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ESU DAVID JOHN

SOCIAL HYGIENIC ANALYSIS OF CHILD MORBIDITY,
MORTALITY AND ORGANIZATION
OF CHILD HEALTH PROTECTION
IN NIGERIA

3.2.3. Public health, organization and sociology of healthcare,
medical and social expertise

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Scientific Supervisor :
Kicha Dmitry Ivanovich,
Honored Professor of RUDN University,
Doctor of Medical Sciences,
professor

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ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ АВТОНОМНОЕ
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ИСУ ДАВИД ДЖОН

СОЦИАЛЬНО-ГИГИЕНИЧЕСКИЙ АНАЛИЗ
ЗАБОЛЕВАЕМОСТИ, СМЕРТНОСТИ ДЕТЕЙ И
ОРГАНИЗАЦИИ ОХРАНЫ ЗДОРОВЬЯ ДЕТЕЙ
В НИГЕРИИ

3.2.3. Общественное здравоохранение, организация
и социология здравоохранения, медико-социальная
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кандидата медицинских наук

Научный руководитель:
Кича Дмитрий Иванович,
Заслуженный профессор РУДН,
доктор медицинских наук,
профессор

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INTRODUCTION

Relevance of the Research Topic

The analysis of morbidity and mortality of the population, especially children, using social hygienic methods and the development primary health care (PHC) organization in countries with high rates of children morbidity and mortality is relevant as data source and basis for decision-making. Nigeria, one of the most densely populated countries with low and average income in Africa. It faces significant challenges in ensuring adequate health care of population in general, and children in particular related to, decreasing of children morbidity and mortality. In 2021, the countries of the Central, Southern and Western Africa had the highest mortality rate of children under the age of five in the world (73 deaths per 1,000 live births)¹. (S.Mohamed E-H. Chikhi, Kicha D.I., 2016²; Isaac B. et al., 2022). WHO, 2020-25³, Said A.Sh., Fomina A., Kicha D., 2023⁴).

To improve quality and accessibility of medical care for newborns, the World Health Organization (WHO), together with the United Nations Children's Fund (UNICEF), developed a paper on integrated management of diseases in children, (IMCI). It represents method to ensure healthy well-being and development of children, reducing disability and illness, and increasing preventable mortality, especially in infancy. Nowadays, discussions about the actual efficiency of the program and suitability of its further existence are

¹ Eilerts H, Prieto JR, Eaton JW, Reniers G. Age patterns of under-5 mortality in sub-Saharan Africa during 1990-2018: A comparison of estimates from demographic surveillance with full birth histories and the historic record. *Demogr Res.* 2021 Jan-Jun;44:415-442. doi: 10.4054/demres.2021.44.18. Epub 2021.

² Sidi M. El-Habib Chikhey, Kicha D.I. et al. Development of primary health care in Algeria. *RUDN Journal of Medicine.* 2016. No. 3. pp. 75-82.

³ https://www.who.int/health-topics/child-health#tab=tab_1

⁴ Said A.Sh, Fomina A., Kicha D. Comprehensive health stabilization system in a country with an unstable socio-economic statement. In: *For the sustainable development of civilization: cooperation, science, education, technology.* Mat. international Scientific Conference...Moscow, 2023. pp.164-169.

underway (Himani P. et al., 2018; whqlibdoc.who.int/bulletin/1997/supplement/bulletin_1997-75)⁵.

The WHO, in partnership with the UNICEF, launched the program on reducing -mortality from diarrhea and pneumonia among children (GAPPD). It became the first global plan with national targets for mortality from diarrhea and pneumonia (Getaneh S. et al., 2019; WHO⁶, 2013). In the course of the plan implementing, such results as reduction per 27% of global mortality from diarrhea and pneumonia were achieved. However, problems persist, as 80% of recorded pneumonia deaths go to just 30 countries and at that 50% of them go to Nigeria, Pakistan, India, Niger and Ethiopia (Wonodi C. et al., 2020; Quach A. et al., 2022).

The African region accounts for nearly 94% of globally recorded malaria cases and 96% of deaths go to only 31 countries. This alarming statistic data made the WHO Director-General to initiate the "Rollback Malaria" program. The program accentuated political mobilization and civil society involvement, relying on evidence-based actions (Maria K. et al., 2021; WHO⁷, 2021).

Due to previous studies, it is known that risk factors and mortality rates from children childhood infections, which often are biological product of the socio-economic structure of the region, epidemiological and medical demographic characteristics, require wide immunization and preventive measures (Shehu M.D. et al., 2018; Hussein, M.A. et al., 2021; Yaya S. et al., 2018; Briko N.I., Drapkina O.M., Kontsevaya A.V., 2020-2025. https://apps.who.int/gb/ebwha/pdf_files/WHA58/A58_12-ru.pdf⁸).

⁵ whqlibdoc.who.int/bulletin/1997/supplement/bulletin_1997_75

⁶ <https://www.who.int/ru/news/item/12-04-2013-new-plan-to-address-pneumonia-and-diarrhoea-could-save-2-million-children-annually>

⁷ <https://www.who.int/ru/news/item/19-11-2018-who-and-partners-launch-new-country-led-response-to-put-stalled-malaria-control-efforts->

⁸ https://apps.who.int/gb/ebwha/pdf_files/wha58/a58_12-ru.pdf

In Nigeria, the main causes of children mortality relate to the so-called first group of infectious, maternal, perinatal and alimentary diseases, The second group is formed by more five causes of children mortality - diarrheal diseases, pneumonia and other common infectious diseases, including respiratory tract infections, malaria and so-called "neglected" tropical diseases, malnutrition and HIV/AIDS (Piane G.M., 2019; Okoroiwu H.E., 2020; Kitila F.E., 2021; Patel K. et al., 2021; Kicha D.I. et al. 2020⁹; WHO¹⁰, 2024).

The factors associated with mortality of children under the age of five years are diverse and quite similar in most regions of Africa exposed southward to Sahara. Although none of specific factors plays leading hand by itself, they all in the aggregate worsen the public health problem. These factors represent scope of social, educational, economic, and religious factors tightly interlaced in children, maternal, and public groups (Okeke et al., 2020; Endup T., 2018; Kingsley E.A., 2020).

The factors of children mortality include the weighted average age of the child, birth in a medical facility, and breastfeeding practices. Maternal factors include the age of the mother at first birth, the number of children, the number of household members, and their level of education. The community factors include access to electricity, sanitation, region of residence, proximity to medical facility, family income, and marital cohabitation (Woldeamanuel B.T. et al., 2021; Kitila F.L. et al., 2021; Sakamoto K., 2020).

The mortality rate of children under the age of five years also includes the infant (under one year old) and neonatal (first 28 days of life) mortality rates. The neonatal period is still the most important for child's survival. In 2020, 2.4 million

⁹ Armah P., Kicha D. Primary health care in Ghana: the structure and functions in relation to preventing neglected tropical diseases. *Archiv euromedica*. 2020. 10. № 3. articles 12-17.

¹⁰ <https://www.who.int/ru/campaigns/world-immunization-week/2024>

newborns were lost, mostly in Africa. During this period, almost all deaths of children under the age of five years occurred during the neonatal period. At that, the most number of neonatal deaths account to countries southward to Sahara - 43% of the global total (Jayathilaka R. et al., 2021; Hagal C. et al., 2020; Dribe M., 2022; Temporin F. et al., 2019).

The deficiency of official statistic data and scientific publications devoted to the social hygienic analysis of morbidity and mortality in Nigeria is noted. Although Nigeria is one big nation, it has many religions, tribes and communities with different traditions. Such a diversity impedes to carry out the research and to derive presumptive conclusions that is additionally complicated by the problem of access to such kind of research in many communities (Rudloff P. et al., 2021; Solanke B.L. et al., 2018; Ukwaja K.N. et al., 2020), Schepin O.P. et al.)¹¹. Said A.S., Kicha D.I., 2024¹²).

Since children morbidity has the greatest impact on rural residents health, access to such areas for data collection is extremely important. In Nigeria it is difficult to implement because the terrain is not only rugged, but also unsafe (Singh S. et al., 2019; Chibuye P.S. et al., 2018; Atalay G. et al., 2018; Afoakwah C. et al., 2018; Isaac B. et al., 2022).

In view of the above said, a comprehensive social hygienic study was carried out concerning children mortality and morbidity and affecting factors in order to develop recommendations improving preventive and medical care of children population in general.

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¹¹ Schepin O.P. (editor and co-authors Vladimirova L.I., Kozlitin V.M., Kosenko E.V., Rosov A.A., Stepanova N.N.) Public health of foreign countries. 1981. M. 368p.

¹² Said A. Sh., Kicha D.I. Implementing the Health system and the new Federalism in Somalia : Challenges and Opportunities. Frontiers in Public Health. 2024. Vol. 12

The degree of development of the topic

The majority of researchers studying public health, including rural populations, often rely on hospital-based data (Johnson G.E. et al., 2018; Stephanie A.K. et al., 2018; Robert M.C., 2020; Schueller S.M. et al., 2019). The lack of analytical databases of out-patient visits testifies underdevelopment of statistical accounting tools.

The results of research of various aspects of children morbidity and mortality are extremely rare in Nigeria. They point on the prevalence of such diseases as malaria, pneumonia, diarrhea and malnutrition, which are the main causes of children mortality. Besides, the importance of the influence of social economic factors, cultural traditions and health care infrastructure on children health indicators is emphasized (Jayathilaka R. et al.; Hagal C. et al.; Dribe M., Temporin F. et al.; Okeke et al., Endup T., Kingsley E.A.; Al-Shreideh A. P., Kicha D. I. and others).

The Russian scientists and specialists emphasize the necessity of comprehensive sanitary hygienic and epidemiological analysis covering all aspects of epidemiology and immunization of various age groups. Also evaluation of health protection and prevention in population and children is needed (Baranov A.A., Briko N.I., Kontsevaya A.V., Orel V.I., Albitsky V.Yu., Tsvetkov A.I., 2020-2024).

It is necessary to identify gaps in existing children health care organizations and to propose evidence-based improving recommendations. Hence, in African countries an analysis of social hygienic factors affecting health indicators, and the development of efficient practices reducing morbidity and mortality is required

(Said A. Sh., Fomina A., Kicha D., 2023; Said A.Sh., Kicha D.I., 2024; A-Shreideh A.R., Kicha D. et al. 2025¹³.

As far as is known from the literary analysis, there are still few studies with emphasis on African countries and Nigeria concerning the analysis of influence of the factors and the consequences of improvement of health of children under age of 5 years, the relationship between physicians and mothers, their knowledge of prevention (Albitsky V.Yu., Kicha D.I., Konovalov O.E., Orel V.I., Woldeamanuel B.T. et al., Kitila F.L., Sakamoto K., Hoffstedt, C., Fredriksson, M., Lenhoff, H., & Winblad, U.; Larson E., Sharma J., Boren M.A., Tuncchalp O.; Regmi, K., Jones, L. A. et al.

Research Purpose

To conduct a complex social hygienic research of children morbidity and mortality and related factors, include maternity, in condition of deficiency of statistical accounting data and to develop recommendations enhancing possibilities of prevention and immunization to improve children health protection in Nigeria.

Research Tasks

1. To develop the program and the methodology of complex the target social hygienic research of children morbidity and mortality in conditions of deficiency of statistical accounting data.
2. To evaluate both state of the infrastructure of primary health care facilities and practice of health personnel training in the field of disease prevention and improvement of immunization of children considering opinions and attitudes of mothers.

¹³ Al-Shreideh A.R., Kicha D.I., Al-Rawashdeh B.M. et al.. Archiv Euromedica. 2025. vol. 15. no. 1. The integrated approaches concerning the environment, public and systems management used to public health protection: Jordanian practice. Archiv Euromedica. 2025. vol. 15. no. 1.

3. To analyze and to identify relevant social hygienic, social economic and maternal factors of variability of children morbidity and mortality in Nigeria, to establish priority groups of family.
4. To evaluate services of voluntary counseling and testing of children under realization of immunization in primary health care centers in view of health conditions and opinions of mothers and medical personnel.
5. On the base of complex pilot social hygienic research of mothers with children, in local conditions of deficiency of statistical accounting data and opinions of mothers, to elaborate recommendations to improve immunization and disease prevention of children.
6. On the base of research result on the PHC level in Nigeria and analytical database created to develop the algorithm of improving of children immunization and disease prevention of children.

Scientific Novelty of the Research

- The first time on the base of sampling complex social hygienic research, in conditions of deficiency of statistical account data PHC activities the organization technology of formation of analytical databases are demonstrated.
- The program of target sampling social hygienic research was developed and implemented for the first time and an experimental (pilot) analytical database was developed.
- For the first time, the key social hygienic and economic factors and conditions of formation of morbidity and mortality of children under the age of 5 years are identified on the basis of the rural municipal district of Nigeria.
- The results of the study revealed ideas about the social hygienic conditions and characteristics of the sample of mothers with children under 5 years old, including biosocial, economic, sanitary, educational and housing ones. The priority families were differentiated in the local context: poor, low-income ones, and families with lack of communication or prolonged power outages, etc.

- For the first time, the assessment of mothers' knowledge and attitude to prevention through immunization of children was given with significant difference in the experimental ($p < 0.05$): more positive opinion of young mothers, insufficient accessibility of vaccination, dependence of satisfaction on age and educational status of mother, mother having other children, successful communication with medical assistant and medical personnel.
- The obstacles for prevention of children diseases and satisfaction of mothers and medical personnel were identified: long waiting for medical care, unsatisfactory sanitary and hygienic living conditions, malnutrition of children (especially related to protein products and vitamins), low awareness of mothers about preventive measures and low educational level of mothers.
- To identified medical, social and economic factors affecting health status of children under the age of 5 and ensuring quality of services of voluntary counseling and testing of mothers with children in PHC centers.
- The pilot counseling was organized for mothers with children under age of 5 years, the respective medical consultants (public health workers) were trained, according to programs for the prevention of HIV/AIDS transmission from mothers to children; target installations for medical personnel have been developed.
- The recommendations are developed of research practices to improve for efficiency of children immunization and education of mothers having children at the level of rural community, as well as of medical personnel.
- For the first time, in the course of experimental research the algorithm for improving of children immunization was elaborated. During its implementation the indicators of its effectiveness in primary health care in Nigeria were obtained.

Theoretical and Practical Significance

The organizational and methodological improvements were applied to have been made to the methodology of public health and health care research to carry

out experimental research in the countries with underdeveloped system for collecting statistical information and forming analytical databases. On the basis of the experience of the specialized Chair of Public Health, Health Care Organization and Hygiene of the RUDN University, the group of priority families with children was identified considering social hygienic condition of living and PHC in Nigeria.

The results of the social hygienic analysis of morbidity, mortality of children and children health organizations in Nigeria are of practical importance. The practical theoretical significance lies in the study of such factors contributing to the incidence of children morbidity and mortality in Nigeria, as poverty, insufficient access to health services, epidemiological risks, poor sanitation, malnutrition and limited awareness of preventive measures. The criteria for preventive counseling and targeted intervention were have been developed concerning priority families in the context of local conditions.

During the implementation of the algorithm improving children immunization, practical results were confirmed, mainly with significance level ($p < 0.05$):

- the prevalence of HIV/AIDS in mothers was 8.5%, with 9.1% at Esin Ufot Medical Center, 8.7% at Uya Oro Medical Center, and 7.8% at Eyo Abasi Medical Center-7.8%. About half of medical consultants - public health workers (44%) believed that they had achieved their goal, and (94%) believed that consulting services needed improvement. The pre-test counseling of mothers was adequate in 89%, 81.8%, and 90.9% of cases (out of a possible 100%) at Esin Ufot, Uya Oro, and Eyo Abasi Medical Centers, respectively. The efficiency of counseling was confirmed by the indices of consent to pass HIV test after counseling, which amounted to 93.1%, 96.2%, and 98.7% based on the Experienced Medical Centers with an overall average of 96%; and 89% of women who agreed to pass the test actually passed it.

The practical recommendations «Organizational, methodological, research recommendations». For middle/low income countries : Esu Djon D., D. I. Kicha, A.V. Fomina. – Moscow : RUDN, 2025.18p. can be applied to improve children health organizations, both at the district, provincial and central levels in the countries of tropical zone of Africa with similar conditions, i.e. in virtually every country in Central, Western and Southern Africa. The mixed approach combining quantitative, qualitative and selective data collection methods made it possible to assess the current state of morbidity and mortality, to identify influencing factors, and to evaluate existing children health organizations.

The algorithm was developed to improve children immunization based on evidence and recommendations for different levels of health care and experimental research to reduce rate of morbidity and mortality among children in Nigeria.

The implementation of the study results will lead to further development of effective strategies and tactics in African health care to improve children health. By eliminating identified gaps in existing children health organizations and focusing on preventive measures, the regions, on the basis of developed recommendations and algorithms can work on reducing children morbidity and mortality. The results of the research widely implemented and contribute to the overall well-being and health of Nigerian children, ensuring a healthier future generation.

The Methodology and Research Methods

The chapter below presents the bases, objects, materials, and methods of the research program. The research base was determined, and primary administrative information about the region of Nigeria under study and its medical institutions was collected: «Nigeria consists of 36 states, plus the federal capital of Abuja, which is located in the center of the country. The study was conducted on the basis of primary health care in Akwa Ibom State, which is typical for Nigeria, located in the Southeastern part of the country, bordering the ocean. It is represented by

typical medical facilities located compactly, including hospitals, clinics and pharmacies necessary for medical care in the area. These facilities offer a variety of services to children and the surrounding adult communities, including general medical care, emergency care, laboratory and pharmacy services, specialized care».

The research program included a selective targeted research of local community conducted using the method of organizational experiment for the period of 5 months (June 2021 - October 2021). Because of data deficiency, the four blocks of questions were used in the questionnaire: the questions about households, individual questions personally to mother, special questions from the perspective of mothers with children under the age of five and ~~block~~ questions about the family as a whole and the burden of diseases.

The research object consisted of randomly selected women with children under 5 years old who were willing to stay and listen and fill out a structured questionnaire when they visited medical consultation. The women who were older than the age under consideration, had no children, or whose children were over 5 years old at the time of the survey were not included in the sample.

The main provisions submitted for defense

1. For the first time, the program of targeted complex social hygienic research using combined technique of data collection and analysis that applied nested qualitative and quantitative samples of research objects and methods, surveys, interviews was developed and implemented in the statistical data deficiency conditions.

2. The result of state infrastructure of primary health care and practice of training health personnel in the field of disease prevention, improving the immunization of children according to the opinions and attitudes of mothers investigated in the pilot analytical database in the data-deficiency of statistical accounting system for PHC activities.

3. On the base of social hygienic and epidemiological experimental collecting data factors of children morbidity and mortality in specific tropical region, were identified as well as priority families with children grouping for active surveillance by health personnel.

4. On the Base of analytical database pilot research the social hygienic recommendations for African region were developed to improve both quality and accessibility of children immunization and the prevention activities in children mother health care.

5. Based on the results of the research and analytical database the algorithm was developed to expand the quality and accessibility of children immunization and to improve the prevention of children health care in relation to the specific conditions of tropical zone of Africa.

The degree of reliability and approbation of the results

The reliability of the results is confirmed by the use of adequate statistical and sociological methods, criteria of significance, target samples and research units ($p=95\%$, Δ is the maximum error, mean SD, etc.), reflected in the section of the program and methodological materials.

The main provisions of the dissertation were reported, approved and discussed at:

- The International Scientific Conference of Students and Young Scientists "for the Sustainable Development of Civilization: Cooperation, Science, education, technology" within the framework of the SDG program (Moscow, November 22-26, 2022),
- II International Scientific Conference of Students and Young Scientists for the Sustainable Development of Civilization: Cooperation, Science, Education, Technology within the framework of the SDG program (Moscow, November 21-24, 2023),

- Mat. All-Russian scientific-practical conf. (with international participation), dedicated to the 160-th anniversary of the formation of the Society of Doctors of Eastern Siberia (1863-2023). Irkutsk. (2023),
- Department of Public Health, Public Health and Hygiene of the Peoples' Friendship University of Russia named after Patrice Lumumba, the Medical Institute (RUDN University) (2022-2024.).

Implementation into the practice

The results of the dissertation were put into practice and used for a period after conducting research at St. Patrick's Hospital and Maternity Hospital, in rural communities of Oron district, Nigeria, in the Educational process of RUDN University, First St.Petersburg SMU named after acad. I.P. Pavlov, Astrakhan SMU. The implementation of the results of a social hygienic and epidemiological study affected children mortality, resulted in reorganization of medical care programs improving the scientific and educational process of training doctors and consolidation of the position of priority family. The author developed the analytical framework, the algorithm improving immunization and recommendations that emphasized the importance of comprehensive intervention in priority families, such as efficient disease control measures, improved access to primary health care and sanitation, and the elimination of epidemiological social determinants to improve children health.

Publications

Based on the materials of the dissertation, 7 articles were published, including, 4 articles in the journals included in the List of the HAC of RF.

Personal contribution of the author

The author conducted a comparative analytical review of the literature on this topic, identified existing research gaps and summarized relevant studies. Taking into account the experience of the Chair of Public Health, Healthcare and

Hygiene of the RUDN University Medical Institute for integrated medical and social research of families, the base was organized for research and areas requiring further study were identified. The author also collected primary data through surveys, interviews and observations, which allowed him to gain first-hand information about the factors contributing to children morbidity and mortality in Nigeria and gain insight into them from the perspective of parties in interest.

The author, under moderation of his supervisor, analyzed and interpreted the data using appropriate statistical and qualitative analysis methods. This helped to identify patterns, trends and correlations that shed the light on the complex dynamics of children's health and immunization in Nigeria and resulted in the differentiation of priority families.

Based on original findings, the author developed scientifically based recommendations and the algorithm describing the possibilities of immunoprophylaxis to improve functioning of organizations protecting health of children in priority families in Nigeria. These recommendations are practical, feasible ones and are adapted to the specific context of Nigeria, taking into account socio-cultural, economic and epidemiological factors affecting indicators of children health.

Moreover, the author contributed through publishing the corresponding results of research in scientific journals, presenting them at conferences and sharing them with relevant parties in interest, thereby helping to raise awareness of children health issues in Nigeria and adding to the existing array of knowledge in this field.

Compliance of the thesis with the passport of the scientific specialty

The scientific provisions of the thesis correspond to the passport of the specialty 3.2.3. Public health, organization and sociology of healthcare, medical and social expertise (medical sciences) pp. 4, 5, 8, 10, 13, 20.

The structure and scope of the dissertation

The dissertation is presented on 164 pages of typewritten text and consists of introduction, literature review, methodological part, chapters of with the results of original research, conclusions, practical recommendations, list of references and list of illustrative material and attachments. The list of references includes 178 sources, most of which are foreign publications, 34 - domestic. The results are illustrated with tables and figures (contains 17 tables and 9 figures).

CHAPTER I - GLOBAL AND REGIONAL SOCIAL HYGIENIC ANALYSIS OF MORBIDITY AND MORTALITY OF CHILD AND CHILD HEALTH ORGANIZATION

1.1 Key terminologies needed in understanding child health.

In other words, morbidity can be simply referred to as unhealthy conditions, whether mental or from physical strain. These states usually degrade an individual's quality of life and often worsen with time. Morbidity is the state of being diseased, the incidence or prevalence of disease and injury in a population. It measures the level or amount of disease in a specific population, usually in terms of the number of people affected during a certain period of time. Morbidity is typically measured by indicators including the number of cases, or rate of occurrence of a particular disease or condition in a specific population.

There are different types of morbidity, including acute morbidity, which refers to illnesses or injuries of a short duration, and chronic morbidity, or long-term or continuous health conditions. In addition, morbidity can be classified based on disease-specific conditions, such as infectious diseases, non-communicable diseases, mental disorders, or injury.

Morbidity measurement is an important concern for ascertaining the health status of the population, recognizing trends, and informing the interventions and policies of public health. Measuring morbidity encompasses data collection about the occurrence, distribution, and consequences of diseases and other health conditions among a given population. Such information can be used to estimate the burden of diseases, identify risk factors, and guide health planning and resource allocation.

Morbidity should aptly be differentiated from co-morbidity, conditions that don't often have the same root cause but may occur together, worsening each other. Co-morbidity refers to the presence of two or more medical conditions or diseases

existing in a patient at one time. These can be unrelated or related in such a way that one condition increases the risk or severity of another. Co-morbidity is common in many chronic diseases and has important implications for diagnosis, treatment, and management of the individual. For example, a patient with diabetes might have other co-morbidities like hypertension, obesity, or cardiovascular disease. These comorbid conditions can affect the overall health of the individual and may require additional medical attention and specialized treatment approaches. Co-morbidity can also complicate the prognosis and increase the risk of complications, leading to a higher burden of disease and potentially poorer outcomes.

Mortality rate represents the measure of the number of deaths in a specific population during a certain period. It is often expressed as the ratio of the number of deaths per unit of population, usually per 1,000 or 100,000 individuals, over a fixed period. The mortality rate is an important indicator used within public health for assessing the general health status of a population and monitoring the effects of diseases, injuries, or other causes of death. It provides valuable information about the risk of dying within a certain population and is helpful for understanding the various burdens of health conditions on society. There are different types of mortality rates based on various factors such as age, causes of death, or specific population groups. Such commonly used types of mortality rates include:

Crude Mortality Rate: This is the simplest form of mortality rate and is calculated by the total number of deaths in a population divided by the total population and multiplied by a constant such as 1,000 or 100,000 to express it per unit of population.

Age-Specific Mortality Rate: It indicates the number of deaths in each age group of a population and helps understand the pattern of mortality across different age groups.

Infant Mortality Rate: This rate refers precisely to deaths among infants less

than one year old. It is an important indicator of the general health and survival of newborns, which reflects the quality of healthcare and socio-economic conditions within a population.

Maternal Mortality Rate: This rate measures the number of maternal deaths related to pregnancy or childbirth per 100,000 live births. It highlights the risks faced by women during pregnancy and childbirth and reflects the quality of maternal healthcare services.

Cause-Specific Mortality Rate: This rate focuses on deaths caused by specific diseases or conditions. It helps in identifying the leading causes of death within a population and aids in public health planning and intervention strategies.

Mortality rates are used for various purposes, including tracking disease trends, evaluating the effectiveness of healthcare interventions, comparing health outcomes between different populations, and identifying areas of public health concern. They play an important role in informing health policies, resource allocation, and the development of preventive measures to decrease mortality and improve the overall health of the population. Child mortality or Under-five mortality is the death of children under the age of five. Expressed per thousand live births, this is the probability of dying between birth and age five, encompassing infant mortality and neonatal morbidity. The under-five mortality rate measures the chances a newborn would survive beyond his fifth birthday and says a lot about a community's economic, social, and environmental condition[14].

Child mortality is still a major problem in public health for Nigerian families and other developing countries. Reports from Nigeria and other sub-Saharan countries paint a dim picture as they reveal that neonatal, infant, and child mortality rates are all still high.[15][16][17].

Contributing 13% to the global under-five mortality, child survival has been of major concern to the public health community in the country but unfortunately, the comparative roles of social determinants of health in different stages of

childhood haven't been vigorously researched. All these troubles are despite international efforts to minimize preventable causes of under-five mortality. Sub-Saharan Africa is way behind other regions in this fight and Nigeria is the second largest contributor to child mortality numbers globally [18][19][20].

Summary: Understanding child morbidity and mortality requires familiarity with the definitions of basic terminologies associated with the field. Terminologies that are associated with child morbidity are defined as the state of being diseased or unhealthy in children, child mortality, under-five Mortality Rate (U5MR) as the number of deaths per 1,000 live births in children under the age of five years, neonatal mortality, infant Mortality Rate (IMR) as the number of deaths per 1,000 live births in infants under one year of age.

Familiarity with these key terminologies will help in better understanding the factors, challenges, and interventions related to child morbidity and mortality. It aids in communication, policy-making, and strategy implementation aimed at improving child health outcomes.

1.2 Global efforts towards child morbidity and mortality

September 2015 witnessed a global and ambitious proposal to end poverty, combat climate change and fight injustice and inequity over the next 15 years. The proposal was the United Nations (UN) Agenda 2030 which aimed to build a better future by proposing 17 Sustainable Development Goals (SDGs) that all UN member states were expected to achieve. [1] The goal of SDG-3 was "good health and well-being" encapsulated in promoting a healthy lifestyle and well-being for all ages. It relied on two main ideas. The first was that health was a universal right and the second was welfare, which was comprised of psychological and physical factors. Stressing the importance of health to the future of the global world, 13 of the 17 targets were directly related to health. While undoubtedly there has been success with regards to SDG3, particularly with access to drinking water, poverty reduction, malaria, tuberculosis, and the fight against HIV/AIDS, progress needs

to focus more on regions still encountering a high burden of disease, particularly sub-Saharan Africa. In addition to these infectious agents, sub-Saharan Africa now sees a growing rise in the prevalence of chronic diseases with its iterative factors, and these are still covered under SDG-3. [2]

With over 80% of the global under-five deaths as a result of neonatal conditions or infectious diseases, it is postulated that childhood mortality could be curtailed with an effective intervention even in a resource-constrained setting. Childhood mortality can be curtailed in resource-constrained settings through effective interventions. These interventions focus on prevention and case management, and they can be implemented by families, communities, and health facilities. The Integrated Management of Childhood Illness (IMCI) approach is one such intervention that aims to improve the health and well-being of children under five. IMCI includes preventive and curative elements, and it emphasizes improving the case management skills of healthcare providers, strengthening health systems, and promoting family and community health practices. Key requirements for implementing IMCI include adopting national policies, updating clinical guidelines, improving the quality of care in health facilities, ensuring the availability of essential medicines, strengthening referral pathways, and empowering families and communities. By implementing such interventions at scale, even in resource-constrained settings, it is possible to reduce childhood mortality and improve child health outcomes. It's worth noting that the success of these interventions is influenced by factors such as political leadership, strengthened health systems, and empowered communities. By prioritizing and implementing effective interventions, we can work towards curbing childhood mortality, even in challenging settings with limited resources. To improve the quality of care and access to newborns the World Health Organization (WHO) in partnership with the United Nations International Children's Emergency Fund (UNICEF) developed the Integrated Management of Childhood Illness (IMCI)

strategy. The IMCI was an integrated approach focused on the well-being and health of the child, aiming to minimize disability and illness, reduce preventable mortality and promote the development of children under five years of age. The IMCI strategy consisted of 3 building blocks.[3]

- Improved health system for the provision of quality care
- Improved management skills of healthcare providers
- Improved family and community healthcare practices.

When the IMCI strategy is correctly applied, there is potential for the reduction of child mortality and morbidity. Unfortunately, its impact has remained limited due to poor adherence to its guidelines and limited uptake. Also, since its introduction over 20 years ago, many countries have had difficulties scaling up the program or achieving high coverage, especially in countries with a weaker health system where the IMCI's effective implementation has proven most challenging. Hence, there have been talks about the program's true impact and continued survival [4].

Summary: Efforts to reduce morbidity and mortality among children have been a focus of international attention through agencies including the United Nations, the Sustainable Development Goals, and the Integrated Management of Childhood Illness program.

The UN has also been involved in the health of children through various initiatives. Among the most important are the Millennium Development Goals (MDGs), aimed at reducing child mortality by two-thirds, from 1990 to 2015. While the MDGs achieved great success, the UN realized the need for more such efforts and adopted the SDGs in 2015.

The SDGs, particularly Goal 3, focus on maternal and child health. This goal pursues the end of preventable deaths of newborns and children under five years and a reduction in maternal mortality. It underscores access to quality healthcare, immunizations, and nutrition for children. The SDGs establish targets to be

achieved by 2030, calling on all countries to invest more in their healthcare systems and put the concerns of children at the forefront of each national agenda.

The WHO and UNICEF-developed IMCI program puts great emphasis on integrated approaches to the leading causes of morbidity and mortality among children under five years. IMCI offers a comprehensive strategy that focuses on the enhancement in management of illnesses related to childhood, thereby training health workers, improving health systems, and encouraging community participation. The program focuses on early identification and proper management of the most common childhood diseases: pneumonia, diarrhea, malaria, and malnutrition.

These global efforts towards child morbidity and mortality have yielded positive results. Over recent decades, there has been a tremendous decline in child mortality rates, with increasing numbers of children starting to access essential healthcare services. However, the challenges are yet to be overcome, especially in low-income countries where resources and infrastructure may be minimal.

1.3. Nigerian efforts towards child morbidity and mortality

Just like the IMCI, in 2013, WHO in partnership with UNICEF launched another program focused on the massive burden of diarrhea and pneumonia deaths among children. This program called the Integrated Global Action Plan for Pneumonia and Diarrhea (GAPPD) was the first global plan with a national mortality target for diarrhoea and pneumonia.[5] The Integrated Global Action Plan for Pneumonia and Diarrhea (GAPPD) was the first global plan to set national mortality targets for pneumonia and diarrhoea. It aims to reduce deaths from these diseases through a comprehensive approach that includes creating healthy environments, promoting protective practices, and ensuring access to preventive and treatment measures for every child. By implementing this plan, countries can work towards ending preventable deaths from pneumonia and diarrhoea. This individual approach has seemingly shown results as, since its inception, diarrhoea

and Pneumonia deaths have decreased by 27%. This success also comes with some challenges as it should be noted that 80% of recorded pneumonia deaths occur in only 30 countries, with 50 % of this number in Nigeria, Pakistan, India, Niger, and Ethiopia alone. Also, these 30 countries will most likely not reach the GAPPD 2030 target for pneumonia mortality thereby putting more strain on the SDG child survival goals.[6] [7]

With 241 million cases globally in 2020, half of the world's population at risk, and an estimated 627,000 deaths recorded globally, Malaria has rightfully been identified as a menace to public health. Malaria, a mosquito-borne infectious disease, continues to pose a significant public health threat in Africa because malaria is a leading cause of morbidity and mortality in Africa, particularly among children under five and pregnant women also the burden of malaria affects socio-economic development, leading to increased healthcare costs, reduced productivity, and hindered educational opportunities. Also controlling malaria is challenging as many African communities lack access to quality healthcare facilities, making early diagnosis and treatment a challenge, insufficient funding, limited healthcare infrastructure, and shortages of essential drugs and insecticides hinder effective malaria control measures, the emergence of insecticide-resistant mosquito species poses a significant obstacle to vector control efforts and finally changing climatic conditions contribute to the expansion of mosquito breeding sites and the spread of malaria into new areas.

The African region accounts for almost 94% of global recorded cases of malaria and 96% of deaths are recorded in just 31 countries. While between 2000 and 2020 about 1.7 billion malaria cases and 10.6 million deaths have been prevented, the number of countries with less than a hundred cases has increased from 6 up to 26 showing a global prevalence. Such damning statistics are what prompted the director-general of the WHO to initiate the “rollback malaria” program. The initiative developed as a social movement was to be directed by

national authorities with the backing of global partners. The Roll Back Malaria program emphasized political mobilization and the participation of civil society while relying on evidence-based action.[8] The program has managed to record some success as the number of children who received at least a single dose of seasonal malaria chemoprevention (SMC) rose to 33.5 million in 2020 from 0.2 million in 2012. Also, 3.1 billion rapid diagnostic tests (RDTs) were sold globally between 2010 and 2020, with 81% purchased in sub-Saharan countries. These successes in the malaria campaign haven't come without some challenges as the disease remains of importance to public health. Also, the malaria rate seems to have increased with the price of the program seemingly rising yearly [9][10][11]

Although cases of malaria seem to have plateaued in several parts of the globe, its epicenter remains in sub-Saharan Africa with 241 million cases and under 5 children accounting for 80% of mortality in 2020. The most recent program for malaria control has been the WHO Global Technical Strategy for Malaria from 2016 to 2030. The program which was adopted by the World Health General Assembly in May of 2015 was an all-inclusive agenda to guide nations in the speedy elimination of malaria. The global strategy for malaria had set aside four goals by 2030 and it included-

- Reducing the rate of malaria mortality by at least 90%
- Reducing malaria case incidence by at least 90%
- The elimination of malaria in at least 35 countries, and
- preventing its resurgence in all countries that have been declared malaria-free

Unfortunately, there have been mixed results towards these targets and as of 2020, while the goals of decreasing mortality rate and case incidence by 40% had not been met, the prevention of malaria resurgence and the elimination of malaria in at least 10 countries were successful.[12][13]

Summary: While there has been an appreciable effort by Nigeria in trying to reduce child morbidity and mortality through the Global Action Plan for the Prevention and Control of Pneumonia and Diarrhea, Roll Back Malaria, among others, in collaboration with the World Health Organization, not much has been done.

The GAPPD was launched in 2013 with the aim of reducing child mortality from pneumonia and diarrhea, which are the leading causes of child morbidity in Nigeria. The plan focuses on improving access to essential healthcare services such as vaccinations, antibiotics, and oral rehydration therapy, as well as promoting breastfeeding and adequate nutrition of infants and young children.

The World Health Organization, in collaboration with other partners, including Nigeria, initiated the Roll Back Malaria program due to the fact that malaria remains one of the leading causes of child mortality within the country. Some of the strategies that have been put in place in Nigeria regarding this program include the distribution of insecticide-treated bed nets, indoor residual spraying, and access to prompt and effective treatment for malaria.

The WHO plays a vital role in supporting Nigeria's efforts to reduce child morbidity and mortality by providing technical assistance, guidance, and other resources aimed at strengthening the healthcare system toward improved delivery of essential healthcare services. WHO also contributes to capacity building, training health workers, as well as monitoring and evaluation of health programs for effectiveness.

However, despite these initiatives, child morbidity and mortality remain continuously high in Nigeria's remote and underserved areas. The situation is partly worsened by the limited reach of healthcare access, inadequate infrastructure, and socioeconomic considerations that contribute to the persistently high rates.

1.4. The burden of community's health and key factors under-five mortality in Nigeria

There is no doubt that globally, a lot has been achieved in reducing childhood mortality figures over the last two decades [21][22][23], with the child mortality rate shrinking from 12.6 million in 1990 to about 5 million in 2020. This represents a reduction of about 60%, but still, two regions accounted for about 80% of the 5 million child deaths worldwide, namely Sub-Saharan Africa and Southern Asia. Unfortunately, sub-Saharan Africa still maintains one of the highest child mortalities of about 74 deaths per thousand, which is 14 times higher than in Northern America and Western Europe.[24][25][26] In 2022, Nigeria ranks second behind Pakistan for infant mortality rate, as the country's current rate is 56.220 deaths per thousand live births, and disparities are noted between regions. Grateful for prior research, we know that risk factors and mortality rates are usually the bioproduct of a region's socioeconomic structure and bio-demographic characteristics.[27][28][29]. Rather than observing life expectancy or mortality, studying health outcomes using both mortality and morbidity figures gives a robust view of a community's health. The burden on the health of a community could be classified into three groups-:

- Communicable, maternal, perinatal, and nutritional diseases,
- Non-communicable diseases (NCDs) and,
- Injuries

The major causes of child mortality in Nigeria fall into the first category, with the leading five causes of child mortality being Diarrheal diseases (and common infectious diseases), Pneumonia (and respiratory tract infections), Malaria (and neglected tropical disease), nutritional deficiencies, and HIV/AIDS.[30][31][32][33]

The reasons for under-five mortality are wide and generally similar in most regions of sub-Saharan Africa. While no one factor plays a leading role singly, they all combine to exacerbate this public health problem. These influences are a

combination of social, educational, economic, and religious factors intertwined in childhood, maternal, and community groups.[34][35][36]

Some of the key factors that have been identified include:

Poverty and low socio-economic status: Poor children are at a higher risk of mortality. It is often manifested through a lack of proper health care, good nutrition, clean water, and adequate sanitation-all elements necessary for the child's survival.

Limited access to quality health care: Poor access to healthcare facilities, trained health personnel, immunizations, and medications are pathways to higher under-five mortality.

Malnutrition: This includes undernutrition and overnutrition, which is one of the leading risks to child mortality. Inadequate nutritional level impairs a child's immunity, thereby making them more susceptible to infections and other health complications.

Infections like pneumonia, malaria, diarrhea, and HIV/AIDS are leading causes of mortality among children under five years in sub-Saharan Africa. Inadequate access to prevention, diagnosis, and treatment contributes to the high rates of mortality.

Maternal health and education: These factors have a significant bearing on child survival. Poorly educated mothers might lack knowledge concerning the child's health and nutrition, and they may be hindered in seeking access to healthcare facilities both during pregnancy and after giving birth to the child.

Water and sanitation: Inadequate access to clean water and utilization of proper sanitation facilities raise the danger of diarrheal diseases, which for young children may be life-threatening.

Environmental factors include exposure to air pollution, indoor smoke due to the use of fuel for cooking, and other related effects.

Cultural and gender norms: Cultural and social inequalities between males and females further account for child survival. Discrimination against girls, early

marriages, and women's low decision-making status pertaining to health all affect child health outcomes.

The factors are weighted mean age of the child, birth in a health facility, and breastfeeding practice from childhood factors. Maternal factor includes mothers' age, age at first birth, parity, household size, and educational level. Community factors include access to electricity, sanitation, housing region, nearness to the health facility, family income, and living with husband.[37][38][39] A comprehensive approach is thus needed to address these, including improving the access to quality healthcare services, promoting education and empowerment of women, reduction of poverty, improvement of water and sanitation infrastructure, and effective strategies for disease prevention and control.

In the year 2000, global leaders signed the United Nations (UN) declaration to a new partnership targeted at decreasing extreme poverty and other goals. This declaration was the Millennium Development Goals (MDGs) and it had eight targets- hunger, disease, income poverty, shelter, social exclusion, gender equity, education, and environmental sustainability.[40][41][42] Like several other nations, Nigeria was a signatory to this treaty but with the MDG concluding in 2015 were any of the targets met? According to the UN, during the 15 years of the MDG operation, the number of people in extreme poverty declined by more than half, enrollment in primary school increased, more women took up paid jobs and the child mortality rate decreased by more than half.[43][44][45] While Nigeria might have achieved some of its targets, especially regarding maternal mortality and HIV, generally the effect of the program in the country was a failure with over 60% of the world's poorest people living in 5 countries, Nigeria being one of them. At the end of the program, Nigeria still had a high infant mortality rate, low contraceptive prevalence rate, low health expenditure, high HIV burden, and a low life expectancy. While a myriad of factors could be referred to as to why Nigeria couldn't achieve the MDG targets, I would pin the reasons on the initial absence of

baseline data, the absence of midline reviews and proper end-line assessment, the country's security challenges, industrial actions especially in the health sector, and the health system verticalization.[46][47][48][49]

The under-five death rate also covers the infant (below one year) and the neonatal (the first 28 days of life) death rate. Statistically speaking the neonatal period still is the most important period for child survival and in the year 2020, 2.4 million newborns were lost. Also in the same year, almost all under-five deaths occurred in the neonatal period, with sub-Saharan Africa having the highest number of neonatal deaths at 43% of the global total.[50][51][52][53] From these figures, we can see that if there must be a decrease in under-five mortality, a significant number of resources would have to be channelled towards the challenge of neonatal mortality. Other studies that compared this childhood period also showed that in most developing countries, while under-five mortality has decreased by half over the past twenty years, infant mortality decreased by 30%. Unfortunately, there has only been less than a 10% decrease in the rate of neonatal mortality in developing countries over the last two decades and that begs the question as to the difficulties in this aspect.[54][55][56] The challenges with neonatal mortality in developing countries could be because some of its problems such as preterm delivery, congenital malformation, and injury at birth are the hardest to solve. Also, some figures are saying the actual numbers might be underreported.[57][58][59][60] Child mortality could be linked to outcomes in socioeconomic determinants at an individual, household, or community level as stated by Morsley and Chen's framework which would be elaborated on later. There have also been other practical and theoretical studies that support the idea of the community in which a child is born playing a key role in the child's health and survival chances, especially in Africa. Similarly DO and Fincher hypothesized that "place and health are intimately linked, given that goods and services, exposure to hazards, and the availability of opportunities are all spatially distributed" [61][62].

Socioeconomic disparities in access to goods and services, as well as exposure to hazards, can contribute to health inequities. Additionally, the availability of opportunities, such as education and employment, can impact individual and community health outcomes. Understanding the spatial distribution of these factors is essential for addressing health disparities and promoting equitable access to resources and opportunities. Policymakers and urban planners need to consider these spatial dynamics to create healthier and more equitable communities. Thus, as a community is generally intertwined, its role in the health of its members is evident as families in these communities would often have to depend on the availability of healthcare services. Besides, health infrastructure availability at a community level often means an improved chance of childhood survival as the cost of health-related goods is reduced and an opening for better healthcare is open.[63][64][65] In the same vein, the safety and quality of the physical environment have a huge influence on the health of a child.[66][67][68] Notably, there has been researching proposing that family-level factors play a more significant role compared to community-level factors in under-five mortality, hence the suggestion that membership into some families and specific communities in sub-Saharan Africa is a key determinant of under-five mortality.[69][70][71] It can be postulated that since a child's contact with groups outside the family is often very limited, it might also be proof of how less of an influence the community effect could be. Similarly, it is generally agreed that the household environment is a huge factor that determines if a child will be exposed to risk factors causing ill health, moreover, since the child is often raised in a home and under the care of its mother, it goes to show that family-level factors play a greater role compared to that of a community.[72][73][74] However, it will be prudent to note that there is limited academic literature discussing the individual effects of these individual, family, and community factors.

The reason for this lack of literature discussing the socio-hygienic analysis of

morbidity and mortality in Nigeria is due to the vastness and differences amongst communities. While Nigeria is one big nation, there are numerous religions, tribes, and communities with different practices. This difference makes the generalizability of the finding quite challenging. Another factor that poses a challenge to this type of research has always been the issue of logistics and access to many communities.[75][76][77] As childhood morbidity takes a greater toll on rural dwellers, accessing such areas to collect data is vital yet this is extremely difficult in Nigeria because the terrains are not just rough, they are also insecure.[78][79][80][81][82] Therefore, most researchers looking into topics concerning rural populations often get their sample data from hospital-based groups.[83][84][85][86]The collection of data from a single pool and the inability to often generalize this data makes assessment quite difficult.

Having failed in its implementation of the Millennium Development Goals (MDGs),[87][88][89] the big question is would the country be able to meet the international targets for the Sustainable Development Goals (SDGs) before 2030. These targets are often monitored using regional and country distribution by the United Nations (UN) and its agencies. The agency concerned with monitoring targets related to child welfare is the United Nations International Children's Emergency Fund (UNICEF). UNICEF monitor a country's performance on about 44 child-related indicators, by grouping them into five categories, survival and thrive, learning, protection, environment, and fair chance. Using these 44 parameters a country is graded as having no data, insufficient data to monitor, in need of acceleration, on track towards the target, and has met its target.[90][91][92][93] For Nigeria there is no data for 7 of the targets, insufficient data for 3 targets, and a need for an acceleration of 18 targets, the country is on track towards achieving 5 of the SDG child-related targets, and only 1 of the targets has been considered as met. [94][95][95][97][98]

The 2019 index for SDGs ranked Nigeria 159 of a possible 162 countries when

graded for their current achievements towards the Sustainable Development Goals (SDG), scoring just 46.4. [99][100] Although the country has a population of over 220 million people and a GDP of over 45 trillion Naira which makes it the largest economy in Africa hence the nickname “giants of Africa”, Nigeria is also known to be the global headquarters of poverty with more than half its population living below the poverty line, The World Bank had even projected that the number of people living below the poverty line would increase to 95.7 million by 2022 in Nigeria.[101][102][103][104] Also, the country’s allocation towards the health sector has always been low as over the past twenty years, Nigeria has never met the 15% commitment towards the health sector on which all African governments agreed.[105][106][107] The commitment made by African governments to allocate at least 15% of their national budgets towards the health sector is a crucial step in ensuring the development and well-being of their citizens. However, Nigeria, despite being the most populous country in Africa and boasting significant economic potential, has consistently failed to meet this commitment. The country’s 2022 budget set aside an insignificant 4.34% for health. Be it due to insufficient funding, corruption and mismanagement, infrastructure and human resource deficits or persistent health challenges, the consequence of the failure to meet the 15% commitment towards the health sector has significant consequences for the country and its population. The inadequate funding and infrastructure deficits have led to a lack of essential medical equipment, limited access to healthcare services, and substandard healthcare quality. This has disproportionately affected vulnerable populations, exacerbating health inequalities within the country. Furthermore, the health sector's underperformance has hindered Nigeria's overall development, including its ability to attract foreign investment and achieve economic growth.

Failure by Nigeria to adhere to the 15% commitment towards the health sector reflects the entanglement of factors characterized by inadequate funding, corruption, deficits in infrastructure, a shortage of human resources, and unresolved

health challenges. Resolving these issues requires several approaches that include improvement in governance and increased transparency with accountability; increased budgetary allocations; and targeted spending on healthcare infrastructure and human resources. All these factors have constituted causes for concern for stakeholders as they doubt whether or not Nigeria could meet its SDGs obligation within the next years. Lack of proper planning and implementation, and also financial allocation to such goals, was cited as reasons why such goals were not met. The United Nations and UNICEF have recommended that policies yielding impact toward the child-related SDG-3 targets need to be implemented, as well as rigorous engagement of citizens, monitoring, and evaluation in Nigeria.

Summary: Burdens on community health and factors associated with under-five mortality are some of the major challenges in Nigeria. The country has one of the highest rates of under-five mortality across the world, which is influenced by a variety of factors. Socio-economic Factors: Poverty, limited access to education, and poor healthcare infrastructure. Other factors contributing include infectious diseases, malnutrition, and maternal health and access to healthcare.

A multi-faceted approach for the burden of community health and its associated factors needs to be incorporated in a wide array of sectors: government, health providers, communities, and international partnerships. It is by addressing these that Nigeria will achieve great milestones in reducing mortality in under-five children and improving the health and well-being of its children.

1.5. The Mosley-Chen Health Framework System

As hinted earlier, having a look at the Mosley-Chen framework would aid in our understanding of this topic. The Mosley-Chen Health Framework system, also known as the "Barefoot Doctors" model, is a healthcare delivery system that was implemented in China during the 1960s and 1970s. This system aimed to provide primary healthcare services to rural communities by training and deploying village-level health workers known as "Barefoot Doctors." From the 1980s, global health

leaders made concerted efforts in child health and protection, and given its initial success there was a cry for expanded reach, especially into low-income countries, hence, newer technologies and cheaper but efficient methods for infectious disease control were introduced, as well as the greater acceptance of immunization. Yet, Henry Mosley and Lincoln Chen hypothesized that efforts in identifying the most cost-effective strategy for the use of healthcare resources were affected by the lack of a clear conceptual model for studying child health. They developed an outcome measuring the probability of child health status or child death using a group of socioeconomic and biological sets.[108][108][109][110]

The key was the identification of intermediate variables which could directly or indirectly influence mortality and morbidity risk. These intermediate variables were grouped into 5 sets-

- Maternal factors (age, birth interval, parity)
- Nutritional deficiency (protein, calories, micronutrient consumption)
- Environmental factors {food, water, soil, insect, and vectors)
- Injuries (accidental or intentional)
- Personal illness control (availability of personal preventive measures and medical treatment)

The framework had presented obvious advantages. Advantages of the Mosley-Chen Health Framework system:

Increased Access to Healthcare: Perhaps one of the single most significant benefits associated with the Mosley-Chen Health Framework system was increased access to healthcare services, particularly in more rural settings. The placing of Barefoot Doctors within the local community guaranteed the bringing of healthcare closer to people, overcoming geographical barriers, with the idea of reducing the need for long-distance traveling by individuals seeking medical attention.

Cost-effective Delivery: The system was meant to provide cost-effective

healthcare delivery, especially for basic and preventive services. Barefoot Doctors received less training compared to professional doctors, reducing the overall cost in health provision. This approach reaches the underserved population and minimizes the financial burden on the healthcare system.

Community Integration and Trust: The implementation of Barefoot Doctors ensured strong integration into the community and gained their trust. Being from the local community, the Barefoot Doctors were more culturally sensitive and familiar with the needs, customs, and practices of the community. This familiarity and earned trust helped in building rapport between healthcare providers and the population, leading to better patient compliance and overall health outcomes.

Preventive Care: The Mosley-Chen Health Framework system places much emphasis on preventive care and health education.

While this framework was the first of its kind and aided healthcare workers in improving health systems, some intermediate variables might be difficult to measure in terms of potential health gain. As noted above, the Mosley-Chen health framework system has some limitations that need consideration. One of the disadvantages of this framework is that it assumes all social and economic determinants of child mortality operate through a common set of biological mechanisms. This may not consider various interrelations that occur between different factors such as poverty, education, and gender inequality. Furthermore, some researchers feel that the emphasis of the framework on the common determinants does not capture adequately the contextual differences contributing to child mortality in different regions and communities. Another limitation is that the framework focuses primarily on child mortality and may not capture other important features of child health such as child development and well-being. Lastly, even though this approach may help health professionals estimate the net influence of background factors on a child's health, they do not provide the data for the health system to pick an individual target to focus on. [111][112][113] .

Summary: The comprehensive framework developed by Christopher J.L. Murray and Alan D. Lopez, the Mosley-Chen Health Framework system, is used to analyze and understand the factors that underlie health outcomes at both the individual and population levels. Three basic components comprise the framework: health determinants, health outcomes, and health interventions.

Health Determinants: This refers to the basic underlying factors affecting health outcomes. These can be broadly grouped into four dimensions that include socio-economic factors, behavioral factors, environmental factors, and biological factors.

Health outcomes serve as the quantifiable effects of health status, which include mortality rates, disease prevalence, and disability-adjusted life years (DALYs).

Health Interventions: These refer to the health improvement and actions taken that would address the underlying determinants of health. Health interventions may thus be preventive, curative, or rehabilitative.

The Mosley-Chen Health Framework offers a systematic way of conceptualizing how health determinants, health outcomes, and health interventions interrelate. This framework can be used in ways that promote improved population health and a reduction in health inequities.

1.6. Stakeholders and Policymakers regarding child healthcare in Nigeria

Child healthcare in Nigeria has been a mix of both governmental and non-governmental agencies' efforts and while the country's healthcare sector has undergone several reforms targeted at its public health challenges, there has still been a very limited capacity for social protection. It could be argued that the government's inability to deal with several public health challenges has contributed to the growing poverty level and demise of its health system, with a vast majority of Nigerians not being covered by an insurance scheme. As households have to bear the cost of healthcare often by paying out of pocket, the tendency to delay,

find healthcare alternatives, or not seek healthcare altogether is a social norm. As stated earlier, there are both governmental and non-governmental players in the child health and protection sector. Some governmental efforts in this direction have included –

- National Health Insurance Scheme (NHIS) [114][115]
- National Immunization Coverage Scheme (NICS) [116][117]
- Midwives Service Scheme (MSS)
- Nigerian Pay for Performance Scheme (P4P)

Using the NHIS which was established in 1999 but commenced operation in 2005 as an example of the Nigerian government's efforts toward healthcare, it aimed to provide financial risk protection, ensure access to standard healthcare services, ensure healthcare efficiency, and reduce cost. All these were targeted at the communities most vulnerable which included children, people with disabilities, pregnant women, the elderly, refugees, and retirees. While these vulnerable groups could sometimes benefit from free healthcare services, these services are often poorly implemented, politically motivated, have not been nationally operationalized, and often last a few political tenures. Hence, the country is still battling the challenges of paying out of pocket for healthcare limiting access to healthcare for the poor.[118][119][120][121]

A more recent governmental program has been the Nigerian Subsidy Reinvestment and Empowerment Program popularly known as SURE-P which was launched in 2012 as a maternal and child health initiative. Currently active in over a thousand public primary care facilities nationally, this program has two main components-

- Improving service supply which involves training midwives, and community extension workers and also upgrading infrastructure and provision of services.

- Service use improvement by undertaking an information campaign about the availability and benefits of maternal and child care. This also covers a cash transfer policy for pregnant women who come for antenatal screening and also take their infants for regular vaccinations.

The initial result of the SURE-P program has been encouraging although it faces a massive challenge of corruption, loopholes, and unaccounted funds.[122][123][124][125].

The non-governmental sector and NGOs play a crucial role in improving child health and protection in Nigeria and Sub-Saharan Africa. Some of the prominent NGOs that work towards child welfare in the region include Save the Children, UNICEF, and OXFAM. These NGOs focus on providing access to healthcare, education, and nutrition to children in need. They also work towards building child protection systems to prevent abuse, neglect, and exploitation.

For instance, Save the Children focuses its work on reducing child mortality rates through provision of lifesaving healthcare services to children. UNICEF focuses its work on making improvements in child nutrition and even access to education. OXFAM works in the region by providing clean water and sanitation facilities, which also prevent diseases from spreading.

Besides direct provision of services, the NGOs also work in advocating policies and programs for child welfare. They collaborate with governments, civil society organizations, and other actors in efforts targeted at bringing positive changes to the lives of the children. For instance, they may advocate for policies that increase funding for healthcare or education programs. The Maternal, Newborn and Child Health Programme (MNCH2) in Northern Nigeria has ensured more than 1.5 million new recipients of modern family planning, more than 5.4 million infants have been immunized, and more than 700,000 newborns and mothers have received professional care 24 hours post-delivery.[126][127][128][129] These and other similar organizations, such as the

Society for Family Health, always support sourcing and running nutritional programs. The Society for Family Health (SFH) is a foremost nonprofit corporate organization in Nigeria that works to promote the health and well-being of families and communities. SFH has wide operations in Nigeria and, under the sponsorship of many donor partners, has over the years implemented several health programs designed to address many of these challenges. The health areas covered include access to health care services, family planning, HIV/AIDS and other infectious disease prevention, maternal and child health, among others. The SFH also collaborates with other NGOs, government agencies, and private sector agencies toward the attainment of its goals. Through its programs, SFH has contributed tremendously to improving child health and protection in Nigeria. Among other services, they offer healthcare, education, nutrition, and child protection. It also undertakes related advocacy work to influence policies and programs meant to benefit children and families.

Summary: In Nigeria, stakeholders and policymakers are very significant in shaping child healthcare. They hold influential positions in which policies affecting children's health can be formulated, resources allocated, and interventions implemented to bring better health outcomes for children. Key stakeholders and policymakers associated with child healthcare in Nigeria include the following:

It means that both the federal and state governments of Nigeria have a responsibility to make healthcare for children a priority. Policy formulation, budgeting, and implementation of programs are all geared toward enhancing child health status. Government agencies at different levels, like the Ministry of Health and NPHCDA, are very instrumental in coordinating efforts and driving progress.

The international organizations, including the World Health Organization, UNICEF, and the World Bank, work with the Government of Nigeria to support its child healthcare activities. They provide technical assistance, funding, and other resources.

The stakeholders in child health care include healthcare professionals like doctors, nurses, midwives, and others. They play a very important role in the care of children by providing direct services such as prevention, treatment, and follow-up.

Civil society organizations, through NGOs, help champion community-based programs, health care services, and advocacy in child health rights to complement government efforts.

The community and parents are key stakeholders in the area of child healthcare. They offer necessary support, participate in health promotion activities, and play an enabling role in the provision of appropriate care for children.

This calls for effective collaboration in the development of comprehensive policies on child healthcare, ensuring adequate funding, and effective implementation of interventions by all stakeholders involved, including policymakers. Working together, they will be in a better position to enhance access to health, reduce morbidity and mortality among children, and advance the general welfare of children in Nigeria.

The experience of Soviet and Russian scientists and specialists in the prevention of diseases among children and immunization of children, the phased PHC service, the use of methodological tools, which we took into account in the dissertation, is very interesting (Briko N.I., Orel V.I., Grinina O.V., Kontsevaya A.V., Kicha D.I., Schepin O.P., Drapkina O.M. et etc. [144-161].

Research of employees and graduate students of the Department of Public Health, Healthcare and Hygiene of the RUDN University of Foreign Health and PHC, et etc. (Kicha D.I., Fomina A.V., Esu David D., Sidi M. El-Habib Chikhey, Said Adam Sh., Shreideh Ahmad. R. et etc. [164,167, 172, 175, 176], [178-183].

CHAPTER II - RATIONALE FOR BASE, AIM AND OBJECTIVES, MATERIALS AND METHODS REASEARCH

2.1. Base, aims and objectives of the research

The target strategic is to Develops a program and methodology of the target selective social-hygienic researches of child morbidity and mortality, entire project cycle planning and organizational experiment in a data-deficiency. To conduct a comprehensive socio-hygienic analysis of child mortality and morbidity and related factors in a data-deficient environment and develop recommendations to expand child immunization opportunities and improve child health in Nigeria. To characterize the factors and obstacles and develop recommendations for improving immunization and disease prevention among children at the level of families with children, taking into account local obstacles and the opinions of mothers and the expansion of social and hygienic research. Based on the analytical database created in the organizational experiment, to develop an algorithm for expanding the quality and accessibility of child immunization and improving prevention and immunization in children's healthcare.

BACKGROUND OF THE REASERCH AREA

Nigeria is a federal republic located on the western coast of Africa. It gained independence from British rule in 1960 and has a diverse population, with hundreds of languages spoken by its people. The country is Africa's most populous, and its major rivers include the Niger and Benue, while the northern Borno Plains extend to Lake Chad. Its varied geography includes plains, plateaus, hills, and soft sedimentary coastal areas. Nigeria has abundant natural resources, including large deposits of petroleum and natural gas. The government is headed by a president who is elected by the people and serves as the head of state, commander-in-chief of the armed forces, and head of government. The legislature consists of two independent chambers that create laws and approve budgets, while the judicial

branch is led by the Supreme Court, whose justices are appointed by the president. After decades of military control, Nigeria adopted constitutional reforms in 1999 that reinstated a civilian government. It is a country between the Sahel desert in the North and the Atlantic Ocean in the South. With a population of over 225 million people, it is the sixth most populous country in the world and the most populous country in Africa. Nigeria has an almost similar male-to-female ratio with the total number of males at 107.15 and 104.25 females. The sex ratio at birth is 1.06 males to females, then at the ages of 15-24, it is 1.03 males/females and finally, at the prime age of fertility (25-54) years, the sex ratio is equal.

Nigeria is made up of 36 states plus the federal capital city Abuja, situated at the heart of the country. This study was conducted in Oron, Akwa Ibom State, a state located in the southeastern part of Nigeria, bounded by Cross River State, the Bight of Biafra, Rivers State, Abia State, and Ebonyi State. Akwa Ibom state was created in 1987 from the former Cross River State. The state has its capital as Uyo. It has a population of over 5.5 million people and is the fifteenth most populous state of the country. The inhabitants are largely of 3 ethnic groups Ibibio, Anaang and Oron. Akwa Ibom is the highest oil and gas producing state in Nigeria, with two major seaports, an airport, and a 30,000-seater ultra-modern sports complex. The state is also home to various institutions of higher learning and the Ibom E-Library, a world-class information centre. The Oron ethnic group are mostly situated in the Oron local government area of the state, where the study was conducted.

Located near the Atlantic Ocean, it is a coastal community and as such, its economy is entirely marine-based, with much revenue and work emanating from the agricultural and maritime industries. Most people are involved in small-scale farming of food crops such as plantains, oil palm, and cassava, while others are involved in poultry farming and fishery. The middle class and the more educated people are mostly engaged in the civil service in several government offices and

administrative parastatals, especially the Maritime Academy of Nigeria and the General Hospital Iquita.

Medical establishments in Oron, Akwa Ibom State, Nigeria, are indispensable for health reasons within the area. Various medical establishments exist in Oron, which include hospitals, clinics, and pharmacies. Such establishments offer a wide variety of services to the people of Oron and the surrounding communities, including general medical care, emergency services, laboratory services, pharmacy services, and specialist care.

The General Hospital is one of the primary medical establishments in Oron, offering a wide range of medical services to the community. There is a well-equipped laboratory at this hospital, an accident and emergency department, in addition to an array of wards for inpatients. Besides, there is a pharmacy within the hospital premises where drugs were dispensed to patients. Aside from the General Hospital, there is a number of private medical clinics operating in Oron, offering specialized medical care, including dental care, eye care, and maternity care. Such clinics form a part of the healthcare system in Oron, offering specialized care to needy patients.

Pharmacies are also an important part of the healthcare system in Oron. A number of pharmacies around the area provide prescription drugs, over-the-counter medications, and other medical supplies. They are very crucial in ensuring that patients get the medicines they need to manage their conditions effectively. A number of community health centres operate in Oron to offer health care services to those who cannot afford medical treatment.

These health facilities, operated by non-governmental organizations, have many services such as family planning, maternal and child health, and HIV/AIDS counseling and testing. They also provide health education to the community and help them to make knowledgeable decisions about their life and health.

The Nigeria Demographic and Health Survey (NDHS) -2018): This was done

using the latest Nigeria Demographic and Health Survey (NDHS) in 2018. This survey collected data on various health indicators in the country. This survey provides information on fertility levels, family planning, maternal and child health, nutrition, and other health-related topics.

The 2018 Nigeria Demographic and Health Survey (NDHS) utilized a rigorous methodology to ensure the accuracy and reliability of the collected data. The questionnaires covered a wide range of topics, including demographic characteristics, reproductive health, family planning, maternal and child health, nutrition, and HIV/AIDS knowledge. These questionnaires were carefully designed to gather comprehensive and accurate data. To assess the nutritional status of children and women, height and weight measurements were taken. These measurements were conducted following standardized procedures to ensure accuracy and comparability.

2.2. Research design, methodology and object

The target object population for this study was women between the ages of 15 to 49 years who had kids under the age of 5 and lived in the Oron local government area.

The population of the study consisted of 100 randomly selected women who were willing to sit, listen, and fill in a structured questionnaire. The sample population excluded those above the age considered who had no kids or whose kids were above the age of 5 at the time of administering the questionnaire.

This was a community-based study undertaken for a period of 4 months (June 2021 – October 2021). The data was collected by the researcher and 8 assistants, a GP, two midwives, and five nurses after undergoing training. A week of training, two hours daily was carried out to aid health personnel in administering the questionnaire and this was held at St Patrick's Clinic and maternity Oron, Nigeria. The personnel were trained on how to create a good first impression, make the survey more interesting, encourage the respondents to answer for themselves, break

down more difficult questions (prompting), and especially avoid words or utterances that could influence the choices of the respondents.

The questionnaire used for this study was designed using elements from the Multiple Indicator Cluster Survey (MICS) and Demographic Health Survey (DHS) 2020-2021. The focused elements listed in the designed questionnaire are those used in assessing the situation of women and children, assessing the progress of programs related to various areas of family health, and also providing monitoring data for health goals established after the Millennium development goal.

For this survey, a block of questionnaire questions was used: "due to the lack of information, four block questions were used in the questionnaire: questions about households, individual questions personally to a female mother, special questions from the perspective of mothers with children under the age of five, and a group of questions about the family as a whole and the burden of disease; for evidence-based results groups of mothers' experience and control were formed, as well as surveys of medical professionals." The household questionnaire was used to collect information about household characteristics, which included: the number of household members, the availability of electricity, the availability and exposure to media, and the monthly household income. It also included questions about the number of sleeping rooms, the availability of first aid kits, private sanitary facilities, the source of water supply, and the challenges faced in accessing medical care.

An individual questionnaire for female mothers was distributed to women aged 15-49 years and who had a child under the age of five when visiting a primary health care facility. A set of questionnaire questions about maternal characteristics related to the current age, age at marriage and at first birth, the number of prenatal visits and protection from tetanus, postpartum care and the unmet need for family planning. Other aspects studied included the level of education and employment, property ownership, marital status, previous interval between births, the number of

lost children under the age of five, and the age of the child at the time of death.

The block questions in the questionnaire for a mother on the characteristics of her children under the age of five, which was conducted among mothers or guardians of children under the age of five living in selected households, included questions about age, vaccination status, birth registration, preschool attendance and the availability of children's books at home. Other questions asked included the child's body mass index (BMI), the children's injuries at home in the last 6 months.

The block questions of the questionnaire dealt with the most common childhood diseases and related factors. These were questions about malaria, HIV/AIDS transmission, malnutrition, pneumonia and respiratory tract infections, and finally diarrhea and common infectious diseases.

For malaria, I asked questions on ownership of insecticide-treated nets (ITN), fever in the child within 2 weeks of the survey, use of indoor residual spray (IRS) and taking of anti-malarial drugs over the past 6-month period.

Prompts related to HIV/AIDS included knowledge of HIV status, ways of HIV transmission and prevention, knowledge of where to do an HIV test and knowledge of mother-to-child transmission.

For nutritional deficiencies, questions were asked related to the practice of infant breastfeeding, consumption of iron-rich food, consumption of food containing vitamin A or the use of supplements and the use of iodized salt for meal preparation.

Questions asked relating to pneumonia and respiratory tract infection included family use of solid fuel for cooking, respiratory infection in the child over the previous year, difficulty with breathing, and family history of asthma. Other questions included a history of asthma in the child, previous hospitalization for respiratory infection of any household member and if there was any smoker in the household.

For diarrhea and common infectious diseases, questions posed included the

household source of drinking water, water treatment method employed, type of toilet facility and the availability of a place for hand washing. Treatment of diarrhea two weeks before being surveyed, and a question on previous use of oral rehydration solution.

Fundamental methodological techniques of social-hygienic researches in the absence of available PHC data information, taking into account the unsatisfactory development of statistical tools (Tab. 1). The methodologic chapter outlines the rationale for the study, its goals and objectives, bases and facilities, methods, taking into account the experience of the Department of Public Health, Public Health and Hygiene of the RUDN University Medical Institute for Integrated Medical and Social research of the families (Kicha D.I., 1991-2009).

To create an analytical database in the experiment, structural and substantive components of the program were developed to develop directions for expanded immunization and prevention of morbidity and mortality of children in real areas, taking into account the unsatisfactory development of statistical tools, and the following development steps were required:

THE first STEP. Identification and selection of rural communal medical centers for the organization of primary health care in the Oron municipal district as the subject and base of the target level of immunoprophylaxis research in the absence of sufficient sadistic tools to develop an adequate evidence-based solution. By the method of directed sampling, three healthcare bases were identified that participate in the framework of the state program for the prevention of mother-to-child transmission of infection in the Oron region, Akwa Ibom State (about 4 million Nigeria : The medical centers of the three communes of Esin Ufot, Uya Oro and Eyo Abasi, were selected in homogeneous typological compact zones.

The second STEP. Formation of sample populations among mothers with children and healthcare workers (medical workers of secondary and medical personnel) to launch an organizational experiment on the formation of a factor

database for the expansion of immunization and prevention of morbidity and mortality of children. The methods of selective experimental research and evaluation of the quality of voluntary consulting services and testing were used.

Tabl. 1 - The Fundamental methodological techniques of social hygienic researches in the absence of available of health PHC data information

Develops a program of complex social hygienic researches of child morbidity and mortality, organizational experiment in conditions of deficiency of statistical accounting data.	<i>Methodological techniques in the absence of available health data</i>	<i>Promote analytical data collection and processing</i>
State infrastructure of primary health care and practice of training health personnel in the field of disease prevention evaluate, improving the immunization of children according to the opinions and attitudes of mothers in the experiment	Enabled, selective, socket, directional, pilot, target, survey, selection and sampling	Observation, registration, consultation, questionnaire, official, statistics
Analyze and identify key social hygienic, social-economic and maternal factors as a variable in child morbidity and mortality in Nigeria, to identify priority family's surveillance.	Enabled, selective, socket, directional, pilot, survey, selection and sampling	Observation, registration, consultation, questionnaire, statistics
Assessment of voluntary counseling and testing results of children services for providing immunization according health conditions and family planning and mothers and medical staff opinions.	Enabled, selective, socket, directional, pilot, survey, selection and sampling	Observation, registration, consultation, questionnaire, statistics
Based on the experience model of social-hygienic research at the level of families with children, taking into account local obstacles and the opinions of mothers, to develop recommendations for improving immunization and disease prevention among children.	Pilot, analytical, logic, content, visits, assessing, evaluation, indices calculation, concludes	establishing patterns, evidence, conclusions, practice, grouping, algorithms, comparison, conceptualization
On the base of the analytical database created in the organizational experiment, to develop an algorithm of quality and expanding the accessibility of child immunization and children's health prevention of tropical zone African countries.	Pilot, analytical, logic, content, visits, indices calculation, concludes	establishing patterns, evidence, conclusions, practice, grouping, algorithms, comparison

The study subjects were women aged 15 to 49 years old in two groups who had children under the age of 5 (n=216 women after testing), about their opinions on the quality of services for voluntary counseling by medical professionals on the transmission of HIV\AIDS from mother to child. Medical consultants (n=18) - public health workers who have received special training, and study participants who have been instructed on the specifics of collecting questionnaires (n=8).

To obtain opinions on the quality of immunization at the pre- and post-intervention stages, two groups of mothers with children were formed by random sampling among women who applied to the centers: at Iquita General Hospital (Oron) (experimental group = 150 respondents) and at St. Patrick's Clinic (Oron) (control group = 150 respondents) (no significant difference in the results has been determined) (Kruskala-Wallis-H, t, p).

In a random sample (n=100), the values of the standard deviation (mean SD) at the tertiary, secondary, and zero levels of education were determined to estimate the intervals between births and "Lost children under 5 years of age."

2.3. Variables and Statistical analysis of the Nigeria health survey

Based on the analytical database created in the experimental survey of a group of families with children, differentiation and allocation of priority families for targeted social and hygienic impact (selected framework object) were carried out.

This was a community-based study conducted for more than three years, including 5 months of organizational experiment (June, 2021 - October, 2021). The data were collected by a researcher and 8 assistants, a general practitioner, two midwives and five nurses after they had been instructed and trained. A week of training was conducted for two hours a day to assist the medical staff in conducting the survey, which was conducted at the clinic and maternity hospital of St. Patrick's in Oron, Nigeria. The staff was trained on how to make a good first impression, make the survey more interesting, encourage respondents to answer on their own,

sort out more complex questions (prompts), and especially avoid words or statements that could influence the respondents' choice.

In the course of the analysis, the following evidence and practices should be emphasized for future methodologies research on the creation of analytical decision bases:

1. The study was conducted on a nest-based, well-founded sample of experimental and control groups. The data was collected only from those female mothers who were contacted and who agreed to participate.
2. It was not calculated what percentage of women who had criteria for participation in the study agreed to participate in the study, and it was not assessed how much the totality of participating women differed from those who decided not to participate.
3. Since the questionnaire was submitted in a medical institution, there was a tendency for consultants to be biased towards the result, which is a frequent occurrence, which is why there was author control at all stages.
4. Since there was no reward for mothers answering the questionnaire, the author provided incentives and motivations so as not to lead to a decrease in the number of responses.

The block questionnaire for this study was developed using elements from the Multi-Indicator Cluster Survey (MICS) and the Demographic and Health Survey (DHS) 2020-2021 (<https://dhsprogram.com/methodology/survey-Types/dHs.cfm#>:). The main blocks of questions in the developed questionnaire are aimed at assessing the situation of women mothers and children, assessing the progress of programs related to various areas of family health, as well as providing monitoring data for the health goals established on the basis of the Millennium Development Goals.

For this survey, a block of questionnaire questions was used: "due to data-deficiency, four block questions were used in the questionnaire: questions about

households, individual questions personally to a female mother, special questions from the perspective of mothers with children under the age of five, and a group of questions about the family as a whole and the burden of disease; for evidence-based results groups of mothers' experience and control were formed, as well as surveys of medical professionals." The household questionnaire was used to collect information about household characteristics, which included: the number of household members, the availability of electricity, the availability and exposure to media, and the monthly household income. It also included questions about the number of sleeping rooms, the availability of first aid kits, private sanitary facilities, the source of water supply, and the challenges faced in accessing medical care.

An individual questionnaire for female mothers was distributed to women aged 15-49 years and who had a child under the age of five when visiting a primary health care facility. A set of questionnaire questions about maternal characteristics related to the current age, age at marriage and at first birth, the number of prenatal visits and protection from tetanus, postpartum care and the unmet need for family planning. Other aspects studied included the level of education and employment, property ownership, marital status, previous interval between births, the number of lost children under the age of five, and the age of the child at the time of death.

The block-questions in the questionnaire for a mother on the characteristics of her children under the age of five, which was conducted among mothers or guardians of children under the age of five living in selected households, included questions about age, vaccination status, birth registration, preschool attendance and the availability of children's books at home. Other questions asked included the child's body mass index (BMI), the children's injuries at home in the last 6 months.

The block-questions of the questionnaire dealt with the most common childhood diseases and related factors. These were questions about malaria, HIV/AIDS transmission, malnutrition, pneumonia and respiratory tract infections, and finally diarrhea and common infectious diseases.

THE LIMITATIONS OF THE STUDY:

1. This study was performed on a convenience sample. Data were collected only from those women who were approached and agreed to participate.
2. We did not calculate what percentage of women approached agreed to participate in the study or evaluate how the participating women may differ from those who chose not to participate.
3. Since the questionnaire was presented in a medical setting there was a tendency for bias. Self-serving bias and reporting bias were probably prevalent.
4. As there was no reward or incentive for answering the questionnaire, it might have reduced the response rate.

And the following development advance were required:

The first advance: identification and selection of rural communal medical centers for the organization of primary health care in the Oron, Nigeria, middle income country, municipal district as the subject and base of the target level of immunoprophylaxis research in the insufficient statistic tools to develop an adequate evidence-based solution. By the method of directed sampling, three healthcare bases were identified that participate in the framework of the state program for the prevention of mother-to-child transmission of infection in the Oron region, Akwa Ibom State (about 4 million Nigeria : The medical centers of the three communes of Esin Ufot, Uya Oro and Eyo Abasi, were selected in homogeneous typological compact zones.

The second advance: formation of sample populations among mothers with children and healthcare workers (medical workers of secondary and medical personnel) to launch an organizational experiment on the formation of a factor database for the expansion of immunization and prevention of morbidity and mortality of children. The methods of selective experimental research and evaluation of the quality of voluntary consulting services and testing were used. The study subjects were women aged 15 to 49 years old in two groups who had

children under the age of 5 in health facilities participating in the State Program for the Prevention of Mother-to-Child Transmission of HIV/AIDS in at Oron Akwa Ibom State were identified by targeted sampling: Esin Ufot, Uya Oro and Eyo Abasi Health Centers. The research method is sociological, using two questionnaires developed: one for female- mothers after testing) (n=216) and the other for medical consultants about their opinions on the quality of services for voluntary counseling by medical professionals on the transmission of HIV/AIDS from mother to child. Medical consultants (n=18) - public health workers who have received special training, and study participants who have been instructed on the specifics of collecting questionnaires (n=8).

To obtain opinions on the quality of immunization at the pre- and post-intervention stages of children, two groups of mothers with children were formed by random sampling among women who applied to the centers: at Iquita General Hospital (Oron) (experimental group = 150 respondents) and at St. Patrick's Clinic (Oron) (control group = 150 respondents) (no significant difference in the results has been determined (Kruskala-Wallis-H, t, p)).

In a random sample (n=100), the values of the standard deviation (mean SD) at the tertiary, secondary, and zero levels of education were determined to estimate the intervals between births and "Lost children under 5 years of age."

Secondary analysis: Variables Analysis : Similar to the primary survey the total characteristics of participants were analyzed before more analysis of the survey data. Characteristics focused on were the child's age, the mother's age, religion, wealth index, mother's education, number of antenatal visits, weight of the child and infant mortality rates.

Studying the risk factors for child mortality and morbidity, the exposure was each of the variables above while the outcome was child mortality, knowledge and influencing factors. The association between each variable and child mortality was analyzed using descriptive, explanatory, and predictive models while adjusting for

mothers' education level, demographic variables and socioeconomic variables. Also considering the number of variables being studied and that result might be significant just by chance, a multiple comparison analysis was also applied. Statistical analysis and data management were done using the pvalue.io software and significance was established with a p-value less than 0.05.

The candidate predictor variables were included in a Least Absolute Shrinkage and Selection Operation (LASSO) penalized regression model. The penalty coefficient (λ) was chosen to provide an estimation error lower than one standard deviation of the minimum error obtained by 10-fold cross-validation while being as parsimonious as possible. No variable had a coefficient different from 0 with this λ coefficient. Model performance (AUC) was calculated from a bootstrap resampling (100 iterations). using the same procedures for variable selection and calculation of logistic regression coefficients. We then carried out the procedure for correcting over-optimism in performance measurement and performed coefficient shrinkage to improve prediction on external data.

CHAPTER III - ANALITICAL RESULTS TO STATE INFRASTRUCTURE OF PHC AND TRAINING HEALTH PERSONNEL

The Oron community has over 25 medical establishments consisting of state-owned, local government, and private health institutions. Unfortunately, there is no Federal health facility yet to be established in the region. Although the State Primary Health Care Development Agency (SPHCDA) was established by the governor, the board is yet to be formed hence the Local Government Service Commission (LGSC) and the state Ministry of Health are still in charge of healthcare protection. Also, the state health insurance scheme has been assented to by the government but is yet to be implemented.

The results of research on the structure and organization of primary health care have been obtained, the discussion of which is presented using figures (Fig. 1) The structure of primary health care in the region at the level of districts and rural communes is extremely diverse and so far it is a "non-system", i.e. disordered representation of various medical organizations and centers, understaffed with medical personnel, equipment and unsatisfactory sanitary facilities.

Akwa Ibom State currently operates 425 public primary health care facilities across its three senatorial districts: Uyo, Ikot Ekpene, and Eket. The Eket senatorial district hosts 152 PHCs. Oron LGA, as one of the Local Government Areas in the Eket senatorial district, has a mix of primary health centers and a few secondary facilities, with tertiary care available in larger urban centers such as Eket or Uyo. This pyramid chart further depicts the level of care provided and some information about staffing and amenities, corresponding chair evaluation¹⁴.

PHC workers include community health workers, nurses, community health

¹⁴ O.V. Grinina, O.E. Gorlova, A.I. Gurova, D.I. Kicha et al. Social hygiene problem and public health of developing countries. M. 1990. RUDN. Uch. Manual. Ed. Grinina O.V. M. 1990. 124p.

extension workers, and volunteers. A 2020 study in Akwa Ibom reported that the number of full-time core health workers was 276 across 18 PHCs, with 17.4%

Pyramid of Health Facilities in Oron, Akwa Ibom: Staffing and Amenities

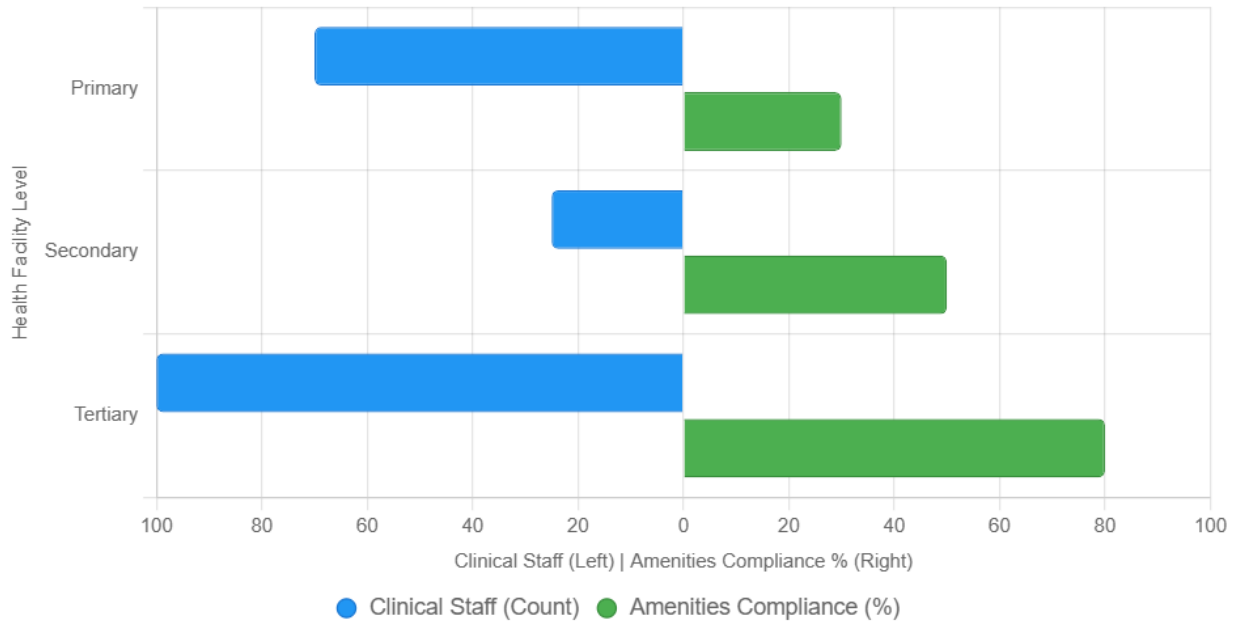


Figure 1 - Pyramid of Health Facility in Oron, Akwa Ibom: Staffing and Amenities (O.V. Grinina, O.E. Gorlova, A.I. Gurova, D.I. Kicha et al. Social hygiene problem and public health of developing countries. M. 1990. RUDN. Uch. Manual. Ed. Grinina O.V. M. 1990. 124p.)

described as volunteers. Eket zone had the least, 47, representing 17% of all workers. Similarly, in Oron, health personnel shortages are likely to be similar; however, most facilities heavily depend on CHEWs and volunteers, while some health facilities may not have pharmacy or laboratory technicians. Infrastructure is usually significantly poor; there are inadequate sources of active water, electricity, or proper waste disposal. Most challenges include a lack of unavailable diagnostic equipment, such as screening for the HBV virus, and poor management of waste.

Secondary Health Care facilities have a greater number of doctors, nurses, and specialists. However, many specialists prefer to go into private practice, and so public secondary facilities are often understaffed compared to private facilities. These facilities are better equipped than PHCs but still have many problems, including a precarious supply of water and insufficient security systems.

Tertiary Health Care includes highly trained doctors, specialists, and support staff, mainly in urban areas. The facilities include highly developed equipment and better infrastructural capacities, but access remains limited for the rural Oron people because of geographic and logistics barriers.

The Chief Physician of the Akwa Ibom District Hospital and his deputies manage 425 public primary health care (PHC) institutions in their three senatorial districts - Uyo, Ikot-Ekpene and Eket, with 152 PHC institutions located in the Eket District as a local government area. There are several primary health care (PHC) centers in Oron, a limited number of secondary facilities (such as general hospitals), and access to tertiary care in nearby urban centers such as Eket or Uyo. The pyramid diagram illustrates this multi-level structure by providing data on staffing and facilities for each level.

The PHC administration employs local Health Workers (CHW), nurses, Community Health Extension Workers (CHEW), and volunteers. A study from 2020-24 in the state of Akwa Ibom showed that there are 276 full-time primary health workers in 18 PHC organizations, and 17.4% of them were volunteers. The Eket area had the fewest number of medical workers (47, representing 17% of the total). PHC Oron, experiencing a comparable shortage of staff, relies heavily on CHEW and volunteers, and some institutions do not have a pharmacist or laboratory assistant. Infrastructure is often inadequate, with a lack of water, electricity, and proper waste disposal systems. Problems include the lack of diagnostic tools (for example, for HBV screening) and inefficient disposal of medical waste.

Nurses and other specialists work in medium-level medical institutions, including doctors if available, but in public institutions of secondary medical care the number of staff is often lower than the norm compared to their private counterparts, as many employees prefer private practice. They are better equipped than PHC, but still face problems such as unreliable water supply and inadequate

security measures.

Comparative indicators of special child mortality rates from National data and own research data as a predictor of child survival in infancy and early childhood are shown in Table 2.

Table 2: Comparative indicators of special child mortality rates from National data and own research data as a predictor of child survival in infancy and early childhood.

Subject	UNDER-5 MORTALITY RATE	NEONATAL MORTALITY RATE	CHILD MORTALITY RATE	INFANT MORTALITY RATE
NATIONAL VALUE	12%	3.9%	1.1%	7%
RECORDED VALUE	28%	5%	15%	8%

State infrastructure of primary health care facilities and practice of training health personnel in the field of disease prevention evaluate, improving the immunization of children according to the opinions and attitudes of mothers in the experiment.

Some achievements can be noted in the implementation of the Global Vaccine Action Plan towards the realization of the Decade of Vaccines vision as Nigeria is among the 194 member states of the World Health Assembly that recognizes the Global Vaccination Action Plan (GVAP) of May 2012. The World Health Organization reports that Nigeria has increased vaccination coverage for some diseases like measles and yellow fever, although it still lies below the GVAP targets for other diseases like polio. Through a combination of improved surveillance, community engagement, and vaccination campaigns, Nigeria has been able to reduce cases of polio. However, challenges persist with vaccine hesitancy, inadequate funding, and weak health systems.

Domestic accidents are a leading cause of under-5 mortality in Nigeria and

sub-Saharan Africa. Children in these regions are at a higher risk due to poor housing conditions and lack of adult supervision. Domestic accidents are events that could occur anytime within the home, but these are largely preventable, and their occurrence minimized. These are preventable through improved housing conditions and increasing awareness and education on safety practices. Parents must be watchful of their children to avoid accidents. Health care providers should sensitize parents on the dangers of domestic accidents and ways of preventing them. The most common causes of such injuries include falls, drowning, road accidents, burns, and poisoning.

The focus settings for medical personnel working with families with children have been identified:

The focus settings for medical personnel working with families with children have been identified: a)–targeted sanitary and hygienic and anti-epidemic counseling; b) development and monitoring of the implementation of the extended immunization program for children; c)–organization and control of the disposal of liquid and solid household waste; d)–organization and implementation of sanitary and educational work in rural communes; e)–establishing a format of communication with families in conditions of unsatisfactory energy supply, epidemic situations and natural disasters; f)–family planning counseling; g)–home care for pregnant women.

Insert 1 : The selected object -The focus settings for medical personnel working with families with children have been identified.

Assessment of Communities' knowledge, attitudes and practices about child health protection next : Understanding the knowledge, attitudes, and practices of the community regarding child health protection is crucial for improving child well-being and reducing child mortality rates. Here are some key points I considered:

1. Knowledge: Assessing the knowledge about preventive measures for common childhood illnesses, such as vaccination, proper nutrition, hygiene practices, and

access to healthcare services.

2. Attitudes: barriers or facilitators to optimal child health practices. Cultural beliefs, perceptions of illness, and trust in healthcare providers, adhering to treatment regimens, and adopting preventive measures.

3. Practices: actual practices within the communities related to child health protection. This includes practices such as breastfeeding, appropriate complementary feeding, hygiene practices, use of mosquito nets, and adherence to immunization schedules.

Data on knowledge, attitudes, and practices produced a few significant results.

Univariable analysis - Nearness to a health facility as a predictor of under-5 morbidity.

As the Conditions for applying the Chi-square test were not met (at least one of the cells in the contingency table has too few theoretical observations), an exact Fisher test was performed. Fisher's exact test is a statistical test used to determine if there are nonrandom associations between two categorical variables. In the context of examining the relationship between child respiratory infection and nearness to a health facility, obtaining a p-value of less than 0.01 from the Fisher's test indicates a statistically significant relationship between these variables. The significant relationship suggests that the nearness to a health facility is associated with the incidence of child respiratory infection. Specifically, it implies that the proximity to a health facility may influence the prevalence of respiratory infections among children.

The distribution of Child Respiratory infections in the previous year is significantly different depending on Nearness to a health facility ($p = <0.01$).

On this fact condition very important factors Hygienics obstacle of child's health development in tropical and low / middle income country.

Table 3 - Univariable analysis showing relationship between nearness to a health facility as a factor in child respiratory infection

Subject		nearness to a health facility average (n = 51)	nearness to health facility far (n = 30)	nearness to a health facility close (n = 19)	n	p	test
respiratory infection in previous year, n	no	49 (96%)	25 (83%)	12 (63%)	86	<0.01	fisher
N	yes	2 (3.9%)	5 (17%)	7 (37%)	14	-	-

The fact that 90% of respondents used iodized salt for cooking is quite significant and compares well with the result from the MICS5 study of Nigerian households, which reported a usage rate of 91%. A finding that 90% of respondents use iodized salt for cooking implies high utilization of iodized salt in the population sampled. This is good practice, as iodized salt is a very affordable and widely accessible way to protect against iodine deficiency disorders such as goiter, cretinism, and intellectual disability. This similarity between findings from the current study and findings from the MICS5 study of Nigerian households, where a 91% utilization rate of iodized salt was recorded, indicates consistency in the rate of use of iodized salt over time and across populations in Nigeria. This will clearly indicate sustained efforts in promoting the use of iodized salt and its availability to households.

The high level of utilization of iodized salt indicates the success of the public health interventions promoting iodine fortification of salt. Iodine remains an important modulator of thyroid function and proper cognitive development, especially among pregnant women and young children. When the population consumes adequate levels of iodine through iodized salt, the negative impact of iodine deficiency is mitigated, which has long-term consequences on both physical

and cognitive health. Based on this premise, there should be continued monitoring and evaluation of iodized salt utilization to further assess the effectiveness of iodine fortification programs and establish any areas that need additional attention. Periodic surveys, like the MICS5 study, prove to be valuable in tracking progress and developing policy decisions on iodine fortification and public health interventions.

Iodine deficiency disorder is the single most significant cause of preventable mental retardation and impaired psychomotor development in young children worldwide. Iodine deficiency disorders are a significant threat to the health of under-5 children in Nigeria. Low dietary intakes of iodine cause IDD, which may lead to serious health problems, such as stunted growth, thyroid deficiency, and impaired neurocognitive development. These conditions increase the rates of mortality for under-5-year-old children, which are presently at alarming rates within Nigeria. The national under-five mortality rate in 2019 was 117 deaths per 1,000 live births. However, universal salt iodization was recommended to be the main strategy for eliminating IDD. While the African Region has made steady progress since the 1990s in controlling IDD, specific challenges towards elimination persist, particularly regarding long-term salt iodization programs that provide iodized salt to all target communities. Nigeria should, therefore, be very keen on the implementation of the USI programs as a means of preventing IDD and reducing the high burden of disease among children under 5 years.

The skew towards the "Sometimes" category in the distribution of respondents' consumption habits of vitamin-A-rich foods such as carrots, spinach, sweet red pepper, or its supplement suggests several potential insights and implications. The prevalence of "Sometimes" consumption indicates variability in respondents' dietary habits regarding vitamin-A-rich foods. This variability may stem from factors such as availability, accessibility, affordability, taste preferences, cultural norms, and knowledge about the importance of consuming these foods for

adequate vitamin A intake. The predominance of "Sometimes" consumption suggests that there may be opportunities to enhance nutritional awareness and education regarding the benefits of vitamin-A-rich foods. Many individuals may be aware of these foods but may not prioritize their consumption consistently in their diets. Efforts to increase knowledge about the importance of vitamin A for eye health, immune function, and overall well-being could encourage more regular consumption of these foods. Various barriers may prevent individuals from consuming vitamin-A-rich foods on a regular basis. These barriers could include limited access to fresh produce, affordability constraints, lack of time for meal preparation, taste preferences, and competing dietary preferences within households. Addressing these barriers may require multifaceted approaches, such as promoting local production and availability of vitamin-A-rich foods, providing nutrition education, and cooking demonstrations, and addressing socioeconomic inequalities. The inclusion of vitamin-A-rich supplements in the survey reflects an alternative source of vitamin A intake for individuals who may not consume enough through dietary sources alone. However, the distribution of responses regarding supplement consumption is also important to consider. Understanding patterns of supplement usage can inform strategies to improve access to and utilization of vitamin-A-rich supplements, particularly among populations at risk of vitamin A deficiency, such as pregnant women and young children.

The consumption pattern indicates that public health interventions should focus more on promoting the habit of consuming vitamin-A-rich food regularly. These include nutrition education campaigns, programs for fortification of food with vitamins, agricultural development policies to ensure access to a variety of more nutritious foods, and policy support for an enabling environment for healthy eating. This calls for continued monitoring and evaluation of consumption and dietary behavior over time to assess their effectiveness and possible changes in behavior. Surveys and assessments, such as dietary recall surveys and household

food consumption surveys, provide data on patterns of diets and nutritional status to inform evidence-based interventions and policy decisions.

Proper infant feeding is essential for the survival and good health of infants in Nigeria. Undernutrition accounts for 45% of all deaths among children, and therefore, optimum breastfeeding is very significant in child survival and healthy growth. The World Health Organization (WHO) and UNICEF advise EBF for the first six months as it protects an infant from infections and also reduces mortality rates. However, EBF rates are still poor in Nigeria, influenced by factors such as maternal education, socioeconomic class, and the kind of first feed given to an infant. Programs that have been initiated, such as the Baby Friendly Hospital Initiative, are meant to educate and consequently encourage breastfeeding practice among mothers. However, much more has to be done to enhance the feeding behavior. At about six months, an infant's requirements for energy and nutrients exceed the provisions in breast milk, and therefore, he needs complementary foods. Consequently, proper feeding is vital for optimum infant nutrition and invaluable in reducing disease conditions, hence mortality rates, in Nigeria. With support, education, and awareness, improved feeding behavior can positively impact mortality rates and contribute to the health and well-being of infants in Nigeria.

Household factors as a variable in child morbidity and mortality

From the questions related to households, we see that more than two-thirds of respondents live in households of over 4 occupants. The number of sleeping rooms in comparison to the number of household occupants portrays the level of overcrowding [130], thus increasing the risk of contracting a communicable disease. From the responses gathered, more than 15% have less than two sleeping rooms.

Two-thirds of respondents have less than 6 hours of electricity or no electricity, while over 80% have less than 12 hours of electricity daily. This is far less than the national average of 54% [131].

From the responses collated, 95 % of respondents sometimes or regularly use social media while more than half of households had a form of mass media.

From our data, three in one household could boast of owning agricultural land or animals. Also, from the question regarding the ownership of personal illness control measures/first aid kits, these were available in 74 % of households and unavailable in 26% of households.

As for respondents' description of religious views, 40% described their households as very religious, 54 % indicated being moderately religious, 3% were of no religious view and 3% rather not answer the question. Also, over 80% of respondents had a private sanitary facility in their households.

The distance to the nearest health facility is of significance. Just less than 20% percent of respondents admitted to living close to any health facility. 51 % reported living an average distance to the health facility while 30% described the distance to their nearest health center as being too far. This is significant as it has been noted that greater distance to health facilities is linked to higher mortality, lower healthcare utilization, an increase in home birth and a decrease in at least three antenatal visits [132]. Fig. 2).

Also, the prompt on problems with assessing healthcare produced a significant result as 80% of respondents had either some, most or all problems with access to healthcare. Four major problems with healthcare were posed, and these included getting money for treatment, distance from the health facility, unwillingness to go for treatment alone, and getting permission to go for treatment. 8% of respondents had all of the challenges, 17% had most of the issues, 55% answered as having some of the issues and 20% had none of the issues. This is significant because difficulty in access to healthcare leads to high maternal mortality and pregnancy-related complications [133].

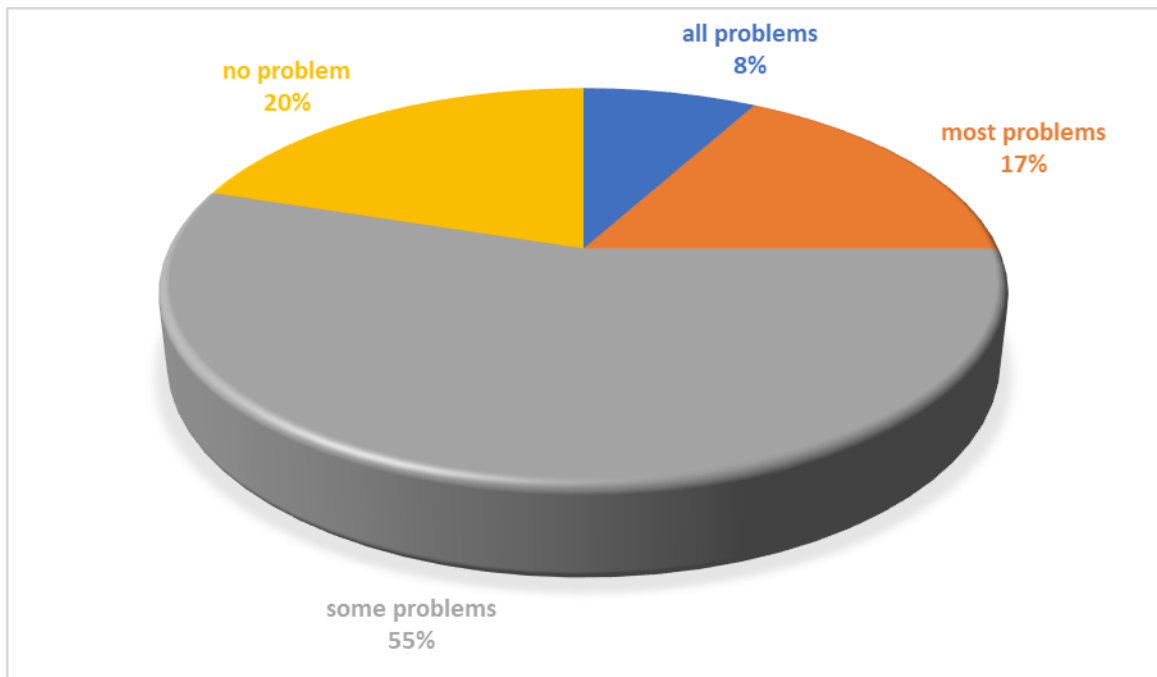


Figure 2 - Problems with accessing healthcare (getting money for treatment, distance from the health facility, not wanting to go alone, getting permission to go for treatment)

It improves education, productivity, efficiency, job creation, healthcare, reduces isolation and marginalization, ensures safety, and decreases spending on fossil fuel in a rural community. A lack of access to electricity, in turn, will result in market failures and shortcomings within the availability of community services. Many studies have demonstrated that access to electricity would bring about various poverty, health, and socio-economic improvements in developing countries. Electricity is a very important element of living in a rural community as it not only serves to power farm machinery, but it ensures good cooking and storage of food, internet connectivity, and an efficient means of regulating temperatures.

There are several effects and implications of availability and use of household durable goods. Availability of household durable goods, such as appliances, has been associated with improved child health. Adoption of household technology through a policy-induced program improved child health by improving parental care and increasing nutrition. Similarly, households with more valuable housing

assets and consumer durables pay greater attention to their children's education, thus positively affecting the educational attainments, health, and self-efficacy of children. The availability of household durable goods decreases the time children need to spend doing housework, allowing opportunities for human capital investment by means of schooling or other activities. Generally, availability of household durable goods may ensure better health and well-being among children and the family.

Another aspect of the financial situation of the family is ownership of assets. Among household assets are: property, investments, and personal property-all valuable resources contributing to the financial welfare of a family. Ownership could provide both direct and indirect income, limiting the variability of income and increasing the net worth of households. Household net worth is a significant variable in economic well-being since it may support additional sources of income during hard times. Ownership of a refrigerator could prolong the wholeness of family meals; the availability of a transport means can increase access to many services which are beyond walking distance.

CHAPTER 4 - SEARCH RESULTS OF EXAMINATION AND IDENTIFY KEY MEDICAL SOCIAL HYGIENIC, ECONOMIC FACTORS AS A VARIABLE IN CHILD MORBIDITY AND MORTALITY IN NIGERIA

Key medical social hygienic factors which influence under-5 morbidity for decision making. Analyze and identify key social-hygienic, social-economic and maternal factors as a variable in child morbidity and mortality in Nigeria. On this base to identify priority groups of family's surveillance and focus settings for medical personnel has been implemented : nutrition, mother's age, education level, previous birth interval, ANC visits and employment status.

Nutritional Deficiencies for tropical zone its hay risk. Breastfeeding for the first few years of life protects children from infection, provides an ideal source of nutrients and is economical and safe. Therefore, recording a breastfeeding rate of over 70% is significant and corresponds with other studies done in Nigeria [140]. This is also significant as other studies show a correlation between mothers' level of education, household wealth and economic situation to the breastfeeding practices of mothers [141].

Iodine deficiency could cause stillbirth and miscarriage in pregnant women. 90% of respondents used iodized salt for cooking which is comparable to the 91% result from the MICS5 study of Nigerian households. When quizzed on the consumption of iron-rich food such as beans, seafood, potatoes or iron-rich supplements, 70% admitted to always consuming such food, 20% often ate these meals, and 30% sometimes ate food rich in iron.

As for consumption of vitamin-A-rich food such as carrot, spinach, sweet red pepper or its supplements, while only 31% of respondents always consumed such foodstuffs, 24% often ate them, 43% sometimes and 2% of respondents never used these food products. Since the total number of respondents is 100, we can calculate

the number of respondents in each category based on the given percentages.

- Always: 31% of 100 = 31 respondents
- Often: 24% of 100 = 24 respondents
- Sometimes: 43% of 100 = 43 respondents
- Never: 2% of 100 = 2 respondents
- We can calculate measures of central tendency
- Mean: $(31 + 24 + 43 + 2) / 100 = (31 + 48 + 129 + 8) / 100 = 216 / 100 = 2.16$
- Median: Since the percentages are not evenly distributed, the median might not be a whole number.
- Mode: The consumption category "Sometimes" has the highest frequency, so the mode is 3 (Sometimes).

Therefore, the distribution of respondents' consumption habits of vitamin-A-rich foods is skewed towards the "Sometimes" category. The mean consumption habit is approximately 2.16, and the mode is "Sometimes." Overall, the majority of respondents reported consuming these foodstuffs "Sometimes," indicating a potential area for targeted interventions to promote more consistent consumption of vitamin-A-rich foods.

This is significant as vitamin A helps to boost immunity and protect under-five children from preventable diseases and the recommended daily use of vitamin A is between 300-500 RAE.

From the primary data, I recorded 28 deaths under the age of five years and a total live births of 227, therefore a child mortality rate of 123 per 1000 live births or 12.3%. Results from the primary data were quite similar when compared to the results collated from the secondary data which showed a child mortality rate of 132 deaths per 1000 or 13.2%. Disparities existed as seen from the results of the mother's age, education level, previous birth interval, ANC visits and employment

status.

Mothers employment as a variable in under-5 mortality. We carried out a predictive analysis, with the outcome variable as employed and the predictor variable as under-5 children lost. Carrying out a predictive analysis with the outcome variable "employed" and the predictor variable "under-5 children lost" aimed to explore the relationship between the number of children lost before the age of 5 and the likelihood of being employed. This analysis could offer valuable insights into social and economic dynamics, the predictive analysis could provide valuable insights into the intersection of family dynamics, individual well-being, and employment. Exploring the relationship between the loss of under-5 children and employment status can offer a deeper understanding of the social and economic implications of such experiences, with implications for societal dynamics.

The predictive analysis relied on logistic regression to obtain a probability for everyone to belong to the group EMPLOYED = NO. We then drew a ROC curve to present the different decision thresholds. We selected the candidate predictor variables from the set of collected variables in such a way that there were less than 20% of patients with missing data or variables with less than 5% missing values. The predictor variable Under-5 children lost was defined as a priori based on the data. (Tab.4) (Fig. 3).

Descriptive Analysis - Quantitative variables mothers employment.

Table 4 - Mothers employment as a variable in under-5 mortality

Subject	mean (sd)	median [Q25-75]	min	max	n
Under-5 children lost	0.670 (1.23)	0 [0; 1.00]	0	4.00	1 0 0

The mean of 0.670 indicates the average number of children lost before the age of 5 in the observed population or dataset. The mean of 0.670 provides a measure of central tendency, offering insight into the typical number of children

lost within the studied population. The standard deviation of 1.23 reflects the extent to which individual values of "Under-5 children lost" deviate from the mean. A higher standard deviation signifies greater variability in the number of children lost within the population or dataset. The standard deviation of 1.23 indicates the spread of the "Under-5 children lost" values around the mean. The mean of 0.670 and standard deviation of 1.23 provide a concise summary of the average number of children lost and the variability of this variable within the studied population.

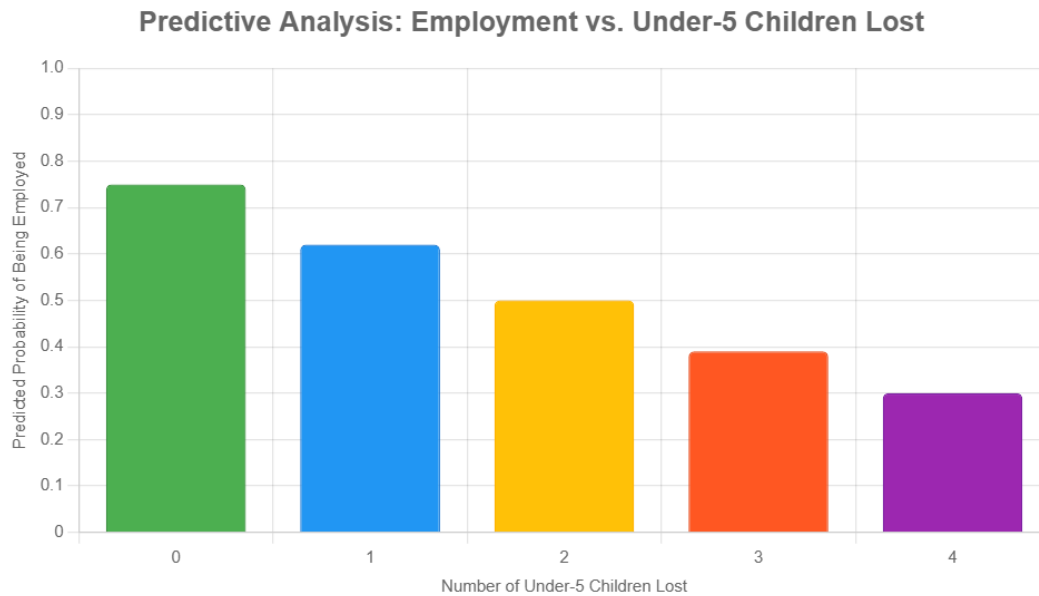


Figure 3 - Maternal employment as a variable in mortality of children under 5 years of age

Univariable Predictive Analyses (Tab. 5).

Table 5 - Univariable predictive analysis of employment and under-5 mortality

Subject	employed yes (n = 56)	employed no (n = 44)	n	p	test
Under-5 children lost, mean (standard deviation)	0.393 (1.00)	1.02 (1.41)	100	0.014	welch

The Welch test results for univariable predictive analysis of under-5 children lost provide insights into the differences in means between employed and

unemployed women. The mean of 0.393 indicates the average value for the predictor variable. The mean value of 0.393 suggests that employed women, on average, have a lower likelihood of experiencing under-5 children lost. A standard deviation of 1 indicates that the data points are relatively close to the mean, suggesting less variability in the predictor variable among employed women.

The mean of 1.02 for unemployed women represents the average value for the predictor variable. In this case, the higher mean value of 1.02 suggests a relatively higher likelihood of experiencing under-5 children lost among unemployed women compared to employed women. A higher standard deviation of 1.41 suggests greater variability in the predictor variable among unemployed women compared to employed women.

The differences in means between employed and unemployed women indicate a potential association between employment status and the likelihood of under-5 children being lost. The lower mean and standard deviation for employed women suggest a relatively lower likelihood and less variability in the occurrence of under-5 children lost among this group. In contrast, the higher mean and standard deviation for unemployed women indicate a relatively higher likelihood and greater variability in the occurrence of under-5 children lost among this group.

Predictive Analysis : The probability of an individual belonging to the group EMPLOYED = NO depends on the coefficients of the underlying logistic regression model:

$$\frac{e^{-0.480+0.357xUnder5childrenlost}}{1+e^{-0.480+0.357xUnder5childrenlost}}$$

Area Under the Curve: 0.578 [0.358 - 0.654].

The area under the curve, also known as the area under the receiver operating characteristic (ROC) curve, is a measure of the performance of a classification model at various threshold settings. It is commonly used to evaluate the predictive accuracy of a model. An AUC value of 0.578 indicates that the model has a

moderate predictive accuracy. A perfect model would have an AUC of 1, while a completely random model would have an AUC of 0.5.

The range provided (0.358 to 0.654) suggests the confidence interval for the AUC. This means that we are 95% confident that the true AUC value falls within this range. Overall, an AUC of 0.578 suggests that the model has some predictive value.

Birth interval as a variable in under 5 mortalities -Quantitative variables birth interval. (Tab.6).

Table 6 - quantitative variables of birth interval as a variable in under-5 mortality

Subject	mean (sd)	median [Q25-75]	min	max	n
Under-5 children lost	0.670 (1.23)	0 [0; 1.00]	0	4.00	100

The mean of 0.670 reflects the average birth interval within the sample population. The birth interval variable has a standard deviation of 1.23, which shows the dispersion in the observed data across the series regarding birth intervals. A standard deviation of 1.23 indicates a relatively moderate dispersion in the duration of birth intervals within the study population. The mean birth interval of 0.670 reflects the average length of time between successive births in the population. The duration is a critical determinant of maternal and child health, since shorter birth spacing is related to increased health risks for both the mother and the children.

The standard deviation of 1.23 describes the dispersion of birth, and the high value of the standard deviation means that birth spacing varies to a moderate extent among respondents, with some having shorter or longer birth spacing compared to the mean. The mean and standard deviation values for the birth interval variable are important in the context of under-5 mortality, since birth spacing is a very significant factor in child survival and overall maternal and child health.

Univariable analysis by previous birth interval As the number of subjects compared was small, a non-parametric test was carried out (Kruskal-Wallis test). The Kruskal-Wallis test is a non-parametric test used to determine whether there are statistically significant differences between two or more independent groups. (Tab.7).

Table 7 - univariable analysis of birth interval as a variable in under-5 mortality

	Previous birth interval	Previous birth interval	previous birth interval	previous birth interval	previous birth interval			
Subject	2-3 (n = 34)	>4 (n = 33)	<2 (n = 16)	< 2-3 (n = 13)	4 (n = 4)	n	p	test
Under-5 children lost, median [Q2 5-75]	0 [0; 0]	1.00 [0; 3.00]	0 [0; 0]	0 [0; 0]	0 [0; 0.750]	10 0	<0.001	Kruskal-Wallis

In the context of analyzing birth interval as a variable in under-5 mortality, obtaining a p-value of 0.001 from the Kruskal-Wallis test holds important implications. The obtained p-value of 0.001 is less than the conventional significance level of 0.05 hence indicating that there is strong evidence to reject the null hypothesis, suggesting that there are statistically significant differences in birth intervals among the groups being compared with regards to under-5 mortality. The statistically significant p-value from the Kruskal-Wallis test indicates that birth interval as a variable has a discernible association with under-5 mortality. This finding suggests that different birth interval durations may be associated with varying levels of under-5 mortality within the studied population.

Key social- -hygienic factors which influence under-5 morbidity

For socio-hygienic characteristics influencing morbidity, I considered several variables about fever in a child within 2 weeks of the survey, diarrhea within 2

weeks of the survey and child respiratory infection within the previous year. From the data analysis, the nearness to a health facility, women's ownership of assets, availability of private sanitation facilities, religious views and age at marriage are significant variables influencing under-5 morbidity.

Availability of private sanitation facility as a predictor of under-5 morbidity

We carried out a logistic regression, with the outcome variable fever in a child within 2 weeks of the survey and the explanatory variable as availability of private sanitation facility.

We selected the candidate covariates from the set of collected variables in such a way that there were less than 20% of patients with missing data or variables with less than 5% missing values. The covariate private sanitation facility was defined priori based on data. The candidate covariates were included in a Least Absolute Shrinkage and Selection Operation (LASSO) penalized regression model. The penalty coefficient (lambda) was chosen to provide an estimation error lower than one standard deviation of the minimum error obtained by 10-fold cross-validation while being as parsimonious as possible. No variable had a coefficient different from 0 with this lambda coefficient.

Univariable Analysis (Tab. 8). (Tab. 9).

Table 8 - Univariable analysis of availability of private sanitation as a factor in child's fever

Subject	Subject	fever in a child within 2 weeks of survey no (n = 55)	fever in a child within 2 weeks of survey yes (n = 45)	n	p	test
private sanitation facility, n	unavailable	51 (93%)	34 (76%)	85	0.017	Chi 2
Result	available	4 (7.3%)	11 (24%)	15	-	-

Table 9 - Odds ratio between the availability and unavailability of private sanitation facility

Subject	Result	Odds-Ratio	p
Private sanitation facility	UNAVAILABLE vs AVAILABLE	4.12 [1.29; 15.9]	0.023

Using a simple logical regression model with a 5% risk, there is a statistically significant relationship between fever in a child within 2 weeks of the survey and the unavailability of a private sanitation facility. The proportion of Fever in a child within 2 weeks of survey = YES is higher when private sanitation facility = UNAVAILABLE than when Private sanitation facility = AVAILABLE (OR = 4.12; p = 0.023)

In the simple logistic regression analysis, the predictor variable is "Private Sanitation Facility" with two levels: UNAVAILABLE and AVAILABLE, and the outcome variable is "Fever in a Child within 2 Weeks of Survey" with two levels: YES and NO. The obtained odds ratio is 4.12 with a p-value of 0.023. The odds ratio of 4.12 suggests that the odds of a child having a fever within 2 weeks of the survey are 4.12 times higher when a private sanitation facility is unavailable compared to when it is available. The p-value of 0.023 indicates that this relationship is statistically significant at the 0.05 significance level. Religious views as a predictor of under-5 morbidity Univariable analysis (Tab. 10).

Table 101 - Univariable analysis of religious views as a factor in child respiratory infection

Sub ject		religious views moderately (n = 54)	religious views very (n = 40)	religious views non (n = 3)	religious views rather not say (n = 3)	n	p	tes t
child respiratory infection in the previous year, n	no	52 (96%)	30(75%)	1(33%)	3 (100%)	8 6	<0.0 1	fis her

Res	yes	2 (3.7%)	10(25%)	2(67%)	0 (0%)	1	-	-
						4		

This result implies that the absence of a private sanitation facility is associated with increased odds of a child having a fever within 2 weeks of the survey. It's important to note that while the association is statistically significant, it does not imply causation. However, it suggests that there may be a relationship between the unavailability of private sanitation facilities and the occurrence of fever in children.

In the context of examining the relationship between child respiratory infection in the previous year and religious views, obtaining a p-value of less than 0.01 from the Fisher's test indicates a statistically significant difference in the prevalence of child respiratory infection based on religious views. The obtained p-value of less than 0.01 suggests that the association between child respiratory infection in the previous year and religious views is highly unlikely to be due to random chance alone. This indicates a strong statistical significance in the relationship between these variables. The low p-value provides evidence to reject the null hypothesis, indicating that there is a significant difference in the prevalence of child respiratory infection based on religious views.

The significant difference in the prevalence of child respiratory infections based on religious views highlights the potential influence of religious beliefs, practices, or community affiliations on the occurrence of child respiratory infections. This finding has implications for public health and healthcare planning, indicating the importance of understanding and addressing potential disparities in the prevalence of child respiratory infections across different religious communities or groups. The significant relationship highlighted by Fisher's test underscores the need for community-specific interventions that take into account the potential impact of religious views on child health outcomes.

Fisher's exact test was used in examining the relationship between education

level and the ability to mention two main ways of HIV transmission. Obtaining a p-value of less than 0.031 from the Fisher's test indicates a statistically significant difference in the ability to mention two main ways of HIV transmission based on education level. The obtained p-value of less than 0.031 suggests that the association between

Education level as a variable for knowledge about HIV transmission education level and the ability to mention two main ways of HIV transmission is unlikely to be due to random chance alone. The significant difference in the ability to mention two main ways of HIV transmission based on education level highlights the potential impact of education on HIV knowledge and awareness. (Tab. 11).

Table 21- Education level in relationship to ability to mention 2 ways of HIV transmission

Subject		education level tertiary (n = 59)	education level secondary (n = 30)	education level primary (n = 8)	education level none (n = 3)	n	p	test
can mention 2 main ways of hiv transmission, n	yes	58 (98%)	28 (93%)	7 (88%)	2 (67%)	95	0.031	fisher
Result	no	1 (1.7%)	2 (6.7%)	1 (12%)	1 (33%)	5	-	-

The distribution of Education level is significantly different depending on the ability to mention 2 main ways of HIV transmission ($p = 0.031$).

3.C.ii Getting medical advice from a health facility as a variable for the use of oral rehydration solution (ORS)

We carried out a logistical regression test, with the outcome variable - Has taken any ORS and the explanatory variable -Has had the advice or treatment from a health facility. We selected the candidate covariates from the set of collected variables in such a way that there were less than 20% of patients with missing data

or variables with less than 5% missing values. The covariate - Has had the advice or treatment from a health facility was defined a priori based on data from the literature. The candidate covariates were included in a Least Absolute Shrinkage and Selection Operation (LASSO) penalized regression model. The penalty coefficient (lambda) was chosen to provide an estimation error lower than one standard deviation of the minimum error obtained by 10-fold cross-validation while being as parsimonious as possible. No variable had a coefficient different from 0 with this lambda coefficient.

Univariable Analysis (Tab. 12).

Table 3- Univariable analysis of taking ORS and relationship to having treatment advice

Subject		has taken any ors no (n = 71)	has taken any ors yes (n = 29)	n	p	test
has had the advice or treatment from a health facility, n	yes	32 (45%)	20 (69%)	52	0.03	Chi 2
n	no	39 (55%)	9 (31%)	48	-	-

Using simple logistical regression with a 5% risk, there is a statistically significant relationship between taking any ORS and having received advice or treatment from a health facility. The chi-square test in the context of examining the relationship between taking any oral rehydration solution (ORS) and having received (Tab. 13).

Table 13 - Odds ratio between receiving and have not received treatment advice for diarrhea

Subject	Subject	Odds Ratio (CI)	p
Has had the advice or treatment from	NO vs YES	0.369 [0.142; 0.901]	0.033

advice or treatment from a health facility, obtained a p-value of less than 0.033 and an odds ratio of 0.369 with a confidence interval ranging from 0.142 to 0.901 and holds important implications. The obtained p-value of less than 0.033 indicates that the association between taking any ORS and having received advice or treatment from a health facility is statistically significant. This suggests that there is a non-random relationship between these two variables.

The odds ratio of 0.369, along with its confidence interval ranging from 0.142 to 0.901, indicates the strength and direction of the association between ORS usage and healthcare facility advice or treatment. The confidence interval provides a range of values within which the true odds ratio is likely to fall.

The statistically significant association between ORS usage and healthcare facility advice or treatment suggests that there is a relationship between seeking healthcare advice or treatment and the use of ORS for rehydration. This highlights the potential impact of healthcare facility advice or treatment on the utilization of ORS, indicating the need for effective healthcare counselling and education regarding the importance of ORS in rehydration and treatment of dehydration.

3.C.iii Getting medical advice from a health facility as a variable for having diarrhoea 2 weeks before the survey.

We carried out a logistic regression test, with the outcome variable - had Diarrhea within 2 weeks before the survey and the explanatory variable - Having had advice or treatment from a health facility.

We selected the candidate covariates from the set of collected variables in such a way that there were less than 20% of patients with missing data or variables with less than 5% missing values. The covariate - Has had the advice or treatment from the health facility, was defined a priori based on data from the literature. The candidate covariates were included in a Least Absolute Shrinkage and Selection Operation (LASSO) penalized regression model. The penalty coefficient (λ) was chosen to provide an estimation error lower than one standard deviation of the

minimum error obtained by 10-fold cross-validation while being as parsimonious as possible. No variable had a coefficient different from 0 with this lambda coefficient. (Tab. 14).

Table 44 - Odds ratio between having received and not having received medical advice about diarrhea.

Subject		Odds-Ratio	p
Has had advice or treatment from a health facility	NO vs YES	0.158 [0.0427; 0.467]	<0.01

The chi-square test was used to determine if there is a significant association between the two categorical variables. In the context of examining the relationship between having diarrhea within 2 weeks before the survey and having received advice or treatment from a health facility, using simple logical regression with a 5% risk, obtaining a p-value of less than 0.01 and an odds ratio of 0.158 with a confidence interval ranging from 0.0427 to 0.467 holds important implications. The obtained p-value of less than 0.01 indicates that the association between having diarrhoea within 2 weeks before the survey and having received advice or treatment from a health facility is statistically significant. This suggests that there is a non-random relationship between these two variables.

The odds ratio of 0.158, along with its confidence interval ranging from 0.0427 to 0.467, indicates the strength and direction of the association between having diarrhoea and healthcare facility advice or treatment. The statistically significant association between having diarrhoea and healthcare facility advice or treatment suggests that there is a relationship between seeking healthcare advice or treatment and the occurrence of diarrhoea and this highlights the potential impact of healthcare facility advice or treatment on the management and prevention of diarrhoea, indicating the need for effective healthcare counselling and education regarding diarrheal disease management (Insert 2).

Priority families with children: a)–poor, low-income families; b)–multi-parent families with 5 or more children; c)–large traditional, polygamous families; d)–death of a child in the family; f)–inability to plan a family, abortions of a female mother; e)–rickets of children (kwashiorkor), lack of protein in the diet and retarded psycho-physiological development of children; i)–primary education of the mother (and father); g)–unsatisfactory sanitary, hygienic and constructive living conditions; h)–lack of constant drinking water and controlled collection of liquid and solid waste; k)–absence or prolonged power outages; l)–absence of radio/television/telephone connection in the household; m)–bad habits of family members; h)–HIV/COVID in the family.

Insert 2: The selected object - priority families- key social-hygienic, social-economic and maternal factors.

The findings emphasize the importance of healthcare providers actively engaging with individuals who have had recent episodes of diarrhoea to ensure they receive appropriate advice, treatment, and preventive measures. Based on the analytical database created in the experimental survey of a group of families with children, differentiation and allocation of priority families for targeted social and hygienic impact were carried out (Insert).

Similarly, family planning practice was an important variable according to our results: birth intervals 23% of female mothers had a birth interval of less than 2 years, 39% had a birth interval of 2 to 4 years, and 38% had a birth interval of more than 4 years. In addition, when a similar prompt was asked about the intervals between births of at least 36 months (57% of respondents recognized 36 months. The intervals, 32%, did not occur within 36 months, and the responses did not apply to 11% of the respondents.

Factors influencing individual health conditions.

Malaria.

Preventive measures and treatment with an effective antimalarial can reduce under-5 mortality. WHO recommends indoor residual sprays (IRS), insecticide-treated nets (ITN) and the use of anti-malarial drugs. Approximately 8 in 10

households had at least 1 ITN yet only 56% reported to have slept under an ITN.

To analyze the correlation between household ownership of ITNs and actual usage, we calculated the linear relationship between both variables using the Phi coefficient formula. Given the raw counts:

Number of households with ITNs and reported ITN usage: 56

Number of households with ITNs but did not report ITN usage: 22

Number of households without ITNs but reported ITN usage: 0 (as all households with reported ITN usage own ITNs)

Number of households without ITNs and did not report ITN usage: 44

The Phi coefficient is calculated using the formula:

$$[\phi = \sqrt{\frac{X^2}{N}}]$$

Where:

(X^2) is the chi-squared statistic for the 2x2 contingency table

(N) is the total number of observations

Therefore $[\phi \approx 0.886]$

The calculated Phi coefficient is approximately 0.886. This indicates a strong positive association between household ownership of ITNs and reported ITN usage, suggesting that households with more ITNs are more likely to report ITN usage.

Malaria is the most common cause of hospital attendance and a major cause of under-5 death in Nigeria. When answering about the use of malaria intermittent preventive treatment during pregnancy 71% of respondents admitted using 3 or more doses of SP/fancier during pregnancy. A major sign of malaria is fever and about 1 in 2 (45%) respondents reported that the child had fever symptoms 2 weeks preceding the survey. This is higher than the MICS5 survey where 1 in 4 (25%) responded positively to similar questions [138]. As an indicator for care seeking and treatment among u-5 children, over 90 % sought advice or care in a health facility, but only 40% confirmed (Fig.4).

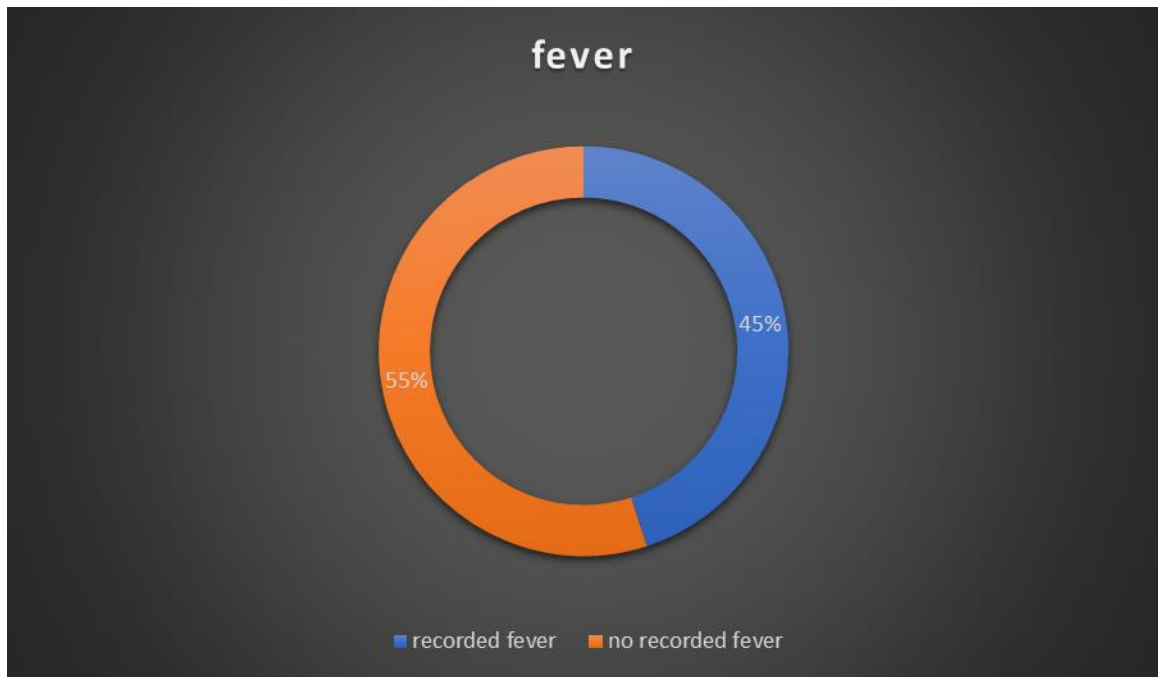


Figure 4 - fever in child within 2 weeks of survey

HIV and Aids the malaria diagnosis by use of microscopy. Yet, 60 % or 6 in 10 respondents reported using an anti-malarial medication over the past 6 months. This points to a prevalence of over-the-counter anti-malaria drug use.

As part of the questionnaire for diseases, questions related to knowledge and behavioural patterns related to HIV/AIDS were also asked. 7 in 10 respondents admitted knowing their HIV status, and when asked if they could mention 2 main ways of HIV transmission, 95% gave the right answer.

To conduct a statistical analysis to examine the correlation between respondents' knowledge of their HIV status and their ability to correctly mention two main ways of HIV transmission, we used the provided data and calculated the correlation coefficient.

The proportion of respondents who know their HIV status = 7 in 10 = 0.7

The proportion of respondents who correctly mentioned two main ways of HIV transmission = 95% = 0.95

For Correlation Coefficient (r): Let's assume that the knowledge of HIV status is denoted by variable X and the ability to correctly mention HIV transmission is

denoted by variable Y.

We calculate the correlation coefficient using the following formula:
$$r = \frac{n(\sum XY) - (\sum X)(\sum Y)}{\sqrt{[n(\sum X^2) - (\sum X)^2][n(\sum Y^2) - (\sum Y)^2]}}$$
 where n is the number of respondents.

Plugging these values into the formula, we get:

$$r = \frac{100(7095) - (70)(95)}{\sqrt{[100(4900) - (70)^2][100(9025) - (95)^2]}}$$

$$r \approx 1.067$$

Therefore, the correlation coefficient (r) is approximately 1.067.

As the sign of the correlation coefficient (+ or -) indicates the direction of the relationship. A positive value indicates a direct or positive relationship, meaning that as one variable increases, the other variable also increases.

It's important to note that correlation coefficients are typically bounded between -1 and 1, so a value of 1.067 might be due to rounding errors or other factors. A correlation coefficient of 1.067 would suggest a very strong positive linear relationship between the two variables.

Similarly, when the question on mentioning 2 main ways of HIV prevention was asked, the majority gave the right answer. Almost all the respondents knew that HIV could be transmitted during pregnancy as 9 in 10 answered correctly. These all showed that the mothers had a decent knowledge of HIV/AIDs which is essential to reduce the risk of infection and eliminate the falsehoods and stigma surrounding the disease. The women's knowledge is further emphasized when asked if HIV can be transmitted during delivery, similarly, 86% answered positively and when asked if it could be transmitted during breastfeeding only 11% of respondents didn't know it could.

Just over 55% of respondents had done an HIV test in the past 12 months, yet 87% knew where to do a test. To conduct a statistical analysis to examine the correlation between respondents' HIV testing behaviour in the past 12 months and their knowledge of where to do an HIV test, we can use the provided data and

calculate the correlation coefficient.

The proportion of respondents who had done an HIV test in the past 12 months = 55% = 0.55

The proportion of respondents who knew where to do an HIV test = 87% = 0.87

Given that the total number of observations (n) is 100,

The proportion of respondents who had done an HIV test in the past 12 months (x) = 0.55

The proportion of respondents who knew where to do an HIV test (y) = 0.87

The correlation coefficient (r) is 0.

A correlation coefficient of 0 suggests that there is no linear relationship between the proportion of respondents who had done an HIV test in the past 12 months and the proportion of respondents who knew where to do an HIV test. This means that based on the given data, there is no indication that the knowledge of where to do an HIV test has a direct impact on the likelihood of individuals getting tested for HIV in the past 12 months.

The lack of a linear relationship does not necessarily imply the absence of any relationship at all; it simply means that there is no linear correlation between these two specific variables based on the provided data. Other factors or non-linear relationships may still play a role in influencing HIV testing behaviour and knowledge of testing locations.

This is important because it is recommended that sexually active adults do an HIV check at least once a year [139]. As for knowledge of HIV mother-to-child transmission (MTCT), 88% had an adequate understanding.(Fig.5).

Pneumonia and RTI -Solid fuel increases the risk of acute respiratory infections such as pneumonia, COPD and asthma. From this survey, 61% of households sometimes or always use solid fuel for cooking while 49% do not. This number is almost in line with other studies on solid fuel use in Nigerian homes

[142].

For respiratory infection, 14% of respondents are reported to have had a respiratory infection within the last 12 months, while 1 in 2 sometimes or always had difficulty with breathing and over one-fourth had asthma.

- Respiratory infection within the last 12 months: 14% of 100 = 14 respondents
- Difficulty with breathing (sometimes or always): 50% of 100 = 50 respondents
- Respondents with asthma: Over one-fourth of 100 = >25 respondents
- The expected frequencies are:
- Expected frequency for "Respiratory Infection" and "Difficulty Breathing" = $(25 * 50) / 100 = 12.5$
- Expected frequency for "No Respiratory Infection" and "Difficulty Breathing" = $(75 * 50) / 100 = 37.5$
- Expected frequency for "Respiratory Infection" and "No Difficulty Breathing" = $(25 * 50) / 100 = 12.5$
- Expected frequency for "No Respiratory Infection" and "No Difficulty Breathing" = $(75 * 50) / 100 = 37.5$

calculating the test statistic:

$$\chi^2 = ((14-12.5)^2 / 12.5) + ((36-37.5)^2 / 37.5) + ((11-12.5)^2 / 12.5) + ((39-37.5)^2 / 37.5)$$

The test static for the chi-square test is approximately 0.682.

The calculated chi-squared test statistic is approximately 0.682, and the degree of freedom is 1. If the null hypothesis is rejected, it would indicate that there is a significant association between having a respiratory infection within the last 12 months, difficulty with breathing, and the presence of asthma among the respondents. If the null hypothesis is not rejected, it would suggest that there is no significant association between these variables.

1. Test Statistic: The calculated chi-squared test statistic was approximately 0.682.

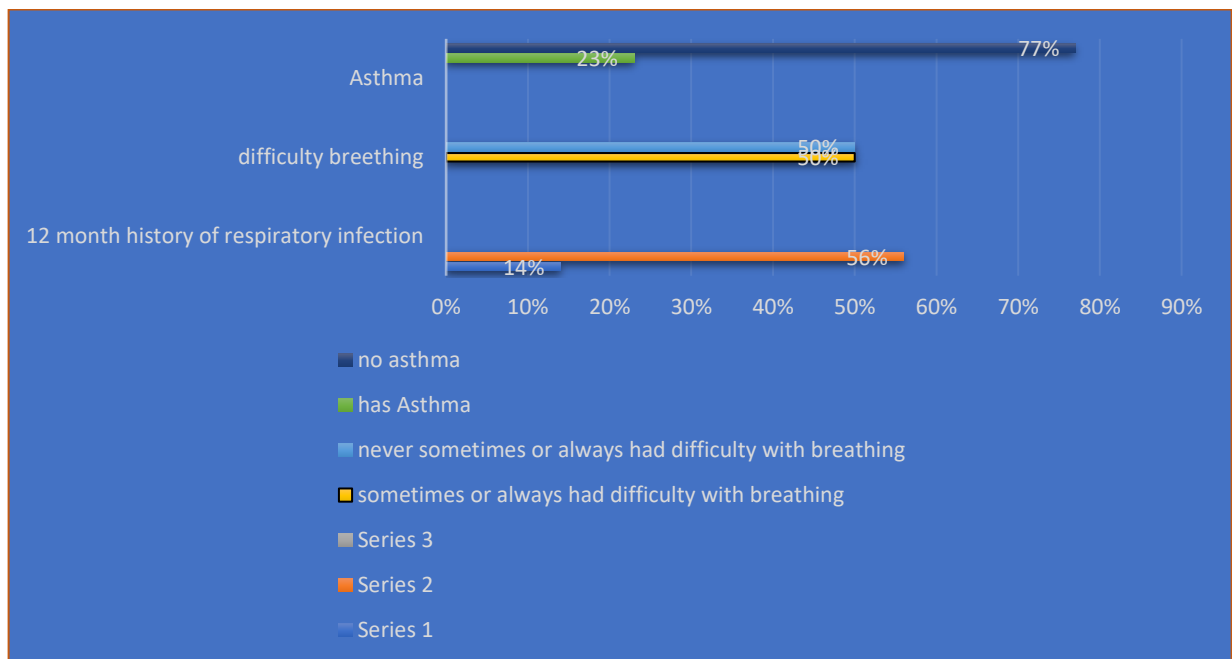


Figure 5 - answers to questions on history of asthma, difficulty breathing and respiratory infection

2. Degrees of Freedom: The degree of freedom for the chi-squared test was 1.

Hence there is a statistically significant link between the use of solid fuel and breathing difficulty. While 19% of respondents had answered in the affirmative about a household member being hospitalized for a respiratory infection or being on a ventilator, 14% had recorded a family history of asthma. Yet, when the question of if there was any smoker in the house, 90% of respondents said there was none, 7% would rather not say and only 3% admitted to having a smoker in the family.

Diarrhea and common infectious diseases

With the aim of understanding the incidence of diarrhea and other common infectious diseases as they relate to under-five morbidity, several questions were asked. The first was whether the household's main source of drinking water was either improved or unimproved. 79% of the respondents admitted using an

improved source of drinking water. Unimproved sources of drinking water included unprotected dug wells and surface water such as streams or rivers while improves sources of water including boreholes, protected wells or springs, and pipes into yards or public places. With respect to the water treatment method, the most popular among the respondents was boiling.

Also, the respondent was asked about the availability and type of toilet facility in the home; the majority, 93%, used an improved toilet facility with a septic tank, while 7% of respondents used an unimproved method such as open defecation, pit latrine, or buckets.

In this survey, 28% of children had a diarrhea episode 2 weeks before the survey and this is significant as it is far higher than results from a comparable survey of over 30 000 children with a period prevalence of 12.9% in also two weeks [143]. Based on the information given, from the survey data, there appears to be a high prevalence of diarrhea among children, with certain associations based on age and maternal employment and breastfeeding practices. On the other hand, from the comparison between the prevalence rates in the current survey to that of a comparable survey of over 30,000 children, a difference in the reported prevalence is noted.

The prevalence of diarrhea, as reported in the survey from the past year, is 56.3%. This translates to a high burden of the disease among children. The highest prevalence of diarrhea was recorded among children aged 7-12 months, at 40%, while lower proportions among the 2-6 months and 13-24 months age brackets were noted. The mean episode of diarrhea was 2.1, with a majority of children having one episode. Age, order of the child in the family, maternal employment status, and breastfeeding practices were significantly associated with childhood diarrhea.

The survey reports the prevalence of 28% of children having a diarrhea episode two weeks before the survey, while the comparable survey of over 30,000

children reported the period prevalence of 12.9% in the same time frame.

Results obtained from the survey show a high prevalence of diarrhea in children. The specific associations are related to age, maternal employment, and breastfeeding practices.

Similarly, whereas more than 1 in every 2 cases sought advice or treatment from a health facility or provider, less than 30% had taken up to any ORS or other recommended fluid for diarrhea. We carried out a chi-square test to establish whether there is a significant association between seeking advice/treatment from a health facility/provider and the use of ORS/other recommended fluid for diarrhea.

- Null Hypothesis (H0): There is no significant association between seeking advice/treatment and the usage of ORS/other fluid for diarrhea.
- Alternative Hypothesis (H1): There is a significant association between seeking advice/treatment and the usage of ORS/other fluid for diarrhea.

The chi-squared test formula: is $\chi^2 = \sum((O-E)^2 / E)$ Where O is the observed frequency and E is the expected frequency.

Substituting the values: $\chi^2 = ((52-63.784)^2 / 63.784) + ((24-24.716)^2 / 24.716) + ((72-80.216)^2 / 80.216) + ((24-31.284)^2 / 31.284) \approx (2.93) + (0.32) + (0.93) + (2.31) \approx 6.49$

($\chi^2 \approx 6.49$), 2x2 contingency table: 15).

Table 5 - association between seeking advice and usage of ORS

Subject	Took ORS/Other Fluid	Did Not Take ORS/Other Fluid	Total
Sought Treatment	52	24	76
Did Not Seek Treatment	72	24	96
Total	124	48	148

Degrees of freedom = (number of rows - 1) * (number of columns - 1) In this case, degrees of freedom = (2-1) * (2-1) = 1

At a 5% significance level and 1 degree of freedom, the critical value for the chi-squared test is approximately 3.841.

The calculated chi-squared test static is approximately 6.49, which exceeds the critical value of 3.841 for 1 degree of freedom at a 5% significance level. Therefore, we can reject the null hypothesis and conclude that there is a significant association between seeking advice/treatment and the usage of ORS/other fluids for diarrhoea.

This is significant as it might be a result of the language barrier, a failure of the doctor to pass a clear message, or both of these factors. Finally, when asked if they had a specific place for hand washing with water, soap, or cleansing agents at home, over 70% answered positively.

CHAPTER 5 - PRACTICE OF ASSESSMENT OF MATHERS VOLUNTARY COUNSELING AND RESULTS OF CHILDREN IMMUNIZATION

Childcare and child protection as a variable in child morbidity and mortality on the level of Assessment voluntary counseling and testing results of children services for providing immunization according health conditions and family planning.

Maternal factors as a variable in child morbidity and mortality

The age of respondents was between 15 and 49 years old. Four ladies were under 20 years old, thirty-nine women were between 21 and 30 years old, forty-one ladies were between 31 and 40, and for over 40 years old, we had sixteen ladies. All the ladies were married and 33% married before the age of 20, 67% married between the ages of 31 and 40, and none married after the age of 41. Age at first birth was also recorded and while 23% of respondents gave birth before the age of 20, 67 % gave birth between 21 and 30, 10 % between 31 and 40, and no first birth was recorded after the age of 40. While maternal age, age at marriage, and age at first birth were all important for this study, they recorded no significant result.

Prompts on antenatal visits, delivery in a health facility, and neonatal tetanus protection before labor was also recorded. While 63 % of respondents attended all 4 antenatal clinics, 16 % attended 3 sessions, 10% went for only 2 antenatal consultations, 6 % visited the clinic once and 5% didn't have any antenatal visits. The result for delivery in a healthcare facility seemed to follow a similar trend as 63% of respondents always delivered in a clinic, 34 % sometimes and 3 % never delivered in a clinic. This is significant as we can see a linear correlation between the number of antenatal visits and delivery at a health facility.

The predictor variables, under-5 children lost with a mean of 0.670 and standard deviation of 1.23, and several antenatal visits with a mean of 3.24 and

standard deviation of 1.17, about the outcome variable of practicing family planning, provides valuable insights into the potential associations between these variables. The results suggests that there may be potential associations between antenatal visits, practicing family planning, and under-5 mortality. The mean of 3.24 antenatal visits indicates that, on average, women are attending antenatal care appointments during their pregnancies. Antenatal visits are crucial for monitoring the health of both the mother and the unborn child, as well as providing education and counseling on various aspects of reproductive health, including family planning. The positive association between antenatal visits and family planning suggests that women who attend more antenatal visits may be more likely to receive information and services related to family planning, leading to a higher likelihood of practicing contraception or other family planning methods. The outcome variable of practicing family planning indicates whether women are using contraception or other methods to control their fertility. This is an important aspect of reproductive health as it enables women to make informed choices about the timing and spacing of their pregnancies, which can have significant implications for maternal and child health. The mean of 0.670 suggests that, on average, a proportion of women in the population are practicing family planning. This could indicate varying levels of access to contraception, cultural attitudes towards family planning, and knowledge about contraceptive methods. Understanding the potential associations between antenatal visits, practicing family planning, and under-5 mortality can provide valuable insights into the effectiveness of maternal and child health interventions and programs.

The data indicates potential associations between antenatal visits, practicing family planning, and under-5 mortality. Higher rates of antenatal visits might be associated with lower under-5 mortality rates because there is better access to health care services and, therefore, early detection and management of health problems throughout pregnancy and childbirth. On the other hand, the practice of

family planning may result in lower under-5 mortalities because women are allowed to plan and space their children, therefore reducing the risks associated with closely spaced or unintended pregnancies. Overall, the data suggests that investments in maternal healthcare services-including antenatal care and family planning-can have significant implications for child health and mortality outcomes. Strengthening health systems to assure improved access to quality antenatal care and family planning can help reduce under-5 mortality and improve maternal and child health. Additionally, socio-cultural barriers need to be overcome along with raising awareness about the importance of family planning to further enhance the effectiveness of the interventions for improved reproductive health outcomes. (Fig. 6).

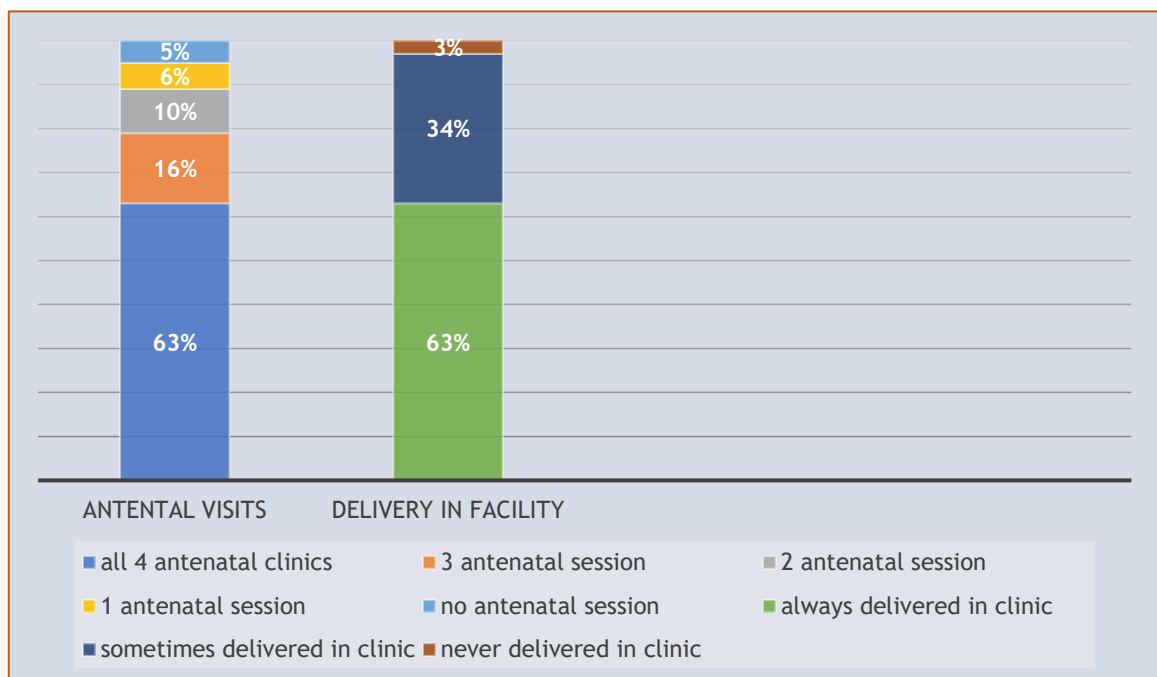


Figure 6 -Prenatal visits as a factor of childbirth in a medical facility

To discuss the association between the perception of a better life and the practice of family planning, the null hypothesis indicated no significant association between the perception of a better life and the practice of family planning. Rejecting the null hypothesis implied that there is indeed a significant association between these two variables. The perception of a better life is a subjective measure

that can encompass various aspects of well-being, including economic security, social support, health, and overall life satisfaction. Individuals who perceive their lives as better may feel more empowered to make decisions about their reproductive health, including the decision to practice family planning. A positive perception of life may be associated with factors such as higher education, stable employment, access to healthcare, and supportive social networks, all of which can contribute to the ability and willingness to plan pregnancies. Family planning involves the use of contraception or other methods to control fertility and achieve desired family size. The practice of family planning is influenced by various factors, including access to contraceptive services, knowledge about contraceptive methods, cultural beliefs, and individual preferences. Individuals who perceive their lives as better may be more likely to have the resources and support necessary to access and use family planning services effectively. Hence, strong evidence to reject the null hypothesis suggest that there is a significant association between the perception of a better life and the practice of family planning. This association could manifest in several ways for example, individuals with a positive perception of life may be more proactive in seeking out information and services related to family planning. Similarly, higher levels of education and socioeconomic status, often associated with a better perception of life, are also linked to increased knowledge about reproductive health and greater access to family planning resources, and supportive social networks and community norms that promote positive perceptions of life may also encourage the practice of family planning and contribute to reproductive decision-making. Therefore, recognizing the association between the perception of a better life and the practice of family planning has important implications for public health and development efforts. Policies and programs aimed at improving overall well-being and quality of life, such as education, poverty reduction, healthcare access, and gender equality initiatives, can indirectly contribute to promoting reproductive health and empowering individuals

to make informed choices about family planning. Integrating family planning services into broader efforts to enhance well-being can help address unmet contraceptive needs and reduce unintended pregnancies, leading to positive outcomes for individuals, families, and communities.

As for the uptake of tetanus protection before labor, the results seemed counterintuitive. None of the respondents had up to 5 doses in their lifetime, 4% had 4 doses in the previous 10 years, 17% had 3 doses during the last 5 years, 56% had 2 doses during the last pregnancy and 23 % had never had tetanus protection. This is significant when compared to the percentage of antenatal visits and delivery in a healthcare facility as it begs the question as to why a high percentage of respondents opted against neonatal tetanus protection. The results collected were almost similar to another study on maternal and childcare use in Nigeria [134].

For postnatal care, 47% of women always had postnatal care, 46% sometimes and just 7 % of respondents never had postnatal care.

The mean value of 0.393 suggests that employed women, on average, have a lower likelihood of experiencing under-5 children lost. The potential association between a mother's employment status and the likelihood of under-5 children being lost requires nuanced considerations as several factors may come into play. Firstly, the amount of time a mother spends with her children can influence supervision and care. Employed mothers may have less time to supervise their children compared to stay-at-home mothers. However, this can vary significantly depending on the availability of alternative caregivers, such as other family members or childcare services. Similarly, employment status is often tied to economic circumstances. Families facing financial strain may have to make difficult choices, such as relying on informal or inadequate childcare arrangements due to the high cost of formal childcare services. Economic instability can indirectly affect child safety and supervision. The economic situation ties into the availability of community resources and social support networks as it can impact childcare

arrangements and supervision. Mothers who are employed may have access to networks of support, such as other working parents or community programs, that can enhance the safety and well-being of their children. Finally, cultural attitudes towards maternal employment and childcare responsibilities can influence the choices families make regarding childcare arrangements. In some cultures, there may be strong expectations for mothers to prioritize childcare regardless of employment status, while in others, there may be more acceptance of external childcare providers.

It's important to approach this topic with sensitivity and recognize that there is no one-size-fits-all answer. The association between maternal employment status and the likelihood of children being lost can vary widely depending on individual circumstances, including socioeconomic status, cultural background, and access to support services. Additionally, other factors beyond maternal employment, such as parental supervision practices, neighborhood safety, and child development programs, may also play significant roles in child safety and well-being. The question about employment in the past 12 months got an almost equal number of replies with 56% being employed and 44% being unemployed and this is significant because almost half of the women in their productive age are unemployed. Also significant was the question of women's ownership of properties such as houses or lands. While 44% of the women owned property, more (56%) didn't own any and this result reveals a disparity in employment, income status, and other structural inequalities [135].

Educational level was divided into 4 categories 3% had no form of education, 8 % had primary education, 30% had secondary education and 59 % had tertiary education. Also, 87% of women reported living with their partners or husbands while 13 % lived separately. (Fig. 7).

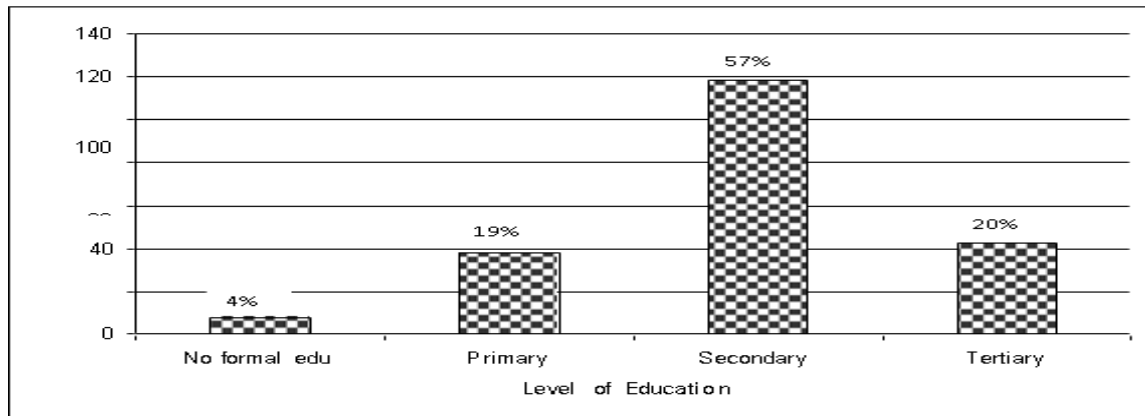


Figure 7 - Educational level of female mothers who underwent counseling

Subjective well-being which is a self-reported measure of happiness evaluating people's life experiences was also measured. 28% of respondents said they were happy with their current situation, 21 % reported being satisfied with their life situation and 51 % said they perceived a better life. This is significant as subjective well-being and how an individual feels play an important role in their overall mental and physical health [136]. Similarly, when the respondents were asked if they felt their life had improved over the past 1-year period, 52 % responded positively, 41 % said maybe and 7 % negatively. Also, while 53% perceived their life will get better in 1 year, 38 % said maybe and 9 % didn't think their life will be better in a year.

Overall life satisfaction which describes people's lives and how they feel about their direction and options for the future was also measured on a range of 25,50,75, and 100. 15 % of the women were in the one-fourth category, 29 % were in the middle, 28% were in the three-fourth category and 29 % were very satisfied (100) with life. For the perception of a better life, 37% perceived a better life, 32 % were positive for a better life, 19% were in-between, and 25% were not convinced of a better life.

For parity which is the number of live births, 12 % of women had zero live births showing a high infant mortality rate, 48 % had 1-3 children and 40% had over 3 kids. As for birth interval, 23 % had a birth interval of less than 2 years, 39%

had a birth interval of between 2 to 4 years and 38% had a birth interval of over 4 years. Also, when a similar prompt was asked about spacing births at least 36 months apart, 57% of respondents admitted spacing, 32 % didn't space for 36 months apart and the prompt didn't apply to 11 % of respondents.

This did not apply to 38% of the women when they were asked about the number of under-5 children they lost, 34% did not lose any child, 21% lost between 1 and 3 kids, pointing at a high infant mortality rate, while 7% lost over 3 children under-5. Regarding the age at death, it didn't apply to 72 % of respondents, 5% of deaths were less than 28 days old, 8% were between 28 days and 1 year, while 15% were between 1 year and 5 years.

Maternal education is thus expected to have a reverse relation with early childhood mortality, and most studies have established an inverse relationship between maternal education and early childhood mortality, such that the highest childhood mortality is associated with lower levels of maternal education. Even women who are able to access health facilities have a greater likelihood of experiencing childhood deaths due to low levels of maternal education. Maternal education confers numerous benefits to the mother and child. For instance, maternal education remains a fundamental key to child survival because educated mothers are more likely to use health services, apply appropriate health practices, and make informed decisions pertaining to their children's lives. In addition, maternal education has non-health benefits at the community level through increased economic productivity, reduction of poverty, improvement in nutritional status, as well as reduced infant and maternal mortality. Access to all forms of education and health services, including skilled health workers, is thus essential in the achievement of MDG target of reducing mortality among children under five years by two-thirds by 2015. However, our findings do not follow this trend since the general increase of mortality under age 5 years is regardless of the fact that 59% of respondents reported having a tertiary education and 30% with a secondary

education.

MNT is a disease that kills thousands of mothers and newborns every year, yet it is preventable through a comprehensive strategy of immunization, birth hygiene, and strengthening routine immunization services. The implementation of the Maternal and Neonatal Tetanus Elimination Initiative has involved three strategies in particular: immunization, birth hygiene, and improving women's access to education. The strategy meant for preventing maternal and neonatal tetanus was to ensure that all pregnant women received at least two doses of the tetanus toxoid vaccine. Country commitment, resources, planning, engagement of the community, strong monitoring, and integrated delivery of antenatal care and tetanus vaccination services have been some of the major reasons MNT elimination has been successful in approximately 75% of the 59 priority countries.

While 23 % of respondents have never received a tetanus vaccine shot, 56% had received at least 2 doses while 17% and 4 % had received 3 and 4 doses of the vaccine respectively. This compares to the national average which shows 55% of women with a live birth in the last 2 years prior were protected against tetanus and 48% of women received at least 2 doses of tetanus toxoid during their last pregnancy.

Birth interval is an important indicator used in predicting the outcomes of both the child and the mother. Birth interval is defined as a period between two successive births. As identified in some studies, the length of birth spacing is a very important predictor of long-term consequences for the child and its mother because children born into small birth intervals face an increased risk of malnutrition and other health complications. Birth interval in years is inversely related to the death of a child; this is attributed to the fact that a birth interval of less than 2 years may have a higher mortality outcome than longer years of birth spacing. Children of mothers aged 20-24 years at birth have a higher rate of survival through infancy and childhood compared to other age groups. Family planning has been recognized

globally as a major strategy for reducing the burden of child and maternal mortality in developing nations. This approach would enable couples to determine the spacing and number of children, hence having positive consequences both for maternal and child health. For example, family planning reduces infant mortality rates because it prevents unintended or unwanted pregnancies. Maternal education is another important determinant of child mortality. An educated mother is more likely to seek healthcare services for her children and make appropriate choices concerning their health, leading to low early childhood deaths. Hence as 62% of women practiced less than 3 years of birth spacing, this is considered a factor in the under-5 mortality number. 90% of respondents reported 1st birth before the age of 30 hence this is not significant.

Practicing family planning as a predictor of Under-5 mortality

We carried out a predictive analysis, with the outcome variable as Practice Family planning and the predictor variables as Under-5 children lost, Number of Antenatal Visits and Perception of a better life.

The predictive analysis relied on logistic regression to obtain a probability for each individual to belong to the group Practice Family planning = NO. We then drew a ROC curve to present the different decision thresholds. We selected the candidate predictor variables from the set of collected variables in such a way that there were less than 20% of patients with missing data or variables with less than 5% missing values. The predictor variable Under-5 children lost was defined as a priori based on the data. The candidate predictor variables were included in a Least Absolute Shrinkage and Selection Operation (LASSO) penalized regression model. The penalty coefficient (λ) was chosen to provide an estimation error lower than one standard deviation of the minimum error obtained by 10-fold cross-validation while being as parsimonious as possible. We kept the variables that had a coefficient different from 0 with this λ coefficient: Number of Antenatal Visits and Perception of a Better Life. Model performance (AUC) was calculated

from a bootstrap resampling (100 iterations). using the same procedures for variable selection and calculation of logistic regression coefficients. We then carried out the procedure for correcting over-optimism in performance measurement and performed coefficient shrinkage to improve prediction on external data.

The interpretation of the mean and standard deviation for the predictor variables, under-5 children lost and several antenatal visits, about the outcome variable of practicing family planning, provides valuable insights into the potential associations between these variables.

The mean of 0.670 for under-5 children lost represents the average number of under-5 children lost within the studied population. A standard deviation of 1.23 suggests a moderate level of variability in the occurrences of under-5 children lost among the individuals in the study. (Fig. 8).

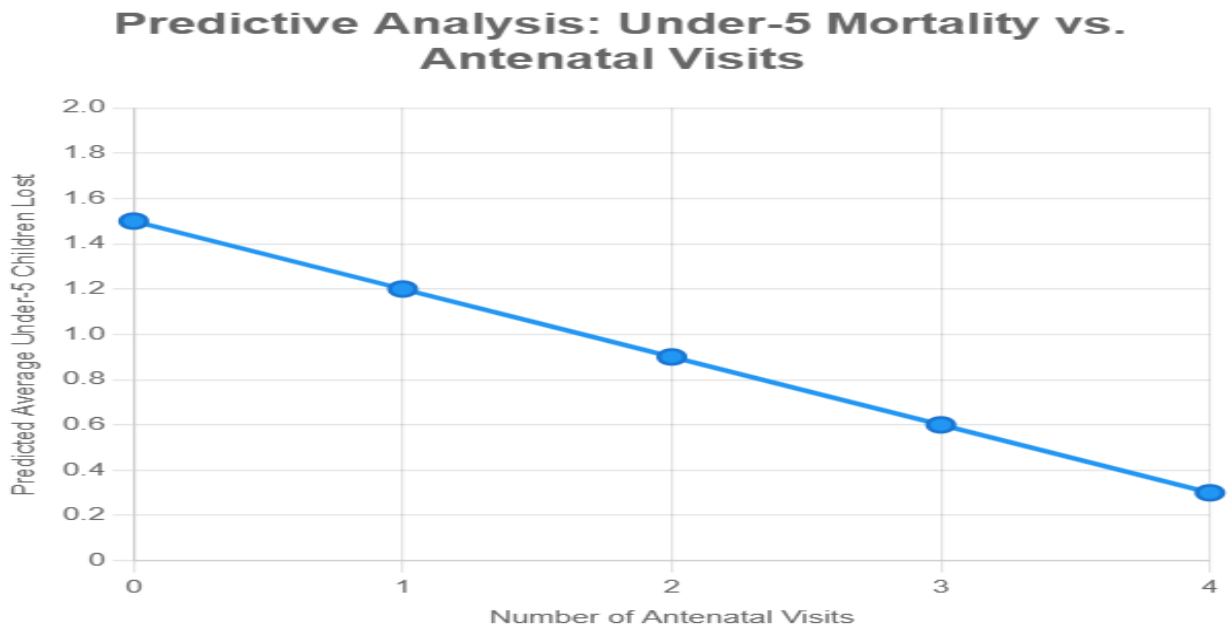


Figure 2 - Number of prenatal visits as a predictor of mortality in children under 5 years of age

Descriptive Analysis -Quantitative variables antenatal visit. (Tab. 16).

Table 6 - Quantitative variable of number of antenatal visit as a predictor of under-5 mortality

Subject	mean (sd)	median[Q25-75]	min	max	n
Under-5 children lost	0.670 (1.23)	0 [0; 1.00]	0	4.00	100
Number of Antenatal Visits	3.24 (1.17)	4.00 [3.00; 4.00]	0	4.00	100

The mean of 3.24 for the number of antenatal visits represents the average number of antenatal visits made by individuals within the studied population practicing family planning. The standard deviation of 1.17 for the number of antenatal visits signifies the variability or spread of the number of antenatal visits around the mean.

Univariable Predictive Analyses (Tab. 17).

Table 17 -Univariable predictive analyses of the relationship between the practice of family planning and under-5 mortality, number of antenatal visits and perception of a better life

Subject	practice family planning yes (n = 53)	Practice family planning no (n = 47)	n	p	test
under-5 children lost, mean (standard deviation)	0.547 (1.17)	0.809 (1.30)	100	0.29	welch
number of antenatal visits, mean (standard deviation)	2.91 (1.32)	3.62 (0.848)	100	<0.01	welch
perception of a better life, n	6 (11%)	6 (13%)	12	<0.01	chi2
---n	6 (11%)	11 (23%)	17	-	-
---n	12 (23%)	20 (43%)	32	-	-
----n	29 (55%)	10 (21%)	39	-	-

To analyze the relationship between the outcome variable "Practice Family Planning" and the predictor variable "Perception of a Better Life" using a chi-square test, the obtained p-value being less than 0.01 indicates that there is a statistically significant relationship between these variables.

The p-value being less than 0.01 suggests that there is strong evidence to reject the null hypothesis, indicating that there is a significant association between the perception of a better life and the practice of family planning. This significant relationship implies that individuals who perceive a better life are more likely to practice family planning compared to those who do not hold the same perception. It may indicate that individuals who have a positive outlook on their future are more inclined to make decisions that contribute to planning for their family's well-being, such as practicing family planning. Conversely, those with a less optimistic perception of their future may be less inclined to prioritize family planning.

Predictive Analysis Family planning. The probability of an individual belonging to the group Practice Family planning = NO depends on the coefficients of the underlying logistic regression model:

Area Under the Curve: 0.703 [0.596 - 0.977]. The provided range of 0.596 to 0.977 indicates that there is a 95% level of confidence that the true AUC value falls within this interval. In other words, if we were to repeat this study many times, we would expect the true AUC to be within this range in 95% of those studies. The wider the confidence interval, the more uncertainty there is about the true value of the parameter. Conversely, a narrower interval suggests more precision in estimating the parameter. In the context of the AUC value and its associated confidence interval, the range of 0.596 to 0.977 signifies the level of confidence we have in the estimated AUC value.

Highly qualified doctors and qualified support staff of the highest level of medical care are located mainly in urban centers. These institutions can usually be equipped with fairly modern equipment and better infrastructure, but access to them is for rural residents of Oron and others. It remains limited due to geographical and logistical barriers. Ethical considerations were considered, taking into account local habits and national traditions, and the importance of research for public health practice in the context of limited information and lack of local

research practice.

The result of childbirth in a medical facility seemed to follow the same trend as 63% of respondents who gave birth in a clinic, 34% who sometimes gave birth in a clinic, and 3% who were never taken to a clinic for childbirth. This is important because there is a proven linear correlation between the number of prenatal visits and delivery in a medical facility.

The distribution of respondents -mothers by age: 30% of the clients were housewives, 20% merchants and 12% farmers.

The average age of the consultants was 40.0 ± 3.5 years, 41.3 ± 2.5 years and 42.5 ± 0.0 years at the Yessin Ufot Medical Center, Uya Oro Medical Center and Eyo Abasi Medical Center, respectively.

Diseases and health conditions as a variable in child morbidity and mortality in African country's : meta-analyses generalized medical - social discourse perform.

Diarrhea, pneumonia, and malaria are 3 preventable childhood morbidities that cause under-5 deaths. These diseases disproportionately affect sub-Saharan Africa and southern Asia, with Nigeria, India, Pakistan, the Democratic Republic of the Congo, and Ethiopia showing the highest number of deaths. Despite the global decline in under-5 mortality rates by about 60% since 1990, additional accelerated progress is required to achieve the Sustainable Development Goal for under-5 mortality reduction by 2030. A variety of interventions and recommendations have been put in place to reduce the prevalence of these morbidities, such as the Global Action Plan for the prevention and control of pneumonia and diarrhea.

The Global Action Plan for the Prevention and Control of Pneumonia and Diarrhea is an integrated framework of key interventions aimed at preventing and treating childhood pneumonia and diarrhea. The GAPPD has a set of core interventions that must be implemented to prevent, protect, and treat the young

children who are at risk of serious illness or death from these diseases. The GAPPD also aims to achieve a global 75% reduction in the incidence of severe pneumonia and diarrhea in children under five years of age by 2025. Pneumonia and diarrhea continue to be leading causes of death among young children around the world, with over 800,000 deaths from pneumonia and 437,000 deaths from diarrhea in children under 5 annually.

The International Vaccine Access Center at the Johns Hopkins Bloomberg School of Public Health produces an annual Pneumonia and Diarrhea Progress Report to track implementation of pneumonia and diarrhea prevention and treatment interventions in the 15 countries with the greatest number of child deaths. The report is based on data from WHO and UNICEF repositories.

The positive finding of a strong positive association between the reported use of ITNs and household ownership of insecticide-treated bed nets is significant, as it has a bearing on malaria prevention efforts. Household ownership indicates the availability of bed nets in the household. Households having more ITNs demonstrate increased access to these preventive tools. This access is a vital starting point for any effort to promote ITN usage, since people must first have access to ITNs before they can use them effectively. This positive association between ownership and reported usage suggests that more households having ITNs actually use them, showing that a greater likelihood of using ITNs exists where the availability of ITNs is high within households. The implication is that there is a positive behavioral response to the presence of ITNs, as households intend to incorporate them into malaria prevention practices. This finding suggests that families view ITNs as valuable and important in preventing malaria. Owning more ITNs within a household may be an indicator of an ever-increasing need for the use of ITNs or a sense of stronger commitment to malaria prevention. These might be influenced by various factors such as education campaigns, community outreach, and personal experiences with malaria. Attention needs to be paid to household

characteristics that may influence both ITN ownership and its use. Socioeconomic status, education level, household size, and geographic location could influence whether the households will own ITNs and will use them consistently.

From the result, as an indicator for care seeking and treatment among u-5 children, over 90 % sought advice or care in a health facility, but only 40% confirmed the malaria diagnosis by use of microscopy. Yet, 60 % or 6 in 10 respondents reported using an anti-malarial medication over the past 6 months, and this pointed to a prevalence of over-the-counter anti-malaria drug use. The data provided has raised a number of important issues regarding care seeking and treatment behaviors among under-5 (U-5) children in relation to malaria. That over 90% would seek advice or care from a health facility does suggest that people are seeking formal healthcare services for U-5 children, and thus there is some general awareness of the need to seek professional medical advice when a child is unwell. Despite high utilization of health facilities, only 40% of cases were confirmed to be malaria through microscopy. This suggests that there is a gap in diagnostic practices, with many cases probably diagnosed based on symptoms without confirmation from a laboratory. In the absence of confirmatory testing, overdiagnosis and overtreatment of malaria may be occurring due to other febrile illnesses being mistaken as malaria. Similarly, the finding that 60% of respondents reported having used an antimalarial medication in the past six months supports the notion of widespread use of these drugs despite no confirmed malaria diagnosis. This suggests a high prevalence of over-the-counter (OTC) anti-malarial drug use, whereby individuals might either self-medicate or obtain medication without prescription from any formal health providers.

The low confirmation rate of malaria diagnosis calls for strengthening diagnostic capacities in health facilities, especially at the primary healthcare level where most cases are first managed. Better access to RDTs and microscopy, accompanied by training in their use, will ensure appropriate diagnosis and

treatment of malaria.

Although the utilization of health facilities for U-5 children is high, challenges with diagnostic practices and the high prevalence of OTC anti-malarial drugs still prevail. These require strengthening on various fronts: not only enhancing diagnostic capabilities and improving appropriate treatment practices but also creating awareness among the general public on the need for timely and appropriate medical treatment of febrile cases.

Regarding HIV and AIDS, while conducting the statistical analysis to investigate the association between respondents who reported knowing their HIV status and those who could correctly mention two main ways of HIV transmission, I obtained a statistically significant result. Knowledge of HIV transmission routes is very important in ensuring effective efforts toward HIV prevention. Those aware of the modes of transmitting HIV are better positioned to protect themselves and others from getting infected. Correct knowledge regarding the routes of transmission, including through unprotected sex and shared needles, indicates basic knowledge of the behaviors that can lead to acquiring HIV infection. Equally fundamental in HIV prevention, treatment, and care is the knowledge of one's status. Those aware of their HIV status are able to take the necessary precautions to safeguard their health and prevent the transmission of the virus to others. This includes getting tested and seeking counseling on one's HIV status; if found positive, adherence to treatment is paramount, besides adopting other safer behaviors aimed at preventing transmission to sexual partners and anyone else.

This finding underscores the importance of HIV testing and counseling as key components of HIV prevention efforts. Increasing access to HIV testing services and promoting regular HIV testing can help improve knowledge about HIV transmission routes and empower individuals to make informed decisions about their sexual health. Understanding the correlation between HIV status awareness and knowledge of HIV transmission routes can inform targeted interventions aimed

at improving HIV prevention education and outreach efforts. Programs that seek to increase HIV testing uptake should be undertaken with comprehensive education campaigns in order to provide accurate information about HIV transmission and prevention strategies.

. A number of factors may affect the relationship between the proportion of respondents who had done an HIV test in the past 12 months and the proportion who knew where to do an HIV test. Such factors could include availability of HIV testing services, dissemination of knowledge, and socioeconomic factors.

Targeted efforts to overcome barriers to testing, improve accessibility and affordability of testing services, and address stigma and discrimination can help increase testing rates and improve linkage to care for those living with HIV.

This strong association between having a respiratory infection within the past 12 months, difficulty with breathing, and the presence of asthma underscores the three-way interaction among respiratory infection, respiratory symptoms, and asthma. Respiratory infections, like the common cold, flu, or pneumonia, can exacerbate asthma symptoms or trigger asthma attacks among those who have the disease. A viral respiratory infection can cause inflammation and airway constriction and, consequently, can lead to wheezing, coughing, and respiratory distress. In cases where there is a background disease of asthma, respiratory infections can further cause worsening inflammation and airway hyperresponsiveness and increase symptoms. Shortness of breath is not only the hallmark symptom of respiratory infection but also one of the hallmark symptoms of asthma. In the setting of a respiratory infection, inflammation of the airways may result in airway obstruction and increased resistance to airflow, leading to symptoms such as shortness of breath and tightness in the chest. In asthma, inflammation and constriction of the airways may result in difficult breathing, especially in the setting of exacerbation or asthma attacks.

Data on vaccination status was also collated and from this data, 62% of

respondents were fully vaccinated, 19% were partially vaccinated, 5% were unvaccinated and 4% had an unknown status.

Birth registration under civil authority helps protect a child from violence, abuse or exploitation and aids in implementing governmental policies. 89% of respondents had a birth certificate while 11% had none.

When asked about the availability of at least 3 children's books at home, over 90% of the response was positive and on the question of attending nursery school or preschool, over 85 % of the response was also positive.

UNICEF and WHO recommend that infants be breastfed within one hour of birth, breastfed exclusively for the first 6 months of life and continue to be breastfed for up to 2 years of age. The results collated show positively that 87% of respondents exclusively breastfed which is far higher than the national estimate [137] and the global target of 50% by 2025 which is significant. Similarly, for child body mass index (BMI) 8% of children were underweight, 91% had a healthy BMI, 1% was overweight and none was obese.

The infant mortality rate of Nigeria is 70 per 1000 live births yet during this research I record a rate of 80 per 1000 live birth for this region. Also, the national under-5 mortality average is 120 per 1000 live births yet I recorded an under-5 mortality of 280 per 1000 live birth. Also, while the national neonatal mortality rate was 39 per 1000 live births, I recorded a rate of 50 per 1000 live births for this region.

From the data collated we had a 28% under-5 mortality rate, 5% neonatal mortality rate, 15% child mortality rate, and 8% infant mortality rate and these were all statistically significant.

The MDGs aim to improve the lives of people and eliminate poverty and hunger through quantifiable targets and timeframes. Child mortality is one of the key focus areas, and infant mortality rate has been used as an outcome measurement indicator for assessing the general well-being of a country. Also, a key target of

SDG is to reduce neonatal mortality to at least as low as 12 per 1000 live births and under-5 mortality to at least as low as 25 per 1000 live births by the year 2030. Going by these figures, a 76% reduction from the current neonatal mortality rate and a 91% reduction in under 5 mortality rate is required in less than a decade to meet the SDG goal 3.2 target by 2030.

Immunization is a vital component in the prevention of diseases in infants. Vaccination planning aims at enabling the body to build antibodies against the specific disease, thus significantly reducing both the prevalence and severity of infections. Vaccinations start as early as six weeks into a baby's life and tend to continue through the child's development, to offer protection against measles, mumps, rubella, polio, pertussis, and diphtheria. Immunization is one of the healthy components in preventing illness as it enhances individual and communal health. Immunization has proved over the years to be a very effective way of preventing some diseases. The introduction of measles vaccines, for instance, has resulted in a 73% decline in deaths due to measles worldwide. Moreover, vaccines have been used to eradicate smallpox, a disease that was previously widespread across the globe and have remarkably lowered the number of recorded polio cases.

On the base of the analytical database created in the organizational experiment, to develop an algorithm of quality and expanding the accessibility of child immunization and children's health prevention of tropical zone African countries (Fig. 9).

Social-hygienic analysis of the research of child morbidity and mortality in Nigeria has revealed the serious challenges faced by healthcare in ensuring the health and well-being of its young population. The results of the study revealed key socio-hygienic and economic factors and conditions in which morbidity and mortality of children under the age of 5 are formed. Using the example of a selective social-hygienic study conducted for the first time in the absence of a statistical accounting system for the results of PHC immunization activities, the

way of forming analytical databases and solutions is demonstrated. (Fig. 9).

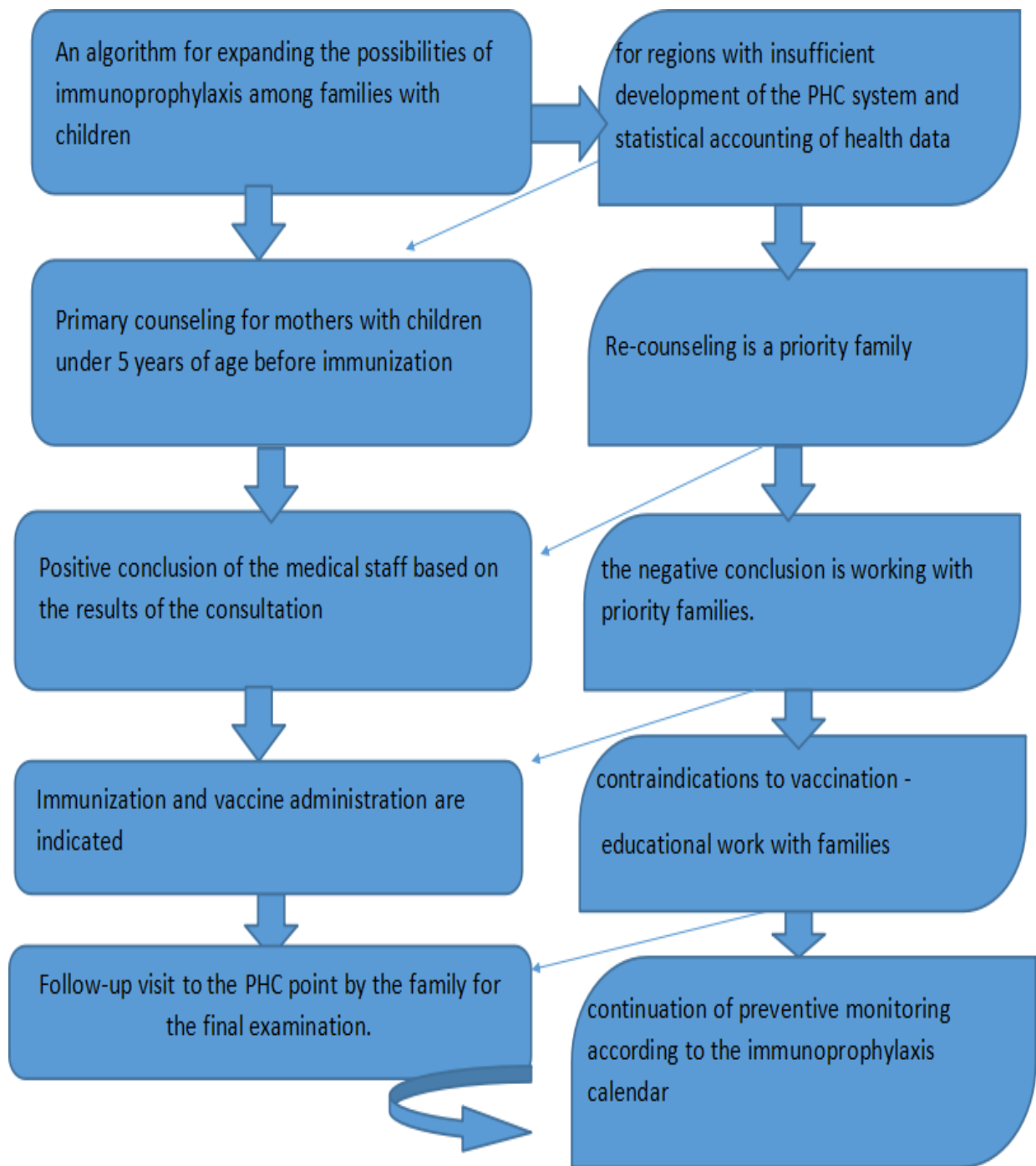


Figure 3 - Algorithm to expand availability of immunization and prevention of child diseases in Nigeria, for extended application of tropical zone countries of Africa

Through an observational assessment study, provide assessments of the quality of voluntary counselling services provided at three health facilities (health

centres) as part of a government programme to prevent mother-to-child transmission in the Oron-Akwa Ibom region of the Republic of Nigeria. Provide evidence to expand or otherwise improve the program to prevent mother-to-child transmission in Orona.

Specific objectives were to determine consultants' perceptions of voluntary counselling services offered at the centers, to assess consultants' performance by monitoring counselling sessions and to ascertain clients' perceptions of services offered at the centers.

In the West African sub-region, the quality of health care has declined due to economic slowdown, political instability, and in Nigeria due to mismanagement of resources. Florence Nightingale in the nineteenth century was the first to draw attention to the benefits of quality health care. Her notes were effectively the standard of nursing care and remained the benchmark of high and achievable quality for many years. Quality assurance is important to meet the increased demand for

medical care and thus the increased expectations of customers. In addition, since resources are limited and cannot meet demand, it is necessary to minimize costs through efficient use of resources.

In meddle/low income country developed countries, the integration of voluntary counselling and testing [VCT] programmers into existing antenatal services, antiretroviral prophylaxis and access to infant formula has dramatically reduced mother-to-child transmission of HIV. In less developed countries, prenatal care is limited; testing programs are virtually non-existent in most antenatal care facilities. Consequently, prevention of perinatal HIV transmission has become a major challenge, with an estimated 3.6 million additional deaths among children by the end of 1999.

Thus, the Prevention of Mother-to-Child Transmission Initiative (PMTCT) was launched in 1998 after the general awareness of leading Governments and

international organizations that HIV/AIDS has become the leading cause of infant and young child mortality. Thereafter, prevention of mother-to-child transmission (PMTCT) has become a regional and global priority.

The first pilot projects were started in Southeast Asian countries, specifically Thailand, while in Africa they were started in Botswana, Ivory Coast, Rwanda, Uganda and Zimbabwe. Other countries that implement prevention of mother-to-child transmission (PMTCT) include Kenya, South Africa, Tanzania, Zambia and Nigeria.

In preparation for implementation in Nigeria, the United Nations Joint Action on AIDS (USAID) commissioned an evaluation of HIV/AIDS services in Nigeria in 2003. The evaluation report found that these services were not comprehensive and that most facilities lacked guidelines on antiretroviral therapy and prevention of mother-to-child transmission (PMTCT). A study conducted in Benin City, which assessed the willingness of women who applied to private clinics for induced abortions to undergo voluntary counselling and testing, found that only 13% (137) of 1,051 women agreed to be tested. The percentage increased for women over 30, with 47% of women over 40 taking voluntary counselling and testing (VCT).

The Prevention of Mother-to-Child Transmission (PMTCT) Initiative was launched in 1998 following widespread awareness by leading governments and international organizations that HIV/AIDS has become the leading cause of infant and young child mortality, with more than 800,000 infants infected each year. AIDS among children has increased the burden on children and their families as well as health services in many countries, making PMTCT a regional and global priority. The first pilot projects were launched in Southeast Asia, in particular in Thailand, in 1998. The initiative's first pilot projects in Africa were launched in Botswana, Côte d'Ivoire, Rwanda, Uganda and Zimbabwe. Other countries that are implementing PMTCT in Africa include Kenya, South Africa, Tanzania and Zambia.

To reduce interviewer bias, a researcher was present at each booking clinic to collect data together with assistants. Questionnaires were provided to women after consultation before testing, while they received other antenatal services such as palpation, blood pressure checks and urinalysis. Pre - and post-test consultations were conducted using a checklist. Records of mother-to-child transmission of the virus at these sites were also analyzed and relevant data collected. The questionnaires were pre-tested and made minor adjustments.

The obvious limitation was incomplete and inaccurate entries. Other limitations included a language barrier that required the use of an interpreter for some women, the presence of a research team may have affected counselors' attitudes toward clients and their counseling skills, and the response of clients may have been influenced by the presence of an interviewer.

This study was conducted over 3 months. Usually the sites have one booking day per week and so it was only possible to visit one site once a week. Pre-test consultations were carried out only on booking days, while post-test consultations are carried out on general antenatal days, when both old and new antenatal women visit.

A total of 18 consultants out of 20 completed the questionnaire, accounting for 90% of responses. The average age of the consultants was 40.0 ± 3.5 years, 41.3 ± 2.5 years, and 42.5 ± 0.0 years at Yesin Ufot Medical Center, Uya Oro Medical Center, and Eyo Abasi Medical Center, respectively.

Thus, on the issue of Confidentiality 82.4 per cent, 75.7 per cent and 52.9 per cent of the respondents at their respective centers said the consultants ensured confidentiality. Up to 47.1 per cent at Eyo Abasi Health Centre and 24.3 per cent at Uya Oro Health Centre said there was no privacy. Overall, 70% of clients surveyed said consultants provide privacy. 95.3% of counselors discussed risky behavior, 87% discussed status disclosure, 68% discussed condom use, and 76.7% discussed other support services, such as where antiretroviral drugs can be

obtained. Condom use least discussed at Eyo Abasi Medical Center.

Thus, on the issue of satisfied 20 (29%), 35 (48.6%), and 39 (55.7%) respondents from the 3 respective health centres were very satisfied with the services, 49 (71%), 34 (47.2%), and 31 (44.3%), respectively, were satisfied. Overall, 98.6% of customers were either satisfied or very satisfied with the services, all (100%), 69 (95.8%), and 70 (100%) customers from the respective centers. On the Likert scale, Esin Ufot Medical Center scored 25, Uya Oro Medical Center scored 27.5, and Eyo Abasi Medical Center scored 28.5, showing that Eyo Abasi Medical Center customers were most satisfied with services, while Esin Ufot Medical Center customers were less satisfied with all-antiretroviral drugs. Condom use least discussed at Eyo Abasi Medical Center.

In the summary, the generalized results are presented, theoretical and tactical practical recommendations for children's healthcare are proposed, an algorithm for expanding immunization, priority family groups is developed, as well as ideas about the long-term impact of extrapolation of interventions in Oron, Akwa Ibom State to other areas of Nigeria in relation to children's health and other age groups are developed.

Based on the experience of practicing social hygienic research at the level of families with children, taking into account local obstacles and the opinions of mothers, develop recommendations to improving immunization and disease prevention among children and the expansion of social and hygienic research (printed 2025).

The composition and levels of the national mortality rate for children under 5 years of age, adjusted based on the data obtained in our experience, indicate the importance of evidence-based databases of morbidity and mortality in this experimental study.

On the base of the analytical database created in the organizational experiment, to develop an algorithm of quality and expanding the accessibility of

child immunization and children's health prevention of tropical zone African countries.

Organizational and methodological improvements have been made to the methodology of public health and healthcare research to conduct experimental research in countries with an undeveloped system for collecting statistical information and forming analytical databases. Based on the experience of the specialized Department of Public Health, the Organization of Health and Hygiene at the RUDN University Medical Institute, a group of priority families has been identified in relation to local living standards and PHC in Nigeria.

The composition and levels of the national mortality rate for children under 5 years of age, adjusted to the data obtained in our experience, indicate the importance of evidence-based databases of morbidity and mortality in this experimental study.

Based on the experience of practicing social hygienic research at the level of families with children, taking into account local obstacles and the opinions of mothers, the recommendations (printed 2025) and algorithm were developed targeted on the improvement of immunization and disease prevention among children and the expansion of social and hygienic research (Fig. 10).

The results of the socio-hygienic analysis of morbidity, mortality of children and child health organizations in Nigeria are of practical importance. The practical significance lies in the study of factors contributing to the incidence of child morbidity and mortality in Nigeria, such as poverty, insufficient access to health services, epidemiological risks, poor sanitation, malnutrition and limited awareness of preventive measures. An analytical base and valuable information about these factors and their impact on children's health are provided, criteria for preventive counseling and targeted intervention have been developed in the focus of priority families in the context of local conditions.

During the implementation of the children's immunization improvement algorithm, practical results were confirmed, mainly with a significance level

($p < 0.05$):

1. The prevalence of HIV/AIDS among female mothers was 8.5%, with 9.1% at Esin Ufot Medical Center, 8.7% at Uya Oro Medical Center, and 7.8% at Eyo Abasi Medical Center.
2. more than half of medical consultants - public health workers (56%) believed that they had not achieved their goal, and (94%) believed that consulting services needed significant improvement.
3. Pre-test counseling was adequate in 89%, 81.8%, and 90.9% of cases (out of a possible 100%) at Esin Ufot, Uya Oro, and Eyo Abasi Medical Centers, respectively.
4. Post-test counseling for HIV-positive women was inadequate, covering only 49% of discussed issues across these centers: 53%, 47%, and 40%, respectively.
5. the effectiveness of counseling was confirmed by the indices of consent to take an HIV test after counseling, which amounted to 93.1%, 96.2%, and 98.7% based on Experienced Medical Centers with an overall average of 96%; eighty-nine (89%) percent of women who agreed to take the test actually passed it.

Practical recommendations based on the results of the study can be applied to improve child health organizations, both at the district, provincial and central levels in countries with similar conditions, i.e. in virtually every country in central, western and southern Africa. A mixed approach combining quantitative and qualitative data collection methods made it possible to assess the current state of morbidity and mortality, identify influencing factors, and evaluate existing child health organizations. An algorithm has been developed to improve child immunization based on evidence and recommendations for different levels of healthcare and experimental research to reduce morbidity and mortality among children in Nigeria.

The implementation of these research results will lead to the further development of effective tactics and strategies in PanAfrican healthcare to improve

children's health. By eliminating identified gaps in existing child health organizations and focusing on preventive measures, regions can work based on recommendations and algorithms to reduce child morbidity and mortality. The results of the study contribute to the overall well-being and health of Nigerian children, ensuring a healthier future generation.

The conclusions :

1. Based on the results of the developed and first time applied program of a complex social hygienic research in conditions of the absence of a statistical accounting system of immunization activities on PHC, the way of forming analytical databases and prophylactics solutions is demonstrated. Revealed key social hygienic, social economic factors and conditions in which morbidity and mortality of children under the age of 5 in Nigeria, the serious challenges faced by health care in ensuring the health and well-being of its young population.

2. The weaknesses of the existing children health infrastructure and mothers opinion have been identified: poverty, lack of education and limited access to clean water and sanitation, poor housing and nutrition (malnutrition of children. Regional differences and inadequate medical facilities in rural areas exacerbate these problems, obstacles to the prevention of children diseases and satisfaction with immunization for children with positions of the mother and medical staff : long waiting times for healthcare services, unsatisfactory sanitary and hygienic living conditions, limited awareness of mothers about preventive measures.

3. An assessment of mothers' knowledge and attitude to prevention through immunization of children: a more positive opinion of young mothers, insufficient availability of vaccination, dependence of satisfaction on the age and educational status of the mother, the presence of other children (having many children), successful communication with the medical average and medical staff. The differences between working and unemployed women, education level indicate a potential link between employment status and the likelihood of losing children under the age of 5. The

values of the mean and standard deviation for the variable «interval between births» are important in the context of mortality among children under 5 years of age.

4. The results of the experimental consultation demonstrated that the average age of medical consultants - public health workers was 41 ± 2.0 years, and the average age of female mothers with a child was 5 years. - 27.7 ± 5.4 years, 78% of the responding medical consultants received adequate training in HIV transmission prevention programs/Mother-to-child AIDS infections. Slightly more than half of female mothers (57%) had secondary education. Which allowed recommend for medical personnel and mother to improving the practice of immunization and prevention at the rural commune level/.

5. The prevalence of HIV/AIDS among mothers was 8.5%, of which: 9.1% at the Esin Ufot Medical Center, 8.7% at the Uya Oro Medical Center and 7.8% at the Eyo Abasi Medical Center; the effectiveness of counseling was confirmed by the indices of consent to take an HIV test after counseling, which amounted to 93.1%, 96.2% and 98.7% on the basis of experienced medical center with a total average of 96%. Eighty-nine (89%) percent of the women who agreed to take the test actually passed it. Only 49% of post-test counseling for HIV-positive women was inadequate on the issues discussed in the same Centers: 53%, 47% and 40%, respectively. About half of medical consultants - public health workers (56%) believed that they had not achieved their goal, and (94%) believed that consulting services needed significant improvement. Pre-test counseling was adequate in 89%, 81.8% and 90.9%, with a possible 100%, at Esin Ufot Medical Center, Uya Oro Medical Center and Eyo Abasi Medical Center, respectively.

6. The research result highlights the importance of immunization programs and sanitary anti-epidemic measures in families in early childhood to reduce children mortality. Despite significant progress made in recent years, continued efforts are needed to ensure that all children, regardless of their socio-economic status or geographical location, receive the necessary vaccinations and timely medical care.

For the first time, during the pilot research on the experiences of RUDN prophylaxis chair priority families were differentiated, competent installations for medical personnel, an algorithm for improving the immunization of children was developed, during the implementation of which indicators of the effectiveness of the prevention of infectious diseases were obtained.

7. The finding association between intergenetic interval length and stillbirth, "better life" perceptions and family planning, associations of diarrhea with fever in a child in the absence of sanitary and hygienic conditions, a positive association of the variable "pediatric respiratory infection" and "proximity to a medical institution" were identified. The findings have far-reaching implications, demonstrating the need for targeted interventions and policies to address factors contributing to child mortality. Expansion of families access to PHC could significantly improve child survival in the region.

8. The experience of practicing the complex social hygienic research of families with children in Nigerian to condition taking into the opinions of mothers and health staff, allowed of develop the recommendations and algorithm to improving immunization and disease prevention among children and the expansion of methodologies social hygienic research on the similar condition. The analytical database created in the experiment, can be used to develop next working of quality and expanding the accessibility of immunization and health prevention for children of Nigeria and the results can be extrapolated to similar territories of the tropical zone African countries, due to their statistical reliability.

THE SUGGESTIONS and RECOMMENDATIONS

1. Recommendations to the Administration and local authorities of Nigeria

- Improving access to health services: priority should be given to improving access to health services, especially in remote and underserved regions. Initiatives such as mobile medical centers, counseling, and community health centers can help bring basic health services closer to vulnerable populations such as families with children.

- Addressing socio-economic determinants: combating children morbidity and mortality requires addressing the root causes of health inequalities. Comprehensive programs targeted to poverty reduction, education and access to clean water and optimal sanitation should be implemented to improve the socio-economic status of communities.

- Investment in primary health care: Strengthening Nigeria's primary health care services is crucial to improve children's health outcomes, investing in public health centers and clinics to ensure timely and appropriate health care for children, especially in underserved regions.

Recommendations to the Ministry of Health of Nigeria.

- PHC and health initiatives based on the creation of databases of targeted sample studies: comprehensive PHC and health programs that simultaneously address multiple aspects of children's health, include immunization campaigns, high-quality nutrition for children, maternal health, and access to clean water and sanitation; the determinants of health include priority families with children, due to which it is possible to achieve maximum effect in reducing morbidity and mortality among children.

- Strengthening immunization programs: continued investment and focus on core immunization campaigns to protect children from vaccine-preventable diseases. Campaigns should be conducted to raise awareness among parents and child caregivers about the importance of vaccination and to dispel misconceptions, train medical staff and PHC counseling practices.

- Priority health care for rural children: the creation of mobile health centers and outreach programs to provide health services to children and communities in remote areas; a crucial role in reaching the population, women with children who do not receive sufficient care, and in reducing health inequalities between urban and rural areas.

2. Recommendations to the families with children and heads of territorial public health units and PHC staff:

- Professional development of medical personnel: Training and equipping medical workers with specialized knowledge in pediatrics, sanitation, epidemiology, immunization, and family work can significantly improve the quality of child health services; offer incentives to attract medical personnel to rural areas and disadvantaged areas.

- Use the proposed focus points for the work of healthcare personnel with priority families and with children.

- Development of knowledge and skills potential and sanitary and hygienic epidemiological education for families with children, especially priority ones.

- Improving the skills and knowledge of women-mothers and fathers, sanitary and hygienic education, taking into account traditions and habits at home and in organizations for the protection of children's health, the supply of electricity, radio and television, communication with families will provide high-quality medical care and effectively respond to emergencies in the field of child health.

- A system for collecting health data and epidemiological surveillance by strengthening real-time health information systems, experience in selective targeted family research, informed decisions on early detection of outbreaks and emergencies in the field of healthcare.

- Regular assessment and monitoring at the family and PHC level based on the experience of this study, to assess the impact of programs and interventions in the field of health protection for families with children, will allow timely adjustments and ensure continuous improvement.

4. Universities and traditional communities are invited to consider recommendations for improving immunization and prevention of children and families with a view to expanding the practice of selective nesting surveys for objective information.

LIST OF ABBREVIATIONS

BFHI - Baby Friendly Hospital Initiative
 BMI - body mass index
 COPD - chronic obstructive pulmonary disease
 DHS - Demographic Health Survey
 EBF - Exclusive breastfeeding
 GAPPD - Integrated Global Action Plan for Pneumonia and Diarrhea
 GVAP - global vaccination action plan
 IDD - Iodine deficiency disorder
 IMCI- Integrated Management of Childhood Illness
 IMR - infant mortality rate
 IRS - indoor residual spray
 ITN - insecticide-treated nets
 LGSC- Local Government Service Commission
 MDGs - Millennium Development Goals
 MICS - Multiple Indicator Cluster Survey
 MNCH - Maternal, Newborn and Child Health Programme
 MNT - Maternal and neonatal tetanus
 MTCT - mother-to-child transmission
 NCDs - Non-communicable diseases
 NGO - non-governmental organization
 ORS - oral rehydration solution
 PHC – Primary Health Care
 RDT - rapid diagnostic tests
 SDGs- Sustainable Development Goals
 SMC - seasonal malaria chemoprevention
 SPHCDA - State Primary Health Care Development Agency
 UN - United Nations
 UNICEF - United Nations International Children’s Emergency Fund
 WHO - World Health Organization

REFERENCES

1. Das, T., Holland, P., Ahmed, M., Husain, L. (2021). Sustainable Development Goal 3: Good Health and Well-being. In: Das, T., Nayar, P.D. (eds) South-East Asia Eye Health. Springer, Singapore. https://doi.org/10.1007/978-981-16-3787-2_4
2. GUEGAN, Jean-François et al. Sustainable Development Goal #3, “health and well-being”, and the need for more integrative thinking. Veterinaria México OA [online]. 2018, vol.5, n.2. ISSN 2448-6760. <https://doi.org/10.21753/vmoa.5.2.443>.
3. Bestsat, C., Zonon, N.A. & D’Acremont, V. Large-scale implementation of electronic Integrated Management of Childhood Illness (MCI) at the primary care level in Burkina Faso: a qualitative study on health worker perception of its medical content, usability and impact on antibiotic prescription and resistance. BMC Public Health 19, 449 (2019). <https://doi.org/10.1186/s12889-019-6692-6>
4. Himani Pandya, Wiedaad Slemming, Haroon Saloojee, Health system factors affecting the implementation of integrated management of childhood illness (IMCI): qualitative insights from a South African province, Health Policy and Planning, Volume 33, Issue 2, March 2018, Pages 171–182, <https://doi.org/10.1093/heapol/czx154>
5. Getaneh, S., Alem, G., Meseret, M. et al. Determinants of pneumonia among 2–59 months old children at Debre Markos referral hospital, Northwest Ethiopia: a case-control study. BMC Pulm Med 19, 147 (2019). <https://doi.org/10.1186/s12890-019-0908-5>
6. Wonodi, C, Obi-Jeff, C, Falade, A, Watkins, K, Omokore, OA. Pneumonia in Nigeria: The way forward. Pediatric Pulmonology. 2020; 55: S5– S9. <https://doi.org/10.1002/ppul.24749>
7. Quach, A., Tosif, S., Graham, S. M., von Mollendorf, C., Mulholland, K., Graham,

- H., Duke, T., Russell, F. M., & ARI Review group (2022). Quality of care for children with acute respiratory infections in health facilities: a comparative analysis of assessment tools. *Journal of Global Health*, 12, 10003. <https://doi.org/10.7189/jogh.12.10003>
8. Maria Kuecken, Josselin Thuilliez, Marie-Anne Valfort, Disease, and Human Capital Accumulation: Evidence from the Roll Back Malaria Partnership in Africa, *The Economic Journal*, Volume 131, Issue 637, July 2021, Pages 2171–2202, <https://doi.org/10.1093/ej/ueaa134>
 9. Ugwu C. Refiguring transnational intervention: Ethnographic example from the Roll Back Malaria initiative in an African community. *Ethnography*. 2019;20(1):108-127. doi:10.1177/1466138117741504
 10. Feachem, S.R. Roll Back Malaria: a historical footnote. *Malar J* 17, 433 (2018). <https://doi.org/10.1186/s12936-018-2582-0>
 11. South African Medical Journal 2019;109(11b):53-56. DOI:10.7196/SAMJ.2019.v109i11b.14250
 12. Shretta R, Liu J, Cotter C, et al. Malaria Elimination and Eradication. In: *Major Infectious Diseases*. 3rd ed. The International Bank for Reconstruction and Development / The World Bank, Washington (DC); 2017. PMID: 30212099.
 13. Ippolito, M.M., Moser, K.A., Kabuya, J.B., et al. Antimalarial Drug Resistance and Implications for the WHO Global Technical Strategy. *Curr Epidemiol Rep* 8, 46–62 (2021). <https://doi.org/10.1007/s40471-021-00266-5>
 14. Singh, Jasmeet¹; Singh, Tejbir¹; Lal, Mohan¹; Mahajan, Sanjeev¹; Ruchika, 2; Padda, Preeti¹, Morbidity profile of under-5 slum dwellers of Amritsar city, *Journal of Family Medicine and Primary Care*: November 2021 - Volume 10 - Issue 11 - p 4131-4136 DOI: 10.4103/jumps.jfmprc_110_21
 15. Amadu I, Seidu A, Duku E, et al Risk factors associated with the coexistence of stunting, underweight, and wasting in children under 5 from 31 sub-Saharan African countries *BMJ Open* 2021;11:e052267. DOI: 10.1136/BMJ open-2021-

052267

16. Eugene Budu, Bright Opoku Ahinkorah, Edward Kwabena Ameyaw, Abdul-Aziz Seidu, Betregiorgis Zegeye, Sanni Yaya, "Does Birth Interval Matter in Under-Five Mortality? Evidence from Demographic and Health Surveys from Eight Countries in West Africa", *BioMed Research International*, vol. 2021, Article ID 5516257, 10 pages, 2021. <https://doi.org/10.1155/2021/5516257>
17. Seidu, AA., Ahinkorah, B.O., Agbaglo, E. et al. Determinants of early initiation of breastfeeding in Papua New Guinea: a population-based study using the 2016-2018 demographic and health survey data. *Arch Public Health* 78, 124 (2020). <https://doi.org/10.1186/s13690-020-00506-y>
18. Mwimba Chewe, Peter Hangoma, Drivers of Health in sub-Saharan Africa: A Dynamic Panel Analysis, *Health Policy OPEN*, Volume 1, 2020,100013, ISSN 2590-2296, <https://doi.org/10.1016/j.hpopen.2020.100013>.
19. UNICEF. Levels and trends in child mortality; 2018. [Cited 2019 Mar 14]. Available from: <https://data.unicef.org/wp-content/uploads/2018/09/UN-IGME-Child-Mortality-Report-2018.pdf>.
20. Adeyinka, D.A., Muhajarine, N., Petrucka, P. et al. Inequities in child survival in Nigerian communities during the Sustainable Development Goal era: insights from analysis of 2016/2017 Multiple Indicator Cluster Survey. *BMC Public Health* 20, 1613 (2020). <https://doi.org/10.1186/s12889-020-09672-8>
21. VanderWeele, Tyler J.a,b; Chen, Yingb; Long, Katelyna,b; Kim, Eric S.b,c,d; Trudel-Fitzgerald, Claudiac,d; Kubzansky, Laura D.c,d Positive Epidemiology?, *Epidemiology*: March 2020 - Volume 31 - Issue 2 - p 189-193 doi: 10.1097/EDE.0000000000001147
22. Jamie Perin, Amy Mulick, Diana Yeung, Francisco Villavicencio, Gerard Lopez, Kathleen L Strong, David Prieto-Merino, Simon Cousens, Robert E Black, Li Liu, Global, regional, and national causes of under-5 mortality in 2000–19: an updated systematic analysis with implications for the Sustainable Development Goals, *The*

- Lancet Child & Adolescent Health, Volume 6, Issue 2,2022, Pages 106-115, ISSN 2352-4642,[https://doi.org/10.1016/S2352-4642\(21\)00311-4](https://doi.org/10.1016/S2352-4642(21)00311-4).
23. Two Decades Since To Err Is Human: An Assessment Of Progress And Emerging Priorities In Patient Safety, David W. Bates and Hardeep Singh, Health Affairs 2018 37:11, 1736-1743
 24. Batist J. An intersectional analysis of maternal mortality in Sub-Saharan Africa: a human rights issue. J Glob Health. 2019;9(1):010320. doi:10.7189/jogh.09.010320
 25. Usman F, Imam A, Farouk ZL, Dayyabu AL. Newborn Mortality in Sub-Saharan Africa: Why is Perinatal Asphyxia Still a Major Cause?. Ann Glob Health. 2019;85(1):112. Published 2019 Aug 8. doi:10.5334/aogh.2541
 26. Anthony E. Akinlo, Abiola O. Sulola, Health care expenditure and infant mortality in sub-Saharan Africa, Journal of Policy Modeling, Volume 41, Issue 1,2019, Pages 168-178, ISSN 0161-8938,<https://doi.org/10.1016/j.jpolmod.2018.09.001>.
 27. M. D. Shehu, L. A. Nafiu, K. M. Latjor, and H. O. Ahmed (2018) Child Mortality and Morbidity in South Sudan. Islamic University Multidisciplinary Journal (IUMJ) 5(2), 169-175.
 28. Hussein, M.A., Mwaila, M. and Helal, D. (2021) Determinants of Under-Five Mortality: A Comparative Study of Egypt and Kenya. Open Access Library Journal, 8, 1-23. DOI: 10.4236/oalib.1107889.
 29. Under-five mortality patterns and associated maternal risk factors in sub-Saharan Africa: A multi-country analysis, Yaya S, Bishwajit G, Okonofua F, Uthman OA (2018) Under-five mortality patterns and associated maternal risk factors in sub-Saharan Africa: A multi-country analysis. PLOS ONE 13(10): e0205977. <https://doi.org/10.1371/journal.pone.0205977>
 30. Piane, G.M. (2019), Maternal Mortality in Nigeria: A Literature Review. World Medical & Health Policy, 11: 83-94. <https://doi.org/10.1002/wmh3.291>
 31. Causes of morbidity and mortality among patients admitted in a tertiary hospital in southern Nigeria: A 6-year evaluation, Okoroiwu HU, Uchendu KI, Essien RA

- (2020) Causes of morbidity and mortality among patients admitted in a tertiary hospital in southern Nigeria: A 6-year evaluation. PLOS ONE 15(8): e0237313. <https://doi.org/10.1371/journal.pone.0237313>
32. Under-five mortality and associated factors in southeastern Ethiopia, Kitila FL, Petros RM, Jima GH, Desalegn T, Sorsa A, et al. (2021) Under-five mortality and associated factors in southeastern Ethiopia. PLOS ONE 16(9): e0257045. <https://doi.org/10.1371/journal.pone.0257045>
 33. Patel, K., Prasad, J., & Biradar, R. (2021). Trends in and determinants of neonatal and infant mortality in Nigeria based on Demographic and Health Survey data. Journal of Biosocial Science, 53(6), 924-934. doi:10.1017/S0021932020000619
 34. Okeke, Edward N., Isa Sadeeq Abubakar, and Zachary Wagner, Reducing Child Deaths in Nigeria Through Contingent Cash Transfers to Expectant Mothers. Santa Monica, CA: RAND Corporation, 2020. https://www.rand.org/pubs/research_briefs/RB10114.html.
 35. endup, T., Zhao, Y. & Dema, D. Factors associated with under-five mortality in Bhutan: an analysis of the Bhutan National Health Survey 2012. BMC Public Health 18, 1375 (2018). <https://doi.org/10.1186/s12889-018-6308-6>
 36. Kingsley E Agho, Osita K Ezech, Akhi J Ferdous, Irene Mbugua, Joseph K Kamara, Factors associated with under-5 mortality in three disadvantaged East African districts, International Health, Volume 12, Issue 5, September 2020, Pages 417–428, <https://doi.org/10.1093/inthealth/ihz103>
 37. .Woldeamanuel BT, Aga MA. Count Models Analysis of Factors Associated with Under-Five Mortality in Ethiopia. Global Pediatric Health. January 2021. doi:10.1177/2333794X21989538
 38. Under-five mortality and associated factors in southeastern Ethiopia, Kitila FL, Petros RM, Jima GH, Desalegn T, Sorsa A, et al. (2021) Under-five mortality and associated factors in southeastern Ethiopia. PLOS ONE 16(9): e0257045.

<https://doi.org/10.1371/journal.pone.0257045>

39. Sakamoto, K. (2020). Factors Influencing Child Mortality: Previous Research. In: Factors Influencing Child Survival in Tanzania. Economy and Social Inclusion. Springer, Singapore. https://doi.org/10.1007/978-981-13-7639-9_2
40. Truslove JP, V. M. Miller A, Mannix N, Nhlema M, Rivett MO, Coulson AB, Mleta P, Kalin RM. Understanding the Functionality and Burden on Decentralised Rural Water Supply: Influence of Millennium Development Goal 7c Coverage Targets. *Water*. 2019; 11(3):494. <https://doi.org/10.3390/w11030494>
41. Mabuza, M.P. (2020). The UN Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs). In: Evaluating International Public Health Issues. Springer, Singapore. https://doi.org/10.1007/978-981-13-9787-5_4
42. Ashraf, M., Ullah, L., Shuvro, M. A., & Salma, U. (2019). Transition from Millennium Development Goals (MDGs) to Sustainable Development Goals (SDGs): Blueprint of Bangladesh for Implementing the Sustainable Development Goals (SDGs) 2030. *Medicine Today*, 31(1), 46–59. <https://doi.org/10.3329/medtoday.v31i1.40323>
43. Mohapatra, A., & Gomare, M. (2019). A critical appraisal of the maternal and child health scenario in a metropolitan city in India with reference to achievements of millennium development goals. *Journal of family medicine and primary care*, 8(3), 995–1001. https://doi.org/10.4103/jfmipc.jfmipc_379_18
44. Huang, X., Yang, B., Liu, Q. et al. Improving maternal and child nutrition in China: an analysis of nutrition policies and programs initiated during the 2000–2015 Millennium Development Goals era and implications for achieving the Sustainable Development Goals. *J Health Popul Nutr* 39, 12 (2020). <https://doi.org/10.1186/s41043-020-00221-y>
45. Awaworyi Churchill, S., Elkins, M., Feeny, S. (2020). Ethnic Diversity and Progress Towards the Millennium Development Goals. In: Awaworyi Churchill, S. (eds) *Moving from the Millennium to the Sustainable Development Goals*.

- Palgrave Macmillan, Singapore. https://doi.org/10.1007/978-981-15-1556-9_8
46. Adeyinka, D.A., Muhajarine, N., Petrucka, P. et al. Inequities in child survival in Nigerian communities during the Sustainable Development Goal era: insights from analysis of 2016/2017 Multiple Indicator Cluster Survey. *BMC Public Health* 20, 1613 (2020). <https://doi.org/10.1186/s12889-020-09672-8>
 47. Eke , D. O., & Ewere, F. (2020). Modeling and Forecasting Under-Five Mortality Rate in Nigeria using Auto-Regressive Integrated Moving Average Approach. *Earthline Journal of Mathematical Sciences*, 4(2), 347-360. <https://doi.org/10.34198/ejms.4220.347360>
 48. Adebayo, R. (2020, October 26). Utilizing Zakat for Attaining Sustainable Development Goals (SDGs) in Nigeria. *International Conference of Zakat*, 231-242. <https://doi.org/https://doi.org/10.37706/iconz.2020.233>
 49. Akinyemi JO, Solanke BL, Odimegwu CO. Maternal Employment and Child Survival During the Era of Sustainable Development Goals: Insights from Proportional Hazards Modelling of Nigeria Birth History Data. *Ann Glob Health*. 2018;84(1):15-30. Published 2018 Apr 30. doi:10.29024/aogh.11
 50. Jayathilaka, R., Adhikari, H., Liyanage, R. et al. Cherish your children: socio-economic and demographic characteristics associated with child mortality. *BMC Public Health* 21, 1217 (2021). <https://doi.org/10.1186/s12889-021-11276-9>
 51. Hagel C, Paton C, Mbevi G on behalf of the Clinical Information Network (CIN) information systems interest group, et al Data for tracking SDGs: challenges in capturing neonatal data from hospitals in Kenya *BMJ Global Health* 2020;5:e002108.
 52. Dribe, M. and Karlsson, O., ‘ Inequality in early life: Social class differences in childhood mortality in southern Sweden, 1815–1967’, *Economic History Review*, 75 (2022), pp. 475– 502. <https://doi.org/10.1111/ehr.13089>
 53. Temporin, F. (2019). Do Poverty and Economic Inequality Matter for Neonatal Mortality? *International Comparison of Macro-Level Deterministic Patterns of*

- Early-Age Mortality. *Statistica*, 79(2), 157–179. <https://doi.org/10.6092/issn.1973-2201/8566>
54. Abbuy, E. K. (2018). Macroeconomic Determinants of Infant Mortality in WAEMU Countries: Evidence from Panel Data Analysis. *Applied Economics and Finance*, 5(6). <https://doi.org/10.11114/aef.v5i6.3682>
 55. Verma, A., Sharma, R.K. & Saha, K.B. Diversity in Child Mortality and Life Expectancy at Birth Among Major Tribes in Selected States of India. *Indian Pediatr* 58, 20–24 (2021). <https://doi.org/10.1007/s13312-021-2090-0>
 56. Becquey, E., Sombié, I., Touré, M. et al. Stories of change in nutrition in Burkina Faso 1992–2018: a micro-level perspective. *Food Sec.* (2022). <https://doi.org/10.1007/s12571-022-01274-z>
 57. Tanja A J Houweling, David van Klaveren, Sushmita Das, Kishwar Azad, Prasanta Tripathy, Dharma Manandhar, Melissa Neuman, Erik de Jonge, Jasper V Been, Ewout Steyerberg, Anthony Costello, A prediction model for neonatal mortality in low- and middle-income countries: an analysis of data from population surveillance sites in India, Nepal, and Bangladesh, *International Journal of Epidemiology*, Volume 48, Issue 1, February 2019, Pages 186–198, <https://doi.org/10.1093/ije/dyy194>
 58. Veloso, Felipe Camilo Santiago et al. Analysis of neonatal mortality risk factors in Brazil: a systematic review and meta-analysis of observational studies ☆ ☆ Please cite this article as Veloso FC, Kassir LM, Oliveira MJ, Lima TH, Bueno NB, Gurgel RQ, et al. Analysis of neonatal mortality risk factors in Brazil: a systematic review and meta-analysis of observational studies. *J Pediatr (Rio J)*. 2019;95:519-30. . *Jornal de Pediatria* [online]. 2019, v. 95, n. 5 [Accessed 19 April 2022], pp. 519-530. Available from: <<https://doi.org/10.1016/j.jped.2018.12.014>>. Epub 28 Oct 2019. ISSN 1678-4782. <https://doi.org/10.1016/j.jped.2018.12.014>.
 59. Shrestha, G., Paudel, P., Shrestha, P. R., Jnawali, S. P., Jha, D., Ojha, T. R., &

- Lamichhane, B. (2018). Free Newborn Care Services: A New Initiative in Nepal. *Journal of Nepal Health Research Council*, 16(3), 340–344. Retrieved from <https://www.nepjol.info/index.php/JNHRC/article/view/21435>
60. Andegiorgish, A.K., Andemariam, M., Temesghen, S., et al. Neonatal mortality and associated factors in the specialized neonatal care unit Asmara, Eritrea. *BMC Public Health* 20, 10 (2020). <https://doi.org/10.1186/s12889-019-8118-x>
 61. Laura Macdonald, Jonathan R. Olsen, Niamh K. Shortt, Anne Ellaway, Do ‘environmental bads’ such as alcohol, fast food, tobacco, and gambling outlets cluster and co-locate in more deprived areas in Glasgow City, Scotland? *Health & Place*, Volume 51, 2018, Pages 224-231, ISSN 1353-8292, <https://doi.org/10.1016/j.healthplace.2018.04.008>.
 62. Tewelde Gebre, Berhanu Gebremedhin, The mutual benefits of promoting rural-urban interdependence through linked ecosystem services, *Global Ecology and Conservation*, Volume 20, 2019, e00707, ISSN 2351-9894, <https://doi.org/10.1016/j.gecco.2019.e00707>.
 63. Carolyn Allshouse, Meg Comeau, Rylin Rodgers, Nora Wells; Families of Children With Medical Complexity: A View From the Front Lines. *Pediatrics* March 2018; 141 (Supplement_3): S195–S201. 10.1542/peds.2017-1284D
 64. Spencer N, Raman S, O'Hare B, Tamburlini G. Addressing inequities in child health and development: towards social justice. *BMJ Paediatr Open*. 2019;3(1):e000503. Published 2019 Aug 1. doi:10.1136/bmjpo-2019-000503
 65. Ties Boerma, Jennifer Requejo, Cesar G Victora, Agbessi Amouzou, Asha George, et etc. To 2030: tracking progress towards universal coverage for reproductive, maternal, newborn, and child health, *The Lancet*, Volume 391, Issue 10129, 2018, Pages 1538-1548, ISSN 0140-6736, [https://doi.org/10.1016/S0140-6736\(18\)30104-1](https://doi.org/10.1016/S0140-6736(18)30104-1).
 66. Taimaz Larimian, Claire Freeman, Falli Palaiologou, Negin Sadeghi. (2020) Urban social sustainability at the neighbourhood scale: measurement and the impact of

- physical and personal factors. *Local Environment* 25:10, pages 747-764.
67. Vilcins D, Sly PD, Jagals P. Environmental Risk Factors Associated with Child Stunting: A Systematic Review of the Literature. *Ann Glob Health*. 2018;84(4):551-562. Published 2018 Nov 5. doi:10.9204/aogh.2361
 68. Krefis AC, Augustin M, Schlünzen KH, Oßenbrügge J, Augustin J. How Does the Urban Environment Affect Health and Well-Being? A Systematic Review. *Urban Science*. 2018; 2(1):21. <https://doi.org/10.3390/urbansci2010021>
 69. Risk factors for diarrhoea and malnutrition among children under the age of 5 years in the Tigray Region of Northern Ethiopia, Wasihun AG, Dejene TA, Teferi M, Marugán J, Negash L, et al. (2018) Risk factors for diarrhoea and malnutrition among children under the age of 5 years in the Tigray Region of Northern Ethiopia. *PLOS ONE* 13(11): e0207743. <https://doi.org/10.1371/journal.pone.0207743>
 70. Aheto, J.M.K. Predictive model and determinants of under-five child mortality: evidence from the 2014 Ghana demographic and health survey. *BMC Public Health* 19, 64 (2019). <https://doi.org/10.1186/s12889-019-6390-4>
 71. Yaya S, Hudani A, Udenigwe O, Shah V, Ekholuenetale M, Bishwajit G. Improving Water, Sanitation and Hygiene Practices, and Housing Quality to Prevent Diarrhea among Under-Five Children in Nigeria. *Tropical Medicine and Infectious Disease*. 2018; 3(2):41. <https://doi.org/10.3390/tropicalmed3020041>
 72. Kynast-Wolf G, Schoeps A, Winkler V, et al. Clustering of Infant Mortality Within Families in Rural Burkina Faso. *Am J Trop Med Hyg*. 2019;100(1):187-191. doi:10.4269/ajtmh.17-0669
 73. Ingrid K. van Dijk (2019) Early-life mortality clustering in families: A literature review, *Population Studies*, 73:1, 79-99, DOI: 10.1080/00324728.2018.1448434
 74. Risk factors for early childhood disability in Bangladesh: Evidence from Multiple Indicator Cluster Survey 2019. Saha SR, Khan MMH (2021) Risk factors for early childhood disability in Bangladesh: Evidence from Multiple Indicator Cluster Survey 2019. *PLOS ONE* 16(11): e0259532.

<https://doi.org/10.1371/journal.pone.0259532>

75. Rudloff P, Vinson LT. Surveys in Communities Divided by Ethnicity and Conflict: Challenges, Possible Solutions, and Lessons Learned from a Survey in Jos, Nigeria. *Sociological Methods & Research*. January 2021. doi:10.1177/0049124120986175
76. Solanke, B.L., Rahman, S.A. Multilevel analysis of factors associated with assistance during delivery in rural Nigeria: implications for reducing rural-urban inequity in skilled care at delivery. *BMC Pregnancy Childbirth* 18, 438 (2018). <https://doi.org/10.1186/s12884-018-2074-9>
77. Investigating barriers and challenges to the integrated management of neglected tropical skin diseases in an endemic setting in Nigeria, Ukwaja KN, Alphonsus C, Eze CC, Lehman L, Ekeke N, et al. (2020) Investigating barriers and challenges to the integrated management of neglected tropical skin diseases in an endemic setting in Nigeria. *PLOS Neglected Tropical Diseases* 14(4): e0008248. <https://doi.org/10.1371/journal.pntd.0008248>
78. Singh, S., Srivastava, S. & Upadhyay, A.K. Socio-economic inequality in malnutrition among children in India: an analysis of 640 districts from National Family Health Survey (2015–16). *Int J Equity Health* 18, 203 (2019). <https://doi.org/10.1186/s12939-019-1093-0>
79. Chibuye, P.S., Bazant, E.S., Wallon, M. et al. Experiences with and expectations of maternity waiting homes in Luapula Province, Zambia: a mixed–methods, cross-sectional study with women, community groups and stakeholders. *BMC Pregnancy Childbirth* 18, 42 (2018). <https://doi.org/10.1186/s12884-017-1649-1>
80. Atalay Getachew, Tadesse Guadu, Alebachew Tadie, Zemichael Gizaw, Mulat Gebrehiwot, Daniel Haile Cherkos, Martha Alemayehu Menberu, Teklay Gebrecherkos, "Diarrhea Prevalence and Sociodemographic Factors among Under-Five Children in Rural Areas of North Gondar Zone, Northwest Ethiopia", *International Journal of Pediatrics*, vol. 2018, Article ID 6031594, 8 pages, 2018.

<https://doi.org/10.1155/2018/6031594>

81. Afoakwah, C., Deng, X. & Onur, I. Malaria infection among children under five: the use of large-scale interventions in Ghana. *BMC Public Health* 18, 536 (2018).
<https://doi.org/10.1186/s12889-018-5428-3>
82. ISAAC Bonuedi, Nicolas Gerber, Lukas Kornher. (2022) Intervening in Cash Crop Value Chains for Improved Nutrition: Evidence from Rural Sierra Leone. *The Journal of Development Studies* 58:1, pages 38-54.
83. Johnson, G.E., Wright, F.C. & Foster, K. The impact of rural outreach programs on medical students' future rural intentions and working locations: a systematic review. *BMC Med Educ* 18, 196 (2018). <https://doi.org/10.1186/s12909-018-1287-y>
84. Stephanie A. Kraft, Mildred K. Cho, Katherine Gillespie, Meghan Halley, Nina Varsava, Kelly E. Ormond, Harold S. Luft, Benjamin S. Wilfond & Sandra Soo-Jin Lee (2018) Beyond Consent: Building Trusting Relationships With Diverse Populations in Precision Medicine Research, *The American Journal of Bioethics*, 18:4, 3-20, DOI: 10.1080/15265161.2018.1431322
85. Call to Action: Rural Health: A Presidential Advisory From the American Heart Association and American Stroke Association. Robert A. Harrington, MD, FAHA, Chair, Robert M. Califf, MD, Co-Chair, Appathurai Balamurugan, MD, MPH, DrPH, Nancy Brown, Regina M. Benjamin, MD, MBA, Wendy E. Braund, MD, MPH, MEd, Janie Hipp, JD, LLM, Madeleine Konig, MPH, Eduardo Sanchez, MD, MPH, Karen E. Joynt Maddox, MD, MPH
86. Schueller, S.M., Hunter, J.F., Figueroa, C. et al. Use of Digital Mental Health for Marginalized and Underserved Populations. *Curr Treat Options Psych* 6, 243–255 (2019). <https://doi.org/10.1007/s40501-019-00181-z>
87. María Yetano Roche, Hans Verolme, Chibuikem Agbaegbu, Taylor Binnington, Manfred Fishedick & Emmanuel Olukayode Oladipo (2020) Achieving Sustainable Development Goals in Nigeria's power sector: assessment of transition

- pathways, *Climate Policy*, 20:7, 846-865, DOI: 10.1080/14693062.2019.1661818
88. Yagboyaju DA, Akinola AO. Nigerian State and the Crisis of Governance: A Critical Exposition. *SAGE Open*. July 2019. doi:10.1177/2158244019865810
 89. Liverman DM. Geographic perspectives on development goals: Constructive engagements and critical perspectives on the MDGs and the SDGs. *Dialogues in Human Geography*. 2018;8(2):168-185. doi:10.1177/2043820618780787
 90. Nirmala Rao, Stephanie W. Y. Chan, Yufen Su, Ben Richards, Claudia Cappa, E. Filipa De Castro & Nicole Petrowski (2021) Measuring Being “Developmentally on Track”: Comparing Direct Assessment and Caregiver Report of Early Childhood Development in Bangladesh, China, India and Myanmar, *Early Education and Development*, DOI: 10.1080/10409289.2021.1928446
 91. Biggeri M, Ferrone L. Measuring Child Multidimensional Deprivation: A Sustainability Perspective. *Sustainability*. 2021; 13(7):3922. <https://doi.org/10.3390/su13073922>
 92. Marguerit, D., G. Cohen and C. Exton (2018), "Child well-being and the Sustainable Development Goals: How far are OECD countries from reaching the targets for children and young people?", *OECD Statistics Working Papers*, No. 2018/05, OECD Publishing, Paris, <https://doi.org/10.1787/5e53b12f-en>.
 93. Vaghri, Z., Krappmann, L., & Doek, J. (2019). From the Indicators of General Comment No. 7 to GlobalChild, *The International Journal of Children's Rights*, 27(4), 821-851. doi: <https://doi.org/10.1163/15718182-02704009>
 94. Mario Biggeri, Lucia Ferrone, Child Sustainable Human Development Index (CSHDI): Monitoring progress for the future generation, *Ecological Economics*, Volume 192, 2022, 107266, ISSN 0921-8009, <https://doi.org/10.1016/j.ecolecon.2021.107266>.
 95. Adeyinka DA, Petrucka PM, Isaac EW, et al Changing patterns of gender inequities in childhood mortalities during the Sustainable Development Goals era in Nigeria: findings from an artificial neural network analysis *BMJ Open* 2021;11:e040302.

DOI: 10.1136/bmjopen-2020-040302

96. Klingelhöfer, D., Braun, M., Brüggmann, D. et al. Does health-related poverty publication landscape reflect global needs in the light of the current poverty rebound?. *Global Health* 18, 35 (2022). <https://doi.org/10.1186/s12992-022-00828-2>
97. Adeyinka, D.A., Muhajarine, N., Petrucka, P. et al. Inequities in child survival in Nigerian communities during the Sustainable Development Goal era: insights from analysis of 2016/2017 Multiple Indicator Cluster Survey. *BMC Public Health* 20, 1613 (2020). <https://doi.org/10.1186/s12889-020-09672-8>
98. UNICEF for every child. Monitoring the situation of children and women. Nigeria. <https://data.unicef.org/sdgs/country/nga/>
99. Olutosin A. Otekunrin, Oluwaseun A. Otekunrin, S. Momoh, Idris A. Ayinde, How far has Africa gone in achieving the zero hunger target? Evidence from Nigeria, *Global Food Security*, Volume 22, 2019, Pages 1-12, ISSN 2211-9124, <https://doi.org/10.1016/j.gfs.2019.08.001>.
100. Oluwaseun A. Otekunrin, Siaka Momoh, Idris A. Ayinde, Olutosin A. Otekunrin, How far has Africa gone in achieving sustainable development goals? Exploring African dataset, *Data in Brief*, Volume 27, 2019, 104647, ISSN 2352-3409, <https://doi.org/10.1016/j.dib.2019.104647>.
101. Deinne, C.E., Ajayi, D.D. Dynamics of inequality, poverty, and sustainable development of Delta State, Nigeria. *GeoJournal* 86, 431–443 (2021). <https://doi.org/10.1007/s10708-019-10068-4>
102. Abdulmalik, J., Olayiwola, S., Docrat, S. et al. Sustainable financing mechanisms for strengthening mental health systems in Nigeria. *Int J Ment Health Syst* 13, 38 (2019). <https://doi.org/10.1186/s13033-019-0293-8>
103. Yagboyaju DA, Akinola AO. Nigerian State and the Crisis of Governance: A Critical Exposition. *SAGE Open*. July 2019. doi:10.1177/2158244019865810
104. Adelowokan, O. A.; Maku, O. E.; Babasanya, A. O.; Adesoye, A. B.

- Unemployment, poverty and economic growth in Nigeria. *Journal of Economics & Management* 2019, 35, 5–17.
105. Chilaka MA, Ndioho I. Health impact assessment in Nigeria: An initiative whose time has come. *J Public Health Afr.* 2020;10(2):1014. Published 2020 Mar 19. doi:10.4081/jphia.2019.1014
 106. Enabulele, O. (2020), Achieving Universal Health Coverage in Nigeria: Moving Beyond Annual Celebrations to Concrete Address of the Challenges. *World Medical & Health Policy*, 12: 47-59. <https://doi.org/10.1002/wmh3.328>
 107. Onwujekwe O, Orjiakor CT, Hutchinson E, et al. Where Do We Start? Building Consensus on Drivers of Health Sector Corruption in Nigeria and Ways to Address It. *Int J Health Policy Manag.* 2020;9(7):286-296. Published 2020 Jul 1. doi:10.15171/ijhpm.2019.128
 108. Chalulot, G., Njuguna, S., & Ndirangu, E. (2018). Institutional Factors that Influence the Implementation of Policy on Management of Childhood Illnesses in Bomet County. *Journal of Medicine, Nursing & Public Health*, 1(1), 55-67. Retrieved from <https://stratfordjournals.org/journals/index.php/Journal-of-Medicine-Nursing-P/article/view/177>
 109. Hermann, B., Sathiya Susuman, A., Aristide Romaric, B. and Mwinonè Hervé, H. 2020. Mothers' Preventive Health Care Practices and Children's Survival in Burkina Faso: Findings from Repeated Cross-sectional Household Surveys. *Comparative Population Studies*. 45, (Oct. 2020). DOI:<https://doi.org/10.12765/CPoS-2020-19>
 110. Walhout, E. C. (2019). An infants' graveyard? Region, religion, and infant mortality in North Brabant, 1840-1940. Print Service Ede
 111. Anita Pal, Jeetendra Yadav, Dolly Kumari, Kh. Jitenkumar Singh, Gender differentials and risk of infant and under five mortality in India. A comparative survival analysis, *Children and Youth Services Review*, Volume 118, 2020, 105477, ISSN 0190-7409, <https://doi.org/10.1016/j.childyouth.2020.105477>.

112. Eboh, A. ., Abba, J. Y. ., & Fatoye, H. A. . (2018). Impact Assessment of the Public Health Expenditure on the Health Outcome in Nigeria. *International Journal of Social and Administrative Sciences*, 3(2), 62–72. <https://doi.org/10.18488/journal.136.2018.32.62.72>
113. Dutta, U.P., Gupta, H., Sarkar, A.K. et al. Some Determinants of Infant Mortality Rate in SAARC Countries: an Empirical Assessment through Panel Data Analysis. *Child Ind Res* 13, 2093–2116 (2020). <https://doi.org/10.1007/s12187-020-09734-8>
114. Aregbeshola, B. S., & Khan, S. M. (2018). Predictors of Enrolment in the National Health Insurance Scheme Among Women of Reproductive Age in Nigeria. *International journal of health policy and management*, 7(11), 1015–1023. <https://doi.org/10.15171/ijhpm.2018.68>
115. Amu H, Dickson KS, Kumi-Kyereme A, Darteh EKM (2018) Understanding variations in health insurance coverage in Ghana, Kenya, Nigeria, and Tanzania: Evidence from demographic and health surveys. *PLOS ONE* 13(8): e0201833. <https://doi.org/10.1371/journal.pone.0201833>
116. Uche Shalom Obi, Osondu Ogbuoji, Wenhui Mao, Minahil Shahid, Obinna Onwujekwe, Gavin Yamey, Progress in the face of cuts: a qualitative Nigerian case study of maintaining progress towards universal health coverage after losing donor assistance, *Health Policy and Planning*, Volume 36, Issue 7, August 2021, Pages 1045–1057, <https://doi.org/10.1093/heapol/czab051>
117. Aregbeshola, Bolaji Samson, Towards Health System Strengthening: A Review of the Nigerian Health System From 1960 to 2019 (January 14, 2021). Available at SSRN: <https://ssrn.com/abstract=3766017> or <http://dx.doi.org/10.2139/ssrn.3766017>
118. Ironbar, Archibong E, Angioha, Pius U, & Iji, Mary E. (2021). Reduced Out of Pocket Spending among Enrolled Employees in Government Institutions: How Effective is the National Health Insurance Scheme?. *International Journal of Public*

- Administration and Management Research , 6(2), 119-127. Retrieved from <http://journals.rcmss.com/index.php/ijpamr/article/view/34>
119. Aregbeshola, B.S., Khan, S.M. Out-of-pocket health-care spending and its determinants among households in Nigeria: a national study. *J Public Health (Berl.)* 29, 931–942 (2021). <https://doi.org/10.1007/s10389-020-01199-x>
 120. Nemati, E., Nosratnejad, S., Doshmangir, L., Zarea Gavgani, V. 2019. The out of pocket payments in low and middle-income countries and the affecting factors: a systematic review and meta-analysis. *Bali Medical Journal* 8(3): 733-740. DOI:10.15562/bmj.v8i3.958
 121. Alawode, G.O., Adewole, D.A. Assessment of the design and implementation challenges of the National Health Insurance Scheme in Nigeria: a qualitative study among sub-national level actors, healthcare and insurance providers. *BMC Public Health* 21, 124 (2021). <https://doi.org/10.1186/s12889-020-10133-5>
 122. Uzochukwu, Benjamin; Mirzoev, Tolib; Okeke, Chinyere; Hicks, Joseph; Etiaba, Enyi; Obi, Uche; Ensor, Tim; Uzochukwu, Adaora; Onwujekwe, Obinna; (2020) Did an Intervention Programme Aimed at Strengthening the Maternal and Child Health Services in Nigeria Improve the Completeness of Routine Health Data Within the Health Management Information System? *International journal of health policy and management*. ISSN 2322-5939 DOI: <https://doi.org/10.34172/ijhpm.2020.226>
 123. Oduenyi, C., Ordu, V. & Okoli, U. Assessing the operational effectiveness of a maternal and child health (MCH) conditional cash transfer pilot programme in Nigeria. *BMC Pregnancy Childbirth* 19, 298 (2019). <https://doi.org/10.1186/s12884-019-2418-0>
 124. Jibrin, A., Tayeb, A. and Razali, S. (2020) “An Assessment of the Implementation Impact of SURE-P Intervention on Maternal Mortality in the Selected Local Governments in Niger State, Nigeria”, *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, 5(11), pp. 245 - 256. doi: 10.47405/mjssh.v5i11.543.

125. Jibrin, A., Muhammad Tayeb, A. and Razali, S. Z. (2021) “An Evaluation of Local Government and SURE-P Implementation Challenges on Rural Community Development: A Case of Selected Local Government in Niger State, Nigeria”, *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, 6(6), pp. 237 - 246. doi: 10.47405/mjssh.v6i6.816.
126. Oguntunde, Olugbenga, Nyenwa, Jabulani, Yusuf, Farouk, Dauda, Dauda Sulaiman, Salihu, Abdulsamad, & Sinai, Irit. (2021). Factors associated with the knowledge of obstetric danger signs, and perceptions of the need for obstetric care amongst married young women in northern Nigeria. *African Journal of Primary Health Care & Family Medicine* , 13(1), 1-9. <https://dx.doi.org/10.4102/phcfm.v13i1.2557>
127. Oguntunde, O., Nyenwa, J., Yusuf, F. et al. The experience of men who participated in interventions to improve demand for and utilization of maternal and child health services in northern Nigeria: a qualitative comparative study. *Reprod Health* 16, 104 (2019). <https://doi.org/10.1186/s12978-019-0761-2>
128. Oguntunde O, Yusuf FM, Nyenwa J, Dauda DS, Salihu A, Sinai I. Emergency transport for obstetric emergencies: integrating community-level demand creation activities for improved access to maternal, newborn, and child health services in northern Nigeria. *Int J Womens Health*. 2018;10:773-782. Published 2018 Nov 28. doi:10.2147/IJWH.S180415
129. Oguntunde, O., Surajo, I.M., Dauda, D.S. et al. Overcoming barriers to access and utilization of maternal, newborn and child health services in northern Nigeria: an evaluation of facility health committees. *BMC Health Serv Res* 18, 104 (2018). <https://doi.org/10.1186/s12913-018-2902-7>
130. Justin Lueker, Ronita Bardhan, Ahana Sarkar, Leslie Norford, Indoor air quality among Mumbai's resettled populations: Comparing Dharavi slum to nearby rehabilitation sites, *Building and Environment*, Volume 167,2020,106419,ISSN03601323,<https://doi.org/10.1016/j.buildenv.2019.106419>

131. Paul C. Okonkwo, El Manaa Barhoumi, Wilfred Emori, Mahaad Issa Shammass, Paul C. Uzoma, Adel Mohamed Amer Mohamed & Aboubakr M. Abdullah (2022) Economic evaluation of hybrid electrical systems for rural electrification: A case study of a rural community in Nigeria, *International Journal of Green Energy*, 19:10, 1059-1071, DOI: 10.1080/15435075.2021.1979982
132. Quattrochi, J.P., Hill, K., Salomon, J.A. et al. The effects of changes in distance to nearest health facility on under-5 mortality and health care utilization in rural Malawi, 1980–1998. *BMC Health Serv Res* 20, 899 (2020). <https://doi.org/10.1186/s12913-020-05738-w>
133. Olonade O, Olawande TI, Alabi OJ, Imhonopi D. Maternal Mortality and Maternal Health Care in Nigeria: Implications for Socio-Economic Development. *Open Access Maced J Med Sci*. 2019 Mar 14;7(5):849-855. doi: 10.3889/oamjms.2019.041. PMID: 30962850; PMCID: PMC6447322.
134. Rolle Remi Ahuru (2021) The influence of women empowerment on maternal and childcare use in Nigeria, *International Journal of Healthcare Management*, 14:3, 690-699, DOI: 10.1080/20479700.2019.1688505
135. Oluwakemi D. Udoh, Sheriff F. Folarin & Victor A. Isumonah | Emmanuel O Amoo (Reviewing editor) (2020) The influence of religion and culture on women's rights to property in Nigeria, *Cogent Arts & Humanities*, 7:1, DOI: 10.1080/23311983.2020.1750244
136. Abdullahi AM, Orji R, Rabiou AM, Kawu AA. Personality and Subjective Well-Being: Towards Personalized Persuasive Interventions for Health and Well-Being. *Online J Public Health Inform*. 2020 May 16;12(1):e1. doi: 10.5210/ojphi.v12i1.10335. PMID: 32547678; PMCID: PMC7289121.
137. Flax VL, Fagbemi M, Schnefke CH, Kawu AA, Edwards S, et al. (2022) Impacts of a social and behavior change communication program implemented at scale on infant and young feeding practices in Nigeria: Results of a cluster-randomized

- evaluation. PLOS ONE 17(12): e0277137. <https://doi.org/10.1371/journal.pone.0277137>
138. Olaleye AO, Walker O. Impact of Health Systems on the Implementation of Intermittent Preventive Treatment for Malaria in Pregnancy in Sub-Saharan Africa: A Narrative Synthesis. *Tropical Medicine and Infectious Disease*. 2020; 5(3):134. <https://doi.org/10.3390/tropicalmed5030134>
139. Sevelius JM, Poteat T, Luhur WE, Reisner SL, Meyer IH. HIV Testing and PrEP Use in a National Probability Sample of Sexually Active Transgender People in the United States. *J Acquir Immune Defic Syndr*. 2020 Aug 15;84(5):437-442. doi: 10.1097/QAI.0000000000002403. PMID: 32692101; PMCID: PMC7340231.
140. Joseph, F.I., Earland, J. A qualitative exploration of the sociocultural determinants of exclusive breastfeeding practices among rural mothers, North West Nigeria. *Int Breastfeed J* 14, 38 (2019). <https://doi.org/10.1186/s13006-019-0231-z>
141. Ekhoulunetale, M., Barrow, A. & Arora, A. Skin-to-skin contact and breastfeeding practices in Nigeria: a study of socioeconomic inequalities. *Int Breastfeed J* 17, 2 (2022). <https://doi.org/10.1186/s13006-021-00444-7>
142. Imo, C., & Wet-Billings, N. (2023). Socio-ecological determinants of under-five mortality in Nigeria: Exploring the roles of neighbourhood poverty and use of solid cooking fuel. *Journal of Biosocial Science*, 55(1), 22-34. doi:10.1017/S0021932021000614
143. Egbewale BE, Karlsson O, Sudfeld CR. Childhood Diarrhea Prevalence and Uptake of Oral Rehydration Solution and Zinc Treatment in Nigeria. *Children*. 2022; 9(11):1722. <https://doi.org/10.3390/children9111722>

REFERENCES of Russian authors

144. Авдеев С.Н., Алыева М.Х., Баранов А.А., Бикмиева А.В., Брико Н.И., ... Драпкина О.М. и др. ВАКЦИНОПРОФИЛАКТИКА ПНЕВМОКОККОВОЙ ИНФЕКЦИИ У ДЕТЕЙ И ВЗРОСЛЫХ. МЕТОДИЧЕСКИЕ РЕКОМЕНДАЦИИ. *Профилактическая медицина*. 2023. Т. 26. № 9-2. С. 3-

- 23.
145. Баранов А.А., Намазова-Баранова Л.С., Брико Н.И. и др. ВАКЦИНОПРОФИЛАКТИКА ВЕТРЯНОЙ ОСПЫ. Методические рекомендации для педиатров / Москва, 2022.
146. Брико Н.И., Миндлина А.Я., Михеева И.В., Попович Л.Д., Ломоносова А.В. МОДЕЛИРОВАНИЕ ПОТЕНЦИАЛЬНОГО ЭФФЕКТА РЕВАКЦИНАЦИИ ПРОТИВ КОКЛЮША ДЕТЕЙ В 6-7 И 14 ЛЕТ В РАМКАХ НАЦИОНАЛЬНОГО КАЛЕНДАРЯ ПРОФИЛАКТИЧЕСКИХ ПРИВИВОК/ Эпидемиология и вакцинопрофилактика. 2021. Т. 20. № 5. С. 4-20.
147. Брико Н.И., Никитин Н.В., Глушкова Е.В., Кодалаева М.В., Шаова К.Т., Мазанкова Л.Н., Корсунский А.А. КЛИНИЧЕСКИЕ ПРОЯВЛЕНИЯ СКАРЛАТИНЫ У ДЕТЕЙ В МЕГАПОЛИСЕ НА СОВРЕМЕННОМ ЭТАПЕ/ Российский медицинский журнал. 2024. Т. 30. № 4. С. 336-347.
148. Баранов А.А., Бехтерева М.К., Брико Н.И. и др. ВАКЦИНОПРОФИЛАКТИКА РОТАВИРУСНОЙ ИНФЕКЦИИ У ДЕТЕЙ/ Методические рекомендации / Москва, 2020.
149. O.V. Grinina, O.E. Gorlova, A.I. Gurova, D.I. Kicha et al. Social hygiene problem and public health of developing countries. M. 1990. RUDN. Uch. Manual. Ed. Grinina O.V. M. 1990. 124p.
150. Д.О. Иванов, В.И. Орел, Ю.С. Младенческая смертность в Российской Федерации и факторы, влияющие на ее динамику. — Педиатр, 2017.
151. Орел В.И., Смирнова В.И., Гурьева Н.А. и др. Совершенствование процесса профилактического медицинского осмотра детей с применением бережливых технологий. Children's Medicine of the North-West. 2024. Т. 12. № 3. С. 102-109.
152. Орел, В.М. Середа, А.В. Ким, Л.Л. Шарафутдинова. Здоровье детей Санкт-Петербурга. — Педиатр, 2017.
153. Орел В.И., Смирнова В.И., Ченцов Д.В., Гурьева Н.А., Углева Е.М.,

- Разгуляева Д.Н. Современный подход к совершенствованию профилактической работы среди детского населения мегаполиса. *Forcipe*. 2023. Т. 6. № S1. С. 450-451.
154. Орел В.И., Ким А.В., Антипов М.С. Временные проблемы нормативно-правового регулирования первичной медико-санитарной помощи детям. *Российский педиатрический журнал*. 2022. Т. 3. № 2. С. 228.
155. Иванов Д.О., Орел В.И., Антипов М.С. Современные проблемы организации медицинской помощи детям на муниципальном уровне (на примере городского округа Балашиха). *Медицина и организация здравоохранения*. 2022. Т. 7. № 1. С. 4-14.
156. Kontsevaya A.V., Imaeva A.E., Balanova Y.A., Breda J.J., Wickramasinghe K., Jewell Jo.M., Abdrakhmanova S., Polupanov A.G., Bosi T.B., Drapkina O.M., Boyland E.J., Ergüder T. CHILDREN'S EXPOSURE TO TELEVISION ADVERTISING OF UNHEALTHY FOODS AND BEVERAGES ACROSS 4 COUNTRIES OF WHO EUROPEAN REGION. *Public Health Nutrition*. 2023. С. 1-9.
157. Копылова О.В., Ершова А.И., Мешков А.Н., Концевая А.В., Драпкина О.М. ПРОФИЛАКТИКА СЕРДЕЧНО-СОСУДИСТЫХ ЗАБОЛЕВАНИЙ НА ПРОТЯЖЕНИИ ЖИЗНИ. ЧАСТЬ II: ДЕТСКИЙ И ПОДРОСТКОВЫЙ ПЕРИОДЫ. *Кардиоваскулярная терапия и профилактика*. 2021. Т. 20. № 6. С. 107-116.
158. Намазова-Баранова Л.С., Баранов А.А., Брико Н.И. и др. ПОЗИЦИЯ ЭКСПЕРТОВ СОЮЗА ПЕДИАТРОВ РОССИИ В ОТНОШЕНИИ УХУДШЕНИЯ ГЛОБАЛЬНОЙ СИТУАЦИИ С ВИРУСОМ ПОЛИОМИЕЛИТА/ Детские инфекции. 2022. Т. 21. № 4 (81). С. 5-7.
159. Авдеев С.Н., Алыева М.Х., Баранов А.А., Бикмиева А.В., Брико Н.И., ... Драпкина О.М. и др. ВАКЦИНОПРОФИЛАКТИКА ПНЕВМОКОККОВОЙ ИНФЕКЦИИ У ДЕТЕЙ И ВЗРОСЛЫХ. МЕТОДИЧЕСКИЕ

- РЕКОМЕНДАЦИИ. Профилактическая медицина. 2023. Т. 26. № 9-2. С. 3-23.
160. Концевая А.В., Мырзаматова А.О., Муканеева Д.К., Анциферова А.А., Худяков М.Б., Иванова Е.С., Драпкина О.М. ФИЗИЧЕСКАЯ АКТИВНОСТЬ ДЕТЕЙ ШКОЛЬНОГО ВОЗРАСТА В ПАНДЕМИЮ COVID-19: РЕЗУЛЬТАТЫ РОССИЙСКОЙ ЧАСТИ МЕЖДУНАРОДНОГО ИССЛЕДОВАНИЯ С УЧАСТИЕМ 9 СТРАН ЕВРОПЫ. Экология человека. 2022. № 10. С. 731-740.
 161. Терлецкая Р.Н., Конова С.Р., Фисенко А.П., Тимофеева А.Г., Макарова С.Г., Апросимова С.И., Широкова Т.В. Анализ показателей деятельности первичного звена детского здравоохранения. Национальное здравоохранение. 2021;2(4):26-35. <https://doi.org/10.47093/2713-069X.2021.2.4.26-35>
 162. Zelinskaya D.I., Terletskaia R.N., Yakovleva TV, Ukhanova A.A., Rozhkovskaya S.A. The disease incidence of children in large families, according to a sociological survey. *Pediatrics named after GN Speransky*. 2018; 97 (6): 192-197.
 163. Said Adam Sh ., Kicha D.I. Implementing the Health system and the new Federalism in Somalia : Challenges and Opportunities. *Frontiers in Public Health*. 2024. Vol. 12.
 164. Said Adam Sh, Fomina A., Kicha D. Comprehensive health stabilization system in a country with an unstable socio-economic statement. In: *For the sustainable development of civilization: cooperation, science, education, technology*. Mat. international Scientific Conference...Moscow, 2023. pp.164-169
 165. Sidi M. El-Habib Chikhey, Kicha D.I. et al. Development of primary health care in Algeria. *RUDN Journal of Medicine*. 2016. No. 3. pp. 75-82.
 - 166.** Shreideh A.R., Kicha D.I., Al-Rawashdeh B.M. et al.. *Archiv Euromedica*. 2025. vol. 15. no. 1. The integrated approaches concerning the environment, public and

- systems management used to public health protection: jordanian practice. *Archiv Euromedica*. 2025. vol. 15. no. 1.
167. O.V. Grinina, O.E. Gorlova, A.I. Gurova, D.I. Kicha et al. Social hygiene problem and public health of developing countries. M. 1990. RUDN. Uch. Manual. Ed. Grinina O.V. M. 1990. 124p.
 168. Esu David D., A.V. Fomina, D.I. Kicha. Quality assurance of voluntary HIV counselling and testing services for the prevention of mother-to-child transmission in Oron, Akwa Ibom State, Nigeria. *Modern Problems of Healthcare and Medical statistics*, 2023. (1), 491-505. doi:10.24412/2312-2935-2023-1-491-505.
 169. Esu David. D., Kicha D. I. Training of practicing physicians and its impact on the immunization of children in the Oron region (Akwa Ibom State, Nigeria) // *Bulletin of the National Research Institute of Public Health named after N. A. Semashko*. 2023. No. 4. pp.25-30. doi:10.25742/nriph.2023.04.004.
 170. David John Esu, D.I. Kicha. Overview of the cost of malaria treatment in children in Uyo and Oron, Akwa Ibom State, Nigeria. *Public Health and Public Health*, 2023. 3 (78), 19-24. doi: 10.56685/18120555-2023 78-3-19.
 171. Esu David. D., Kicha D.I. Evaluation of the quality of immunization services for children in primary health care centers in Orona, Akwa Ibom State, Nigeria. *Public health*. 2023;3(2):21-30. [<https://doi.org/10.21045/2782-1676-2023-3-2-21-30>].
 172. Study assessing the effectiveness of digital education programs, Esu D.J., *Arch. of 3uromedica* | 2022 | Vol. 12 |Special Issue. P.14.
 173. . Esu David John The impact of health workers' awareness-raising on the quality of care, according to mothers of children attending the immunization clinic at Iquita General Hospital, Oron, Akwa Ibom State, Nigeria. *Stolypinsky Bulletin*, 2022. 4 (3), 1587-1603.
 174. Armah P., Kicha D. Primary health care in Ghana: the structure and functions in relation to preventing neglected tropical diseases. *Archiv euromedica*. 2020. 10. № 3. articles 12-17.

175. https://apps.who.int/gb/ebwha/pdf_files/wha58/a58_12-ru.pdf
176. <https://www.who.int/ru/campaigns/world-immunization-week/2024>
177. <https://www.who.int/ru/news/item/12-04-2013-new-plan-to-address-pneumonia-and-diarrhoea-could-save-2-million-children-annually>
178. <https://www.who.int/ru/news/item/19-11-2018-who-and-partners-launch-new-country-led-response-to-put-stalled-malaria-control-efforts->

APPENDIX A

GREETING/ VERBAL CONSENT FORM.

good morning / afternoon. my name is -----

thank you for taking time to talk with me. this is a research work looking into the quality of family planning services and ways to improve quality in lagos state. this clinic has been chosen to be included in the study. if you agree to be interviewed, i will be asking you questions about yourself and your ideas, attitudes and behavior on various issues. we are interested in finding out what women think about the family planning services that they have received. this information will be used to help developed better health services for women in lagos state.

if you decide that you do not want to participate in the study, it will not affect the services you receive at the clinic now or in the future. your privacy will be protected and you will not be identified in any way. no one including the provider will know your answers.

your opinions and experiences are important to us, so please be honest and truthful in answering our questions. your answers will be confidential and secret. if you agree to be interviewed, we will go to a place where no one can hear us talking. if you are not comfortable with any question, do not answer it if you do not want. you may also stop the interview at any time.

thank you.

APPENDIX B

QUESTIONNAIRE

PEOPLES FRIENDSHIP UNIVERSITY OF RUSSIA

MEDICAL RESEARCH QUESTIONNAIRE

TOPIC - **THE SOCIO-HYGIENIC ANALYSIS OF MORBIDITY AND MORTALITY OF CHILDREN AND CHILD HEALTH ORGANIZATION IN NIGERIA**

(to be completed only by medical personnel)

(1) household questions

respondents' initials (first letters of names):

- household size - < 3, 4 -6, 7-9, > 9
- availability of electricity – none, < 6 hours, 7-12 hours, > 13 hours
- availability of mobile phones, radio, television, and computer (exposure to mass media) – all, some, none
- household income(monthly) - < 136 700 naira (360 usd), > 136 700 naira (360 usd)
- has access to social media and the internet- none, sometimes, regularly
- number of sleeping rooms - < 2, 3-5, >5
- household ownership of assets (agricultural lands or animals)- yes, no
- availability of personal illness control measures (first aid kit)- yes, no
- nearness to a health facility - far, average distance, close
- description of religious views- very religious, moderately religious, non-religious, rather not say
- private sanitation facility available, unavailable
- access to tap water (improved water source) – available, unavailable
- problems with accessing healthcare (getting money for treatment, distance from the health facility, not wanting to go alone, getting permission to go for treatment) – none, some, most, all problems

(2) women questionnaire (15-49 years)

respondents' initials (first letters of names):

- woman's age: <20, 21-30, 31-40, >41
- age at marriage: not married, <20, 21-30, 31-40, >41
- age at first birth: <20, 21-30, 31-40, >41
- number of antenatal visits: 0,1,2,3,4

- delivered in a health facility: always, sometimes, never
- neonatal tetanus protection before labor - none, 2 doses during last pregnancy, 3 doses during last 5 years, 4 doses in previous 10 years, 5 doses in a lifetime)
- postnatal care: always, sometimes, never
- unmet need for planning (want to stop or delay childbearing but not using any method of contraception.) yes, no
- practice family planning yes, no
- employed in the past 12 months: yes, no
- women's ownership of house or land: yes, no
- education level- (none, primary, secondary, tertiary)
- living with husband or partner yes, no
- subjective wellbeing - (happy, satisfied with life, perceived a better life)
- perceived their life improved in the past 1 year - no, maybe, yes
- perceive their life will get better after 1 year - no, maybe, yes
- overall life satisfaction (%) – 25,50,75,100
- perception of a better life (%)- 25,50,75,100
- parity (number of live births): 0,1-3, >3
- previous birth interval (<2 years, +2 years, +4 years)
- spacing birth at least 36 months apart yes, no, doesn't apply
- number of under-5 children lost (0, 1-3, >3, doesn't apply
- age at death (<28, 28-1 year, 1 -5 years, doesn't apply
- (3) under 5 questionnaires
 - age < 28 days, 28 days to 1 year, 1 year to 5 years
 - vaccination coverage- fully vaccinated, partially vaccinated, unvaccinated, vaccination status unknown
 - injuries at home the past 6 months- yes, no
 - birth registration under civil authority- yes, no
 - at least 3 children's books in the house- yes, no

- attending preschool or nursery school yes, no
- child body mass index (bmi) – underweight, healthy weight, overweight, obese
- exclusive breastfeeding till 6 months yes, no
- respondent to the questionnaire- (mother/another primary caretaker)

(4) malaria

- ownership of insecticide-treated nets (itn) yes, no
- slept under an itn night before survey yes, no
- use of malaria intermittent preventive treatment during pregnancy (3 or more doses of sp/fancier during pregnancy) yes, no
- fever in a child within 2 weeks of survey yes, no
- seeking medical treatment for children with fever- always, sometimes, never
- children 6-59 months who tested positive for malaria by microscopy – yes, no
- use of indoor residual sprays (irs) - always, sometimes, never
- taken antimalarial drugs for the past 6 months- yes, no

(5) hiv and aids (mother)

- has knowledge of hiv status- yes, no
- can mention 2 main ways of hiv transmission – yes, no
- can mention 2 main ways of hiv prevention – yes, no
- can hiv be transmitted during -pregnancy? yes, no
- can hiv be transmitted during delivery? yes, no
- can hiv be transmitted during breastfeeding? yes, no
- has done an hiv test in the past 12 months? yes, no
- know where to do an hiv test? yes, no
- knowledge of hiv mother-to-child transmission? yes, no

(6) nutritional deficiencies

- practice infant breastfeeding always, sometimes, never
- consumption of iron-rich food or supplement (beans, seafood, potatoes) – never, sometimes, often, always

- consumption of vitamin a-rich food or supplement (carrot, spinach, sweet red pepper) never, sometimes, often, always

- household use of iodized salt – yes, no

(7) pneumonia and respiratory tract infection

- family use of solid fuel (charcoal) for cooking – yes, no, sometimes

- history of asthma in the child- yes, no

- child respiratory infection in the previous year – yes, no

- do some household children ever experience difficulty in breathing yes, no, sometimes

- has any household member been hospitalized for a respiratory infection or been on a ventilator yes, no

- family history of asthma – yes, no

- any smoker in the house- yes, no, rather not say

(8) diarrhea and common infectious disease

- household's main source of drinking water:

unimproved (unprotected dug well/spring, surface water (stream, river), tanker or truck crate)

improved (boreholes, protected well or spring, pipes into yard or public)

- water treatment method (none, cloth filter, allow to settle, boil, add alum, chlorine, bleach)

- toilet facility:

unimproved- (open defecation (busy, field), pit latrine, bucket)

improved – septic tank

- had diarrhoea within 2 weeks before the survey – yes, no

- has had the advice or treatment from a health facility for diarrhoea – yes, no

- has taken any ors or any recommended fluid for diarrhoea – yes, no

- has a specific place for handwashing with water, soap, or cleansing agent at home- yes, no

APPENDIX C

PICTURES OF ACTIVITIES CARRIED OUT



Figure 4: medical personnel administering the questionnaire.



Figure 5: General Hospital Iquita Oron



ST. PATRICK'S CLINIC & MATERNITY

No 15 Nsile Street,
Off Eyetong Road,
Oron,
Akwa Ibom State

08062622707
08027438227

CLEARANCE CERTIFICATE FOR INVESTIGATION

Investigator: Dr. David John Esu

Project Title: The Socio-Hygienic Analysis of Morbidity and Mortality of Children and Child Health Organizations in Nigeria.

School: Peoples Friendship University, Russia

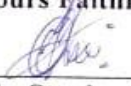
Faculty: Public Health, healthcare and hygiene

Hospital Director: Dr. Robin John

This is to certify that **Dr. David John Esu** under the authority of the hospital management was given permission to ask questions within the facility with regards to his research titled: **The Socio-Hygienic Analysis of Morbidity and Mortality of Children and Child Health Organizations in Nigeria** between **1st November, 2021 to 30th November, 2022.**

All other concerns and questions pertaining to this research can be directed to the hospital management board.

Yours Faithfully,


Mr. Stanley O
Secretary


Dr. Robin J. E
Medical Director

Consent letter from a medical establishment where data collation was carried out
THE RESULT OF IMPLEMENTATION



The Header
 08062622707
 08027438227

ST. PATRICK'S CLINIC & MATERNITY

No 15 Nsile Street,
 Off Eyetong Road,
 Oron,
 Akwa Ibom State

12th March, 2024.

The ACT OF IMPLEMENTATION In the Educational Process

1. Name of the Proposal for Implementation: Methodological Recommendations-: The Socio-hygienic Analysis of Morbidity and Mortality of Children and Child Health Organization in Nigeria
2. Author of the Proposal: Esu D.J
3. Where and When it was Implemented: The study was undertaken for a period of four months (between June 2021- October 2021), with the results implemented over the two-year period following the studies. The recommendations from the research were implemented at the study site - St Patrick's clinic and maternity Oron, Nigeria.
4. Result and Effectiveness of Implementation: Identification of the social determinants of age-specific childhood mortalities in the region across the neonatal, post-neonatal, and toddler/pre-school stages, and maternal-level factors which accounted for high variation in childhood mortalities, prompted a reorganization and restructuring of health service provisions. A new service hierarchy was established with higher priority on the importance of targeted interventions such as effective disease control measures, improved access to water and sanitation, and addressing social determinants to reduce child mortality and improve child health outcomes.
5. Comments and Suggestion: No

Secretary of Hospital



letter confirming the implementation of result.

GOVERNMENT OF AKWA IBOM STATE OF NIGERIA



Our Ref: _____

Your Ref: _____

GENERAL HOSPITAL
ORUKO
URUE OFFONG/ORUKO L.G.A.

Date: 15th April, 2024

The ACT OF IMPLEMENTATION In the Educational Process

1. Name of the Proposal for Implementation: Methodological recommendations:- The Socio-Hygienic Analysis of Morbidity and Mortality of Children and Child Health Organization in Nigeria
2. Author of the proposal: Esu D.J
3. Where and when it was Implemented: The study was undertaken for a period of four months (between June 2021- October 2021), with the results implemented over the two-year period following the studies. The recommendations from the research were implemented at the study site at General Hospital Oruko, Urue Offong/Oruko, Nigeria.
4. Result and effectiveness of implementation: significant improvement in health workforce development, capacity building and training. Also, an increased drive towards the provision of integrated health services addressing socio-economic determinants, especially the strengthening of immunization programs.
5. Comments and suggestion: No

Secretary of hospital



letter confirming the implementation of result.