzo-Uwani LGA, on the South-East by Igbo-Etiti LGA, and on the West by Odoru/Igalamala LGA of Kogi State. The study setting was chosen due to the lifestyle of childbearing mothers pertaining to nature of their involvement in farming, trading, and negligence in exposing their children to immunization programmes that often result in U5M.

### **Participants**

The study participants consisted of 10 health facilities and 15,162 childbearing mothers (CBMs) registered and attending health care services in the major primary and secondary health facilities at the time of the study in the study area. Only CBMs who are in good health and had no health complications were included in the study population. Childbearing mothers that were still pregnant and had complications were excluded from the study.

### **Sampling procedures**

A sample size of 400 childbearing mothers currently attending health facilities was used for the study. The sample size was determined using Cohen et al. (2011) Standardized Table for Sample Size, purposive and random sampling technique of balloting without replacement. Purposive sampling technique was adopted to select 10 major health facilities in Nsukka district that offer comprehensive health care services. Moreover, Simple random sampling



technique of balloting without replacement was adopted to select 40 childbearing mothers from each of the 10 drawn health facilities. This gave a total of 400 CBMs.

### **Measures**

Data collection was done using a validated self-structured Under-five Mortality Inventory Proforma (U5MIP) and self-structured Risk Factors for Under-five Mortality and Preventive Measures Questionnaire. The U5MIP was used to collect data on the rate of U5M and demographic factors of under-five from hospital folders/records.

The questionnaire consisted of three parts. Part 1 consists of five socio-demographic variables (maternal age, maternal level of education, parity, birth interval, and place of residence). Maternal age was measured as a continuous variable (<18years, 19-29years, 30-39 years, and 40+years). Maternal education level was categorized into four groups (no formal education, primary education, secondary education, and tertiary education). Parity was grouped into four categories (no previous child delivered alive, 1-2 children, 3-4 children, and 5 children and above). Birth intervals was categorized into three groups (1-2years spacing, 3-4years spacing, and 5 years spacing and above). Place of residence was dichotomized into urban and rural. Part II consists of 12 questions with dichotomous response options covering risk factors for U5M; while Part III consists of five questions dichotomous response options covering preventive measures for U5M.

Questions assessing Risk Factors for Under-five Mortality and Preventive Measures were prepared by the researchers according to a literature review and had dichotomous response options (yes and no). Regarding the possible risk factors for death of children below five years, the CBMs were asked to kindly, indicate by placing a tick (✓) against their views on the spaces provided thus: malnutrition makes children more vulnerable to infectious?; inadequate utilization of health facilities due to poverty can result in under-five children's death?; good education helps mothers to make better choices regarding their child's welfare?; preterm birth complications can result to under-five children's death?; environmental contamination in homes makes children more vulnerable to infectious diseases that results in death?; poor access to health facilities due to bad roads, compound children's health problems can result to death?; shorter birth interval increases the risk of a child's death?; long birth intervals can present a higher risk of under-five children's death?; poor toilet facilities tend to increase under-five children's death?; childhood killer diseases can result in under-five children's death?; congenital malformation and circumstances of the delivery can lead to



under-five children's death?; and higher parity increases the risk of under-five children's death?.

Regarding the possible preventive measures for death of children below five years, the CBMs were asked to kindly, indicate by placing a tick (✓) against their views on the spaces provided thus: improved living standards can prevent under-five children's, death?, adequate utilization of health facilities and better health care can prevent under-five children's death?, public health programmes can prevent under-five children's death?, access to pipe-borne drinking water and proper toilet facilities can prevent under-five children's death?, adequate immunization coverage against childhood killer diseases can prevent under-five children's death?.

Content validity of the questionnaire was evaluated by a professional board of seven specialists in medical and health sciences, and as well was tested for internal consistency.

### **Data collection procedure**

This research was developed in accordance with the Ethical Principles of the World Medical Association Declaration of Helsinki for medical research involving human subjects (World Medical Association, 2013), and the research was approved by the Research Ethics Committee of the Faculty of Education, University of Nigeria, Nsukka (UNN/FE/REC22/057).

After obtaining the various health facilities' permission for data collection, childbearing mothers who gave consent for participation were interviewed on risk factors for under-five mortality and preventive measures by the researchers as soon as possible before leaving the selected health facilities. The researchers explained the objectives of research to the participants and they were reassured that their responses are confidential and no personal identifiers will be disclosed. The questionnaire was administered with the aid of well-trained interviewers to CBMs that registered for maternal and child health services in the selected health facilities that enabled the researchers elicit information on risk factors and preventive measures for U5M between 2016 and 2021. A total number of 400 questionnaires were filled out in the process. The 400 copies were all returned, duly filled out, and used for analyses.

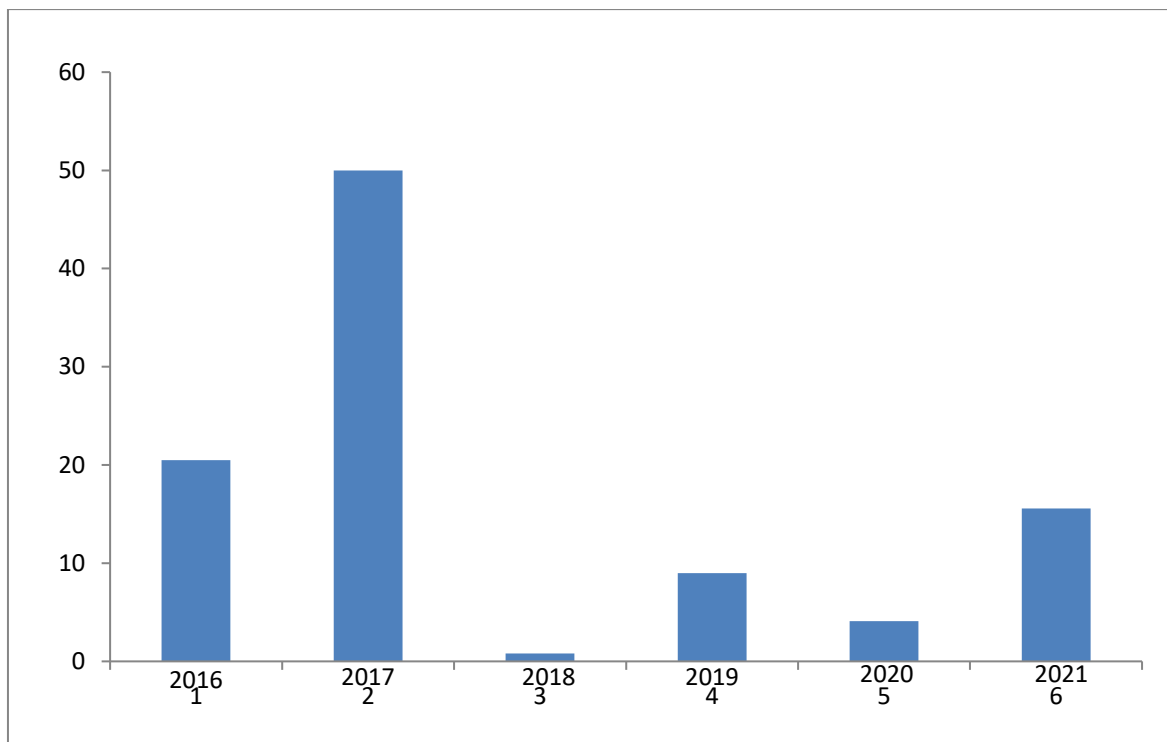
A record staff of each selected health facility assisted in data collection process as briefed on procedures guiding data collection. At the health facilities, the researchers collected data on the number of U5M cases recorded from 2016–2021.

**Data analysis**

The IBM Statistical Package for Social Sciences (SPSS) version 23.0 was used for all statistical analyses. The standard descriptive statistics of frequency and percentage were applied to describe the data patterns. Chi-square test was used to examine the significance of the association between categorical data.

The internal consistency of the questionnaire was determined using a split half (Spearman’s Brown Coefficient) with an index of .78. All tests were 2-tailed, and probability values less than 0.05 ( $p < 0.05$ ) were considered significant.

**Results**



**Figure 1: Bar Graph Representing the Proportion of Death of Under Five Children from 2016 – 2021**

Figure 1 shows that the highest proportion (50%) of under-five deaths occurred in 2017, while the lowest proportion (0.8%) occurred in 2018.

**Table 1: Risk Factors for Death of Children Under Five Years ( $n=360$ )**

S/N	Items	Yes f (%)	No f (%)
1	Malnutrition makes children more vulnerable to infectious diseases and can result to death	229 (63.6)	131 (36.4)
2	Inadequate utilization of health facilities due to poverty can result in under-five children’s death	321 (89.2)	39 (10.8)



3	Good education helps mothers to make better choices regarding their child's welfare	303 (84.2)	57 (15.8)
4	Preterm birth complications can result to under-five children's death	263 (73.1)	97 (26.9)
5	Environmental contamination in homes makes children more vulnerable to infectious diseases that results in death	296 (82.2)	64 (17.8)
6	Poor access to health facilities due to bad roads compound children's health problems and can result to death	287 (79.7)	73 (20.3)
7	Shorter birth interval increases the risk of a child's death	235 (65.3)	125 (34.7)
8	Long birth intervals can present a higher risk of under-five children's death	193 (53.6)	167 (46.4)
9	Poor toilet facilities tend to increase under-five children's death	225 (62.5)	135 (37.5)
10	Childhood killer diseases can result in under five children's death	310 (86.1)	50 (13.9)
11	Congenital malformation and circumstances of the delivery can lead to under-five children's death	294 (81.7)	66 (18.3)
12	Higher parity increases the risk of under-five children's death	289 (80.3)	71 (19.7)
	<b>Overall %</b>	<b>75.1</b>	<b>24.875</b>

Table 1 shows that overall, more than two-thirds (75.1%) of CBMs reported the possible risk factors for under five deaths. Also, the table shows that among the enlisted items, majority of CBMs reported inadequate utilization of health facilities due to poverty which results in under-five death (89%); good education helps mothers to make better choices regarding their child's welfare (84.2%); environmental contamination in homes makes children more vulnerable to infectious disease that results in death (82.2%); childhood killer disease can result in under-five death (86.1%); congenital malformation and circumstances of the delivery can lead to under-five death (81.7%), and higher parity increases the risk of under-five death (80.3%) as risk factors for under-five deaths.

**Table 2: Frequencies and Percentages of Preventive Measures for Death of Under-Five**

S/N	Items	Yes f (%)	No f (%)
1	Improved living standards can prevent under-five children's death	297 (82.5)	63 (17.5)
2	Adequate utilization of health facilities and better health care can prevent under-five children's death	330 (91.7)	30 (8.3)
3	Public health programmes can prevent under-five children's death	302 (83.9)	58 (16.1)
4	Access to pipe-borne drinking water and proper toilet facilities can prevent under-five children's death	314 (87.2)	46 (12.8)
5	Adequate immunization coverage against childhood killer diseases can prevent under-five mortality	326 (90.6)	34 (9.4)

Table 2 shows that majority of CBMs indicated the possible preventive measures for death of under-five, which include: improved living standards can prevent under-five death (82.5%), adequate utilization of health facilities and better health care can prevent under-five death



(91.7%), public health programmes can prevent under-five death (83.9%), access to pipe-borne drinking water and proper toilet facilities can prevent under-five death (87.2%), and adequate immunization coverage against childhood killer diseases can prevent under-five death (90.6%).

**Table 3: Chi-square Test of Risk Factors for Death of Under-Five Based on Covariates**

Variable	N	Yes O(E)	No O(E)	$\chi^2$	df	p-value
<b>Maternal Education</b>						
No Formal Education	20	16 (14.3)	4 (5.7)	1.370	3	.71
Primary Education	79	55 (56.4)	24 (22.6)			
Secondary Education	117	86 (83.5)	31 (33.5)			
Tertiary Education	144	100 (102.8)	44 (41.2)			
<b>Age Category</b>						
< 18 years	16	12 (11.4)	4 (4.6)	4.883	3	.18
19 – 29 years	91	59 (65.0)	32 (26.0)			
30 – 39 years	145	112 (103.5)	33 (41.5)			
40 years & above	108	74 (77.1)	34 (30.9)			
<b>Place of Residence</b>						
Rural Area	168	114 (119.9)	54 (48.1)	1.924	1	.165
Urban Area	192	143 (137.1)	49 (54.9)			
<b>Parity</b>						
NPCDA	21	13 (15.0)	8 (6.0)	14.282	3	.003*
1 – 2 children	102	82 (72.8)	20 (29.2)			
3 – 4 children	133	81 (94.9)	52 (38.1)			
5 children & above	104	81 (74.2)	23 (29.8)			
<b>Birth Interval</b>						
1 – 2 years spacing	90	69 (64.3)	21 (25.8)	3.269	2	.195
3 – 4 years spacing	144	105 (102.8)	39 (41.2)			
5 years & above	126	83 (90.0)	43 (36.1)			

\* **Significant (p < .05)**

Table 3 shows that childbearing mothers did not differ significantly in their perceived risk factors for under-five death based on maternal education ( $\chi^2 = 1.370$ ;  $df = 3$ ;  $p = .71 > .05$ ), maternal age ( $\chi^2 = 4.883$ ;  $df = 3$ ;  $p = .18 > 0.05$ ), maternal place of residence ( $\chi^2 = 1.924$ ;  $df = 1$ ;  $p = .16 > .05$ ), and birth interval ( $\chi^2 = 3.269$ ;  $df = 2$ ;  $p = .195 > .05$ ). Also, the table shows that childbearing mothers differed significantly in the perceived risk factors for under-five death based on parity ( $\chi^2 = 14.282$ ;  $df = 3$ ;  $p = .003 < .05$ ).



## Discussion

The finding showed that the highest proportion of under-five deaths occurred in 2017, while the lowest proportion occurred in 2018 respectively (Figure 1). The result was expected and therefore, not surprising given the fact that increase in awareness and immunization programme in Nigeria today should lead to a decrease in infant mortality. The finding on lowest proportion of under-five children death in 2018 was in line with the finding of Morakinyo and Fagbamigbe (2017) that there was reduction in the proportions of U5M in Nigeria. Also, the finding is in line with the finding of Agborndip et al. (2020) that U5MR was lower than what was observed in previous large-scale studies in the East and South Africa. However, findings on the highest proportion of under-five death in 2017 was consistent with the finding of Ezeh et al. (2021) that the extracted Northern Geopolitical Zones in Nigeria showed that the U5MRs in the three NGZs are still very high. The high rate of under-five mortality reported could be because of the related factors associated with under-five mortality, while the decline could be because of the marked improvements in immunization rates, and nutrition. The tenet of the reviewed Demographic Transition Theory were applied in this finding to show that social beliefs and customs play an important role in keeping birth rate high, and death rate is also high because of primitive sanitation and absence of medical facilities. People live in dirty and unhealthy surroundings. As a result, they are disease ridden and the absence of proper medical care results in large deaths.

The finding showed that more than two-thirds of CBMs reported the possible risk factors for under-five deaths (Table 1). The finding was expected and thus, not surprising because utilization of health facilities due to poverty, environmental contamination in homes have been reported by several studies as the infectious disease that results in death. The finding is consistent with the finding of Ezeh et al. (2015) that age; living in a poor household; living in a rural area; and having a mother with no schooling, are among the risk factors of child mortality in Nigeria. Also, the finding is in agreement with the finding of Fenta and Fenta (2020) that risk factors associated with under-five mortality in Ethiopia, include: child vaccination, family size, age, antenatal care visit, birth interval, education, place of delivery, religion, and child twin. The tenet of precede proceed model theory were applied in this study to explain the reduction of under-five mortality and its risk factors.

The finding showed that majority of CBMs indicated the possible preventive measures for death of under-five (Table 2). The finding was expected and therefore, not surprising. This is because living standards, adequate utilization of health facilities and better health, public



health programmes, access to pipe-borne drinking water, proper toilet facilities, and adequate immunization coverage against childhood killer diseases can prevent under-five mortality. The finding agrees with the finding of Abir et al. (2025) that infants whose mothers did not have Tetanus (TT) immunizations in Bangladesh, had significantly higher odds of neonatal, post-neonatal, infant, and child mortality. The tenets of the reviewed information on Health Belief Model were applied in this study to explain that childbearing mothers in Nsukka perceive under-five mortality as a threat, and considering the severity of its occurrence, they will take healthy action through preventive measures to check the incidence of under-five mortality.

The findings in Table 3 showed that childbearing mothers did not differ significantly in their perceived risk factors for under-five death based on maternal education, maternal age, maternal place of residence, and birth interval. Also, the table shows that childbearing mothers differed significantly in their perceived risk factors for under-five death based on parity. The finding on maternal education was not expected and hence, surprising because a mother's education has been a positive effect in the living situations of her children, and a well-educated woman increases the chances of her child's survival by routine health checkups, timely vaccination, proper hygiene, nutritious diet, and increasing the environmental health through domestic sanitation. Many studies have found children whose mothers did not have a formal education, were 2.59 times more likely to die than children whose mothers had diploma in Ethiopia (Tibebu et al., 2022), Southern Ethiopia (Shifa et al., 2018), Ghana (Aheto et al., 2019), and sub-Saharan Africa (Van et al., 2019; Yaya et al., 2018). High education should relate to increase access to information and knowledge. It is expected that those who are educated should have more knowledge of risk factors for under-five mortality than their uneducated counterpart in South Africa (Kyei, 2017; Tlou et al., 2018). Also, the finding disagrees with the finding of Ezeh et al. (2021) that mothers who had no formal education had 1.30 times greater odd rate of U5M, and 1.32 times greater odd rate of U5M, respectively, compared with those who had secondary or higher education in Nigeria. The finding was in agreement with the finding of Ahmed et al. (2020) that low education of the mothers was proved not to be statistically significant determinant of under-five mortality in Sudan. The disparity in the findings may be because of the adoption of different research methods.

The finding of maternal age was surprising and not expected. This is because studies have shown that maternal age had a significantly higher risk of under-5 mortality in Bangladesh,



Nigeria, and Ethiopia (Abir et al., 2015; Central Statistical Agency & Ethiopia Demographic House Survey, 2016; Ezeh et al., 2015). Though, results that maternal age did not differ significantly in their perceived risk factors for under-five mortality are surprisingly inconsistent (Gebremichael & Fenta, 2020). The finding is consistent with the finding of Ahmed et al. (2020) that age of mothers in Sudan is statistically not significant with under-five mortality. The disagreement between the studies may be because none of these studies focused on maternal age, and maternal age has been analysed together with several other associated factors. This may thus, have led to drawing premature conclusion on the influence of maternal age in under-five mortality. The finding of maternal place of residence was surprising and thus, not expected. This is because mothers residing in urban settings have a higher likelihood of utilising health services or better access to health care facilities than those in rural settings. This finding disagrees with the finding of Fenta and Fenta (2020) that children born in rural settings recorded the highest percentage of deaths, while the death from the urban area was low in Ethiopia. Also, this finding is not in line with the finding of Patel and Olickal (2021) that mothers residing in rural settings had higher under-five mortality in India. The finding is in agreement with the finding of Ahmed et al. (2020) that mothers residing in rural settings were proved not to be statistically significant determinant of under-five mortality in Sudan. However, higher risk of under-five mortality in a rural setting may be related to limited access to healthcare facilities, poor educational and transport services, unavailability of a safe water supply, and inadequate basic sanitation facilities (Ezeh et al., 2025). The disparity in the findings may be because of the difference in location. The tenets of the reviewed Demographic Transition Theory were applied in this finding to show that the improvement of the standard of living of people both in the urban and rural settings, will lead to resultant reduction in U5M.

The finding of parity was expected and hence, not surprising because the finding was in line with the finding of [20] that children who lived in families with more than four children were 54 per cent times less likely to die than children who lived in families with four or less children in Ethiopia. Though results concerning the influence of parity on perceived risk factors of under-five death among CBMs is surprisingly expected (Fenta & Fenta, 2020). The finding is consistent with the finding of Azuike et al. (2019) that having a family size of more than five, reduced under-five mortality by 24 per cent compared to a family size of one through five in South Eastern Nigeria. The finding on birth interval was surprising and not expected. This is because Ezeh et al. (2015) revealed that children of fourth or higher birth order born with shorter birth intervals  $\leq 2$  years, were at a greater risk of dying at infant, post-



neonatal and under-5 ages in Nigeria. Also, the finding is not consistent with the finding of Abir et al. (2025) that second/third rank children with an interval of  $<2$  years had significantly higher odd value of child mortality compared with children of similar rank, but with an interval of  $>2$  years in Bangladesh. This finding is however, in agreement with the finding of Ahmed et al. (2020) that previous birth intervals (except for  $< 2$  years interval) did not significantly determine under-five mortality in Sudan. The difference in the studies may be because of exclusion of important covariates from the studies.

### **Implications of the Study to Public Health Education**

The findings of the study have a positive implication on educational institutions in organizing in-service training for CBMs as a way of providing adequate information needed to protect their children from U5M. The finding would help Ministry of Health and other health agencies in providing effective intervention programme that will meet the needs of childbearing mothers irrespective of their age, level of education, place of residence, and birth interval. It would help health educators/professionals and health agencies in encouraging childbearing mothers to have small family size so as to encourage child survival. The government, health institutions, and health professionals would be properly guided in developing adequate and effective intervention efforts that will meet the needs for childbearing mothers both in the urban and rural locations.

The findings from proportion/prevalence of death of under-five, risk factors, and preventive measures for death of under-five have implications for adoption by the Ministry of Health, health agencies/institutions, and policy makers in designing policies that emphasize the prevention of U5M. Moreover, it demonstrates the impact of health educators in intensifying effort toward public education for reduction and prevention of U5M. In addition, it would help Federal Ministry of Health to assess and examine their U5M intervention programmes, and also in motivating them in their continual effort toward the reduction of U5M in Nigeria.

### **Conclusion**

Our findings have shown that the highest proportion of under five deaths occurred in 2017 while the lowest proportion occurred in 2018, More than two-thirds of CBMs reported the possible risk factors, and majority of CBMs indicated the possible preventive measures for death of under-five. Childbearing mothers did not differ significantly in their perceived risk factors for under-five death based on maternal education, maternal age, maternal place of residence, and birth interval. Also, childbearing mothers differed significantly in their perceived risk factors for under-five death based on parity. However, Considering the



existence of two-third of risk factors for U5M in Enugu State, there is urgent need for public or community health, special sensitization programme, seminars and workshop on risk factors for U5M for childbearing mothers at various health facilities during ante-natal and post-natal clinic, so as to ensure the continual half of U5M in Enugu State Risk factors for death of under-five children based on parity shows a significant difference. Therefore, public health educators and health care givers should use family planning programme as a platform to encourage childbearing mothers to have small family size so as to encourage child survival. Policies and programmes aimed at addressing enumeration area variations in under-five mortality need to be formulated, and their implementation must be strongly pursued. Moreover, efforts are needed to extend educational programmes aimed at educating mothers on the benefits of antenatal checkup before first birth, spacing their birth interval, and having their child vaccinated in order to reduce under-five mortality.

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